BEFORE THE
STATE OF NEW YORK
PUBLIC SERVICE COMMISSION

In the Matter of

New York State Electric & Gas Corporation
and
Rochester Gas & Electric Corporation

Cases 22-E-0317, 22-G-0318, 22-E-0319 and 22-G-0320

September 26, 2022

Prepared Exhibits of Staff Finance Panel:

Michael J. Augstell
Principal Utility Financial Analyst
Office of Accounting, Audits and Finance

Christopher Carmel
Utility Financial Analyst Trainee 1
Office of Accounting, Audits and Finance

State of New York
Department of Public Service
Three Empire State Plaza
Albany, New York 12223-1350

List of Exhibits

List of Exhibits

Exhibit SFP-1

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New York State Electric & Gas Corporation
Rochester Gas and Electric Corporation

22-E-0317, 22-G-0318, 22-E-0319, 22-G-0320
Request for Information

Requesting Party: Chris Carmel (DPS)

Request No.: NYRC-0291 (DPS-27)

Date of Request: June 16, 2022

Response Due Date: June 27, 2022

Date of Reply: June 27, 2022

Witness: Howard Coon / Dave George

Subject: NYSEG / RG&E Long Term Debt

Question:

In all interrogatories, all requests for workpapers or supporting calculations shall be construed as requesting any Word, Excel or other computer spreadsheet models in original electronic format with all formulae intact and unlocked.

1. Reference Schedule E, Exhibit_(NYSEG RRP-6), Page 6. Provide the calculations and support to develop the debt cost of 4.00% for the forecast issuance of $67.21 million and the debt cost of 4.386% for the forecast issuance of $275 million during the interim period. Provide the calculations and support to develop the cost of debt of 4.05% for the forecast issuance of $100 million and the cost of debt of 5.05% for the forecast issuance of $950 million issuance during the rate year.

2. Reference Schedule E, Exhibit_(RGE RRP-6), Page 6. Provide the calculations and support to develop the debt cost of 4.55% for the forecast issuance of $125 million during the interim period and the debt cost of 4.95% for the $200 million issuance during the rate year.

Response:

1. The 4.00% cost of issuance on $67.21 million is based on an actual tax-exempt bond refunding transaction that priced on March 29th and closed on April 6th, 2022. Page 2 of Attachment 1, indicates that the bond bears a 4.00% rate or coupon, but is priced to yield 3.30% and issued at a premium to par. The amortization of the premium, which lowers the effective cost of the debt from 4.00% to 3.30% is shown in Schedule F, Exhibit_(NYSEG RRP-6), line 31.

New York State Electric & Gas Corporation
Rochester Gas and Electric Corporation

22-E-0317, 22-G-0318, 22-E-0319, 22-G-0320
Request for Information

The coupon costs for the other debt issuances during the interim period and rate year are based on a forecast of rates and spreads attached in NYRC-0291-DPS-27 Attachment 2. The interim (2022) issuance was assumed to be a mix of 10 and 30-year maturities priced in 2Q22. These securities were actually priced on June 23, 2022 and we are including the relevant term sheet as NYRC-0291-DPS-27 Attachment 3. The coupon for the RY1 issuance, assumed to be a 30-year maturity, is based on the forecasted treasury rate (3.40% in cell E10) plus the indicated spread (165 basis points, cell E11). For the tax-exempt remarketing in rate year 1 designated as PCN 2004 Series C, we are using the 2023 forecast for the 10Y treasury (3.20%, cell E6) and spread (135 basis points, cell E7) and subtracting 50 basis points to adjust for the tax exemption.

2. The coupon costs for debt issuances during the interim period and rate year are based on a forecast of rates and spreads attached in NYRC-0291-DPS-27 Attachment 2. The interim (2022) issuance was assumed to be a 30-year maturity priced in 2Q22. The security was actually priced on June 23, 2022 and we are including the relevant term sheet as NYRC-0291-DPS-27 Attachment 3. The coupon for the RY1 issuance, assumed to be a 30-year maturity, is based on the forecasted treasury rate (3.40% in cell E10) plus the indicated spread (155 basis points, cell E12).

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SOURCES AND USES OF FUNDS

National Finance Authority
Pollution Control Refunding Revenue Bonds (New York State Electric & Gas Corporation) Series 2022A
AMT
Final Numbers

Dated Date	04/06/2022
Delivery Date	04/06/2022

Sources:	
Bond Proceeds:	
Par Amount	67,210,000.00
Premium	2,787,198.70
	69,997,198.70
Other Sources of Funds:	
Company Contribution	2,801.30
	70,000,000.00

Uses:	
Refunding Escrow Deposits:	
Cash Deposit	70,000,000.00
	70,000,000.00

BOND PRICING

National Finance Authority
Pollution Control Refunding Revenue Bonds (New York State Electric & Gas Corporation) Series 2022A
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Bond Component	Maturity Date	Amount	Rate	Yield	Price	Premium (-Discount)
Term Bond 2028:						
	12/01/2028	67,210,000	4.000%	3.300%	104.147	2,787,198.70
		67,210,000				**2,787,198.70**

Dated Date	04/06/2022	
Delivery Date	04/06/2022	
First Coupon	06/01/2022	
Par Amount	67,210,000.00	
Premium	2,787,198.70	
Production	69,997,198.70	104.147000%
Underwriter's Discount		
Purchase Price	69,997,198.70	104.147000%
Accrued Interest		
Net Proceeds	69,997,198.70	

BOND SUMMARY STATISTICS

National Finance Authority
Pollution Control Refunding Revenue Bonds (New York State Electric & Gas Corporation) Series 2022A
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Dated Date	04/06/2022
Delivery Date	04/06/2022
First Coupon	06/01/2022
Last Maturity	12/01/2028
Arbitrage Yield	3.301170%
True Interest Cost (TIC)	3.301170%
Net Interest Cost (NIC)	3.376651%
All-In TIC	3.301170%
Average Coupon	4.000000%
Average Life (years)	6.653
Weighted Average Maturity (years)	6.653
Par Amount	67,210,000.00
Bond Proceeds	69,997,198.70
Total Interest	17,885,327.78
Net Interest	15,098,129.08
Bond Years from Dated Date	447,133,194.44
Bond Years from Delivery Date	447,133,194.44
Total Debt Service	85,095,327.78
Maximum Annual Debt Service	69,898,400.00
Average Annual Debt Service	12,790,946.97
Underwriter's Fees (per $1000)	
Average Takedown	
Other Fee	
Total Underwriter's Discount	
Bid Price	104.147000

Bond Component	Par Value	Price	Average Coupon	Average Life	Average Maturity Date	PV of 1 bp change
Term Bond 2028	67,210,000.00	104.147	4.000%	6.653	11/29/2028	40,998.10
	67,210,000.00			**6.653**		**40,998.10**

	TIC	All-In TIC	Arbitrage Yield
Par Value	67,210,000.00	67,210,000.00	67,210,000.00
+ Accrued Interest			
+ Premium (Discount)	2,787,198.70	2,787,198.70	2,787,198.70
- Underwriter's Discount			
- Cost of Issuance Expense			
- Other Amounts			
Target Value	69,997,198.70	69,997,198.70	69,997,198.70
Target Date	04/06/2022	04/06/2022	04/06/2022
Yield	3.301170%	3.301170%	3.301170%

SUMMARY OF BONDS REFUNDED

National Finance Authority
Pollution Control Refunding Revenue Bonds (New York State Electric & Gas Corporation) Series 2022A
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Bond	Maturity Date	Interest Rate	Par Amount	Call Date	Call Price
Pollution Control Revenue Bonds (NYSEG), 2004 Series B (AMT), PCRB04B:					
2028	12/01/2028	5.350%	70,000,000.00	04/06/2022	100.000
			70,000,000.00		

BOND DEBT SERVICE

National Finance Authority
Pollution Control Refunding Revenue Bonds (New York State Electric & Gas Corporation) Series 2022A
AMT
Final Numbers

Period Ending	Principal	Coupon	Interest	Debt Service
12/01/2022			1,754,927.78	1,754,927.78
12/01/2023			2,688,400.00	2,688,400.00
12/01/2024			2,688,400.00	2,688,400.00
12/01/2025			2,688,400.00	2,688,400.00
12/01/2026			2,688,400.00	2,688,400.00
12/01/2027			2,688,400.00	2,688,400.00
12/01/2028	67,210,000	4.000%	2,688,400.00	69,898,400.00
	67,210,000		**17,885,327.78**	**85,095,327.78**

NET DEBT SERVICE

National Finance Authority
Pollution Control Refunding Revenue Bonds (New York State Electric & Gas Corporation) Series 2022A
AMT
Final Numbers

Period Ending	Principal	Coupon	Interest	Total Debt Service	Net Debt Service
12/01/2022			1,754,927.78	1,754,927.78	1,754,927.78
12/01/2023			2,688,400.00	2,688,400.00	2,688,400.00
12/01/2024			2,688,400.00	2,688,400.00	2,688,400.00
12/01/2025			2,688,400.00	2,688,400.00	2,688,400.00
12/01/2026			2,688,400.00	2,688,400.00	2,688,400.00
12/01/2027			2,688,400.00	2,688,400.00	2,688,400.00
12/01/2028	67,210,000	4.000%	2,688,400.00	69,898,400.00	69,898,400.00
	67,210,000		**17,885,327.78**	**85,095,327.78**	**85,095,327.78**

PROOF OF ARBITRAGE YIELD

National Finance Authority
Pollution Control Refunding Revenue Bonds (New York State Electric & Gas Corporation) Series 2022A
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Date	Debt Service	Present Value to 04/06/2022 @ 3.3011704364%
06/01/2022	410,727.78	408,678.33
12/01/2022	1,344,200.00	1,315,774.74
06/01/2023	1,344,200.00	1,294,409.41
12/01/2023	1,344,200.00	1,273,391.00
06/01/2024	1,344,200.00	1,252,713.89
12/01/2024	1,344,200.00	1,232,372.53
06/01/2025	1,344,200.00	1,212,361.47
12/01/2025	1,344,200.00	1,192,675.35
06/01/2026	1,344,200.00	1,173,308.89
12/01/2026	1,344,200.00	1,154,256.89
06/01/2027	1,344,200.00	1,135,514.26
12/01/2027	1,344,200.00	1,117,075.97
06/01/2028	1,344,200.00	1,098,937.08
12/01/2028	68,554,200.00	55,135,728.87
	85,095,327.78	**69,997,198.70**

Proceeds Summary

Delivery date	04/06/2022
Par Value	67,210,000.00
Premium (Discount)	2,787,198.70
Target for yield calculation	69,997,198.70

FORM 8038 STATISTICS

National Finance Authority
Pollution Control Refunding Revenue Bonds (New York State Electric & Gas Corporation) Series 2022A
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Dated Date	04/06/2022
Delivery Date	04/06/2022

Bond Component	Date	Principal	Coupon	Price	Issue Price	Redemption at Maturity
Term Bond 2028:						
	12/01/2028	67,210,000.00	4.000%	104.147	69,997,198.70	67,210,000.00
		67,210,000.00			**69,997,198.70**	**67,210,000.00**

	Maturity Date	Interest Rate	Issue Price	Stated Redemption at Maturity	Weighted Average Maturity	Yield
Final Maturity	12/01/2028	4.000%	69,997,198.70	67,210,000.00		
Entire Issue			69,997,198.70	67,210,000.00	6.6528	3.3012%

Proceeds used for accrued interest	0.00
Proceeds used for bond issuance costs (including underwriters' discount)	0.00
Proceeds used for credit enhancement	0.00
Proceeds allocated to reasonably required reserve or replacement fund	0.00
Proceeds used to currently refund prior issues	70,000,000.00
Proceeds used to advance refund prior issues	0.00
Remaining weighted average maturity of the bonds to be currently refunded	6.6528
Remaining weighted average maturity of the bonds to be advance refunded	0.0000

FORM 8038 STATISTICS

National Finance Authority
Pollution Control Refunding Revenue Bonds (New York State Electric & Gas Corporation) Series 2022A
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Refunded Bonds

Bond Component	Date	Principal	Coupon	Price	Issue Price
Pollution Control Revenue Bonds (NYSEG), 2004 Series B (AMT):					
2028	12/01/2028	70,000,000.00	5.350%	100.000	70,000,000.00
		70,000,000.00			**70,000,000.00**

	Last Call Date	Issue Date	Remaining Weighted Average Maturity
Pollution Control Revenue Bonds (NYSEG), 2004 Series B (AMT)	04/06/2022	05/09/2008	6.6528
All Refunded Issues	04/06/2022		6.6528

ESCROW REQUIREMENTS

National Finance Authority
Pollution Control Refunding Revenue Bonds (New York State Electric & Gas Corporation) Series 2022A
AMT
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Dated Date	04/06/2022
Delivery Date	04/06/2022

Period Ending	Principal Redeemed	Total
04/06/2022	70,000,000.00	70,000,000.00
	70,000,000.00	**70,000,000.00**

ESCROW COST

National Finance Authority
Pollution Control Refunding Revenue Bonds (New York State Electric & Gas Corporation) Series 2022A
AMT
Final Numbers

Purchase Date	Cost of Securities	Cash Deposit	Total Escrow Cost
04/06/2022		70,000,000.00	70,000,000.00
	0	**70,000,000.00**	**70,000,000.00**

ESCROW SUFFICIENCY

National Finance Authority
Pollution Control Refunding Revenue Bonds (New York State Electric & Gas Corporation) Series 2022A
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Date	Escrow Requirement	Net Escrow Receipts	Excess Receipts	Excess Balance
04/06/2022	70,000,000.00	70,000,000.00		
	70,000,000.00	**70,000,000.00**	**0.00**	

ESCROW STATISTICS

National Finance Authority
Pollution Control Refunding Revenue Bonds (New York State Electric & Gas Corporation) Series 2022A
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Total Escrow Cost	Modified Duration (years)	PV of 1 bp change	Yield to Receipt Date	Yield to Disbursement Date	Perfect Escrow Cost	Value of Negative Arbitrage	Cost of Dead Time
70,000,000.00					70,000,000.00		
70,000,000.00		**0.00**			**70,000,000.00**	**0.00**	**0.00**

Delivery date	04/06/2022
Arbitrage yield	3.301170%

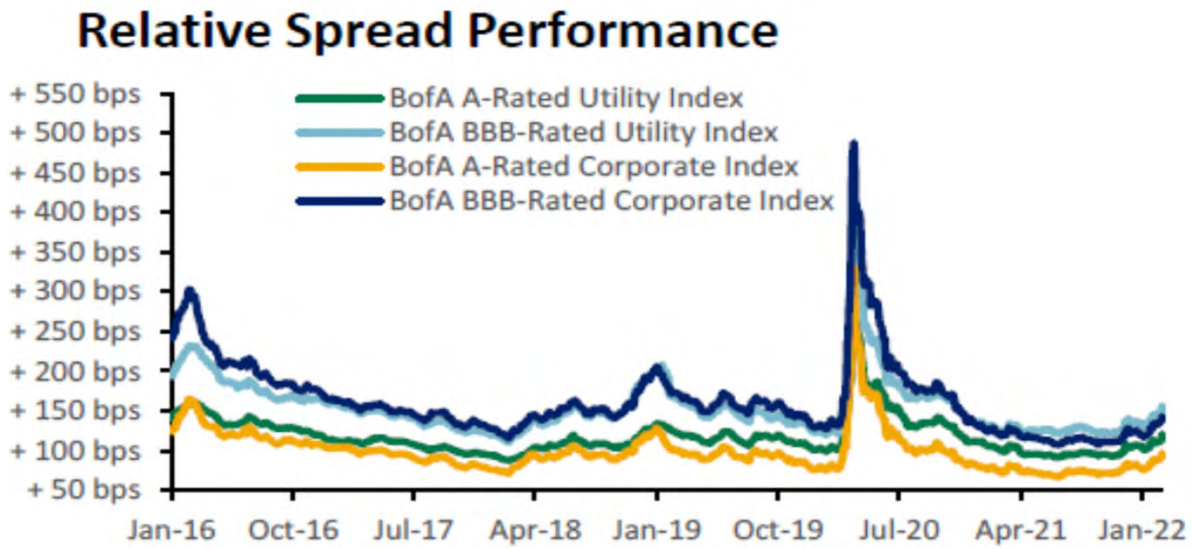
RATES FORECAST

	2Q22	3Q22	4Q22	2023	2024	2025	2026	2027
Commercial Paper 1-mo.	0.70	1.30	1.80	2.40	1.60	2.10	2.30	2.40
10Y Treasury	2.85	3.00	3.00	3.20	3.30	3.70	3.80	3.90
Unsecured Spread[1]	1.35	1.35	1.35	1.35	1.35	1.35	1.35	1.35
FMB Spread[2]	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
30Y Treasury	2.95	3.00	3.00	3.40	3.90	4.30	4.40	4.40
Unsecured Spread[1]	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65
FMB Spread[2]	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55

Using Current Level
Top 10 Average of LT Forecast
Bridge to LT Forecast

[1] Applicable to NYSEG, UI, CNG, BGC
[2] Applicable to RG&E, CMP, SCG

Bank of America Debt Capital Markets Utilities Weekly
Utility and Corporate Spreads



After moving to near all-time tight spreads in 3Q/4Q 2021, spreads have widened in early 2022 to levels extant in 2017 through early 2020.

Indicative Spreads Provided by SMBC on 4/25/22

Indicative Pricing (USD)				
Maturity or Average Life	10	12	15	20
Benchmark treasury	1.875% due 2/32	1.875% due 2/32	1.875% due 2/32	2.375% due
US Treasury yield (%)	2.80	2.80	2.80	3.07
Issue Spread (bps)	**115 - 125**	**125 - 135**	**135 - 145**	**115 - 12**
Issue Coupon (%)	**3.95 - 4.05**	**4.05 - 4.15**	**4.15 - 4.25**	**4.22 - 4.3**

Rochester Gas and Electric Co: A2 / A- / A

Indicative Pricing (USD)				
Maturity or Average Life	10	12	15	20
Benchmark treasury	1.875% due 2/32	1.875% due 2/32	1.875% due 2/32	2.375% due
US Treasury yield (%)	2.80	2.80	2.80	3.07
Issue Spread (bps)	**120 - 130**	**130 - 140**	**140 - 150**	**120 - 13**
Issue Coupon (%)	**4.00 - 4.10**	**4.10 - 4.20**	**4.20 - 4.30**	**4.27 - 4.3**

Berkshire Gas: A3 / A- / A
Connecticut Natural Gas: A2 / A- / A
New York State Electric & Gas: Baa1 / A- / A-
United Illuminating Company: Baa1 / A- / A

Indicative Pricing (USD)				
Maturity or Average Life	10	12	15	20
Benchmark treasury	1.875% due 2/32	1.875% due 2/32	1.875% due 2/32	2.375% due
US Treasury yield (%)	2.80	2.80	2.80	3.07

Blue Chip Financial Forecasts
4/1/2022
Short-term Forecast

Consensus Forecasts of U.S. Interest Rates and Key Assumptions

	History								Consensus Forecasts-Qu			
	Average For Week Ending				Average For Month			*Latest Qtr*	2Q	3Q	4Q	1Q
Interest Rates	Mar 25	Mar 18	Mar 11	Mar 4	Feb	Jan	Dec	1Q 2022*	2022	2022	2022	2023
Federal Funds Rate	0.33	0.08	0.08	0.08	0.08	0.08	0.08	0.11	**0.8**	**1.4**	**1.8**	**2.2**
Prime Rate	3.50	3.25	3.25	3.25	3.25	3.25	3.25	3.28	**3.9**	**4.4**	**4.9**	**5.2**
SOFR	0.28	0.15	0.05	0.05	0.05	0.05	0.05	0.08	**0.7**	**1.3**	**1.8**	**2.1**
Commercial Paper, 1-mo.	0.33	0.36	0.30	0.25	0.16	0.07	0.07	0.17	**0.7**	**1.3**	**1.7**	**2.1**
Treasury bill, 3-mo.	0.52	0.43	0.38	0.35	0.31	0.15	0.06	0.30	**0.9**	**1.4**	**1.8**	**2.1**
Treasury bill, 6-mo.	0.96	0.84	0.75	0.67	0.64	0.33	0.15	0.60	**1.1**	**1.6**	**2.0**	**2.3**
Treasury bill, 1 yr.	1.55	1.30	1.15	1.02	1.00	0.55	0.30	0.95	**1.6**	**1.9**	**2.2**	**2.5**
Treasury note, 2 yr.	2.18	1.92	1.67	1.46	1.44	0.98	0.68	1.42	**2.2**	**2.4**	**2.6**	**2.8**
Treasury note, 5 yr.	2.40	2.14	1.85	1.68	1.81	1.54	1.23	1.80	**2.4**	**2.6**	**2.7**	**2.9**
Treasury note, 10 yr.	2.37	2.16	1.91	1.80	1.93	1.76	1.47	1.93	**2.4**	**2.6**	**2.8**	**2.9**
Treasury note, 30 yr.	2.56	2.47	2.29	2.18	2.25	2.10	1.85	2.25	**2.6**	**2.8**	**3.0**	**3.2**

12/1/2021
Long-term Forecast

		Average For The Year				
		2023	2024	2025	2026	2027
1. Federal Funds Rate	CONSENSUS	**0.8**	**1.6**	**2.0**	**2.2**	**2.3**
	Top 10 Average	1.2	2.2	2.7	2.7	2.8
	Bottom 10 Average	0.4	1.0	1.4	1.7	1.8
2. Prime Rate	CONSENSUS	**4.0**	**4.7**	**5.1**	**5.3**	**5.4**
	Top 10 Average	4.3	5.3	5.8	5.8	5.9
	Bottom 10 Average	3.6	4.1	4.5	4.9	5.0
3. LIBOR, 3-Mo.	CONSENSUS	**1.0**	**1.7**	**2.2**	**2.4**	**2.5**
	Top 10 Average	1.3	2.1	2.7	2.9	3.0
	Bottom 10 Average	0.7	1.2	1.6	1.9	2.0
4. Commercial Paper, 1-Mo	CONSENSUS	**0.9**	**1.6**	**2.1**	**2.3**	**2.4**
	Top 10 Average	1.2	2.0	2.6	2.8	2.9
	Bottom 10 Average	0.6	1.2	1.6	1.9	2.0
5. Treasury Bill Yield, 3-Mo	CONSENSUS	**0.8**	**1.4**	**1.8**	**2.0**	**2.3**
	Top 10 Average	1.2	1.9	2.5	2.6	2.8
	Bottom 10 Average	0.4	0.8	1.2	1.5	1.8
6. Treasury Bill Yield, 6-Mo	CONSENSUS	**0.8**	**1.4**	**1.9**	**2.1**	**2.4**
	Top 10 Average	1.2	2.0	2.6	2.7	2.9
	Bottom 10 Average	0.4	0.9	1.2	1.6	1.9
7. Treasury Bill Yield, 1-Yr	CONSENSUS	**1.0**	**1.6**	**2.1**	**2.4**	**2.5**
	Top 10 Average	1.4	2.1	2.7	2.8	3.0
	Bottom 10 Average	0.6	1.2	1.5	1.9	2.0
8. Treasury Note Yield, 2-Yr	CONSENSUS	**1.3**	**1.9**	**2.4**	**2.6**	**2.6**
	Top 10 Average	1.7	2.5	3.0	3.1	3.2
	Bottom 10 Average	0.8	1.4	1.8	2.0	2.1
9. Treasury Note Yield, 5-Yr	CONSENSUS	**1.9**	**2.4**	**2.8**	**2.9**	**2.9**
	Top 10 Average	2.3	3.0	3.4	3.5	3.6
	Bottom 10 Average	1.5	1.9	2.1	2.3	2.3
10. Treasury Note Yield, 10-Yr	CONSENSUS	**2.4**	**2.8**	**3.1**	**3.2**	**3.2**
	Top 10 Average	2.8	3.3	3.7	3.8	3.9
	Bottom 10 Average	2.0	2.3	2.4	2.5	2.5
11. Treasury Bond Yield, 30-Yr	CONSENSUS	**2.9**	**3.3**	**3.6**	**3.7**	**3.7**
	Top 10 Average	3.4	3.9	4.3	4.4	4.4
	Bottom 10 Average	2.4	2.8	2.9	3.0	3.0

	30
2/42	2.25% due 2/52
	2.88
5	**145 - 155**
32	**4.33 - 4.43**

	30
2/42	2.25% due 2/52
	2.88
0	**150 - 160**
37	**4.38 - 4.48**

	30
2/42	2.25% due 2/52
	2.88

NYSEG RG&E CENTRAL MAINE POWER UI

Part of the AVANGRID Family

New York State Electric & Gas Corporation
$275 million Senior Unsecured Notes

Rochester Gas & Electric Corporation
$125 million First Mortgage Bonds

Central Maine Power Company
$125 million Green First Mortgage Bonds

The United Illuminating Company
$50 million Senior Unsecured Notes

Private Placement

Pricing Memorandum to Investors

June 23, 2022

HSBC NATIXIS Scotiabank SMBC usbancorp

Pricing Memorandum

Dear Investor:

On behalf of New York State Electric & Gas Corporation ("NYSEG"), Rochester Gas & Electric Corporation ("RG&E"), Central Maine Power Company ("CMP"), and The United Illuminating Company ("UI" and together with NYSEG, RG&E and CMP, the "Issuers"), HSBC Securities (USA) Inc. ("HSBC"), Natixis Securities Americas LLC ("Natixis"), Scotia Capital (USA) Inc. ("Scotia"), SMBC Nikko Securities America, Inc. ("SMBC") and U.S. Bancorp Investments, Inc. ("U.S. Bancorp" and together with HSBC, Natixis, Scotia, and SMBC, the "Agents"), are pleased to confirm the following pricing terms for the Senior Notes and First Mortgage Bond offerings (the "Transactions").

Offering Summary

	New York State Electric & Gas Corporation		Rochester Gas & Electric Corporation	Central Maine Power Company		The United Illuminating Company
Tenor	10-year	30-year	30-year	10-year	30-year	10-year
Amount (US$ MM)	$150 million	$125 million	$125 million	$75 million	$50 million	$50 million
Type	Senior Unsecured Notes		First Mortgage Bonds	Green First Mortgage Bonds		Senior Unsecured Notes
Benchmark	2.875% due 5/32	2.875% due 5/52	2.875% due 5/52	2.875% due 5/32	2.875% due 5/52	2.875% due 5/32
Treasury Yield	3.02%	3.16%	3.16%	3.02%	3.16%	3.02%
Credit Spread	160 bps	180 bps	170 bps	135 bps	160 bps	160 bps
Coupon	4.62%	4.96%	4.86%	4.37%	4.76%	4.62%
Payment Frequency	Semi-Annual		Semi-Annual	Semi-Annual		Semi-Annual
Closing Date	July 12, 2022		July 12, 2022	July 12, 2022		July 12, 2022
Funding Date	December 15, 2022		December 15, 2022	December 15, 2022		December 15, 2022
Interest Payment Dates	June 15 and December 15		June 15 and December 15	June 15 and December 15		June 15 and December 15
First Coupon Date	June 15, 2023		June 15, 2023	June 15, 2023		June 15, 2023
Maturity Dates	December 15, 2032	December 15, 2052	December 15, 2052	December 15, 2032	December 15, 2052	December 15, 2032

Investor Summary *($ in millions)*

	New York State Electric & Gas Corporation		Rochester Gas & Electric Corporation	Central Maine Power Company		The United Illuminating Company	Total
Tenor	10-year	30-year	30-year	10-year	30-year	10-year	
State Farm	$23			$40 (1)		$30 (1)	$93
Northwestern Mutual			$52 (1)	$35			$87
Prudential		$82 (1)					$82
AllianceBernstein	$80 (1)						$80
New York Life	$38	$17					$55
Legal & General			$52				$52
RBC Insurance		$26	$16				$42
Manulife			$5		$24 (1)		$29
MetLife					$22	$3	$25
Aegon	$9					$7	$16
Great West						$10	$10
CUNA					$4		$4
Total	**$150**	**$125**	**$125**	**$75**	**$50**	**$50**	**$575**

Notes:
(1) Denotes investor responsible for filing with the NAIC

As an appendix to this memorandum, please find the attached Bloomberg PX1 screen, confirming the reference Treasury yields used to calculate the coupons for the Transactions.

The Issuers and Agents appreciate your interest in the offering and look forward to the completion of a successful funding. Please feel free to call us with any questions.

Transaction Details

Investors' Counsel:	**Pillsbury Winthrop Shaw Pittman LLP** Jeffrey J. Delaney (212-858-1292 | jeffrey.delaney@pillsburylaw.com) Alexandra Calcado (212-858-1108 | alexandra.calcado@pillsburylaw.com)
Documentation:	The Bonds have been circled pursuant to the Supplemental Indentures and Bond/Note Purchase Agreements posted to IntraLinks.

Agent Contact Details

HSBC Team

James Keller
james.t.keller@us.hsbc.com
+1 (646) 881-1791

Mike Maciurzynski
michael.x.maciurzynski@us.hsbc.com
+1 (646) 251-6740

Natixis Team

Anthony V. Ferraro
anthony.ferraro@natixis.com
+1 (518) 423-9244

Brian Clionsky
brian.clionsky@natixis.com
+1 (646) 847-6178

Ben Kaplan
benjamin.kaplan@natixis.com
+1 (212) 891-5815

Lyubomyr Kraynyak
lyubomyr.kraynyak@natixis.com
+1 (917) 963-4503

Scotia Team

Maeve McLaughlin
maeve.mclaughlin@scotiabank.com
+1 (212) 225-5483

Matthew Lindgren
matthew.lindgren@scotiabank.com
+1 (212) 225-6206

Jack Williamson
john.williamson@scotiabank.com
+1 (212) 225-5593

Jennifer Elbers
jennifer.elbers@scotiabank.com
+1 (212) 225-5896

SMBC Team

Edward Reznik
edward_reznik@smbcgroup.com
+1 (212) 224-5379

Nina Benson
nina_benson@smbcgroup.com
+1 (212) 409-1009

Michael Brown
michael_brown@smbcgroup.com
+1 (212) 527-1978

U.S. Bancorp Team

Terry Martin
terrence.martin@usbank.com
+1 (917) 319-7015

Jerry Kokal
gerald.kokal@usbank.com
+1 (312) 771-7126

Violet Pavlov Grecu
violet.grecu@usbank.com
+1 (347) 564-2559

Molly Wecharatana
molly.wecharatana@usbank.com
+1 (973) 224-3932

Appendix: Bloomberg PX1 Screenshot

United States | 1) Actions | 3) Settings | Fixed Income Trading

11:06 Outright Switch Bfly

4) Actives 5) Bills 6) Notes 7) TIPS 8) Strips 9) Sprds 10) Curves 11) FRN 12) Bfly 13) WI

Bills				
31) 07/19/22	1.040 / 1.003	1.017	+0.140	
32) 08/16/22	1.420 / 1.375	1.397	+0.123	
33) 09/22/22	1.595 / 1.558	1.585	+0.058	
34) 12/22/22	2.338 / 2.287	2.346	-0.015	
35) 06/15/23	2.615 / 2.560	2.646	-0.082	
Notes				
36) $2\frac{1}{2}$ 424	99-05$\frac{5}{8}$ / 06$\frac{1}{8}$	2.951	-0.107	
37) $2\frac{1}{2}$ 524 2YR	99-04$\frac{7}{8}$ / 05$\frac{1}{8}$	2.949	-0.107	
38) WI 2YR	2.990 / 2.975		--	
39) $2\frac{5}{8}$ 425	98-26+ / 27$\frac{1}{4}$	3.054	-0.141	
40) $2\frac{3}{4}$ 525	99-04+ / 05	3.056	-0.146	
41) $2\frac{7}{8}$ 625 3YR	99-15$\frac{3}{4}$ / 16	3.052	-0.147	
42) $2\frac{3}{4}$ 427	98-14$\frac{3}{4}$ / 15+	3.088	-0.155	
43) $2\frac{5}{8}$ 527 5YR	97-30 / 30+	3.075	-0.155	
44) WI 5YR	3.080 / 3.075		--	
45) $2\frac{3}{4}$ 529 7YR	97-28 / 29	3.088	-0.151	
46) WI 7YR	3.095 / 3.085		--	
47) $1\frac{3}{8}$ N31	86-17+ / 18+	3.028	-0.138	
48) $1\frac{7}{8}$ 232	90-13+ / 14	3.026	-0.136	
49) $2\frac{7}{8}$ 532 10YR	98-23 / 23+	3.024	-0.132	
Bonds				
50) $2\frac{3}{8}$ 242	84-29+ / 31+	3.432	-0.098	
51) $3\frac{1}{4}$ 542 20YR	97-24+ / 26	3.402	-0.097	

Bonds			
52) $1\frac{7}{8}$ N51	75-01+ / 04	3.184	-0.091
53) $2\frac{1}{4}$ 252	82-10 / 11+	3.172	-0.091
54) $2\frac{7}{8}$ 552 30YR	94-15 / 16+	3.160	-0.089
TIPS			
55) $0\frac{1}{8}$ 427	98-24$\frac{3}{4}$ / 98-29	0.355	-0.124
56) $0\frac{1}{8}$ 132	96-05$\frac{3}{4}$ / 96-10$\frac{1}{4}$	0.520	-0.092
57) $0\frac{1}{8}$ 252	83-00$\frac{1}{4}$ / 83-11	0.753	-0.063
Curve Trades			
58) 2yr vs 5yr	12.150 / 12.919		-4.807
59) 2yr vs 10yr	7.028 / 7.634		-2.357
60) 5yr vs 10yr	-5.470 / -4.937		+2.277
61) 10yr vs 30yr	13.418 / 13.856		+4.857
Other Markets			
62) US Long(CBT)	10:56 d	137-25	+1-26
63) 10yr Fut (CBT)	10:56 d	118-06+	+1-08
64) 5Yr Fut(CBT)	10:56 d	111-29$\frac{3}{4}$	+0-26$\frac{1}{4}$
65) Dow Jones Ind	11:06	30613.230	+130.100
66) S&P 500 Ind	10:51 d	3786.140	+26.250
67) NYM WTI Crd	10:56 d	105.430	-0.760
68) Gold	11:06	1838.480	+0.760
69) Global Agg	06/22	456.247	+3.341
70) US Agg	06/22	2094.600	+17.426
71) US Treasury	06/22	2253.724	+21.539

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New York State Electric & Gas Corporation
Rochester Gas and Electric Corporation

22-E-0317, 22-G-0318, 22-E-0319, 22-G-0320
Request for Information

Requesting Party: Chris Carmel (DPS)

Request No.: NYRC-0310 (DPS-46)

Date of Request: June 16, 2022

Response Due Date: June 27, 2022

Date of Reply: June 27, 2022

Witness: Ann E. Bulkley

Subject: Return on Equity Panel – Proxy Group Selection

Question:

In all interrogatories, all requests for workpapers or supporting calculations shall be construed as requesting any Word, Excel or other computer spreadsheet models in original electronic format with all formulae intact and unlocked.

1. On page 41 of Ann Bulkley's Direct Testimony, she discusses the proxy group selection criteria. Ann Bulkley noted that she eliminated 17 companies from the list of 46 companies she compiled from Value Line. Please provide which screening criteria excluded each of the 17 companies from her proxy group.

Response:

Please see Attachment 1. The 17 companies were excluded because they did not meet at least 1 of the criteria shown on the first tab of Attachment 1.

Proxy Group Screening

		Include/ Exclude	TOTAL	Pays Dividends	S&P Credit Rating Between BBB- and AAA	Coverd by More Than 1 Analyst	Positive Growth Rates from at least two sources	% Regulated Operating Income ≥ 70%	Announced Merger	Other Consideration
Atmos Energy Corporation	ATO	Include	6	1	1	1	1	1	1	
Chesapeake Utilities Corporation	CPK		5	1		1	1	1	1	
New Jersey Resources Corporation	NJR		5	1	1	1	1		1	
NiSource Inc.	NI	Include	6	1	1	1	1	1	1	
Northwest Natural Gas Company	NWN	Include	6	1	1	1	1	1	1	
ONE Gas, Inc.	OGS	Include	6	1	1	1	1	1	1	
South Jersey Industries, Inc.	SJI		5	1	1	1	1	1		
Southwest Gas Corporation	SWX		5	1	1	1	1	1		
Spire, Inc.	SR	Include	6	1	1	1	1	1	1	
UGI Corporation	UGI		5	1	1	1	1		1	
ALLETE, Inc.	ALE	Include	6	1	1	1	1	1	1	
Alliant Energy Corporation	LNT	Include	6	1	1	1	1	1	1	
Ameren Corporation	AEE	Include	6	1	1	1	1	1	1	
American Electric Power Company, Inc.	AEP	Include	6	1	1	1	1	1	1	
Avangrid, Inc.	AGR		5	1	1	1	1	1		
Avista Corporation	AVA	Include	6	1	1	1	1	1	1	
Black Hills Corporation	BKH	Include	6	1	1	1	1	1	1	
CenterPoint Energy, Inc.	CNP		4		1	1	1	1		
CMS Energy Corporation	CMS	Include	6	1	1	1	1	1	1	
Consolidated Edison, Inc.	ED	Include	6	1	1	1	1	1	1	
Dominion Resources, Inc.	D		5		1	1	1	1	1	
DTE Energy Company	DTE		5		1	1	1	1	1	
Duke Energy Corporation	DUK	Include	6	1	1	1	1	1	1	
Edison International	EIX	Include	6	1	1	1	1	1	1	
Entergy Corporation	ETR	Include	6	1	1	1	1	1	1	
Eversource Energy	ES	Include	6	1	1	1	1	1	1	
Evergy, Inc.	EVRG	Include	6	1	1	1	1	1	1	
Exelon Corporation	EXC		3		1	1		1		
FirstEnergy Corporation	FE		5	1	1	1	1	1		
Hawaiian Electric Industries, Inc.	HE		5	1	1	1	1	1	1	-1
IDACORP, Inc.	IDA	Include	6	1	1	1	1	1	1	
MGE Energy, Inc.	MGEE	Include	6	1	1	1	1	1	1	
NextEra Energy, Inc.	NEE	Include	6	1	1	1	1	1	1	
NorthWestern Corporation	NWE	Include	6	1	1	1	1	1	1	
OGE Energy Corporation	OGE	Include	6	1	1	1	1	1	1	
Otter Tail Corporation	OTTR	Include	6	1	1	1	1	1	1	
PG&E Corporation	PCG		5	1		1	1	1	1	
Pinnacle West Capital Corporation	PNW		4	1	1	1		1	1	-1
PNM Resources, Inc.	PNM		5	1	1	1	1	1		
Portland General Electric Company	POR	Include	6	1	1	1	1	1	1	
PPL Corporation	PPL		3		1	1		1		
Public Service Enterprise Group Inc.	PEG	Include	6	1	1	1	1	1	1	
Sempra Energy	SRE		4	1	1	1	1			
Southern Company	SO	Include	6	1	1	1	1	1	1	
Wisconsin Energy Corporation	WEC	Include	6	1	1	1	1	1	1	
Xcel Energy Inc.	XEL	Include	6	1	1	1	1	1	1	

Notes:
[1] HE was excluded from the proxy group due to its unique geographical risk operating in Hawaii.
[2] PNW's share price was affected by a one-time event (rate case decision for Arizona Public Service Company); therefore, PNW was excluded from the proxy group.

Proxy Group Selection Data

Company	Ticker	Dividends	S&P Credit Rating Between BBB- and AAA	Covered by More Than 1 Analyst	Positive Growth Rates from at least two sources (Value Line, Yahoo! First Call, and Zacks)	Regulated Income / Total Income	M&A Activity or Other Significant Event	Date Announced	Date Completed	Notes
Atmos Energy Corporation	ATO	Yes	A-	Yes	Yes	100.00%	No			
Chesapeake Utilities Corporation	CPK	Yes	NR	Yes	Yes	81.36%	No			
New Jersey Resources Corporation	NJR	Yes	A+	Yes	Yes	67.22%	No			
NiSource Inc.	NI	Yes	BBB+	Yes	Yes	99.51%	No			
Northwest Natural Gas Company	NWN	Yes	A+	Yes	Yes	99.84%	No			
ONE Gas, Inc.	OGS	Yes	BBB+	Yes	Yes	100.00%	No			
South Jersey Industries, Inc.	SJI	Yes	BBB	Yes	Yes	92.33%	Yes	2/24/2022	Pending	J.P. Morgan Investment Management Inc. to acquire South Jersey Industries, Inc.
Southwest Gas Corporation	SWX	Yes	BBB-	Yes	Yes	78.01%	Yes	########	5/23/2022	Icahn Enterprises L.P. to acquire Southwest Gas Holdings, Inc.
Spire, Inc.	SR	Yes	A-	Yes	Yes	91.43%	No			
UGI Corporation	UGI	Yes	A	Yes	Yes	23.31%	No			
ALLETE, Inc.	ALE	Yes	BBB	Yes	Yes	95.57%	No			
Alliant Energy Corporation	LNT	Yes	A-	Yes	Yes	96.60%	No			
Ameren Corporation	AEE	Yes	BBB+	Yes	Yes	100.00%	No			
American Electric Power Company, Inc.	AEP	Yes	A-	Yes	Yes	95.43%	No			
Avangrid, Inc.	AGR	Yes	BBB+	Yes	Yes	95.69%	Yes	########	Pending	Avangrid, Inc. to acquire PNM Resources, Inc.
Avista Corporation	AVA	Yes	BBB	Yes	Yes	100.00%	No			
Black Hills Corporation	BKH	Yes	BBB+	Yes	Yes	97.72%	No			
CenterPoint Energy, Inc.	CNP	No	BBB+	Yes	Yes	102.53%	Yes	4/29/2021	1/10/2022	Summit Utilities, Inc. acquires Arkansas and Oklahoma gas distribution assets
CMS Energy Corporation	CMS	Yes	BBB+	Yes	Yes	98.76%	No			
Consolidated Edison, Inc.	ED	Yes	A-	Yes	Yes	92.54%	No			
Dominion Resources, Inc.	D	No	BBB+	Yes	Yes	99.34%	No	10/5/2021	########	Southwest Gas Holdings, Inc. acquires Dominion Energy Questar Pipeline, LLC
DTE Energy Company	DTE	No	BBB+	Yes	Yes	101.82%	No	########	7/1/2021	DTE Energy Company spins off DT Midstream, Inc.
Duke Energy Corporation	DUK	Yes	BBB+	Yes	Yes	99.36%	No			
Edison International	EIX	Yes	BBB	Yes	Yes	100.25%	No			
Entergy Corporation	ETR	Yes	BBB+	Yes	Yes	100.00%	No			
Eversource Energy	ES	Yes	A-	Yes	Yes	92.02%	No			
Evergy, Inc.	EVRG	Yes	A-	Yes	Yes	100.00%	No			
Exelon Corporation	EXC	No	BBB+	Yes	No	88.31%	Yes	2/24/2021	2/1/2022	Exelon Corporation spins off Constellation Energy Corporation
FirstEnergy Corporation	FE	Yes	BBB-	Yes	Yes	100.00%	Yes	11/7/2021	5/31/2022	Brookfield Infrastructure Partners L.P. to acquire 19.9% of FirstEnergy Transmission, LLC
Hawaiian Electric Industries, Inc.	HE	Yes	BBB-	Yes	Yes	77.24%	No			
IDACORP, Inc.	IDA	Yes	BBB	Yes	Yes	99.84%	No			
MGE Energy, Inc.	MGEE	Yes	AA-	Yes	Yes	71.05%	No			
NextEra Energy, Inc.	NEE	Yes	A-	Yes	Yes	85.07%	No			
NorthWestern Corporation	NWE	Yes	BBB	Yes	Yes	99.75%	No			
OGE Energy Corporation	OGE	Yes	BBB+	Yes	Yes	100.00%	No	2/17/2021	12/2/2021	Energy Transfer LP acquires Enable Midstream Partners, LP (OGE had GP and LP interest in Enable)
Otter Tail Corporation	OTTR	Yes	BBB	Yes	Yes	72.69%	No			
PG&E Corporation	PCG	Yes	BB-	Yes	Yes	99.54%	No			
Pinnacle West Capital Corporation	PNW	Yes	BBB+	Yes	No	100.00%	No			
PNM Resources, Inc.	PNM	Yes	BBB	Yes	Yes	100.00%	Yes	########	Pending	Avangrid, Inc. to acquire PNM Resources, Inc.
Portland General Electric Company	POR	Yes	BBB+	Yes	Yes	100.00%	No			
PPL Corporation	PPL	No	A-	Yes	No	100.00%	Yes	3/18/2021	5/25/2022	PPL Energy Holdings, LLC to acquire Narragansett Electric Company
Public Service Enterprise Group Inc.	PEG	Yes	BBB+	Yes	Yes	82.60%	No			
Sempra Energy	SRE	Yes	BBB+	Yes	Yes	68.51%	Yes	########	Pending	Black River B 2017 Inc. to acquire 10% of Sempra Infrastructure Partners, LP
Southern Company	SO	Yes	BBB+	Yes	Yes	84.58%	No			
Wisconsin Energy Corporation	WEC	Yes	A-	Yes	Yes	99.56%	No			
Xcel Energy Inc.	XEL	Yes	A-	Yes	Yes	100.00%	No			

PROJECTED EARNINGS GROWTH RATES

Company	Ticker	Yahoo! Finance Earnings Growth	Zacks Earnings Growth	Value Line Earnings Growth
Atmos Energy Corporation	ATO	7.30%	7.30%	7.50%
Chesapeake Utilities Corporation	CPK	7.00%	n/a	8.00%
New Jersey Resources Corporation	NJR	6.00%	6.00%	4.50%
NiSource Inc.	NI	3.52%	7.20%	10.50%
Northwest Natural Gas Company	NWN	5.70%	5.10%	6.00%
ONE Gas, Inc.	OGS	2.90%	5.00%	6.00%
South Jersey Industries, Inc.	SJI	5.20%	n/a	10.00%
Southwest Gas Corporation	SWX	4.00%	6.00%	8.00%
Spire, Inc.	SR	7.31%	5.30%	9.00%
UGI Corporation	UGI	7.00%	8.00%	7.00%
ALLETE, Inc.	ALE	5.67%	n/a	6.00%
Alliant Energy Corporation	LNT	6.10%	6.10%	4.50%
Ameren Corporation	AEE	7.40%	7.20%	6.50%
American Electric Power Company, Inc.	AEP	6.10%	5.80%	6.50%
Avangrid, Inc.	AGR	6.40%	6.20%	3.00%
Avista Corporation	AVA	6.60%	6.60%	3.00%
Black Hills Corporation	BKH	4.67%	6.30%	5.00%
CenterPoint Energy, Inc.	CNP	1.80%	5.20%	5.00%
CMS Energy Corporation	CMS	7.40%	9.20%	6.50%
Consolidated Edison, Inc.	ED	2.00%	2.00%	3.50%
Dominion Resources, Inc.	D	6.37%	6.60%	11.50%
DTE Energy Company	DTE	6.00%	6.00%	4.50%
Duke Energy Corporation	DUK	5.85%	6.10%	7.00%
Edison International	EIX	5.80%	4.00%	NA
Entergy Corporation	ETR	6.00%	6.00%	3.00%
Eversource Energy	ES	6.70%	6.20%	5.50%
Evergy, Inc.	EVRG	5.12%	6.10%	7.50%
Exelon Corporation	EXC	Negative	6.20%	NA
FirstEnergy Corporation	FE	Negative	6.40%	10.00%
Hawaiian Electric Industries, Inc.	HE	1.30%	3.20%	3.00%
IDACORP, Inc.	IDA	4.40%	4.30%	4.00%
MGE Energy, Inc.	MGEE	5.90%	6.50%	4.50%
NextEra Energy, Inc.	NEE	9.95%	8.80%	11.00%
NorthWestern Corporation	NWE	4.50%	3.10%	2.00%
OGE Energy Corporation	OGE	3.90%	3.50%	6.50%
Otter Tail Corporation	OTTR	9.00%	n/a	4.50%
PG&E Corporation	PCG	2.50%	2.50%	NA
Pinnacle West Capital Corporation	PNW	0.10%	n/a	NA
PNM Resources, Inc.	PNM	5.10%	5.00%	6.50%
Portland General Electric Company	POR	7.15%	4.60%	7.00%
PPL Corporation	PPL	Negative	n/a	NA
Public Service Enterprise Group Inc.	PEG	3.27%	4.20%	4.00%
Sempra Energy	SRE	4.30%	5.60%	10.00%
Southern Company	SO	6.20%	4.00%	5.50%
Wisconsin Energy Corporation	WEC	6.60%	6.00%	6.00%
Xcel Energy Inc.	XEL	6.90%	6.40%	6.00%

Atmos Energy Corporation
Form 10-K for year ended 9/30/2021, pages 49-51 (pdf pages 37-39);

ATO	(In thousands)	Total	Distribution	Pipeline and Storage	Eliminations
	2021	904,998	618,514	286,484	-
Operating Income	2020	824,099	528,243	295,856	-
	2019	746,058	470,772	275,286	-

	Percent Regulated
ATO2021OPINC	100%
ATO2020OPINC	100%
ATO2019OPINC	100%
ATOOPINCAVG	**100%**

Chesapeake Utilities Corporation
2021 Form 10-K page 28-30, 76; 2020 Form 10-K

Regulated Energy

CPK	(In thousands)	Total	Natural Gas Distribution	Electric Distribution	Natural Gas Transmission	Unregulated Energy	Other Businesses and Eliminations
	2021	131,112	45,412.7	8,724.0	51,927.3	24,382	666
Operating Income	2020	112,723	36,405.9	6,526.2	49,191.8	20,664	(65)
	2019	106,285	42,764.6	1,160.0	42,659.4	19,938	(237)

	Percent Regulated
CPK2021OPINC	81%
CPK2020OPINC	82%
CPK2019OPINC	81%
CPKOPINCAVG	**81%**

	Total Regulated Energy Operating Incom	Delmarva Natural Gas Distribution	Florida Natural Gas Distribution	FPU Electric Distribution Net Income	Eastern Shore	Peninsula Pipeline	Aspire Energy Express
2021	106,064	12,283	16,040	5,441	21,369	10,898	119
2020	92,124	9,448	12,542	3,942	20,320	9,359	34
2019	86,584	9,873	13,721	640	17,965	5,571	N/A

Spire, Inc.
Form 10-K for the year ended 9/30/21, see PDF pp. 28 and 87

SR	(In thousands	Total	Gas Utility	Gas Marketing	Other	Eliminations
Operating Income	2021	450,200	374,000	58,500	17,700	-
	2020	355,000	334,300	9,300	11,400	-
	2019	302,300	293,400	23,200	(14,300)	-

	Percent Regulated
SR2021OPINC	83%
SR2020OPINC	94%
SR2019OPINC	97%
SROPINCAVG	**91%**

New Jersey Resources Corporation
Form 10-K for year ended 9/30/21, PDF pp. 70, 82, 89, 93, 99, 101, 128 227 (elims), Form 10-K for year ended 9/30/20, pages 44, 49, 50, 54, 55, 92, 132-5;
Form 10-K for year ended 9/30/19, pages 34, 40, 45, 47, 50, 51, 124, 125

NJR	(In thousands	Total	Natural Gas Distribution	Clean Energy Ventures	Energy Services	Midstream	Home Services a	Eliminations
Operating Income	2021	288,350	148,993	37,993	79,163	10,659	5,015	6,527
	2020	228,909	173,412	46,978	(11,651)	12,451	8,456	(737)
	2019	164,556	111,189	47,109	2,211	(4,049)	5,142	2,954

	Percent Regulated
NJR2021OPINC	55%
NJR2020OPINC	81%
NJR2019OPINC	65%
NJROPINCAVG	**67%**

NiSource Inc.
Form 10-K for year ended 12/31/21 at pdf pp. 30, 32, 90; see also 12/31/2020 (page 32, 36, 113-4) pdf pages 196-198;;
Form 10-K for year ended 12/31/2019 (page 120,121) pdf pages 196-198;

NI	(In thousands	Total	Gas Distribution Operations	Electric Operations	Corporate and Other	Eliminations
Operating Income	2021	1,006,900	617,500	387,800	1,600	-
	2020	963,200	611,500	348,800	2,900	-
	2019	1,305,200	885,100	406,800	13,300	-

	Percent Regulated
NI2021OPINC	100%
NI2020OPINC	100%
NI2019OPINC	99%
NIOPINCAVG	**100%**

Northwest Natural Gas Company
Form 10-K for year ended 12/31/21 at PDF pp. 165; see also 12/31/2020, page 50 (pdf page 78), 101 (pdf pg 152), ; Form 10-K for year ended 12/31/2019, page 97 (pdf page 174)

NWN	(In thousands	Total	Natural Gas Distribution	Other (NW Natural)	Other (NW Holdings)
Operating Income	2021	163,117	147,902	17,331	(2,116)
	2020	148,351	137,724	9,916	711
	2019	143,474	135,918	11,428	(3,872)

	Percent Regulated
NWN2021OPINC	100.0%
NWN2020OPINC	99.5%
NWN2019OPINC	100.0%
NWNOPINCAVG	**100%**

ONE Gas, Inc.
Form 10-K for year ended 12/31/21 at PDF pp. 54, 56; see also 12/31/2020 (page 33), pdf page 56 and page 55, pdf page 89; Form 10-K for year ended 12/31/2019 (page 25), pdf page 34

OGS	(In thousands)	Total	Regulated Utility
	2021	310,258	310,258
Operating Income	2020	303,500	303,500
	2019	295,300	295,300

	Percent Regulated
OGS2021OPINC	100%
OGS2020OPINC	100%
OGS2019OPINC	100%
OGSOPINCAVG	**100%**

South Jersey Industries, Inc.
2021 Form 10-K, page 108-111; 2020 Form 10-K, page 108-111

SJI	(In thousands	Total	SJI Utilities	Energy Management	Energy Production	Midstream	Corporate and Services	Intersegment Sales/Assets	Discontinued Operations
	2021	349,120	294,723	50,244	4,449	-	(296)	-	-
Operating Income	2020	282,222	261,245	30,716	(5,602)	(467)	(3,670)	-	-
	2019	201,205	217,530	(2,325)	(4,248)	(154)	(9,598)	-	-

	Percent Regulated
SJI2021OPINC	84%
SJI2020OPINC	93%
SJI2019OPINC	100%
SJIOPINCAVG	**92%**

Southwest Gas Corporation
2021 10-K, PDF pp. 37, 39, 55, 97; see also 2020 Form 10-K, pages 70 (pdf pg 72),79 (PDF 80), 45 (PDF 47), 130 (PDF 132) ; 2019 Form 10-K, pages 2, 7, 71-72 (pdf pages 55, 65, 183-185)

SWX	(In thousands)	Total	Natural Gas Operations	Utility Infrastructure Services	Pipeline & Storage	Other
	2021	369,547	318,592	85,551	-	(34,596)
Operating Income	2020	423,004	302,611	122,127	-	(1,734)
	2019	371,913	283,653	90,134	-	(1,874)

	Percent Regulated
SWX2021OPINC	86%
SWX2020OPINC	72%
SWX2019OPINC	76%
SWXOPINCAVG	**78%**

UGI Corporation
Form 10-K for year ended 9/30/21 at PDF 149 (F-61); see also 9/30/2020, page F-67 (PDF 148) ; Form 10-K for year ended 9/30/2019, pages F-72, F-73, (pdf page 160-161);

UGI	(In thousands)	Total	AmeriGas Propane	UGI International	Midstream & Marketing	UGI Utilities	Corporate & Other	Eliminations
	2021	2,350,000	385,000	314,000	160,000	241,000	1,250,000	-
Operating Income	2020	982,000	373,000	241,000	140,000	229,000	(1,000)	-
	2019	616,600	404,000	228,900	105,000	224,200	(345,500)	-

	Percent Regulated
UGI2021OPINC	10%
UGI2020OPINC	23%
UGI2019OPINC	36%
UGIOPINCAVG	**23%**

ALLETE, Inc.
2021 Form 10-K, page 38-40, 67, 119-121 ; 2019 Form 10-K, page 32-38, 119;

ALE		Total	Regulated Operations Total	ALLETE clean Energy	US Water Services	Corporate and Other	Eliminations
	2021	148,500	142,600	(13,900)	-	33,300	(13,500)
Operating Income	2020	150,900	143,200	1,000	-	20,200	(13,500)
	2019	179,800	172,200	1,200	(1,300)	40,700	(33,000)

	Percent Regulated
ALE2021OPINC	96%
ALE2020OPINC	95%
ALE2019OPINC	96%
ALEOPINCAVG	**96%**

Alliant Energy Corporation
2021 Form 10-K, page 11,14,26-27, 91-92

LNT		Total	Utility Utility Electric Operations	Utility Utility Gas Operations	Utility Utility Other	Non-Regulated AEC Holdings, Non-utility, Parent and Other
	2021	795,000	716,000	63,000	(11,000)	27,000
Operating Income	2020	740,000	643,000	74,000	(1,000)	24,000
	2019	777,700	678,900	69,800	1,300	27,700

	Percent Regulated
LNT2021OPINC	97%
LNT2020OPINC	97%
LNT2019OPINC	96%
LNTOPINCAVG	**97%**

Ameren Corporation
2021 Form 10-K pages 17-18, (pdf 13), 93-94 (pdf 57), p. 113 (pdf 68), p. 154 (pdf 92)

AEE		Total	Ameren Missouri Electic	Ameren Missouri Natural Gas	Ameren Illinois Electric	Ameren Illinois Natural Gas	Ameren Transmission	Other / Intersegment Eliminations
	2021	1,530,000		658,000	292,000	189,000	395,000	(4,000)
Operating Income	2020	1,445,000		660,000	257,000	176,000	372,000	(20,000)
	2019	1,396,000		672,000	267,000	152,000	323,000	(18,000)

	Percent Regulated
AEE2021OPINC	100%
AEE2020OPINC	100%
AEE2019OPINC	100%
AEEOPINCAVG	**100%**

American Electric Power Company, Inc.
2021 Form 10-K, page 84 (PDF (98), 90 (PDF 104), 96 (PDF 110), 99 (PDF 113), 320-322 (PDF 339-341);

AEP		Total	Vertically Integrated Utilities	Transmission and Distribution Utilities	AEP Transmission Holdco	Generation and Marketing	Corporate and Other	Reconciling Adjustments
	2021	3,435,900	1,554,700	857,900	842,900	168,000	31,100	(18,700)
Operating Income	2020	3,036,500	1,507,100	750,000	611,200	111,100	99,200	(42,100)
	2019	2,598,600	1,328,800	597,800	596,400	61,500	80,200	(66,100)

	Percent Regulated
AEP2021OPINC	95%
AEP2020OPINC	94%
AEP2019OPINC	97%
AEPOPINCAVG	**95%**

Avangrid, Inc.
2021 Form 10-K, page 61-62 (pdf p. 57-58), p. 159 (pdf 139)

AGR	(In thousands	Total	Networks	Renewables	Other
	2021	895,000	876,000	26,000	(7,000)
Operating Income	2020	869,000	877,000	(16,000)	8,000
	2019	998,000	890,000	93,000	15,000

	Percent Regulated
AGR2021OPINC	98%
AGR2020OPINC	100%
AGR2019OPINC	89%
AGROPINCAVG	**96%**

Avista Corporation
2021 Form 10-K, p. 53 (pdf 48); p. 98 (pdf 85), p. 134 (pdf p 114)

AVA		Total	Avista Utilities	Alaska Electric Light and Power Company	Other	Intersegment Eliminations
	2021	228,232	217,663	16,186	(5,617)	
Operating Income	2020	232,700	220,058	17,088	(4,446)	-
	2019	210,389	200,994	16,423	(7,028)	-

	Percent Regulated
AVA2021OPINC	100%
AVA2020OPINC	100%
AVA2019OPINC	100%
AVAOPINCAVG	**100%**

Black Hills Corporation
2021 Form 10-K, pgs. 38, 111-113, 2020 Form 10-K, pages 121-122 (PDF pages 155-156);

BKH		Total	Electric Utilities Regulated	Electric Utilities Unregulated	Gas Utilities	Corporate	Inter-company Eliminations
	2021		800,747	41,511			
Revenue	2020		699,712	39,145			
	2019		698,807	40,548			
	2021	409,429	192,687	9,988.96	211,157	36,148	(40,552)
Operating Income	2020	428,303	199,796	11,178	215,889	43,409	(41,969)
	2019	406,042	205,739	11,938	189,971	35,070	(36,676)

	Percent Regulated
BKH2021OPINC	99%
BKH2020OPINC	97%
BKH2019OPINC	97%
BKHOPINCAVG	**98%**

CenterPoint Energy, Inc.
2021 Form 10-K, pg. 47, 81, 170; 2020 Form 10-K, pg. 183

CNP		Total	Electric	Natural Gas	Corporate and Other	Eliminations	Discontinued Operations
	2021	1,363	773	618	(28)	-	-
Operating Income	2020	1,039	503	550	(14)	-	-
	2019	1,071	714	402	(45)	-	-

	Percent Regulated
CNP2021OPINC	102%
CNP2020OPINC	101%
CNP2019OPINC	104%
CNPOPINCAVG	**103%**

CMS Energy Corporation
2021 Form 10-K, p. 166-169

CMS		Total	Electric Utility	Gas Utility	Enterprises	Other Reconciling Items
	2021	1,754	889	445	21	399
Operating Income	2020	1,190	886	421	32	(149)
	2019	1,108	856	367	35	(150)

	Percent Regulated
CMS2021OPINC	76%
CMS2020OPINC	110%
CMS2019OPINC	110%
CMSOPINCAVG	**99%**

Consolidated Edison, Inc.
2021 Form 10-K p. 21, p. 62, p. 114, p. 180-181

ED		Total	CECONY Electric	CECONY Gas	CECONY Steam	Intersegment	O&R Electric	O&R Gas	O&R Other	Clean Energy Businesses	ConEd Transmission	Other
	2021	2,834	1,802	646	12		100	50	-	236	(16)	4
Operating Income	2020	2,654	1,731	574	5	-	99	48	-	215	(8)	(10)
	2019	2,676	1,758	528	62	-	98	41	-	202	(6)	(7)

	Percent Regulated
ED2021OPINC	92%
ED2020OPINC	93%
ED2019OPINC	93%
EDOPINCAVG	**93%**

Dominion Resources, Inc.
2021 Form 10-K, p. 204

D		Total	Dominion Energy Virginia	Gas Distribution	Dominion Energy South Carolina	Contracted Assets	Corporate and Other	Adjustments and Elimination
	2021	5,067	2,918	802	768	595	10	(26)
Operating Income	2020	1,059	2,914	757	745	461	(3,730)	(88)
	2019	2,833	2,798	717	615	578	(1,739)	(136)

	Percent Regulated
D2021OPINC	98%
D2020OPINC	100%
D2019OPINC	100%
DOPINCAVG	**99%**

2021 Form 10-K, page 65, 67

	TWh	
Regulated Generation	85.7	2021
Merchant Generation	20.8	
	106.5	
Regulated Generation	87.0	2020
Merchant Generation	19.3	
	106.3	
Regulated Generation	88.2	2019
Merchant Generation	20.2	
	108.4	

DTE Energy Company
2021 Form 10-K, p. 31, 33, 35, 37. 145-147

DTE		Total	Electric	Gas	DTE Vantage	Energy Trading	Corporate & Other	Reclassifications and Eliminations	Discontinued Operations
	2021	1,525	1,290	336	(15)	(86)			
Operating Income	2020	1,574	1,250	307	(35)	52	-		
	2019	1,452	1,135	316	(69)	70			

	Percent Regulated
DTE2021OPINC	107%
DTE2020OPINC	99%
DTE2019OPINC	100%
DTEOPINCAVG	**102%**

Duke Energy Corporation
2021 Form 10-K, p 45-47, 132, 133, 2020 10-K, p. 47, 49, 50, 51, 136

DUK		Total	Electric Utilities and Infrastructure	Gas Utilities and Infrastructure	Commercial Renewables	Other	Eliminations
	2021	5,352	5,256	523	(125)	(302)	
Operating Income	2020	4,553	3,985	481	(16)	85	18
	2019	5,709	5,313	431	(4)	(24)	(7)

	Percent Regulated
DUK2021OPINC	100%
DUK2020OPINC	98%
DUK2019OPINC	100%
DUKOPINCAVG	**99%**

Edison International
2021 Form 10-K, p. 62-74, 2020 Form 10-K, p. 58, 134

EIX		Total	SoCal Edison	Parent and Other
	2021	1,510	1,510	
Operating Income	2020	1,217	1,178	39
	2019	1,775	1,845	(70)

	Percent Regulated
EIX2021OPINC	100%
EIX2020OPINC	97%
EIX2019OPINC	104%
EIXOPINCAVG	**100%**

Entergy Corporation
2021 Form 10K, p. 195.

ETR		Total	Utility	Entergy Wholesale Commodities	All Other	Eliminations
	2021	1,714,321	2,001,883	(251,333)	(36,229)	-
Operating Income	2020	1,677,992	1,883,890	(169,588)	(36,309)	(1)
	2019	1,810,687	2,227,813	(130,003)	(287,123)	

	Percent Regulated
ETR2021OPINC	100%
ETR2020OPINC	100%
ETR2019OPINC	100%
ETROPINCAVG	**100%**

Eversource Energy
2021 Form 10-K, page 133, 135-136

ES		Total	Electric Distribution	Natural Gas Distribution	Electric Transmission	Water Distribution	Other	Eliminations
	2021	1,993	716	302	838	64	71	3
Operating Income	2020	1,989	833	207	788	85	71	6
	2019	1,591	800	163	485	67	74	2

	Percent Regulated
ES2021OPINC	93%
ES2020OPINC	92%
ES2019OPINC	91%
ESOPINCAVG	**92%**

Evergy, Inc.
2021 Form 10-K, p. 44, 73 2020 Form 10-K, p. 43, 72

EVRG		Total	Electric Generation, Transmission and Distribution Services
	2021	1,354.9	1,354.9
Operating Income	2020	1,143.9	1,143.9
	2019	1,185.8	1,185.8

	Percent Regulated
EVRG2021OPINC	100%
EVRG2020OPINC	100%
EVRG2019OPINC	100%
EVRGOPINCAVG	**100%**

Exelon Corporation
2021 Form 10-K, pages 226-228, 72, 75, 79, 93, 171; 2020 Form 10-K pages 81, 88, 91, 95, 204; $ millions

EXC		Total	Generation	ComEd	PECO	BGE	PHI	Other	Intersegment Eliminations
	2021	2,723	(346)	1,255	651	481	801	(29)	(90)
Operating Income	2020	2,821	256	954	546	500	629	(12)	(52)
	2019	4,374	1,323	1,171	713	532	722	(75)	(12)

	Percent Regulated
EXC2021OPINC	100%
EXC2020OPINC	93%
EXC2019OPINC	72%
EXCOPINCAVG	**88%**

FirstEnergy Corp.
2021 Form 10-K, p. 123, 2020 Form 10-K, p. 34, 128

FE		Total	Regulated Distribution	Regulated Transmission	Corporate/Other	Reconciling Adjustments
	2021	1,726	1,465	678	(417)	-
Operating Income	2020	2,162	1,527	792	-	(157)
	2019	2,510	1,921	751	(162)	-

	Percent Regulated
FE2021OPINC	100%
FE2020OPINC	100%
FE2019OPINC	100%
FEOPINCAVG	**100%**

Hawaiian Electric Industries, Inc.
2021 Form 10-K, page 86, 93, 107.

HE		Total	Electric Utility	Bank	Other	
	2021	386,066	279,558	128,203	(21,695)	33.21%
Operating Income	2020	311,493	268,550	61,809	(18,866)	19.84%
	2019	348,021	254,378	110,909	(17,266)	31.87%

	Percent Regulated
HE2021OPINC	72%
HE2020OPINC	86%
HE2019OPINC	73%
HEOPINCAVG	**77%**

IDACORP, Inc.
2021 Form 10-K, p. 10, 82, 130-131

IDA		Total	Utility Operations	All Other	Eliminations
	2021	329,651	329,568	83	-
Operating Income	2020	309,521	308,780	741	-
	2019	298,326	297,652	674	-

	Percent Regulated
IDA2021OPINC	100%
IDA2020OPINC	100%
IDA2019OPINC	100%
IDAOPINCAVG	**100%**

MGE Energy, Inc.
2021 Form 10-K, pg. 112, 2020 Form 10-K, pp. 112, 114; 2019 Form 10-K, pp. 105, 107

MGEE		Total	Electric	Gas	Non Regulated Energy	Transmission Investment	All Others	Consolidation/ Elimination Entries
	2021	117,294	58,993	25,133	33,936	-	(768)	-
Operating Income	2020	109,997	57,847	19,674	33,460	(1)	(983)	-
	2019	110,910	59,180	19,528	33,084	-	(882)	-

	Percent Regulated
MGEE2021OPINC	72%
MGEE2020OPINC	70%
MGEE2019OPINC	71%
MGEEOPINCAVG	**71%**

NextEra Energy, Inc.
2021 Form 10-K, p. 110-111

NEE		Total	FPL	Gulf Power	NEER	Corporate & Other
	2021	6,094	4,290	370	(175)	1,609
Operating Income	2020	1,712	3,860	346	(1,127)	(1,367)
	2019	4,631	3,369	277	2,461	(1,476)

	Percent Regulated
NEE2021OPINC	76%
NEE2020OPINC	100%
NEE2019OPINC	79%
NEEOPINCAVG	**85%**

NorthWestern Corporation
2021 Form 10-K, pp. F-5, F-48, F-49

NWE		Total	Regulated Electric Operations	Regulated Natural Gas Operations	Other	Eliminations
	2021	275,681	238,802	38,569	(1,690)	-
Operating Income	2020	236,204	196,823	37,601	1,780	-
	2019	276,850	231,217	48,716	(3,083)	-

	Percent Regulated
NWE2021OPINC	100%
NWE2020OPINC	99%
NWE2019OPINC	100%
NWEOPINCAVG	**100%**

OGE Energy Corp.
2021 Form 10-K p.5, 32, 55, 103-104

OGE		Total	Electric Utility	Natural Gas Midstream - Sold December 2, 2021	Other Operations	Eliminations
	2021	544	546	(2)	(0)	
Operating Income	2020	522	525	(2)	(1)	-
	2019	504	508	(3)	(0)	-

	Percent Regulated
OGE2021OPINC	100%
OGE2020OPINC	100%
OGE2019OPINC	100%
OGEOPINCAVG	**100%**

Otter Tail Corporation
2021 Form 10-K, p. 50-51, 2020 Form 10-K, p. 49

OTTR		Total	Electric	Manufacturing	Plastics	Corporate and Intersegment Eliminations
	2021	249,708	106,964	24,114	132,760	(14,130)
Operating Income	2020	147,886	107,083	16,103	37,823	(13,123)
	2019	134,880	98,417	17,869	28,439	(9,845)

	Percent Regulated
OTTR2021OPINC	43%
OTTR2020OPINC	72%
OTTR2019OPINC	73%
OTTROPINCAVG	**73%**

Note: 2021 Operting Income Data was excluded from the three year average since, as noted by Otter Tail, 2021 oprating income was impacted by the plastics segment that is not expected to continue over the long-term term. See OTTR 2021 10-K PDF pg. 5: "Our 2021 earnings mix was impacted by significantly higher earnings in our Plastics segment as unique supply and demand conditions during the year in the PVC pipe industry led to earnings levels not previously experienced. We expect our earnings mix to return back to our targeted mix of 70% from the Electric segment and 30% from the Manufacturing and Plastics segments over the long term as these industry conditions
subside."

PG&E Corporation
2021 Form 10-K, p. 35, 36, 37, 69, 100, 107, 111, 116, 118; 2020 Form 10-K, pp. 111

PCG		Total	Electric Utility	Natural Gas Utility	Corporate Other
	2021	1,883	1,889		(6)
Operating Income	2020	1,755	1,731		24
	2019	(10,094)	(10,118)		24

	Percent Regulated
PCG2021OPINC	100%
PCG2020OPINC	99%
PCG2019OPINC	100%
PCGOPINCAVG	**100%**

Pinnacle West Capital Corporation
2021 Form 10-K, pp. 94-99, 105-109, 2020 Form 10-K p.91, 102

PNW		Total	Arizona Public Service Co.	Corporate Other
	2021	805,310	818,961	(13,651)
Operating Income	2020	788,152	802,011	(13,859)
	2019	671,960	686,984	(15,024)

	Percent Regulated
PNW2021OPINC	100%
PNW2020OPINC	100%
PNW2019OPINC	100%
PNWOPINCAVG	**100%**

PNM Resources, Inc.
2021 Form 10-K, p. B-18, B-36-B-37.

PNM		Total	PNM Electric	TNMP Electric	Corporate and Other
	2021	308,153	221,497	100,118	(13,462)
Operating Income	2020	285,281	214,897	88,453	(18,069)
	2019	144,200	61,068	85,814	(2,682)

	Percent Regulated
PNM2021OPINC	100%
PNM2020OPINC	100%
PNM2019OPINC	100%
PNMOPINCAVG	**100%**

Portland General Electric Company
2021 Form 10-K, p. 71,73; 2020 Form 10-K, p. 68

POR		Total	Portland General Electric Company
	2021	378	378
Operating Income	2020	269	269
	2019	353	353

	Percent Regulated
POR2021OPINC	100%
POR2020OPINC	100%
POR2019OPINC	100%
POROPINCAVG	**100%**

PPL Corporation
2021 Form 10-K p. 35, 109, 136, 2020 Form 10-K p. 103, 108

PPL		Total	Kentucky Regulated	Pennsylvania Regulated	Corporate and Other	Discontinued Operations
	2021	1,519	758	761		
Operating Income	2020	1,575	739	836		1,954
	2019	1,527	782	745		1,276

	Percent Regulated
PPL2021OPINC	100%
PPL2020OPINC	100%
PPL2019OPINC	100%
PPLOPINCAVG	**100%**

Public Service Enterprise Group Incorporated
2021 Form 10-K, p. 161-162

PEG		Total	PSE&G	PSEG Power	Other	Eliminations
	2021	(856)	1,818	(2,711)	37	
Operating Income	2020	2,270	1,639	603	28	-
	2019	1,943	1,469	448	26	-

	Percent Regulated
PEG2021OPINC	100%
PEG2020OPINC	72%
PEG2019OPINC	76%
PEGOPINCAVG	**83%**

Sempra Energy
2021 Form 10-K, 12 (80.25% interest in Oncor), F-16, F-22, F-152-F154, Exhibit 99.1 pg. 8;

SRE ($ millions)		Total	SDG&E	SoCalGas	Sempra Texas Utilities	Sempra Infrastructure	Sempra Renewables	All Other	Adjustments and eliminations	Intersegment Revenues	Discontinued Operations
	2021	2,782	1,367	(566)	965	1,050	-	(25)	(9)	-	-
Operating Income	2020	5,308	1,373	785	913	762	-	(367)	2	-	1,840
	2019	3,718	1,313	956	862	485	55	(271)	(10)	-	328

	Percent Regulated
SRE2021OPINC	63%
SRE2020OPINC	58%
SRE2019OPINC	84%
SREOPINCAVG	**69%**

Southern Company
2021 Form 10-K, p. II-265

SO		Total	Traditional Operating Companies	Southern Power	Eliminations	Southern Company Gas	All Other	Eliminations
	2021	4,550	3,015	399	-	1,102	40	(6)
Operating Income	2020	5,143	4,190	388	-	848	(293)	10
	2019	8,051	4,471	440	-	787	2,369	(16)

	Percent Regulated
SO2021OPINC	90%
SO2020OPINC	98%
SO2019OPINC	65%
SOOPINCAVG	**85%**

WEC Energy Group, Inc.
2021 Form 10-K, pgs. 49, 53, 55, 57, 58, 135-136; 2020 Form 10-k, pgs. 46, 52, 55;

WEC ($ thousands)		Total	Wisconsin Electric	Wisconsin Natural Gas	Illinois Natural Gas	Other States Natural Gas	Electric Transmission	Non-Utility Energy Infrastructure	Corporate and Other	Reconciling Eliminations	Wisconsin total
	2021		4,538,600	1,498,400							
Revenue	2020		4,274,000	1,199,500							
	2019		4,317,600	1,329,500							
	2021	1,714,200	984,328.14	324,971.86	361,600	52,400	-	350,300	(18,900)	(340,500)	1,309,300
Operating Income	2020	1,705,200	1,040,721.15	292,078.85	330,800	61,600	-	366,300	(40,800)	(345,500)	1,332,800
	2019	1,567,300	909,531.79	280,068.21	291,900	65,300	-	367,500	7,100	(354,100)	1,189,600

	Percent Regulated
WEC2021OPINC	100%
WEC2020OPINC	100%
WEC2019OPINC	99%
WECOPINCAVG	**100%**

Xcel Energy Inc.
2021 Form 10-K, pp 27-28, 49, 51, 81; 2020 Form 10-K, pp 25, 48;

XEL	($ thousands)		Total	Regulated Electric Utility	Regulated Natural Gas Utility	All Other	Reconciling Eliminations
		2021	2,203,000	1,895,230	307,770	-	
	Operating Income	2020	2,116,000	1,839,110	276,890	-	
		2019	2,104,000	1,819,068	284,932	-	

Xcel Total		Electric Margin	Gas Margin	% Electric	% Gas
2,203,000	2021	6,472,000	1,051,000	86%	14%
2,116,000	2020	6,290,000	947,000	87%	13%
2,104,000	2019	6,065,000	950,000	86%	14%

	Percent Regulated
XEL2021OPINC	100%
XEL2020OPINC	100%
XEL2019OPINC	100%
XELOPINCAVG	**100%**

INPUT: CREDIT RATING

S&P	Include?
AAA	Yes
AA+	Yes
AA	Yes
AA-	Yes
A+	Yes
A	Yes
A-	Yes
BBB+	Yes
BBB	Yes
BBB-	Yes
BB+	
BB	
BB-	
B+	
B	
B-	
CCC+	
CCC	
CCC-	
CC	
C	
D	
NR	

New York State Electric & Gas Corporation
Rochester Gas and Electric Corporation

22-E-0317, 22-G-0318, 22-E-0319, 22-G-0320
Request for Information

Requesting Party: Michael Augstell

Request No.: NYRC-0367 (DPS-103)

Date of Request: June 22, 2022

Response Due Date: July 5, 2022

Extension Due Date: July 6, 2022

Date of Reply: July 6, 2022

Witness: Dave George

Subject: Revenue and Expense Reconciliations

Question:

In all interrogatories, all requests for workpapers or supporting calculations shall be construed as requesting any Word, Excel or other computer spreadsheet models in original electronic format with all formulae intact and unlocked.

1. For NYSEG and RG&E, separately provide:

    a. the amount of the Company's total historic test year operating revenue that was subject to reconciliation, identified by electric or gas operations.

    b. the amount of the Company's total rate year operating revenue that the Company proposes to reconcile, identified by electric or gas operations.

    c. the amount of the Company's total historic O&M expense that was subject to reconciliation, identified by electric or gas operations.

    d. the amount of the Company's total rate year O&M expense that the Company proposes to reconcile, identified by electric or gas operations.

Response:

1. a. For purposes of measuring operating revenue, the grand total should be viewed as the Total Sales Revenue line shown on Schedule B of the RRP-2 exhibits. Of those totals, the test year Delivery amounts that are subject to reconciliation are all items except for BIPP, GRT and the Commodity MFC/POR. The test year amounts by electric and gas are as follows ($ thousands):

- NYSEG Elec $833,904

New York State Electric & Gas Corporation
Rochester Gas and Electric Corporation

22-E-0317, 22-G-0318, 22-E-0319, 22-G-0320
Request for Information

- NYSEG Gas $203,314
- RG&E Elec $475,339
- RG&E Gas $173,538

1.b. The comparable Rate Year with Increase amounts proposed are as follows ($ thousands):

- NYSEG Elec $1,131,370
- NYSEG Gas $247,269
- RG&E Elec $575,194
- RG&E Gas $211,169

1.c. Amount of historic O&M subject to reconciliation are 2020 Joint Proposal Appendix T Rate Year target amounts (all except for non-O&M items Property Taxes, Net Plant Reconciliations, Debt Costs, and Interruptible Revenues). When adjusted to calendar year 2021 the amounts are as follows ($ thousands):

- NYSEG Elec $279,862
- NYSEG Gas $59,541
- RG&E Elec $93,097
- RG&E Gas $45,774

1.d. Comparable proposed amount of O&M to be subject to reconciliation in the forecast rate year is as follows (Note: excludes Inflation related reconciliation as amounts TBD):

- NYSEG Elec $307,017
- NYSEG Gas $56,650
- RG&E Elec $93,538
- RG&E Gas $52,188

New York State Electric & Gas Corporation
Rochester Gas and Electric Corporation

22-E-0317, 22-G-0318, 22-E-0319, 22-G-0320
Request for Information

Requesting Party: Michael Augstell (DPS)

Request No.: NYRC-0462 (DPS-191)

Date of Request: July 6, 2022

Response Due Date: July 18, 2022

Date of Reply: July 12, 2022

Witness: Howard Coon

Subject: NYSEG & RG&E Long-Term Debt

Question:

In all interrogatories, all requests for workpapers or supporting calculations shall be construed as requesting any Word, Excel or other computer spreadsheet models in original electronic format with all formulae intact and unlocked.

1. Does NYSEG and RG&E have any variable rate long-term debt? If yes, provide the details for the variable rate issuances.

2. On May 1, 2020, NYSEG remarketed $200 million in Pollution Control Notes. Explain how the remarketing of these notes worked.

Response:

1. Neither NYSEG nor RG&E have variable rate long-term debt.

2. The bonds were sold to Bank of America in a private transaction pursuant to a forward purchase agreement that was priced and executed on March 9, 2020 and subsequently closed on May 1, 2020. Bank of America intends to hold the bonds to maturity. The Company determined that this private transaction provided the lowest cost of funding by comparing the yields on contemporaneous, comparable underwritten transactions and considering the issuance cost savings of this form of transaction, including no underwriting fees.

New York State Electric & Gas Corporation
Rochester Gas and Electric Corporation

22-E-0317, 22-G-0318, 22-E-0319, 22-G-0320
Request for Information

Requesting Party: Michael Augstell

Request No.: NYRC-0859 (DPS-508)

Date of Request: August 5, 2022

Response Due Date: August 15, 2022

Date of Reply: August 15, 2022

Witness: Dave George, Howard Coon

Subject: NYSEG/RG&E Variable Rate Debt Amortization

Question:

In all interrogatories, all requests for workpapers or supporting calculations shall be construed as requesting any Word, Excel or other computer spreadsheet models in original electronic format with all formulae intact and unlocked.

1. In the workpaper for NYSEG, NC-RRP-4-WP-02, Schedule A there are new variable rate debt amortizations on lines 100 and 250. In the workpaper for RG&E, RC-RRP-4-WP-02 there are new variable rate amortizations on lines 59, 98, 221 and 251. It is our understanding there is no variable rate debt for NYSEG or RG&E. Explain these new variable rate debt amortizations.

Response:

All of the amounts in question fall under the sub-heading "Pre-JP Remaining Balance" which effectively represent any remaining balances on the books prior to 4/30/20 that did not get incorporated in time to be considered in the 2020 JP and amortized effective 5/1/20. Had there been any new variable rate debt, it would have been listed in the workpapers under sub-heading "New Amortization Items".

New York State Electric & Gas Corporation
Rochester Gas and Electric Corporation

22-E-0317, 22-G-0318, 22-E-0319, 22-G-0320
Request for Information

Requesting Party: Michael Augstell

Request No.: NYRC-0969 (DPS-578)

Date of Request: August 16, 2022

Response Due Date: August 26, 2022

Date of Reply: August 25, 2022

Witness: Ann Bulkley / Howard Coon

Subject: (NYRC-0357/DPS-93)-NYSEG/RG&E, Pro Forma Credit Metrics Follow-Up

Question:

In all interrogatories, all requests for workpapers or supporting calculations shall be construed as requesting any Word, Excel or other computer spreadsheet models in original electronic format with all formulae intact and unlocked.

1. For the rate year ending April 30, 2024, provide the following financial ratios in Excel format for New York State Electric & Gas Corporation and Rochester Gas & Electric Corporation reflecting the August 12, 2022, update. Explain any adjustments made to the calculations.

   a. (Cash Flow from Operations (CFO) pre-Working Capital (WC) + Interest)/Interest.
   b. CFO pre-WC/Debt.
   c. (CFO pre-WC – Dividends)/Debt.
   d. Debt/Capitalization.
   e. Funds from Operations (FFO)/Debt.
   f. Debt/Earnings before Interest, Taxes, Depreciation and Amortization (EBITDA).

Response:

Please see attached Confidential Attachment 1 containing forecasted ratios resulting from the August 12, 2022 update. Confidential Attachment 2 has the ratios, supporting data and detailed calculations in Excel format.

In the course of preparing this response, we discovered an error in the forecast model used in preparing the response to NYRC-0357-DPS-93. As a result, we have supplemented the response to NYRC-0357-DPS-93 to update the ratios based on a corrected long-term forecast model.

New York State Electric & Gas Corporation
Rochester Gas and Electric Corporation

22-E-0317, 22-G-0318, 22-E-0319, 22-G-0320
Request for Information

The differences in the ratios between those contained in the Supplemental Response to NYRC-0357-DPS-93 and the ratios provided in response to this interrogatory result from the updates to revenue requirements summarized in Attachment 1 to the August 12 update and attached here as Attachment 3.

Case No. 22-E-0317, 22-G-0318, 22-E-0319, 22-G-0320
Request No. NYRC-0357 (DPS-578)
New York State Electric & Gas Corp

Page 1 of 1
Witness: Ann Bulkley / Howard Coon

Rating Agency Ratio Calculations
(Thousands of Dollars)

		Test Year December 31, 2021	Rate Year 1 April 30, 2024	Benchmark Range[1]	Downgrade Threshold
1	[redacted]				

Case No. 22-E-0317, 22-G-0318, 22-E-0319, 22-G-0320
Request No. NYRC-0357 (DPS-578)
Rochester Gas & Electric Corp

Page 1 of 1
Witness: Ann Bulkley / Howard Coon

Rating Agency Ratio Calculations
(Thousands of Dollars)

		Test Year December 31, 2021	Rate Year 1 April 30, 2024	Benchmark Range[1]	Downgrade Threshold
1	[redacted]				

NYRC-0969-DPS-578 (22-E-0317 et.al.)
REDACTED ATTACHMENT 2

($MM) #REF!	Actual 2021
Capitalized Interest Adjustment	
Capitalized Interest	9
Effective Tax Rate	5.7%
Capitalized Interest, Taxes	1
Capitalized Interest, After-tax	8
Pension Adjustment	
Projected Benefit Obligation (End of Year)	1,593
Fair Value of Plan Assets (End of Year)	1,543
Net Periodic Pension Benefit Cost (Income)	34
Service Cost	16
Interest Cost	39
Actual Return on Plan Assets	108
Employer Contributions	-
Incremental LT Borrowing Interest Rate - Q1	2.42%
Incremental LT Borrowing Interest Rate - Q2	2.04%
Incremental LT Borrowing Interest Rate - Q3	2.18%
Incremental LT Borrowing Interest Rate - Year-end	2.32%
Pension Asset	-
Pension Liability	50
Interest Expense Q1	0
Interest Expense Q2	0
Interest Expense Q3	0
Interest Expense Q4	0
Aggregate Quarterly Interest Expense	1
Annual Interest Expense	1
Interest on Pension Liability	1
Employer Contributions, Net of Service Cost	-
Operating Lease Adjustment	
Current Year Rent Expense	1
Weighted-average Discount Rate (Operating leases)	3.33%
Current Rent Expense x Multiplier	9
Operating Leases	11
Depreciation on Operating Leases	1
Interest on Operating Leases	0
Non-Standard Adjustments	
Unamortized Debt	
Placeholder	
Placeholder	

($MM)	Actual
#REF!	2021

Surplus Cash Adjustment	
Haircut	0%
Cash and cash equivalents	#REF!
Surplus Cash	#REF!

Capitalized Interest Adjustment	
Capitalized Interest	9
Effective Tax Rate	5.7%
Capitalized Interest, Taxes	1
Capitalized Interest, After-tax	8

Asset Retirement Obligation (ARO) Adjustment	
Corporate Tax Rate	21.0%
ARO carrying amount	12
ARO accretion expense	1
ARO liabilities settled	(1)
ARO liabilities incurred	-
Asset Retirement Obligation	9
Interest on ARO	1
ARO (Costs)/Credit	1
Tax Effect on ARO Interest	(0)

Pension Adjustment	
Projected Benefit Obligation (End of Year) - Pension	1,593
Projected Benefit Obligation (End of Year) - OPEB	143
Fair Value of Plan Assets (End of Year) - Pension	1,543
Fair Value of Plan Assets (End of Year) - OPEB	49
Net Funded Status - Under/(Over) - Pension	50
Net Funded Status - Under/(Over) - OPEB	94
Pension Liability	113

Operating Lease Adjustment	
Discount Factor	3.3%
Current Year Rent Expense	1
Operating Leases	11
Average Operating Lease Balance	9
Interest on Operating Leases	0
OLA Rent Expense	1
Depreciation on Operating Leases	1
Adjust Capex for Operating Leases (Y/N)	N
OLA Implied Capex	-

Non-Standard Adjustments	
Unamortized Debt	
Placeholder	
Placeholder	

($MM) RG&E Corp - Moody's Adjustments	Actual 2021
Capitalized Interest Adjustment	
Capitalized Interest	9
Effective Tax Rate	15.9%
Capitalized Interest, Taxes	1
Capitalized Interest, After-tax	8
Pension Adjustment	
Projected Benefit Obligation (End of Year)	345
Fair Value of Plan Assets (End of Year)	291
Net Periodic Pension Benefit Cost (Income)	10
Service Cost	5
Interest Cost	6
Actual Return on Plan Assets	23
Employer Contributions	3
Incremental LT Borrowing Interest Rate - Q1	2.42%
Incremental LT Borrowing Interest Rate - Q2	2.04%
Incremental LT Borrowing Interest Rate - Q3	2.18%
Incremental LT Borrowing Interest Rate - Year-end	2.32%
Pension Asset	-
Pension Liability	54
Interest Expense Q1	0
Interest Expense Q2	0
Interest Expense Q3	0
Interest Expense Q4	0
Aggregate Quarterly Interest Expense	1
Annual Interest Expense	1
Interest on Pension Liability	1
Employer Contributions, Net of Service Cost	-
Operating Lease Adjustment	
Current Year Rent Expense	1
Weighted-average Discount Rate (Operating leases)	2.92%
Current Rent Expense x Multiplier	3
Operating Leases	50
Depreciation on Operating Leases	0
Interest on Operating Leases	0
Non-Standard Adjustments	
Unamortized Debt	
Placeholder	
Placeholder	

($MM) RG&E Corp - S&P Adjustments	Actual 2021
Surplus Cash Adjustment	
Haircut	0%
Cash and cash equivalents	#REF!
Surplus Cash	#REF!
Capitalized Interest Adjustment	
Capitalized Interest	9
Effective Tax Rate	15.9%
Capitalized Interest, Taxes	1
Capitalized Interest, After-tax	8
Asset Retirement Obligation (ARO) Adjustment	
Corporate Tax Rate	21.0%
ARO carrying amount	2
ARO accretion expense	0
ARO liabilities settled	(0)
ARO liabilities incurred	-
Asset Retirement Obligation	2
Interest on ARO	0
ARO (Costs)/Credit	0
Tax Effect on ARO Interest	(0)
Pension Adjustment	
Projected Benefit Obligation (End of Year) - Pension	345
Projected Benefit Obligation (End of Year) - OPEB	61
Fair Value of Plan Assets (End of Year) - Pension	291
Fair Value of Plan Assets (End of Year) - OPEB	-
Net Funded Status - Under/(Over) - Pension	54
Net Funded Status - Under/(Over) - OPEB	61
Pension Liability	91
Operating Lease Adjustment	
Discount Factor	2.9%
Current Year Rent Expense	1
Operating Leases	50
Average Operating Lease Balance	3
Interest on Operating Leases	0
OLA Rent Expense	1
Depreciation on Operating Leases	0
Adjust Capex for Operating Leases (Y/N)	N
OLA Implied Capex	-
Non-Standard Adjustments	
Unamortized Debt	
Placeholder	
Placeholder	

New York State Electric & Gas Corporation
Rochester Gas and Electric Corporation

22-E-0317, 22-G-0318, 22-E-0319, 22-G-0320
Request for Information

Requesting Party: Chris Carmel

Request No.: NYRC-0981 (DPS-586)

Date of Request: August 18, 2022

Response Due Date: August 29, 2022

Date of Reply: August 26, 2022

Witness: Ann Bulkley

Subject: Proxy Group Screening

Question:

In all interrogatories, all requests for workpapers or supporting calculations shall be construed as requesting any Word, Excel or other computer spreadsheet models in original electronic format with all formulae intact and unlocked.

1. The Company's response in NYRC-0310-DPS-46 and NYRC-0310-DPS-46 Attachment 1 indicates that CenterPoint Energy, Inc., Dominion Resources Inc., and PPL Corporation were eliminated from your proxy group selection for not paying regular dividends (for at least one criterion). Is it true that these three companies do not pay regular dividends?

Response:

The dividend screening criterion requires that a company: 1) pay a dividend; and 2) have not had a cut in their dividend in the last three years. As shown in the table below, CenterPoint Energy, Inc., Dominion Resources Inc., and PPL Corporation have each reduced their dividend payments in the last three years and thus were excluded from the proxy group. Further, as in Attachment 1, CenterPoint Energy, Inc. also did not meet the M&A screening criterion while PPL Corporation did not meet either the M&A screening criterion or the growth rate screening criterion which required companies to have a positive EPS growth rate from two sources.

Company	Date of Dividend Cut (Ex-Dividend Date)
CenterPoint Energy, Inc.	5/20/2020
Dominion Resources Inc.	12/3/2020

New York State Electric & Gas Corporation
Rochester Gas and Electric Corporation

22-E-0317, 22-G-0318, 22-E-0319, 22-G-0320
Request for Information

PPL Corporation	3/9/2022

NEW YORK STATE ELECTRIC & GAS CORPORATION
RATE OF RETURN REQUIRED FOR:
TWELVE MONTHS ENDING APRIL 30, 2024

	Average Capitalization %	Cost Rate %	Weighted Cost Rate %	Pre-Tax Cost Rate %
Long-Term Debt	51.64%	3.66%	1.89%	1.89%
Customer Deposits	0.36%	0.00%	0.00%	0.00%
Common Equity	48.00%	8.85%	4.25%	5.75%
Total Capitalization	100.00%		6.14%	7.64%

ROCHESTER GAS & ELECTRIC CORPORATION
RATE OF RETURN REQUIRED FOR:
TWELVE MONTHS ENDING APRIL 30, 2024

	Average Capitalization %	Cost Rate %	Weighted Cost Rate %	Pre-Tax Cost Rate %
Long-Term Debt	51.85%	4.27%	2.21%	2.21%
Customer Deposits	0.15%	0.00%	0.00%	0.00%
Common Equity	48.00%	8.85%	4.25%	5.75%
Total Capitalization	100.00%		6.46%	7.96%

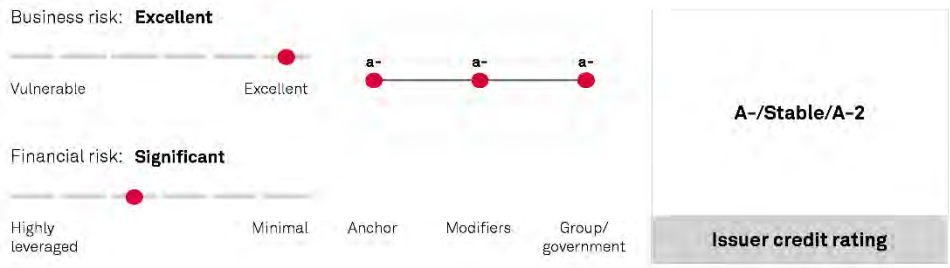
S&P Global Ratings

RatingsDirect®

New York State Electric & Gas Corp.

September 16, 2022

Ratings Score Snapshot



PRIMARY CONTACT

Matthew L O'Neill
New York
1-212-438-4295
matthew.oneill
@spglobal.com

SECONDARY CONTACT

Beverly R Gantt
New York
1-212-438-1696
beverly.gantt
@spglobal.com

RESEARCH CONTRIBUTOR

Jesal K Gandhi
CRISIL Global Analytical Center,
an S&P Global Ratings affiliate
Mumbai

Credit Highlights

Overview

Key strengths	Key risks
Lower-risk, rate-regulated electric and natural gas utility operations.	Limited geographic and regulatory diversity with operations concentrated in upstate New York.
Effective management of regulatory risk.	Robust capital spending.
Large customer base serving more than 1.1 million electric and gas customers.	
Primarily residential customer base provides stable cash flows.	

New York State Electric & Gas Corp. (NYSEG) is a stable, regulated utility that operates under a generally supportive framework. We expect NYSEG to continue to effectively manage its regulatory risk and support its financial metrics through existing cost-recovery mechanisms. In May 2022, NYSEG filed an electric and gas rate case premised on a 10.2% return on equity. The new rates would become effective May 1, 2023, at the end of the utility's current rate plan. The company is also exploring a multi-year rate plan as part of the negotiation. We will continue to monitor the situation.

NYSEG has limited geographic and regulatory diversification. The company's credit quality largely depends on the NYPSC's regulatory framework.

Outlook

The stable outlook on NYSEG mirrors our outlook on its ultimate parent, **Iberdrola S.A.**, along with our expectation of stand-alone financial measures, including funds from operations (FFO) to debt, which we expect to remain above 15%.

Downside scenario

We assess the structural and regulatory protections in place as insulating NYSEG up to two notches above its parent. We could lower the rating on NYSEG if we lowered the rating on Iberdrola S.A. and/or if NYSEG's stand-alone financial measures weakened, including an FFO-to-debt ratio that is consistently below 15%. This could occur if adverse regulatory outcomes impeded NYSEG's ability to manage regulatory risk.

Upside scenario

We could upgrade NYSEG if its stand-alone financial measures consistently reflected the very high end of the range for its financial risk profile category while it maintained the strength of its business risk profile. Specifically, this would reflect FFO to debt consistently greater than 22%.

Our Base-Case Scenario

Assumptions

- Consistent rate case filings and use of existing regulatory mechanisms,
- Capital spending averaging about $650 million-$700 million annually,
- Dividend payments of about $100 million annually, and
- Negative discretionary cash flow.

Key metrics

New York State Electric & Gas Corp. --Key Metrics*

	2021a	2022e	2023f
FFO to debt (%)	15.7	15-16	15-16
Debt to EBITDA (x)	6.0	5.5-6	5.0-5.5

*All figures adjusted by S&P Global Ratings. a--Actual. e--Estimate. f--Forecast.

Enter Article Content Here

Company Description

NYSEG engages in the regulated transmission and distribution of electricity in the U.S. It also transports, stores, and distributes natural gas. It serves approximately y 914,000 electricity and 272,000 natural gas customers in central, eastern, and western New York. The company was founded in 1852 and is a subsidiary of **Avangrid Inc**.

Peer Comparison

New York State Electric & Gas Corp.--Peer Comparisons

	New York State Electric & Gas Corp.	Rochester Gas & Electric Corp.	Central Hudson Gas & Electric Corp.	Orange and Rockland Utilities Inc.
Foreign currency issuer credit rating	A-/Stable/A-2	A-/Stable/--	A-/Negative/NR	A-/Negative/A-2
Local currency issuer credit rating	A-/Stable/A-2	A-/Stable/--	A-/Negative/NR	A-/Negative/A-2
Period	Annual	Annual	Annual	Annual
Period ending	2021-12-31	2021-12-31	2021-12-31	2021-12-31
Mil.	$	$	$	$
Revenue	1,804	958	796	941
EBITDA	375	261	175	249
Funds from operations (FFO)	355	243	140	199
Interest	64	53	38	43
Cash interest paid	56	51	33	43
Operating cash flow (OCF)	392	264	61	126
Capital expenditure	790	426	230	216
Free operating cash flow (FOCF)	(398)	(162)	(169)	(90)
Discretionary cash flow (DCF)	(668)	(412)	(169)	(142)
Cash and short-term investments	0	0	4	29
Gross available cash	0	0	4	29
Debt	2,260	1,563	1,025	1,084
Equity	1,971	1,276	932	888
EBITDA margin (%)	20.8	27.3	22.0	26.4
Return on capital (%)	5.5	6.3	5.8	6.9
EBITDA interest coverage (x)	5.8	4.9	4.6	5.8
FFO cash interest coverage (x)	7.3	5.8	5.2	5.6
Debt/EBITDA (x)	6.0	6.0	5.8	4.4

New York State Electric & Gas Corp.--Peer Comparisons

FFO/debt (%)	15.7	15.5	13.7	18.3
OCF/debt (%)	17.4	16.9	5.9	11.6
FOCF/debt (%)	(17.6)	(10.4)	(16.5)	(8.3)
DCF/debt (%)	(29.5)	(26.4)	(16.5)	(13.1)

Business Risk

Our assessment of NYSEG's business risk reflects its lower-risk electric and natural gas utility operations and effective management of regulatory risk. Residential customers account for more than 85% of the company's customer base, which provides additional stability to its cash flows. However, NYSEG's lack of geographic and regulatory diversity partially offsets these strengths. The company is a wholly owned subsidiary of Avangrid Inc. and an intermediary holding company and subsidiary of its ultimate parent, Iberdrola S.A. NYSEG accounts for about 19% of Avangrid's revenue.

The NYPSC regulates NYSEG. We view the regulatory environment in New York as generally constructive. The company benefits from forward-test year and revenue decoupling that protects it from adverse weather, conservation, and adverse economic conditions, thus reducing its regulatory lag. Overall, we view the company's management of regulatory risk as in line with that of its peers and expect it will continue to effectively manage its regulatory risk.

Financial Risk

We assess NYSEG's financial measures using our medial volatility financial benchmarks, rather than those we use for typical corporate issuers, due to its lower-risk regulated electric and natural gas utility business and effective management of regulatory risk. Under our base case scenario--which includes distribution base-rate increases and modest load growth that are partially offset by moderately negative cash flows (largely stemming from robust capital spending averaging about $650 million-$700 million annually)--we expect its FFO to debt to be about 15%.

New York State Electric & Gas Corp.--Financial Summary

Period ending	Dec-31-2016	Dec-31-2017	Dec-31-2018	Dec-31-2019	Dec-31-2020	Dec-31-2021
Reporting period	2016a	2017a	2018a	2019a	2020a	2021a
Display currency (mil.)	$	$	$	$	$	$
Revenues	1,539	1,535	1,694	1,548	1,564	1,804
EBITDA	419	408	382	339	354	375
Funds from operations (FFO)	292	328	320	285	334	355
Interest expense	63	75	71	80	75	64
Cash interest paid	42	52	41	44	55	56
Operating cash flow (OCF)	347	392	408	272	245	392
Capital expenditure	315	366	522	587	685	790
Free operating cash flow (FOCF)	32	25	(114)	(315)	(440)	(398)
Discretionary cash flow (DCF)	(43)	(75)	(114)	(415)	(540)	(668)
Cash and short-term investments	4	3	5	0	0	0

New York State Electric & Gas Corp.--Financial Summary

Gross available cash	4	3	5	0	0	0
Debt	1,444	1,486	1,481	1,827	1,952	2,260
Common equity	1,192	1,197	1,454	1,472	1,901	1,971
Adjusted ratios						
EBITDA margin (%)	27.2	26.6	22.5	21.9	22.6	20.8
Return on capital (%)	12.0	11.0	8.9	6.2	6.3	5.5
EBITDA interest coverage (x)	6.7	5.4	5.4	4.2	4.7	5.8
FFO cash interest coverage (x)	8.0	7.3	8.9	7.4	7.0	7.3
Debt/EBITDA (x)	3.4	3.6	3.9	5.4	5.5	6.0
FFO/debt (%)	20.3	22.0	21.6	15.6	17.1	15.7
OCF/debt (%)	24.0	26.4	27.6	14.9	12.6	17.4
FOCF/debt (%)	2.2	1.7	(7.7)	(17.3)	(22.5)	(17.6)
DCF/debt (%)	(3.0)	(5.0)	(7.7)	(22.7)	(27.7)	(29.5)

Reconciliation Of New York State Electric & Gas Corp. Reported Amounts With S&P Global Adjusted Amounts (Mil. $)

	Debt	Shareholder Equity	Revenue	EBITDA	Operating income	Interest expense	S&PGR adjusted EBITDA	Operating cash flow	Dividends	Capital expenditure
Financial year	Dec-31-2021									
Company reported amounts	2,148	1,971	1,804	372	199	54	375	400	270	799
Cash taxes paid	-	-	-	-	-	-	37	-	-	-
Cash interest paid	-	-	-	-	-	-	(47)	-	-	-
Lease liabilities	11	-	-	-	-	-	-	-	-	-
Operating leases	-	-	-	1	0	0	(0)	1	-	-
Postretirement benefit obligations/ deferred compensation	113	-	-	-	-	-	-	-	-	-
Capitalized interest	-	-	-	-	-	9	(9)	(9)	-	(9)
Asset-retirement obligations	9	-	-	1	1	1	-	-	-	-
Nonoperating income (expense)	-	-	-	-	23	-	-	-	-	-
Debt: other	(22)	-	-	-	-	-	-	-	-	-

Reconciliation Of New York State Electric & Gas Corp. Reported Amounts With S&P Global Adjusted Amounts (Mil. $)

	Debt	Shareholder Equity	Revenue	EBITDA	Operating income	Interest expense	S&PGR adjusted EBITDA	Operating cash flow	Dividends	Capital expenditure
Total adjustments	112	-	-	2	24	10	(19)	(8)	-	(9)
S&P Global Ratings adjusted	**Debt**	**Equity**	**Revenue**	**EBITDA**	**EBIT**	**Interest expense**	**Funds from Operations**	**Operating cash flow**	**Dividends**	**Capital expenditure**
	2,260	1,971	1,804	375	224	64	355	392	270	790

Liquidity

We assess NYSEG's liquidity as adequate. We believe its liquidity sources will likely exceed its uses by more than 1.1x over the next 12 months. We anticipate the company's net sources will remain positive even if its EBITDA declines by 10%. This assessment also reflects NYSEG's generally prudent risk management, sound relationships with its banks, and satisfactory standing in the credit markets.

Principal liquidity sources

- FFO of about $390 million,
- Credit facility availability of about $700 million, and
- Minimal cash assumed.

Principal liquidity uses

- Long-term and short-term debt maturities of about $188 million over the next 12 months, and
- Maintenance capital spending averaging about $665 million annually.

Environmental, Social, And Governance

ESG Credit Indicators

E-1 **E-2** E-3 E-4 E-5 | S-1 **S-2** S-3 S-4 S-5 | G-1 **G-2** G-3 G-4 G-5

ESG credit indicators provide additional disclosure and transparency at the entity level and reflect S&P Global Ratings' opinion of the influence that environmental, social, and governance factors have on our credit rating analysis. They are not a sustainability rating or an S&P Global Ratings ESG Evaluation. The extent of the influence of these factors is reflected on an alphanumerical 1-5 scale where 1 = positive, 2 = neutral, 3 = moderately negative, 4 = negative, and 5 = very negative. For more information, see our commentary "ESG Credit Indicators: Definition And Applications," published Oct. 13, 2021.

ESG factors have an overall neutral influence on our credit rating analysis of Avangrid; however, it has a significant renewable generation presence. Avangrid has about 8 gigawatts (GW) of wind and solar generation, either owned or under operation, and about 20 GW generation under development. Avangrid is the third-largest wind operator in the U.S.

Avangrid's credit quality is better positioned among peers and positively influenced by its large renewable generation presence and lower-risk transmission and distribution network utilities.

The company's social and governance factors are consistent with what we see across the industry.

Group Influence

We view NYSEG as core to Avangrid because we think it is integral to the company's identity, is highly unlikely to be sold, and has a strong commitment from management given Avangrid's emphasis on maintaining the size and scope of its regulated utility operations.

We rate NYSEG one notch higher than our 'bbb+' group credit profile because of the strength of its SACP and the cumulative value of the structural and regulatory protections in place that insulate it from its parent. These key insulating measures include:

- NYSEG is a separate stand-alone legal entity that functions independently, both financially and operationally; files its own rate cases; and is independently regulated by the NYPSC.
- NYSEG has its own records and books, including stand-alone audited financial statements.
- NYSEG has its own funding arrangements, issues its own long-term debt, and has a separate committed credit facility for its short-term funding needs.
- NYSEG does not commingle funds, assets, or cash flows with parent Avangrid or its other subsidiaries.
- The company does not have any cross-default obligations and a default by parent Avangrid or its other subsidiaries would not directly lead to a default at NYSEG.
- The vote of an independent board of directors at a special-purpose entity (SPE) that owns NYSEG's equity is required to file NYSEG into voluntary bankruptcy.
- A golden share's vote is required to file the SPE into bankruptcy.
- There is a strong economic basis for parent Avangrid to maintain the financial strength of NYSEG because its utility strategy is aligned with the overall strategy of its parent.
- Restrictions on dividend distributions, such as maintaining equity to capital of 48%.
- A nonconsolidation opinion.

Issue Ratings--Subordination Risk Analysis

Analytical conclusions

We rate NYSEG's unsecured debt the same as the issuer credit rating because it is unsecured debt of a qualifying investment-grade regulated utility.

Rating Component Scores

Foreign currency issuer credit rating	**A-/Stable/A-2**
Local currency issuer credit rating	**A-/Stable/A-2**
Business risk	**Excellent**
Country risk	Very Low
Industry risk	Very Low
Competitive position	Strong
Financial risk	**Significant**
Cash flow/leverage	Significant
Anchor	**a-**
Diversification/portfolio effect	Neutral (no impact)
Capital structure	Neutral (no impact)
Financial policy	Neutral (no impact)
Liquidity	Adequate (no impact)
Management and governance	Strong (no impact)
Comparable rating analysis	Neutral (no impact)
Stand-alone credit profile	**a-**

Related Criteria

- General Criteria: Group Rating Methodology, July 1, 2019
- Criteria | Corporates | General: Corporate Methodology: Ratios And Adjustments, April 1, 2019
- Criteria | Corporates | General: Reflecting Subordination Risk In Corporate Issue Ratings, March 28, 2018
- General Criteria: Methodology For Linking Long-Term And Short-Term Ratings, April 7, 2017
- Criteria | Corporates | General: Methodology And Assumptions: Liquidity Descriptors For Global Corporate Issuers, Dec. 16, 2014
- Criteria | Corporates | Industrials: Key Credit Factors For The Unregulated Power And Gas Industry, March 28, 2014
- General Criteria: Country Risk Assessment Methodology And Assumptions, Nov. 19, 2013
- General Criteria: Methodology: Industry Risk, Nov. 19, 2013
- Criteria | Corporates | General: Corporate Methodology, Nov. 19, 2013
- Criteria | Corporates | Utilities: Key Credit Factors For The Regulated Utilities Industry, Nov. 19, 2013
- Criteria | Corporates | Utilities: Collateral Coverage And Issue Notching Rules For '1+' And '1' Recovery Ratings On Senior Bonds Secured By Utility Real Property, Feb. 14, 2013
- General Criteria: Methodology: Management And Governance Credit Factors For Corporate Entities, Nov. 13, 2012
- General Criteria: Principles Of Credit Ratings, Feb. 16, 2011

Related Research

Enter Article Content Here

Ratings Detail (as of September 16, 2022)*

New York State Electric & Gas Corp.		
Issuer Credit Rating		A-/Stable/A-2
Senior Unsecured		A-
Issuer Credit Ratings History		
22-Apr-2016	*Foreign Currency*	A-/Stable/A-2
01-May-2014		BBB+/Positive/A-2
29-Apr-2013		BBB+/Stable/A-2
22-Apr-2016	*Local Currency*	A-/Stable/A-2
01-May-2014		BBB+/Positive/A-2
29-Apr-2013		BBB+/Stable/A-2
Related Entities		
Avangrid Inc.		
Issuer Credit Rating		BBB+/Stable/A-2
Commercial Paper		
Local Currency		A-2
Senior Unsecured		BBB
Berkshire Gas Co.		
Issuer Credit Rating		A-/Stable/--
Central Maine Power Co.		
Issuer Credit Rating		A/Stable/A-1
Senior Unsecured		A
Connecticut Natural Gas Corp.		
Issuer Credit Rating		A-/Stable/--
Iberdrola S.A.		
Issuer Credit Rating		BBB+/Stable/A-2
Rochester Gas & Electric Corp.		
Issuer Credit Rating		A-/Stable/--
Senior Secured		A
Scottish Power Energy Management Ltd.		
Issuer Credit Rating		BBB+/Stable/A-2
Scottish Power Energy Networks Holdings Ltd.		
Issuer Credit Rating		BBB+/Stable/A-2
Scottish Power Energy Retail Ltd.		
Issuer Credit Rating		BBB+/Stable/A-2
Scottish Power Investments Ltd.		
Issuer Credit Rating		BBB+/Stable/A-2
Scottish Power Ltd.		
Issuer Credit Rating		BBB+/Stable/A-2

Ratings Detail (as of September 16, 2022)*

Scottish Power U.K. Holdings Ltd.	
Issuer Credit Rating	BBB+/Stable/A-2
Scottish Power U.K. PLC	
Issuer Credit Rating	BBB+/Stable/A-2
Senior Unsecured	BBB+
Southern Connecticut Gas Co.	
Issuer Credit Rating	A-/Stable/NR
Senior Secured	A
SP Distribution PLC	
Issuer Credit Rating	BBB+/Stable/A-2
SP Manweb PLC	
Issuer Credit Rating	BBB+/Stable/A-2
Senior Unsecured	BBB+
SP Transmission PLC	
Issuer Credit Rating	BBB+/Stable/A-2
Senior Unsecured	BBB+
United Illuminating Co. (The)	
Issuer Credit Rating	A-/Stable/--

*Unless otherwise noted, all ratings in this report are global scale ratings. S&P Global Ratings credit ratings on the global scale are comparable across countries. S&P Global Ratings credit ratings on a national scale are relative to obligors or obligations within that specific country. Issue and debt ratings could include debt guaranteed by another entity, and rated debt that an entity guarantees.

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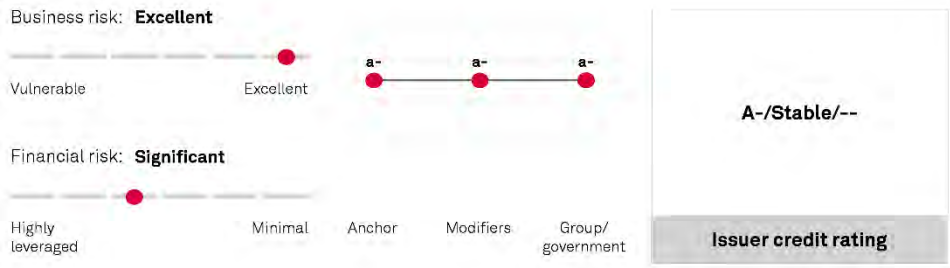
Rochester Gas & Electric Corp.

September 7, 2022

Ratings Score Snapshot



PRIMARY CONTACT

Matthew L O'Neill
New York
1-212-438-4295
matthew.oneill
@spglobal.com

SECONDARY CONTACTS

Beverly R Gantt
New York
1-212-438-1696
beverly.gantt
@spglobal.com

Minni Zhang
New York
1-2124381953
minni.zhang
@spglobal.com

RESEARCH CONTRIBUTOR

Jesal K Gandhi
CRISIL Global Analytical Center,
an S&P Global Ratings affiliate
Mumbai

Credit Highlights

Overview

Key strengths	Key risks
Lower-risk, rate-regulated electric and gas utility operations.	Limited geographic and regulatory diversity.
Effective management of regulatory risk.	Midsize utility serving about 705,600 electric and gas customers.
A primarily residential customer base, providing cash flow stability.	

Rochester Gas & Electric Corp. (RG&E) is a stable, regulated utility that operates under a generally supportive framework. We expect RG&E to effectively manage regulatory risk and support financial metrics through existing cost-recovery mechanisms. In May 2022, RG&E filed an electric and gas rate case premised on a 10.2% return on equity (ROE). The new rates would become effective May 1, 2023, at the end of the utility's current rate plan. The company is also exploring a multi-year rate plan as part of the negotiation. We will continue to monitor the situation.

RG&E has limited geographic and regulatory diversification. The company's credit quality largely depends on the New York Public Service Commission's (NYPSC) regulatory framework.

Outlook

The stable outlook on RG&E mirrors that of ultimate parent **Iberdrola S.A.**, along with our expectation of stand-alone financial measures, including funds from operations (FFO) to debt, which we expect to remain above 15%.

Downside scenario

We assess the structural and regulatory protections in place as insulating RG&E up to two notches above its parent. We could lower the rating on RG&E if we lowered the rating on Iberdrola S.A. and/or if RG&E's stand-alone financial measures weaken, including an FFO-to-debt ratio that is consistently below 15%. This could occur if adverse regulatory outcomes impede RG&E's ability to manage regulatory risk.

Upside scenario

We could upgrade RG&E if its stand-alone financial measures consistently reflect the very high end of the range for its financial risk profile category while it maintains the strength of its business risk profile. Specifically, this would reflect FFO to debt consistently greater than 22%.

Our Base-Case Scenario

Assumptions

- Consistent rate case filings and use of existing regulatory mechanisms;
- Capital spending averaging about $350 million annually; and
- Negative discretionary cash flow.

Key metrics

Rochester Gas & Electric Corp. --Key Metrics*

	2021a	2022e	2023f
FFO to debt (%)	15.5	14.0-16.0	14.0-16.0
Debt to EBITDA (x)	6.0	5.0-5.5	5.0-5.5

*All figures adjusted by S&P Global Ratings. a--Actual. e--Estimate. f--Forecast. FFO—Funds from operations.

Company Description

RG&E generates, transmits, and distributes electricity in western New York. It also transports and distributes natural gas. It serves about 388,700 electricity and 321,700 natural gas customers. The company is based in Rochester, N.Y., and operates as a subsidiary of **Avangrid Inc**.

Peer Comparison

Rochester Gas & Electric Corp.--Peer Comparisons

	Rochester Gas & Electric Corp.	New York State Electric & Gas Corp.	Central Hudson Gas & Electric Corp.	Orange and Rockland Utilities Inc.
Foreign currency issuer credit rating	A-/Stable/--	A-/Stable/A-2	A-/Negative/NR	A-/Negative/A-2
Local currency issuer credit rating	A-/Stable/--	A-/Stable/A-2	A-/Negative/NR	A-/Negative/A-2
Period	Annual	Annual	Annual	Annual
Period ending	2021-12-31	2021-12-31	2021-12-31	2021-12-31
Mil.	$	$	$	$
Revenue	958	1,804	796	941
EBITDA	261	375	175	249
Funds from operations (FFO)	243	355	140	199
Interest	53	64	38	43
Cash interest paid	51	56	33	43
Operating cash flow (OCF)	264	392	61	126
Capital expenditure	426	790	230	216
Free operating cash flow (FOCF)	(162)	(398)	(169)	(90)
Discretionary cash flow (DCF)	(412)	(668)	(169)	(142)
Cash and short-term investments	0	0	4	29
Gross available cash	0	0	4	29
Debt	1,563	2,260	1,025	1,084
Equity	1,276	1,971	932	888
EBITDA margin (%)	27.3	20.8	22.0	26.4
Return on capital (%)	6.3	5.5	5.8	6.9
EBITDA interest coverage (x)	4.9	5.8	4.6	5.8
FFO cash interest coverage (x)	5.8	7.3	5.2	5.6
Debt/EBITDA (x)	6.0	6.0	5.8	4.4
FFO/debt (%)	15.5	15.7	13.7	18.3
OCF/debt (%)	16.9	17.4	5.9	11.6
FOCF/debt (%)	(10.4)	(17.6)	(16.5)	(8.3)

Rochester Gas & Electric Corp.--Peer Comparisons

DCF/debt (%)	(26.4)	(29.5)	(16.5)	(13.1)

Business Risk

Our assessment of RG&E's business risk reflects the company's lower-risk electric and natural gas utility operations and effective management of regulatory risk. Additionally, residential customers account for approximately 90% of RG&E's customer base, thus providing additional cash flow stability. Marginally affecting RG&E's business risk is its lack of geographic and regulatory diversity. RG&E is a wholly owned subsidiary of Avangrid, which is an intermediary holding company and subsidiary of ultimate parent Iberdrola. RG&E contributes about 14% of Avangrid's operations.

The NYPSC regulates RG&E. We view the regulatory environment in New York as generally constructive. The company benefits from a multiyear rate plan; forward-test year; and revenue decoupling that protects the utility from adverse weather, conservation, and adverse economic conditions, thus reducing regulatory lag. Overall, we view the company's management of regulatory risk as in line with that of peers and expect it will effectively manage regulatory risk.

Financial Risk

We assess RG&E's financial measures using our medial volatility financial benchmarks, reflecting the company's lower-risk, regulated electric and natural gas utility business and its effective management of regulatory risk. Our base case includes distribution base rate increases and modest load growth, partially offset by moderately negative cash flow, largely stemming from robust capital spending averaging about $350 million annually. Under our base-case scenario, we expect FFO to debt of about 15%.

Rochester Gas & Electric Corp.--Financial Summary

Period ending	Dec-31-2016	Dec-31-2017	Dec-31-2018	Dec-31-2019	Dec-31-2020	Dec-31-2021
Reporting period	2016a	2017a	2018a	2019a	2020a	2021a
Display currency (mil.)	$	$	$	$	$	$
Revenues	1,041	851	924	893	872	958
EBITDA	401	281	297	284	271	261
Funds from operations (FFO)	328	289	212	199	223	243
Interest expense	66	83	92	83	62	53
Cash interest paid	47	50	57	58	48	51
Operating cash flow (OCF)	143	198	269	206	200	264
Capital expenditure	243	281	259	363	348	426
Free operating cash flow (FOCF)	(101)	(83)	11	(156)	(148)	(162)
Discretionary cash flow (DCF)	(151)	(83)	(29)	(156)	(198)	(412)
Cash and short-term investments	0	1	0	1	0	0
Gross available cash	0	1	0	1	0	0
Debt	1,031	1,105	1,200	1,222	1,423	1,563
Common equity	786	948	1,006	1,104	1,220	1,276

Rochester Gas & Electric Corp.--Financial Summary

Adjusted ratios

EBITDA margin (%)	38.5	33.0	32.2	31.8	31.1	27.3
Return on capital (%)	19.5	11.6	10.4	9.2	7.6	6.3
EBITDA interest coverage (x)	6.1	3.4	3.2	3.4	4.4	4.9
FFO cash interest coverage (x)	7.9	6.8	4.8	4.4	5.7	5.8
Debt/EBITDA (x)	2.6	3.9	4.0	4.3	5.3	6.0
FFO/debt (%)	31.8	26.2	17.7	16.3	15.7	15.5
OCF/debt (%)	13.8	17.9	22.5	16.9	14.1	16.9
FOCF/debt (%)	(9.8)	(7.6)	0.9	(12.8)	(10.4)	(10.4)
DCF/debt (%)	(14.6)	(7.6)	(2.4)	(12.8)	(13.9)	(26.4)

Reconciliation Of Rochester Gas & Electric Corp. Reported Amounts With S&P Global Adjusted Amounts (Mil. $)

	Debt	Shareholder Equity	Revenue	EBITDA	Operating income	Interest expense	S&PGR adjusted EBITDA	Operating cash flow	Dividends	Capital expenditure
Financial year	Dec-31-2021									
Company reported amounts	1,420	1,276	958	260	154	44	261	273	250	436
Cash taxes paid	-	-	-	-	-	-	32	-	-	-
Cash interest paid	-	-	-	-	-	-	(42)	-	-	-
Lease liabilities	50	-	-	-	-	-	-	-	-	-
Operating leases	-	-	-	1	0	0	(0)	0	-	-
Postretirement benefit obligations/ deferred compensation	91	-	-	-	-	-	-	-	-	-
Capitalized interest	-	-	-	-	-	9	(9)	(9)	-	(9)
Asset-retirement obligations	2	-	-	0	0	0	-	-	-	-
Nonoperating income (expense)	-	-	-	-	18	-	-	-	-	-
Total adjustments	143	-	-	1	18	9	(18)	(9)	-	(9)
S&P Global Ratings adjusted	**Debt**	**Equity**	**Revenue**	**EBITDA**	**EBIT**	**Interest expense**	**Funds from Operations**	**Operating cash flow**	**Dividends**	**Capital expenditure**
	1,563	1,276	958	261	172	53	243	264	250	426

Liquidity

We assess RG&E's liquidity as adequate. We believe its liquidity sources will likely exceed uses by more than 1.1x over the next 12 months. As a result, we anticipate that its net sources will remain positive even if its EBITDA declines 10%. This assessment also reflects RG&E's generally prudent risk management, sound relationships with banks, and generally satisfactory standing in the credit markets.

Principal liquidity sources

- FFO of about $275 million;
- Credit facility availability of about $300 million; and
- Minimal cash.

Principal liquidity uses

- Long-term and short-term debt maturities of approximately $65 million over the next 12 months; and
- Capital spending of around $350 million.

Environmental, Social, And Governance

ESG Credit Indicators

E-1	**E-2**	E-3	E-4	E-5	S-1	**S-2**	S-3	S-4	S-5	G-1	**G-2**	G-3	G-4	G-5

ESG credit indicators provide additional disclosure and transparency at the entity level and reflect S&P Global Ratings' opinion of the influence that environmental, social, and governance factors have on our credit rating analysis. They are not a sustainability rating or an S&P Global Ratings ESG Evaluation. The extent of the influence of these factors is reflected on an alphanumerical 1-5 scale where 1 = positive, 2 = neutral, 3 = moderately negative, 4 = negative, and 5 = very negative. For more information, see our commentary "ESG Credit Indicator Definitions And Applications," published Oct. 13, 2021.

ESG factors have no material influence on our credit rating analysis of RG&E.

Group Influence

We view RG&E as core to the group because we think it is integral to Avangrid's identity, is highly unlikely to be sold, and has strong management commitment given the company's emphasis on maintaining the size and scope of the regulated utility operations.

We rate RG&E one notch higher than the 'bbb+' global credit profile because of the strength of its stand-alone credit profile and the cumulative value of structural and regulatory protections in place that insulate RG&E from its parent. Key insulating measures include:

- RG&E'S financial performance and funding prospects are independent from those of the group;
- It is severable from the group and able to stand on its own;
- The parent has clear economic incentives to maintain RG&E's financial strength;
- The strong regulatory restrictions that limit its distributions if such distributions reduce RG&E's equity to capital below specific levels; and
- We think it is unlikely RG&E would be drawn or forced into an Avangrid bankruptcy.

Issue Ratings--Subordination Risk Analysis

Analytical conclusions

We rate RG&E's unsecured debt the same as the issuer credit rating because it is unsecured debt of a qualifying investment-grade regulated utility.

Issue Ratings--Recovery Analysis

Key analytical factors

RG&E's first-mortgage bonds benefit from a first-priority lien on substantially all of the utility's real property, owned or subsequently acquired. Collateral coverage of more than 1.5x supports a recovery rating of '1+' and an issue-level rating one notch above the issuer credit rating.

Rating Component Scores

Foreign currency issuer credit rating	**A-/Stable/--**
Local currency issuer credit rating	**A-/Stable/--**
Business risk	**Excellent**
Country risk	Very Low
Industry risk	Very Low
Competitive position	Strong
Financial risk	**Significant**
Cash flow/leverage	Significant
Anchor	**a-**
Diversification/portfolio effect	Neutral (no impact)
Capital structure	Neutral (no impact)
Financial policy	Neutral (no impact)
Liquidity	Adequate (no impact)
Management and governance	Strong (no impact)
Comparable rating analysis	Neutral (no impact)
Stand-alone credit profile	**a-**

Related Criteria

- General Criteria: Group Rating Methodology, July 1, 2019
- Criteria | Corporates | General: Corporate Methodology: Ratios And Adjustments, April 1, 2019
- Criteria | Corporates | General: Reflecting Subordination Risk In Corporate Issue Ratings, March 28, 2018
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- General Criteria: Methodology: Management And Governance Credit Factors For Corporate Entities, Nov. 13, 2012
- General Criteria: Principles Of Credit Ratings, Feb. 16, 2011

Ratings Detail (as of September 07, 2022)*

Rochester Gas & Electric Corp.	
Issuer Credit Rating	A-/Stable/--
Senior Secured	A
Issuer Credit Ratings History	
22-Apr-2016	A-/Stable/--
01-May-2014	BBB+/Positive/--
29-Apr-2013	BBB+/Stable/--
Related Entities	
Avangrid Inc.	
Issuer Credit Rating	BBB+/Stable/A-2
Commercial Paper	
Local Currency	A-2
Senior Unsecured	BBB
Berkshire Gas Co.	
Issuer Credit Rating	A-/Stable/--
Central Maine Power Co.	
Issuer Credit Rating	A/Stable/A-1
Senior Unsecured	A
Connecticut Natural Gas Corp.	
Issuer Credit Rating	A-/Stable/--
Iberdrola S.A.	
Issuer Credit Rating	BBB+/Stable/A-2
New York State Electric & Gas Corp.	
Issuer Credit Rating	A-/Stable/A-2
Senior Unsecured	A-
Scottish Power Energy Management Ltd.	
Issuer Credit Rating	BBB+/Stable/A-2

Ratings Detail (as of September 07, 2022)*

Scottish Power Energy Networks Holdings Ltd.	
Issuer Credit Rating	BBB+/Stable/A-2
Scottish Power Energy Retail Ltd.	
Issuer Credit Rating	BBB+/Stable/A-2
Scottish Power Investments Ltd.	
Issuer Credit Rating	BBB+/Stable/A-2
Scottish Power Ltd.	
Issuer Credit Rating	BBB+/Stable/A-2
Scottish Power U.K. Holdings Ltd.	
Issuer Credit Rating	BBB+/Stable/A-2
Scottish Power U.K. PLC	
Issuer Credit Rating	BBB+/Stable/A-2
Senior Unsecured	BBB+
Southern Connecticut Gas Co.	
Issuer Credit Rating	A-/Stable/NR
Senior Secured	A
SP Distribution PLC	
Issuer Credit Rating	BBB+/Stable/A-2
SP Manweb PLC	
Issuer Credit Rating	BBB+/Stable/A-2
Senior Unsecured	BBB+
SP Transmission PLC	
Issuer Credit Rating	BBB+/Stable/A-2
Senior Unsecured	BBB+
United Illuminating Co. (The)	
Issuer Credit Rating	A-/Stable/--

*Unless otherwise noted, all ratings in this report are global scale ratings. S&P Global Ratings credit ratings on the global scale are comparable across countries. S&P Global Ratings credit ratings on a national scale are relative to obligors or obligations within that specific country. Issue and debt ratings could include debt guaranteed by another entity, and rated debt that an entity guarantees.

MOODY'S
INVESTORS SERVICE

CREDIT OPINION
10 October 2021

Update

Rate this Research

RATINGS

New York State Electric and Gas Corporation

Domicile	New York, United States
Long Term Rating	Baa1
Type	LT Issuer Rating
Outlook	Stable

Please see the ratings section at the end of this report for more information. The ratings and outlook shown reflect information as of the publication date.

Contacts

Ryan Wobbrock +1.212.553.7104
VP-Sr Credit Officer
ryan.wobbrock@moodys.com

Nikita Nanwani +1.212.553.0300
Associate Analyst
nikita.nanwani@moodys.com

Michael G. Haggarty +1.212.553.7172
Associate Managing Director
michael.haggarty@moodys.com

Jim Hempstead +1.212.553.4318
MD - Global Infrastructure & Cyber Risk
james.hempstead@moodys.com

New York State Electric and Gas Corporation

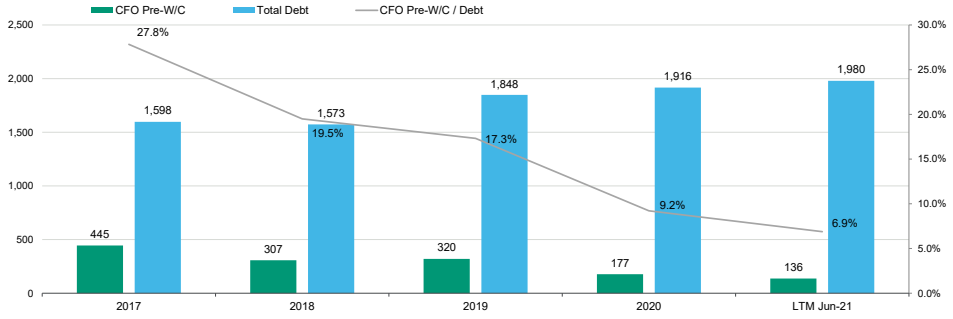
Update following downgrade to Baa1

Summary

New York State Electric and Gas Corporation (NYSEG) credit profile reflects: 1) its low business risk transmission and distribution (T&D) operations, 2) a transparent regulatory framework with helpful cost recovery provisions and 3) several ring-fencing type provisions that are in place to insulate the utility from the higher business risk of its affiliates and parent company.

NYSEG's credit is constrained by weakened financial metrics (e.g., mid-teen's percent range for the CFO pre-WC to debt ratio) that will persist over the next two years due to a rate plan that includes rate modifiers which limit customer bill impacts, but also limit NYSEG's cash flow growth. Uncertainty also exists as to the future of its natural gas business and associated depreciation recovery as New York pursues a path toward reducing economy-wide greenhouse gas emissions.

Exhibit 1
Historical CFO Pre-WC, Total Debt and CFO Pre-WC to Debt ($ MM)



Source: Moody's Financial Metrics

Credit strengths

» Low business risk transmission and distribution utility assets

» Operates under a revenue decoupling mechanism which helps to support fixed cost recovery, regardless of volumetric demand

» Ring-fencing type provisions and stand-alone liquidity provide some insulation from riskier affiliates

Credit challenges

» 2020 rate plan will reduce financial metrics below historical levels

» Increase in capital spending amid cash flow headwinds

» Some uncertainties surrounding state energy policy and path toward carbon transition

Rating outlook

NYSEG's stable outlook incorporates a view that currently weak financial metrics should improve over the next two years to the mid-teen's percent range, but still remain below historic levels (e.g,. 20%). The outlook also incorporates a view that appropriate depreciable lives will be applied to the company's gas business, addressing stranded asset risk as New York transitions to a lower emission economy.

Factors that could lead to an upgrade

» A material improvement in the credit supportiveness of NYSEG's political and regulatory framework

» Stronger financial metrics, such that its CFO pre-WC to debt ratio at 19% or higher on a sustained basis

Factors that could lead to a downgrade

» A lower degree of rate support in New York State, particularly pertaining to the climate action measures taken by the state and NYPSC

» CFO pre-WC to debt falls below 14% for a sustained period

Key indicators

Exhibit 2
New York State Electric and Gas Corporation's [1]

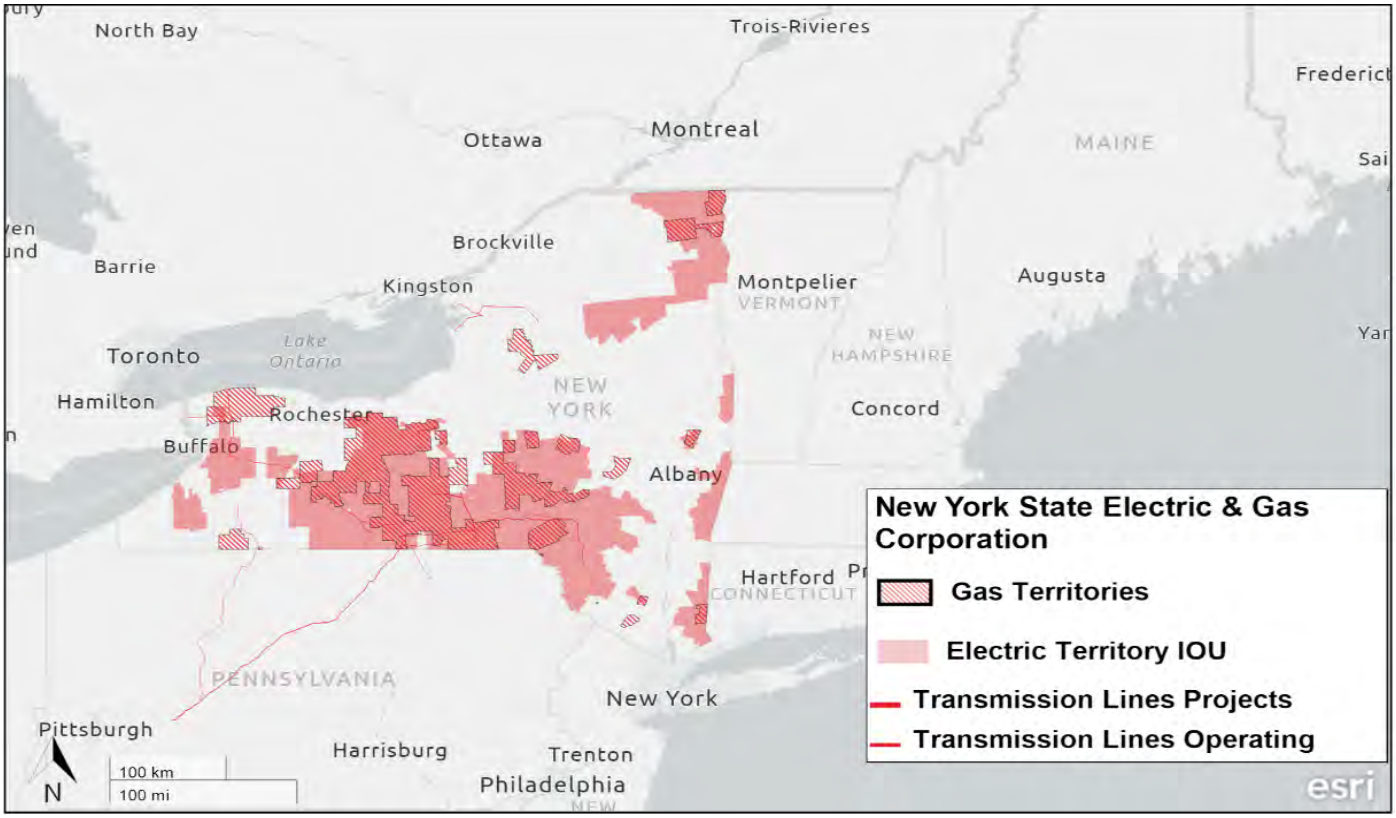
	Dec-17	Dec-18	Dec-19	Dec-20	LTM Jun-21
CFO Pre-W/C + Interest / Interest	6.4x	5.0x	4.7x	3.2x	3.1x
CFO Pre-W/C / Debt	27.8%	19.5%	17.3%	9.2%	6.9%
CFO Pre-W/C – Dividends / Debt	21.6%	19.5%	11.9%	4.0%	1.8%
Debt / Capitalization	49.4%	45.1%	47.9%	43.5%	41.9%

[1] All ratios are based on 'Adjusted' financial data and incorporate Moody's Global Standard Adjustments for Non-Financial Corporations.
Source: Moody's Financial Metrics

Profile

New York State Electric & Gas (NYSEG) is the largest regulated electric and gas distribution utility subsidiary of Avangrid Networks Inc. (Networks, not rated), a direct subsidiary of Avangrid Inc. (Avangrid Baa2 stable). NYSEG's 2021 rate base (according to the second rate year of its 3-year rate plan) is about $3.4 billion (nearly 80% electric and about 20% gas), or about 32% of Networks' total $10.7 billion rate base at August 2021. The company's operations are regulated by the New York Public Service Commission and the Federal Energy Regulatory Commission.

Exhibit 3
NYSEG's Service Territory



Source: S&P Global Market Intelligence

Avangrid is a publicly listed diversified utility holding company with the company's regulated operations accounting for about 75% of operating cash flows. Avangrid's primary owner is Iberdrola S.A. (Baa1 stable). Iberdrola owns an 81.5% stake in the company with the remaining 18.5% being held by the public. Iberdrola is a global diversified energy company primarily operating in Spain, the United Kingdom, the United States, Mexico and Brazil.

Detailed credit considerations

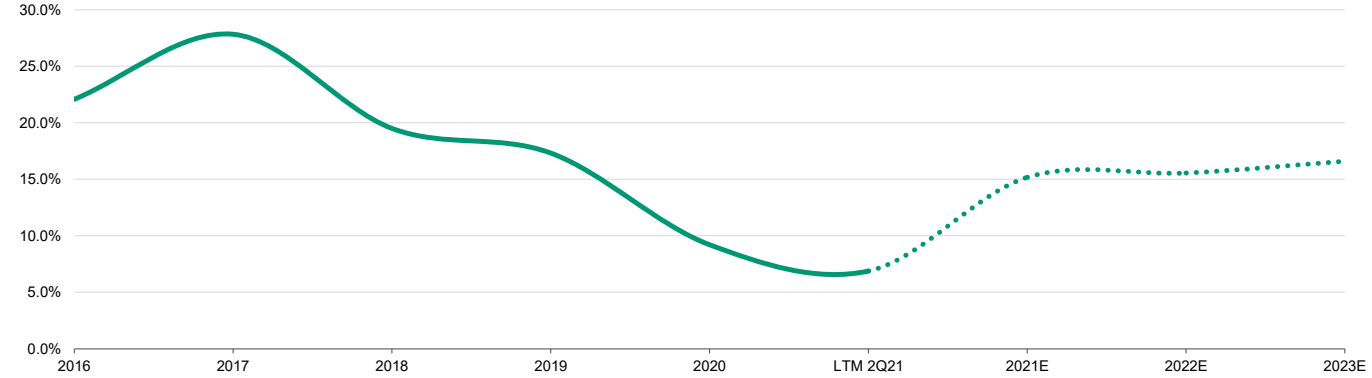
Financial metrics will improve, but remain below historical averages

NYSEG's financial metrics are currently low for a typical Baa1 T&D utility; however, we expect financial ratios to improve over their LTM Q2 2021 levels (e.g., about 7%) due to backloaded revenue increases for the April 2020 -- April 2023 rate plan, which was agreed-upon as a way to help customers face the 2020 economic hardships of the COVID-19 pandemic.

Despite the year-over-year revenue improvement, cash flow growth will be mitigated by other rate features, such as excess depreciation reserves and amortization of regulatory assets and liabilities. We expect the net effect of these rate features will result in CFO pre-WC to debt ranging between 15-17% for the company over the next two-to-three years.

Exhibit 4

NYSEG's ratio of CFO pre-WC to debt will improve as part of its rate plan through 2023



Source: Moody's Financial Metrics, Moody's projections

NYPSC offers a strong suite of cost recovery provisions, but state political environment adds uncertainty

Regulatory framework provides good margin and cash flow visibility

A significant aspect of NYSEG's credit support resides in the transparency of the NYPSC regulatory framework, including the suite of cost recovery mechanisms that allow the company to recover various costs on a timely basis. The most important features include a forward-looking test year (for most expenses and all planned capital expenditures), full recovery of purchased electric and natural gas costs and electric and gas revenue decoupling mechanisms (RDMs) for the majority of customers. Utilities within the state have often operated under multi-year rate plans, which allows recovery of projected capital and operating costs commensurate with the spend.

These features provide quick cost recovery that has underpinned thus far stable and predictable financial metrics. The RDMs, in particular, help to provide stable gross margin regardless of the volume sold to customers. This is an important feature, since it should keep the company's financial profile intact as the industry transitions to a more efficient and distributed network.

New Governor's influence over utility regulation remains to be seen

In the past two years, political rhetoric and state actions taken towards various state utilities have created a more uncertain operating environment for the state's utilities. Various issues around customer service quality (e.g., gas moratoriums, performance in storms and other unforeseen outages) have resulted in a myriad of fines for the state's utilities. Furthermore, incrementally severe measures have been taken, such as threatening utility franchise licenses and introducing legislation that would have enacted more punitive measures on a more consistent basis. As such, we have come to regard the New York political and regulatory environment as challenged and below average for credit supportiveness in the US.

However, in August 2021 Governor Kathy Hochul was sworn into office, following the resignation of former Governor Cuomo. To-date, there has been few opportunities to observe the new administration's direct interaction with the NYPSC. While we will monitor this relationship and Governor Hochul's utility and energy policies, the most near-term developments for the state's policies will likely be the Climate Action Council's (a 22-member committee that will develop a plan to achieve the state's clean energy and climate agenda) draft scoping plan for economy-wide decarbonization efforts in 4Q21 (see section below).

Longer-term challenges for NYSEG's gas business are likely

Part of NYSEG and affiliate Rochester Gas & Electric's (RG&E, Baa1 stable) rate plan includes a commitment to a zero-net increase in natural gas volumes through April 2023. According to the agreement, this means that weather-normalized levels of billed gas use for NYSEG and RG&E do not exceed gas use projected for the April 2020 – April 2021 time frame, or 56 million dekatherms for NYSEG and nearly 59 million dekatherms for RG&E.

While this is currently a finite concession to curb volume growth, we expect this dynamic to advance further and result in longer-term challenges for NYSEG's and RG&E's collective gas business, as the companies and stakeholders attempt to meet the goals of New York's Climate Leadership and Community Protection Act (CLCPA). The CLCPA targets a 40% reduction of greenhouse gas emissions by 2030 and 80% by 2050. The 22 member Climate Action Council is tasked with making recommendations for achieving these goals and is scheduled to have a draft Scoping Plan in October 2021.

The Joint Proposal also puts forth several limitations on gas infrastructure investment, with investments focused, instead, on developing non-pipeline alternatives and enhancing electrification strategies. We see the agreement is a first step to help achieve the state's objectives to limit carbon emissions and natural gas use. As such, we expect that more material reductions will follow in years after the rate plan, which increases the risk for the rate base if mitigating measures are not put in place, such as adjustments to gas asset depreciation rates.

Ring-fencing type mechanisms are positive, but do not completely separate NYSEG's credit profile from that of its parents'
NYSEG benefits from a suite of ring-fencing type measures that help to insulate the company from the higher business risk of its unregulated affiliate and parent company. Some of the key provisions are: the imposition of a minimum equity ratio tied to the capital structure used in establishing NYSEG's rates, a prohibition on lending to unregulated affiliates and a "Special Preferred Share" provision, that adds a significant impediment to NYSEG becoming part of a voluntary bankruptcy proceeding.

While NYSEG is well positioned to withstand some pressure from a credit deterioration at AGR, NYSEG's parent and/or Iberdrola, AGR's majority owner, it is not fully immune should the credit quality of either entity drop materially.

ESG considerations

Environmental

NYSEG has a highly negative exposure to environmental risks, given its geographical concentration in New York, which exposes the company to material and extreme weather events.

From an emissions perspective, NYSEG's poles, wires and pipes asset profile is less exposed to the direct production of greenhouse gases; however, these are emitted during the natural gas life cycle, including through the production of the energy that the utilities deliver and via their own gas infrastructure (about 20% of current rate base). The company's electric business would stand to benefit from electrification efforts, as gas-use winds down.

Moreover, these issues are central to state legislative actions that seek to reduce greenhouse gas emissions, thereby affecting NYSEG's current and future operations. In addition to the company's Joint Proposal targets that seek to limit gas sales growth, the Climate Action Council has been considering proposals that would identify specific targets toward this end. While this adds some near-term uncertainty, until a final plan can be determined, we view the effort to form a cohesive, economy-wide plan as being helpful to long-term utility planning and instructive for regulators to shape utility cost recovery to support credit during the transition.

Social

Exposure to social risks is moderately negative, reflecting the fundamental utility risk that demographics and societal trends could include social pressures or public concern around affordability, utility reputational or environmental concerns.

In turn, these pressures could result in adverse political intervention into utility operations or regulatory changes, which we have seen increasingly in New York. These risks have also surfaced in the form of the public and political backlash the company has received following Hurricane Isaias in August 2020 and measures being undertaken in New York to reduce the state's use of natural gas.

Governance

NYSEG's governance is driven by that of Avangrid, Inc. its ultimate parent company, which is also influenced by Iberdrola's 81.5% stake in the company.

On balance, Avangrid's governance is broadly in-line with other utilities. Avangrid's risks of having a majority owner and several new members of Avangrid's executive leadership are weighed against Iberdrola's supportive ownership practices. This support includes financing measures for Avangrid's pending $8 billion purchase of PNM Resources, Inc. (Baa3 stable). While we view Iberdrola as a supportive help to Avangrid's board and management, we also regard Avangrid as having distinct long-term financial policies and practices, which allow for a degree of credit differentiation between it and Iberdrola.

Liquidity analysis

Over the next 12 months, we expect NYSEG will produce $350 - $400 million of cash flow, compared to $650 - $700 million of capital expenditures, resulting in around $300 million of negative free cash flow before any upstream dividends to Avangrid. We expect

NYSEG's dividend policy to be driven by maintaining its regulatory allowed capital structure, which could mean that NYSEG pays no dividends, or even that Avangrid infuses equity into the utility to help fund capital needs and balance NYSEG's growing debt.

Avangrid employs a centralized approach to managing its liquidity. To the extent possible given certain regulatory restrictions, Avangrid aims to concentrate its cash at the holding company and primarily conduct its short-term borrowings through Avangrid. The utilities optimize their cash balances through a virtual money pool arrangement. Under the terms of this agreement, utilities may lend to each other but not to their unregulated affiliates or parent. These terms meet a regulatory requirement set at the time of Avangrid's acquisition of the utility companies which prohibits utilities from lending to unregulated affiliates, including Avangrid. To the extent that additional liquidity is required, NYSEG borrows under a bi-lateral loan agreement with Avangrid.

From an external liquidity standpoint, Avangrid and its regulated utility subsidiaries, including NYSEG, are parties to a $2.5 billion revolving credit facility that expires in June 2024. NYSEG's minimum sublimit under the facility is $400 million. We view management's efforts to formalize a minimum sublimit as helpful in providing visibility into what amounts of the shared facility are dependably allocated to the utility. Given Avangrid's centralized liquidity management philosophy and the virtual money pool of its utilities, we view the bank facility as effectively serving as a committed lender of last resort.

The bank credit facility does not include an ongoing material adverse change clause and the only financial covenant is a maximum allowed debt to capitalization ratio of 65%. We understand that as of 30 June 2021, each company was in compliance with this covenant.

NYSEG's next long term debt maturity is $75 million of senior notes due September 2022.

Iberdrola also provides incremental liquidity to Avangrid

Aside from cash balances and utility dividends, Avangrid has access to both $1.5 billion of the aforementioned shared $2.5 billion facility. At 30 June, there was no commercial paper outstanding, backstopped by the facility.

Avangrid is also party to a notional cash pooling arrangement along with other Iberdrola subsidiaries. Parties to the agreement, including Avangrid, may deposit funds with or borrow from the pool, provided that the net balance of funds deposited or borrowed by all pool participants in the aggregate is not less than zero. This agreement provides Avangrid with a third avenue for liquidity, supplementing its access to the debt and equity capital markets.

Lastly, Avangrid also has a $500 million credit facility with Iberdrola Financiacion, S.A.U., a company of the Iberdrola Group, which expires in June 2023.

Rating methodology and scorecard factors

Exhibit 5
Rating Factors
New York State Electric and Gas Corporation

Regulated Electric and Gas Utilities Industry [1][2]	Current LTM 6/30/2021		Moody's 12-18 Month Forward View As of Date Published [3]	
Factor 1 : Regulatory Framework (25%)	**Measure**	**Score**	**Measure**	**Score**
a) Legislative and Judicial Underpinnings of the Regulatory Framework	A	A	A	A
b) Consistency and Predictability of Regulation	Baa	Baa	A	A
Factor 2 : Ability to Recover Costs and Earn Returns (25%)				
a) Timeliness of Recovery of Operating and Capital Costs	Aa	Aa	Aa	Aa
b) Sufficiency of Rates and Returns	Baa	Baa	Baa	Baa
Factor 3 : Diversification (10%)				
a) Market Position	Baa	Baa	Baa	Baa
b) Generation and Fuel Diversity	N/A	N/A	N/A	N/A
Factor 4 : Financial Strength (40%)				
a) CFO pre-WC + Interest / Interest (3 Year Avg)	4.3x	Baa	4x - 5x	A
b) CFO pre-WC / Debt (3 Year Avg)	14.9%	Baa	15% - 17%	Baa
c) CFO pre-WC – Dividends / Debt (3 Year Avg)	11.1%	Baa	11% - 14%	Baa
d) Debt / Capitalization (3 Year Avg)	43.0%	A	40% - 45%	A
Rating:				
Scorecard-Indicated Outcome Before Notching Adjustment		Baa1		A3
HoldCo Structural Subordination Notching		0		0
a) Scorecard-Indicated Outcome		Baa1		A3
b) Actual Rating Assigned		Baa1		Baa1

[1] All ratios are based on 'Adjusted' financial data and incorporate Moody's Global Standard Adjustments for Non-Financial Corporations.
[2] As of 6/30/2021(L)
[3] This represents Moody's forward view; not the view of the issuer; and unless noted in the text, does not incorporate significant acquisitions and divestitures.
Source: Moody's Financial Metrics

Appendix

Exhibit 6

Cash Flow and Credit Metrics [1]

CF Metrics	Dec-17	Dec-18	Dec-19	Dec-20	LTM Jun-21
As Adjusted					
FFO	**337**	**327**	**267**	**300**	**301**
+/- Other	107	-20	53	-123	-165
CFO Pre-WC	**445**	**307**	**320**	**177**	**136**
+/- ΔWC	-38	103	-48	69	109
CFO	**407**	**409**	**272**	**245**	**245**
- Div	100	0	100	100	100
- Capex	382	524	611	689	704
FCF	**-75**	**-114**	**-438**	**-543**	**-559**
(CFO Pre-W/C) / Debt	27.8%	19.5%	17.3%	9.2%	6.9%
(CFO Pre-W/C - Dividends) / Debt	21.6%	19.5%	11.9%	4.0%	1.8%
FFO / Debt	21.1%	20.8%	14.5%	15.6%	15.2%
RCF / Debt	14.9%	20.8%	9.0%	10.4%	10.2%
Revenue	1,535	1,694	1,548	1,564	1,664
Interest Expense	82	77	86	79	66
Net Income	120	53	82	145	165
Total Assets	5,213	5,561	5,926	6,451	6,633
Total Liabilities	4,037	4,124	4,471	4,557	4,538
Total Equity	1,175	1,437	1,455	1,895	2,095

[1] All figures and ratios are calculated using Moody's estimates and standard adjustments. Periods are Financial Year-End unless indicated. LTM = Last Twelve Months.
Source: Moody's Financial Metrics

Exhibit 7

Peer Comparison Table [1]

	New York State Electric and Gas Corporation Baa1 (Stable)			Central Hudson Gas & Electric Corporation Baa1 (Stable)			Consolidated Edison Company of New York, Inc. Baa1 (Stable)			Orange and Rockland Utilities, Inc. Baa2 (Stable)		
(In US millions)	FYE Dec-19	FYE Dec-20	LTM Jun-21	FYE Dec-19	FYE Dec-20	LTM Jun-21	FYE Dec-19	FYE Dec-20	LTM Jun-21	FYE Dec-20	FYE Dec-20	LTM Jun-21
Revenue	1,548	1,564	1,664	692	712	749	10,821	10,647	11,139	893	862	896
CFO Pre-W/C	320	177	136	145	129	148	2,481	2,274	2,339	181	168	191
Total Debt	1,848	1,916	1,980	763	878	903	17,817	20,710	20,900	1,084	1,211	1,217
CFO Pre-W/C + Interest / Interest	4.7x	3.2x	3.1x	5.2x	4.7x	5.1x	4.2x	3.9x	4.0x	4.8x	4.5x	5.2x
CFO Pre-W/C / Debt	17.3%	9.2%	6.9%	19.0%	14.7%	16.4%	13.9%	11.0%	11.2%	16.7%	13.9%	15.7%
CFO Pre-W/C – Dividends / Debt	11.9%	4.0%	1.8%	19.0%	14.7%	16.4%	8.8%	6.2%	6.5%	12.4%	9.8%	11.6%
Debt / Capitalization	47.9%	43.5%	41.9%	43.3%	44.1%	43.9%	47.1%	49.3%	48.2%	50.3%	51.3%	50.4%

[1] All figures & ratios calculated using Moody's estimates & standard adjustments. FYE = Financial Year-End. LTM = Last Twelve Months. RUR* = Ratings under Review, where UPG = for upgrade and DNG = for downgrade
Source: Moody's Financial Metrics

Ratings

Exhibit 8

Category	Moody's Rating
NEW YORK STATE ELECTRIC AND GAS CORPORATION	
Outlook	Stable
Issuer Rating	Baa1
Senior Unsecured	Baa1
ULT PARENT: IBERDROLA S.A.	
Outlook	Stable
Issuer Rating	Baa1
Senior Unsecured MTN -Dom Curr	(P)Baa1
ST Issuer Rating	P-2
PARENT: AVANGRID, INC.	
Outlook	Stable
Issuer Rating	Baa2
Senior Unsecured	Baa2
Commercial Paper	P-2

Source: Moody's Investors Service

REPORT NUMBER 1290765

MOODY'S
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MOODY'S
INVESTORS SERVICE

CREDIT OPINION
10 October 2021

Update

Rate this Research

RATINGS

Rochester Gas & Electric Corporation

Domicile	United States
Long Term Rating	Baa1
Type	LT Issuer Rating
Outlook	Stable

Please see the ratings section at the end of this report for more information. The ratings and outlook shown reflect information as of the publication date.

Contacts

Ryan Wobbrock +1.212.553.7104
VP-Sr Credit Officer
ryan.wobbrock@moodys.com

Nikita Nanwani +1.212.553.0300
Associate Analyst
nikita.nanwani@moodys.com

Michael G. Haggarty +1.212.553.7172
Associate Managing Director
michael.haggarty@moodys.com

Jim Hempstead +1.212.553.4318
MD - Global Infrastructure & Cyber Risk
james.hempstead@moodys.com

Rochester Gas & Electric Corporation

Update following downgrade to Baa1

Summary

Rochester Gas and Electric's (RG&E) credit profile reflects: 1) its low business risk transmission and distribution (T&D) operations, 2) a transparent regulatory framework with helpful cost recovery provisions and 3) several ring-fencing type provisions that are in place to insulate the utility from the higher business risk of its affiliates and parent company.

RG&E's credit is constrained by weakened financial metrics (e.g., mid-teen's percent range for the CFO pre-WC to debt ratio) that will persist over the next two years due to a rate plan that includes rate modifiers which limit customer bill impacts, but also limit RG&E's cash flow growth. Uncertainty also exists as to the future of its natural gas business and associated depreciation recovery as New York pursues a path toward reducing economy-wide greenhouse gas emissions.

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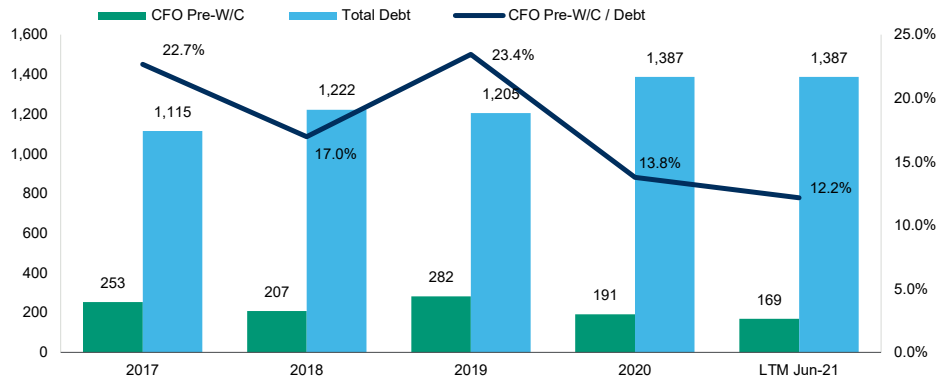
Historical CFO Pre-WC, Total Debt and CFO Pre-WC to Debt ($ MM)



Source: Moody's Financial Metrics

Credit strengths

» Low business risk transmission and distribution utility assets

» Operates under a revenue decoupling mechanism which helps to support fixed cost recovery, regardless of volumetric demand

» Ring-fencing type provisions and stand-alone liquidity provide some insulation from riskier affiliates

Credit challenges

» 2020 rate plan will reduce financial metrics below historical levels

» Small, concentrated operations

» Some uncertainties surrounding state energy policy and path toward carbon transition

Rating outlook

RG&E's stable outlook incorporates a view that currently weak financial metrics should improve over the next two years to the mid-teen's percent range, but still remain below historic levels (e.g,. 20%). The outlook also incorporates a view that appropriate depreciable lives will be applied to the company's gas business, addressing stranded asset risk as New York transitions to a lower emission economy.

Factors that could lead to an upgrade

» A material improvement in the credit supportiveness of RG&E's political and regulatory framework

» Stronger financial metrics, such that its CFO pre-WC to debt ratio at 19% or higher on a sustained basis

Factors that could lead to a downgrade

» A lower degree of rate support in New York State, particularly pertaining to the climate action measures taken by the state and NYPSC

» CFO pre-WC to debt falls below 14% for a sustained period

Key indicators

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Rochester Gas & Electric Corporation [1]

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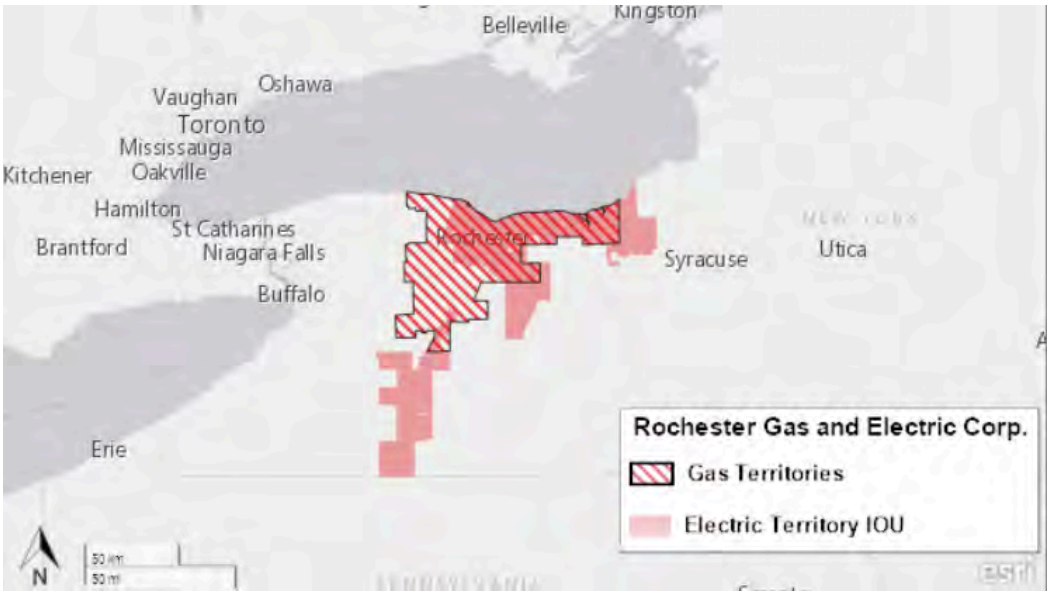
CFO Pre-W/C + Interest / Interest	3.9x	3.2x	4.3x	4.0x	4.2x
CFO Pre-W/C / Debt	22.7%	17.0%	23.4%	13.8%	12.2%
CFO Pre-W/C – Dividends / Debt	22.7%	13.7%	23.4%	10.2%	8.6%
Debt / Capitalization	47.9%	50.1%	46.0%	46.9%	45.8%

[1] All ratios are based on 'Adjusted' financial data and incorporate Moody's Global Standard Adjustments for Non-Financial Corporations. Financial Metrics™
Source: Moody's Financial Metrics

Profile

Rochester Gas & Electric (RG&E) is the third largest regulated electric and gas distribution utility subsidiary of Avangrid Networks, Inc. (Networks, not rated), a direct subsidiary of Avangrid (AGR Baa2 stable). RG&E's 2021 rate base (according to the second rate year of its 3-year rate plan) is about $2.4 billion (about 75% electric and 25% gas) or about 22% of Networks' total $10.7 billion rate base at August 2021. The company's operations are regulated by the New York Public Service Commission and the Federal Energy Regulatory Commission.

Exhibit 3



Source: S&P Global Market Intelligence

AGR is a publicly listed diversified utility holding company with the company's regulated operations accounting for approximately 75% of operating cash flows. AGR's primary owner is Iberdrola S.A. (Baa1 stable). Iberdrola owns an 81.5% stake in the company with the remaining 18.5% being held by the public. Iberdrola is a global diversified energy company primarily operating in Spain, the United Kingdom, the United States, Mexico and Brazil.

Detailed credit considerations

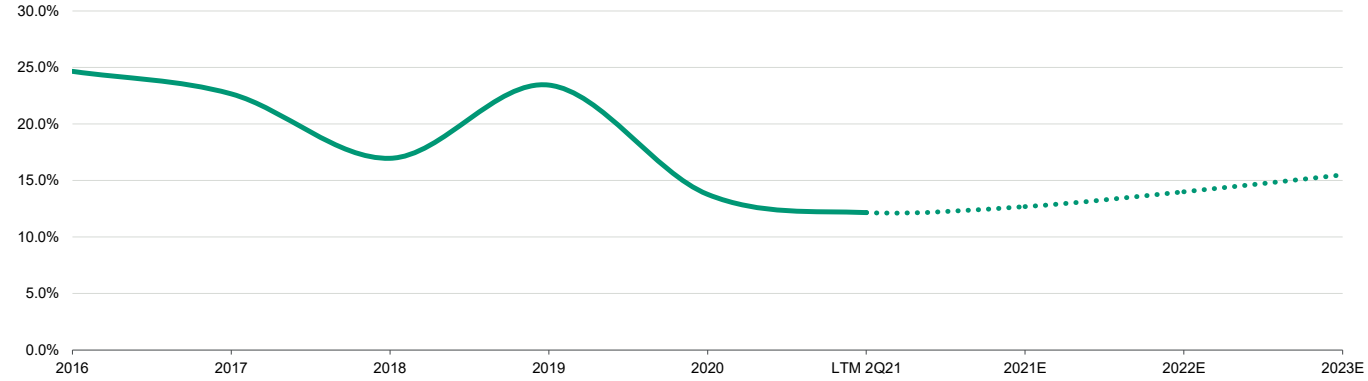
Financial metrics will improve, but remain below historical averages

RG&E's financial metrics are currently low for a typical Baa1 T&D utility; however, we expect financial ratios to improve over their LTM Q2 2021 levels (e.g., about 14%) due to backloaded revenue increases for the April 2020 -- April 2023 rate plan, which was agreed-upon as a way to help customers face the 2020 economic hardships of the COVID-19 pandemic.

Despite the year-over-year revenue improvement, cash flow growth will be mitigated by other rate features, such as excess depreciation reserves and amortization of regulatory assets and liabilities. We expect the net effect of these rate features will result in CFO pre-WC to debt ranging between 12-16% for the company over the next two-to-three years.

Exhibit 4

RG&E's ratio of CFO pre-WC to debt is expected to remain below historical levels through 2023



Source: Moody's Financial Metrics and Moody's projections

NYPSC offers a strong suite of cost recovery provisions, but state political environment adds uncertainty

Regulatory framework provides good margin and cash flow visibility

A significant aspect of RG&E's credit support resides in the transparency of the NYPSC regulatory framework, including the suite of cost recovery mechanisms that allow RG&E to recover various costs on a timely basis. The most important features include a forward-looking test year (for most expenses and all planned capital expenditures), full recovery of purchased electric and natural gas costs and electric and gas revenue decoupling mechanisms (RDMs) for the majority of customers. Utilities within the state have often operated under multi-year rate plans, which allows recovery of projected capital and operating costs commensurate with the spend.

These features provide quick cost recovery that has underpinned thus far stable and predictable financial metrics. The RDMs, in particular, help to provide stable gross margin regardless of the volume sold to customers. This is an important feature, since it should keep the company's financial profile intact as the industry transitions to a more efficient and distributed network.

New Governor's influence over utility regulation remains to be seen

In the past two years, political rhetoric and state actions taken towards various state utilities have created a more uncertain operating environment for the state's utilities. Various issues around customer service quality (e.g., gas moratoriums, performance in storms and other unforeseen outages) have resulted in a myriad of fines for the state's utilities. Furthermore, incrementally severe measures have been taken, such as threatening utility franchise licenses and introducing legislation that would have enacted more punitive measures on a more consistent basis. As such, we have come to regard the New York political and regulatory environment as challenged and below average for credit supportiveness in the US.

However, in August 2021 Governor Kathy Hochul was sworn into office, following the resignation of former Governor Cuomo. To-date, there has been few opportunities to observe the new administration's direct interaction with the NYPSC. While we will monitor this relationship and Governor Hochul's utility and energy policies, the most near-term developments for the state's policies will likely be the Climate Action Council's (a 22-member committee that will develop a plan to achieve the state's clean energy and climate agenda) draft scoping plan for economy-wide decarbonization efforts in 4Q21 (see section below).

Longer-term challenges for RG&E's gas business are likely

Part of RG&E and affiliate New York State Electric and Gas's (NYSEG, Baa1 stable) rate plan includes a commitment to a zero-net increase in natural gas volumes through April 2023. According to the agreement, this means that weather-normalized levels of billed gas use for NYSEG and RG&E do not exceed gas use projected for the April 2020 – April 2021 time frame, or 56 million dekatherms for NYSEG and nearly 59 million dekatherms for RG&E.

While this is currently a finite concession to curb volume growth, we expect this dynamic to advance further and result in longer-term challenges for RG&E and NYSEG's collective gas business, as the companies and stakeholders attempt to meet the goals of New York's Climate Leadership and Community Protection Act (CLCPA). The CLCPA targets a 40% reduction of greenhouse gas emissions by 2030 and 80% by 2050. The 22 member Climate Action Council is tasked with making recommendations for achieving these goals and is scheduled to have a draft Scoping Plan in October 2021.

The Joint Proposal also puts forth several limitations on gas infrastructure investment, with investments focused, instead, on developing non-pipeline alternatives and enhancing electrification strategies. We see the agreement is a first step to help achieve the state's objectives to limit carbon emissions and natural gas use. As such, we expect that more material reductions will follow in years after the rate plan, which increases the risk for the rate base if mitigating measures are not put in place, such as adjustments to gas asset depreciation rates.

Ring-fencing type mechanisms are positive, but do not completely separate RG&E's credit profile from that of its parents'

RG&E benefits from a suite of ring-fencing type measures that help to insulate the company from the higher business risk of its unregulated affiliate and parent company. Some of the key provisions are: the imposition of a minimum equity ratio tied to the capital structure used in establishing RG&E's rates, a prohibition on lending to unregulated affiliates and a "Special Preferred Share" provision, that adds a significant impediment to RG&E becoming part of a voluntary bankruptcy proceeding.

While RG&E is well positioned to withstand some pressure from a credit deterioration at AGR, RG&E's parent and/or Iberdrola, AGR's majority owner, it is not fully immune should the credit quality of either entity drop materially.

ESG considerations

Environmental

RG&E has a highly negative exposure to environmental risks, given its geographical concentration in New York, which exposes the company to material and extreme weather events.

From an emissions perspective, RG&E's poles, wires and pipes asset profile is less exposed to the direct production of greenhouse gases; however, these are emitted during the natural gas life cycle, including through the production of the energy that the utilities deliver and via their own gas infrastructure (about 25% of current rate base). The company's electric business would stand to benefit from electrification efforts, as gas-use winds down.

Moreover, these issues are central to state legislative actions that seek to reduce greenhouse gas emissions, thereby affecting RG&E's current and future operations. In addition to the company's Joint Proposal targets that seek to limit gas sales growth, the Climate Action Council has been considering proposals that would identify specific targets toward this end. While this adds some near-term uncertainty, until a final plan can be determined, we view the effort to form a cohesive, economy-wide plan as being helpful to long-term utility planning and instructive for regulators to shape utility cost recovery to support credit during the transition.

Social

Exposure to social risks is moderately negative, reflecting the fundamental utility risk that demographics and societal trends could include social pressures or public concern around affordability, utility reputational or environmental concerns.

In turn, these pressures could result in adverse political intervention into utility operations or regulatory changes, which we have seen increasingly in New York. These risks have also surfaced in the form of the public and political backlash the company has received following Hurricane Isaias in August 2020 and measures being undertaken in New York to reduce the state's use of natural gas.

Governance

RG&E's governance is driven by that of Avangrid, Inc. its ultimate parent company, which is also influenced by Iberdrola's 81.5% stake in the company.

On balance, Avangrid's governance is broadly in-line with other utilities. Avangrid's risks of having a majority owner and several new members of Avangrid's executive leadership are weighed against Iberdrola's supportive ownership practices. This support includes financing measures for Avangrid's pending $8 billion purchase of PNM Resources, Inc. (Baa3 stable). While we view Iberdrola as a supportive help to Avangrid's board and management, we also regard Avangrid as having distinct long-term financial policies and practices, which allow for a degree of credit differentiation between it and Iberdrola.

Liquidity analysis

Over the next 12 months, we expect RG&E will produce $200 - $250 million of cash flow, compared to $350 - $400 million of capital expenditures, resulting in around $150 million of negative free cash flow before any upstream dividends to Avangrid. We expect RG&E's dividend policy to be driven by maintaining its regulatory allowed capital structure, which could mean that RG&E pays no dividends, or even that Avangrid infuses equity into the utility to help fund capital needs and balance RG&E's growing debt.

Avangrid employs a centralized approach to managing its liquidity. To the extent possible given certain regulatory restrictions, Avangrid aims to concentrate its cash at the holding company and primarily conduct its short-term borrowings through Avangrid. The utilities optimize their cash balances through a virtual money pool arrangement. Under the terms of this agreement, utilities may lend to each other but not to their unregulated affiliates or parent. These terms meet a regulatory requirement set at the time of Avangrid's acquisition of the utility companies which prohibits utilities from lending to unregulated affiliates, including Avangrid. To the extent that additional liquidity is required, RG&E borrows under a bi-lateral loan agreement with Avangrid.

From an external liquidity standpoint, Avangrid and its regulated utility subsidiaries, including RG&E, are parties to a $2.5 billion revolving credit facility that expires in June 2024. RG&E's minimum sublimit under the facility is $250 million. We view management's efforts to formalize a minimum sublimit as helpful in providing visibility into what amounts of the shared facility are dependably

allocated to the utility. Given Avangrid's centralized liquidity management philosophy and the virtual money pool of its utilities, we view the bank facility to effectively serve as a committed lender of last resort.

The bank credit facility does not include an ongoing material adverse change clause and the only financial covenant is a maximum allowed debt to capitalization ratio of 65%. We understand that as of 30 June 2021, each company was in compliance with this covenant.

RG&E's next maturities include several pollution control notes with mandatory redemption in 2025 and $450 million of first mortgage bonds due in June 2027.

Iberdrola also provides incremental liquidity to Avangrid

Aside from cash balances and utility dividends, Avangrid has access to both $1.5 billion of the aforementioned shared $2.5 billion facility. At 30 June, there was no commercial paper outstanding, backstopped by the facility.

Avangrid is also party to a notional cash pooling arrangement along with other Iberdrola subsidiaries. Parties to the agreement, including Avangrid, may deposit funds with or borrow from the pool, provided that the net balance of funds deposited or borrowed by all pool participants in the aggregate is not less than zero. This agreement provides Avangrid with a third avenue for liquidity, supplementing its access to the debt and equity capital markets.

Lastly, Avangrid also has a $500 million credit facility with Iberdrola Financiacion, S.A.U., a company of the Iberdrola Group, which expires in June 2023.

Rating methodology and scorecard factors

Exhibit 5
Rating Factors
Rochester Gas & Electric Corporation

Regulated Electric and Gas Utilities Industry [1][2]	Current LTM 6/30/2021		Moody's 12-18 Month Forward View As of Date Published [3]	
Factor 1 : Regulatory Framework (25%)	**Measure**	**Score**	**Measure**	**Score**
a) Legislative and Judicial Underpinnings of the Regulatory Framework	A	A	A	A
b) Consistency and Predictability of Regulation	Baa	Baa	Baa	Baa
Factor 2 : Ability to Recover Costs and Earn Returns (25%)				
a) Timeliness of Recovery of Operating and Capital Costs	Aa	Aa	Aa	Aa
b) Sufficiency of Rates and Returns	Baa	Baa	Baa	Baa
Factor 3 : Diversification (10%)				
a) Market Position	Ba	Ba	Ba	Ba
b) Generation and Fuel Diversity	N/A	N/A	N/A	N/A
Factor 4 : Financial Strength (40%)				
a) CFO pre-WC + Interest / Interest (3 Year Avg)	3.8x	Baa	4x - 5x	A
b) CFO pre-WC / Debt (3 Year Avg)	17.1%	Baa	12% - 16%	Baa
c) CFO pre-WC – Dividends / Debt (3 Year Avg)	15.8%	A	11% - 14%	Baa
d) Debt / Capitalization (3 Year Avg)	46.0%	A	40% - 45%	A
Rating:				
Scorecard-Indicated Outcome Before Notching Adjustment		Baa1		Baa1
HoldCo Structural Subordination Notching		0		0
a) Scorecard-Indicated Outcome		Baa1		Baa1
b) Actual Rating Assigned		Baa1		Baa1

[1] All ratios are based on 'Adjusted' financial data and incorporate Moody's Global Standard Adjustments for Non-Financial Corporations.
[2] As of 6/30/2021(L)
[3] This represents Moody's forward view; not the view of the issuer; and unless noted in the text, does not incorporate significant acquisitions and divestitures.
Source: Moody's Financial Metrics

Appendix

Exhibit 6

Cash Flow and Credit Metrics [1]

CF Metrics	Dec-17	Dec-18	Dec-19	Dec-20	LTM Jun-21
As Adjusted					
FFO	**244**	**165**	**217**	**210**	**206**
+/- Other	8	42	65	-18	-38
CFO Pre-WC	**253**	**207**	**282**	**191**	**169**
+/- ΔWC	-54	69	-68	16	28
CFO	**198**	**276**	**214**	**207**	**196**
- Div	0	40	0	50	50
- Capex	281	259	367	352	340
FCF	**-83**	**-22**	**-153**	**-195**	**-194**
(CFO Pre-W/C) / Debt	22.7%	17.0%	23.4%	13.8%	12.2%
(CFO Pre-W/C - Dividends) / Debt	22.7%	13.7%	23.4%	10.2%	8.6%
FFO / Debt	21.9%	13.5%	18.0%	15.1%	14.9%
RCF / Debt	21.9%	10.3%	18.0%	11.5%	11.3%
Revenue	851	924	893	872	894
Interest Expense	87	96	86	64	52
Net Income	79	73	89	104	104
Total Assets	3,629	3,862	4,049	4,368	4,417
Total Liabilities	2,705	2,883	2,960	3,162	3,154
Total Equity	924	979	1,089	1,206	1,263

[1] All figures and ratios are calculated using Moody's estimates and standard adjustments. Periods are Financial Year-End unless indicated. LTM = Last Twelve Months.
Source: Moody's Financial Metrics

Exhibit 7

Peer Comparison Table [1]

	Rochester Gas & Electric Corporation Baa1 (Stable)			Central Hudson Gas & Electric Corporation Baa1 (Stable)			Consolidated Edison Company of New York, Inc. Baa1 (Stable)			New York State Electric and Gas Corporation Baa1 (Stable)		
(In US millions)	FYE Dec-19	FYE Dec-20	LTM Jun-21	FYE Dec-19	FYE Dec-20	LTM Jun-21	FYE Dec-19	FYE Dec-20	LTM Jun-21	FYE Dec-20	FYE Dec-20	LTM Jun-21
Revenue	893	872	894	692	712	749	10,821	10,647	11,139	1,548	1,564	1,664
CFO Pre-W/C	282	191	169	145	129	148	2,481	2,274	2,339	320	177	136
Total Debt	1,205	1,387	1,387	763	878	903	17,817	20,710	20,900	1,848	1,916	1,980
CFO Pre-W/C + Interest / Interest	4.3x	4.0x	4.2x	5.2x	4.7x	5.1x	4.2x	3.9x	4.0x	4.7x	3.2x	3.1x
CFO Pre-W/C / Debt	23.4%	13.8%	12.2%	19.0%	14.7%	16.4%	13.9%	11.0%	11.2%	17.3%	9.2%	6.9%
CFO Pre-W/C – Dividends / Debt	23.4%	10.2%	8.6%	19.0%	14.7%	16.4%	8.8%	6.2%	6.5%	11.9%	4.0%	1.8%
Debt / Capitalization	46.0%	46.9%	45.8%	43.3%	44.1%	43.9%	47.1%	49.3%	48.2%	47.9%	43.5%	41.9%

[1] All figures & ratios calculated using Moody's estimates & standard adjustments. FYE = Financial Year-End. LTM = Last Twelve Months. RUR* = Ratings under Review, where UPG = for upgrade and DNG = for downgrade.
Source: Moody's Financial Metrics

Ratings

Exhibit 8

Category	Moody's Rating
ROCHESTER GAS & ELECTRIC CORPORATION	
Outlook	Stable
Issuer Rating	Baa1
First Mortgage Bonds	A2
Senior Secured	A2
LT IRB/PC	Baa1
ULT PARENT: IBERDROLA S.A.	
Outlook	Stable
Issuer Rating	Baa1
Senior Unsecured MTN -Dom Curr	(P)Baa1
ST Issuer Rating	P-2
PARENT: AVANGRID, INC.	
Outlook	Stable
Issuer Rating	Baa2
Senior Unsecured	Baa2
Commercial Paper	P-2

Source: Moody's Investors Service

REPORT NUMBER 1290754

MOODY'S
INVESTORS SERVICE

Company Common Equity Ratio Analysis - Ann Bulkley's Proxy Group

Bulkley Proxy Group	Combined Utility Common Equity %	Holding Company Common Equity Ratio[1]					
	Average (2020-2017)	Average (2020-2017)	2017	2018	2019	2020	2021
1. ALLETE, Inc.	59.78%	59.11%	57.91%	59.20%	58.71%	60.62%	59.64%
2. Alliant Energy Corporation	50.80%	45.06%	45.35%	44.60%	45.24%	45.05%	43.10%
3. Ameren Corporation	51.96%	45.57%	46.53%	46.24%	45.57%	43.96%	41.93%
4. American Electric Power Company, Inc.	47.99%	40.94%	44.21%	42.82%	39.31%	37.43%	37.90%
5. Atmos Energy Corporation	59.73%	56.47%	51.81%	56.31%	59.01%	58.75%	51.11%
6. Avista Corporation	50.92%	45.76%	46.63%	45.31%	45.74%	45.36%	44.92%
7. Black Hills Corporation	61.97%	40.05%	35.37%	42.13%	41.31%	41.39%	38.84%
8. CMS Energy Corporation	51.07%	29.81%	29.92%	28.92%	27.55%	32.85%	35.37%
9. Consolidated Edison, Inc.	47.23%	45.18%	48.16%	44.84%	44.65%	43.08%	44.40%
10. Duke Energy Corporation	52.15%	42.40%	43.40%	43.07%	41.49%	41.63%	41.14%
11. Edison International	45.79%	44.47%	48.89%	45.05%	44.17%	39.78%	33.41%
12. Entergy Corporation	46.96%	33.01%	32.94%	33.33%	34.25%	31.52%	30.35%
13. Evergy, Inc.	59.30%	48.65%	48.66%	53.95%	46.20%	45.79%	45.00%
14. Eversource Energy	54.02%	44.72%	45.58%	44.29%	44.99%	44.01%	42.06%
15. IDACORP, Inc.	54.37%	56.59%	56.37%	56.42%	57.36%	56.20%	57.21%
16. MGE Energy, Inc.	59.62%	62.06%	64.59%	61.43%	60.34%	61.88%	61.21%
17. NextEra Energy, Inc.	60.05%	48.40%	45.74%	50.07%	49.53%	48.24%	45.35%
18. NiSource Inc.	54.10%	32.20%	32.33%	32.71%	32.38%	31.39%	33.21%
19. Northwest Natural Gas Company	50.58%	44.25%	47.10%	44.43%	45.60%	39.85%	38.16%
20. NorthWestern Corporation	48.06%	46.76%	45.70%	47.76%	47.51%	46.08%	47.79%
21. ONE Gas, Inc.	61.06%	54.76%	55.84%	56.31%	54.16%	52.75%	35.83%
22. OGE Energy Corp.	53.06%	54.11%	54.87%	56.00%	55.59%	50.00%	44.69%
23. Otter Tail Corporation	54.01%	52.59%	53.61%	54.49%	52.11%	50.16%	53.11%
24. Portland General Electric Company	48.84%	47.82%	49.90%	49.75%	48.07%	43.56%	42.89%
25. Public Service Enterprise Group Inc.	54.01%	48.50%	50.43%	48.16%	47.72%	47.69%	42.34%
26. Southern Company	52.37%	37.71%	33.73%	38.49%	39.69%	38.92%	36.98%
27. Spire, Inc.	60.96%	43.06%	43.63%	46.17%	42.54%	39.87%	37.84%
28. Wisconsin Energy Corporation	56.21%	44.76%	46.24%	45.48%	44.59%	42.72%	41.57%
29. Xcel Energy Inc.	54.27%	40.59%	42.04%	41.46%	39.21%	39.62%	38.62%
Average (2020-2017)	**53.84%**	**46.05%**					**42.96%**

[1] Source: S&P Capital IQ, Capital Structure Summary.

Major New York State Utilities
Authorized Common Equity Ratios

Company	Authorized Common Equity Ratio*	Commission Authorization Date
Brooklyn Union Gas Co.	48.0%	August 2021
Central Hudson Gas and Electric Corp.	50.0%	November 2021
Consolidated Edison Company of New York, Inc.	48.0%	January 2020
KeySpan Gas East Corp.	48.0%	August 2021
New York State Electric and Gas Corp.	48.0%	November 2020
Niagara Mohawk Power Corp.	48.0%	January 2022
Orange & Rockland Utilities, Inc.	48.0%	April 2022
Rochester Gas and Electric Corp.	48.0%	November 2020

*Central Hudson Gas and Electric Corporation was authorized a 50% equity ratio in Rate Year 1, 49% in Rate Year 2, and 48% in Rate Year 3.

Staff's Cost of Debt Calcualtion for NYSEG
($000)

		A	B	C	D	E	F	G	H	I	J
		Test Year (2021)					Rate Year 1 (5/1/23 - 4/30/24)				
		Average Balance			Cost		Average Balance			Cost	
		Total	Supporting CWIP	Supporting Rate Base	Supporting Rate Base	Percent	Total	Supporting CWIP	Supporting Rate Base	Supporting Rate Base	Percent
	Short-Term Debt										
1	Joint Revolving Credit Facility		$ -	$ -	$ -			$ -	$ -	$ -	
2	Inter-Company Facility	79,800	79,800	-			21,479	21,479	-	-	
3	Total Short-Term Debt	$ 79,800	$ 79,800	$ -	$ -	0.00%	$ 21,479	$ 21,479	$ -	$ -	0.00%
4											
5	**Long-Term Debt**										
6	Principal	1,838,083		1,838,083	58,009		2,786,099		2,786,099	96,602	
7	Debt Issuance Expense	(10,811)		(10,811)	1,817		(15,782)		(15,782)	1,767	
8	Debt Discount / Premium	(2,267)		(2,267)	117		(1,359)		(1,359)	128	
9	Book Value Long-Term Debt	1,825,005		1,825,005	59,943		2,768,958		2,768,958	98,497	
10	Loss on Reacquired Debt				1,718					1,708	
11	Hedge Loss				105					9	
12	Joint Revolver Facility Fees				408					740	
13	Joint Revolver Up-Front Costs				132					305	
14	Total Long-Term Debt*	$ 1,825,005		$ 1,825,005	$ 62,306	3.41%	$ 2,768,958		$ 2,768,958	$ 101,258	3.66%

* PCN 2004 Series C 10-Year issuance estimated at 3.75%
2023 Unsecured 30-Year issuance estimated at 4.75%

Case 22-E-0317, et al.

Satff's Cost of Debt Calcualtion for RG&E
($000)

		A	B	C	D	E	F	G	H	I	J
		Test Year (2021)					**Rate Year 1 (5/1/23 - 4/30/24)**				
		Average Balance			**Cost**		**Average Balance**			**Cost**	
		Total	**Supporting CWIP**	**Supporting Rate Base**	**Supporting Rate Base**	**Percent**	**Total**	**Supporting CWIP**	**Supporting Rate Base**	**Supporting Rate Base**	**Percent**
	Short-Term Debt										
1	Joint Revolving Credit Facility	$ -	$ -	$ -	$ -		$ -	$ -	$ -	$ -	
2	Inter-Company Facility	53,500	53,500	-	-		25,120	25,120	-	-	
3	Total Short-Term debt	$ 53,500	$ 53,500	$ -	$ -	0.00%	$ 25,120	$ 25,120	$ -	$ -	0.00%
4											
5	**Long-Term Debt**										
6	Principal	$ 1,205,525		$ 1,205,525	$ 48,700		$ 1,635,733		$ 1,635,733	$ 64,038	
7	Debt Issuance Expense	(12,553)		(12,553)	1,762		(15,314)		(15,314)	1,997	
8	Debt Discount / Premium	2,905		2,905	(493)		1,420		1,420	(457)	
9	Book Value Long-Term Debt	1,195,877		1,195,877	$ 49,969		1,621,839		1,621,839	65,577	
10	Loss on Reacquired Debt				444					465	
11	Hedge Loss				3,678					2,782	
12	Joint Revolver Facility Fees				332					317	
13	Joint Revolver Up-Front Costs				132					131	
14	Total Long-Term Debt	$ 1,195,877		$ 1,195,877	$ 54,554	4.56%	$ 1,621,839		$ 1,621,839	$ 69,272	4.27%
15											

* 2023 FMB 30-year issuance estimatdd at 4.68%

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On Forecasting Long-Term Interest Rates: Is the Success of the No-Change Prediction Surprising?

DR JAMES E. PESANDO*

I. Introduction

IN A RECENT ARTICLE in this Journal, Elliott and Baier [1] provide empirical evidence that the no-change forecast decidedly outperforms the "unconditional predictions" of long-term interest rates associated with the Modigliani-Sutch, Modigliani-Shiller and other well-known models of interest rate determination. The authors use "unconditional predictions" to refer to forecasts generated by variants of these models in which the current long-term rate is regressed on the relevant sets of exogenous variables lagged one period. These regressions—and the subsequent forecasts—are "unconditional" in the sense that they restrict the information set used to track long-term interest rates to that which is known at the beginning of the period.

The crucial issue that the authors do not address, however, is whether the superior forecasting performance of the no-change prediction is or is not surprising on à priori grounds. This issue is of extreme importance in interpreting their findings. One possible interpretation of the Elliott-Baier results, for example, is that the specific information sets associated with the six models are not valuable in a forecasting context, but other information sets may be. In fact, the empirical results reported by Elliott-Baier are not surprising in view of the accumulating evidence that (1) the bond market is efficient and (2) term premiums, if they exist, are time-invariant. These results imply, in effect, that short-term movements in long-term interest rates will not be "forecastable". This important point is reviewed briefly below.

II. The No-Change Prediction: A "Naive" Forecast?

The fact that long-term interest rates will approximately follow a martingale sequence under the conditions described above, and hence that the no-change prediction will approximate the optimal forecast, has been shown by both Sargent (1976) and Pesando (1978). Let $R_{n,t}$ denote the interest rate (for simplicity) on an n-period, non-coupon, bond in period t, ϕ_t the information available to the market in period t, and ${}_{t+i}f_{1,t}$ the forward rate at time t for the one-period bond rate in period $t + i$. Then, under the joint hypothesis of market efficiency and the pure

* Professor of Economics and Research Associate, Institute for Policy Analysis, University of Toronto

expectations model of the term structure, the ex ante changes in the long-term rate can be approximated as follows:

$$E(\tilde{R}_{n,t} \mid \phi_{t-1}) - R_{n,t-1} = \frac{1}{n} * [E({}_{t+n-1}\tilde{f}_{1,t} \mid \phi_{t-1}) - R_{1,t-1}] \tag{1}$$

The term on the right-hand side of equation (1), which represents the nonoverlapping one-period rates, clearly approaches zero as n gets large. In this case, the optimal forecast of the long-term rate is simply its current value; that is, the optimal forecast is the no-change extrapolation. If $\Psi_{n,t}$ represents the term premium accorded an n-period bond in period t, then (1) may be rewritten as:

$$E(\tilde{R}_{n,t} \mid \phi_{t,1}) - R_{n,t-1} = \frac{1}{n} * [E({}_{t+n-1}\tilde{f}_{1,t} \mid \phi_{t-1}) - R_{1,t-1}] + E(\tilde{\psi}_{n,t} \mid \phi_{t-1}) - \psi_{n,t-1} \tag{2}$$

If this term premium is constant, then (2) simply reduces to (1) and the previous result holds.

Elliott-Baier employ monthly data in their forecasting experiments. Assume, for the sake of argument, that the several long-term rates employed in their study have a representative term to maturity of 10 years. (The synthetic series of U.S. Government bonds employed in the study has an exact maturity of 15 years.) If interest rates are expressed at annual rates, then n equals 120 and thus the ex ante change defined in (1) must be very close to zero, unless the short-term rate is "very" nonstationary. Suppose, for example, that $R_{1,t-1}$ equals five per cent (.05) and that $E({}_{t+n-1}\tilde{f}_{1,t} \mid \phi_{t-1})$ equals 10 per cent, which would be consistent with a sharply rising yield curve. The ex ante change in the long-term rate, in spite of the 500 basis point difference in the respective short-term rates, is only 500 ÷ 120 or approximately 4 basis points. Note, by way of contrast, that if the unit of observation were annual rather than monthly, these same figures would imply—since n would equal 10—an ex ante change of more than 40 basis points in the long-term rate. These figures highlight the fact that it is short-run movements in long-term rates which are not likely to be "forecastable" under the joint hypothesis of market efficiency and a time-invariant term premium.

For non-coupon bonds, as noted by Pesando [5] the expression analogous to (1) is more complicated, but the martingale approximation remains quite close. Intuitively, the martingale approximation—and hence the random walk characteristic of long-term rates—stems from the fact that over short time intervals (one month in the case at hand), the percentage change in bond prices necessary to equate the ex ante returns on short- and long-term securities (up to a time-invariant term premium) is very small. As a result, the implied ex ante changes in long-term rates are very close to zero. In a recent paper (Pesando 1979a), I calculated—for quarterly data—the ex ante changes in long-term Government of Canada and long-term Canadian corporate bonds implied by their yields and the yields on 90-day Treasury Bills and 90-day finance company paper, respectively.[1]

[1] For purposes of these calculations, the (assumed) constant term premiums were set equal to the mean spreads between short- and long-term interest rates in the sample period. The representatives terms to maturity for the two interest rate series were assumed to equal 17 years, although complications posed by call options and sinking funds may cloud the interpretation of this figure in the case of corporate bonds.

The mean absolute values of the ex ante changes in these long-term rates for the sample period 1957:1–1979:1 equalled 2.07 basis points and 2.60 basis points, respectively. If monthly data were employed, the corresponding ex ante changes would be approximately one-third as large. With monthly data, the mean absolute values of the ex ante changes in Government of Canada and Canadian corporate bonds would thus be less than a single basis point. Clearly, if the bond market is efficient and if the term premium accorded long-term interest rate is time-invariant, then agents without access to inside information are not likely to be able to forecast short-term movements in long-term interest rates.

III. Conclusion

Those who work in the capital asset pricing framework of modern finance theory tend to treat the term premium—which is related to the covariance of bond returns and the return to the market portfolio—as constant over time. Many—if not most—of those who have conducted empirical studies of the determinants of term premiums have concluded that they may well be time-invariant. In the absence of convincing evidence of the existence of time-varying term premiums, and in view of the strong à priori belief in market efficiency, the success of the "no-change" prediction in the forecasting experiments conducted by Elliott-Baier is not surprising. Short-run movements in long-term interest rates, quite simply, are not likely to be "forecastable". The failure of recorded forecasts to outperform the no-change prediction of the martingale model, in both the United States (Prell [6], Fraser [2]) and Canada (Pesando [3]), is also noteworthy in this regard.

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JUST HOW BAD ARE ECONOMISTS AT PREDICTING INTEREST RATES? (AND WHAT ARE THE IMPLICATIONS FOR INVESTORS?)

KEVIN STEPHENSON

has taught courses in economics and finance at Middlebury College in Middlebury, Vermont, since 1992. He holds a Ph.D. in economics from Cornell University.

On January 2, 1997, the *Wall Street Journal* published its semiannual survey of economists. Most of the fifty-seven economists surveyed predicted that the yield on the thirty-year Treasury bond, then at 6.64%, would drop by July 1. The consensus estimate for this yield was 6.52%.

Fears of inflation, however, have recently caused interest rates to rise. The yield at the time of this writing in mid-April is over 7%. Thus, barring a major downward shift in interest rates, economists will have wrongly predicted the direction of interest rates.

Some readers will not be surprised by this result, for economists have a notoriously bad reputation for huge forecasting errors. But just how bad are economists at predicting interest rates? And if these experts, whose careers often depend on the accuracy of their predictions, cannot predict interest rates, what are the implications for actively managed bond funds?

I address these questions by analyzing the *Wall Street Journal* survey of economists.

THE DATA AND RESULTS

Economists are employed in nearly all segments of the economy. One of the primary duties of economists in the financial sector is to forecast the economy, or, more specifically, to forecast important economic data such as GDP growth, inflation, and interest rates. Every six months, in late December and late June, the *Wall Street Journal* surveys a group of economists, asking for their forecasts of interest rates, GDP growth, inflation, and the value of the dollar against the yen. The forecasts are published in the first week of January and July.

The participating economists work primarily in the financial sector, most notably investment banks and commercial banks. Only three of the fifty-seven economists participating in the December 1996 survey were then in academia. The number of economists participating has increased steadily from twelve in 1981 to about sixty in the mid-1990s.

The economists have been predicting, six months in advance, the yield on three-month Treasury bills and thirty-year Treasury bonds since December 1981. Each economist provides an estimate for each interest rate, and then a consensus estimate is calculated, which is simply the arithmetic mean of all the estimates.

Can economists predict interest rates? The answer is emphatically "no," regardless of the measure used.

There have been thirty six-month surveys completed since December 1981. The Exhibit provides the consensus estimate and the actual yield for the three-month and thirty-year Treasury securities.

Rates on three-month Treasury bills moved in the *opposite* direction of the consensus prediction in sixteen of these contests (53%). That economists predicted the direction of short-term interest rates correctly almost half of the time is the good news. The bad news is that the consensus estimate for the thirty-year Treasury bond has been in *the wrong direction* in twenty of the thirty contests (67%).

The average error for the consensus estimate is 79 basis points for the Treasury bill, and 86 basis points for the thirty-year bond. Assuming interest rates would stay the same each period yields average errors of 74 and 78 basis points, respectively. Thus, investors who assumed interest rates would remain constant were more accurate than the consensus estimate.

Incorrectly forecasting the direction of interest rates is not very costly for investors if rates move very little. In fact, economists have been least accurate when interest rate changes were largest! The rates on the three-month Treasury bill moved 100 basis points or more on ten occasions. The consensus estimate was in the right direction on six of these occasions, yet the consensus underestimated the move by an average of 99 basis points.

EXHIBIT
Wall Street Journal Consensus Interest Rate Forecast

	3-Month Treasury Bill			30-Year Treasury Bond		
Date Published	Consensus Forecast (%)	Actual Yield (%)	Correct Direction?	Consensus Forecast (%)	Actual Yield (%)	Correct Direction? (%)
Jan-82	11.06	12.43	Wrong	13.05	13.92	Wrong
Jul-82	11.61	11.08	Right	13.27	13.62	Right
Jan-83	7.37	8.75	Right	10.11	10.98	Right
Jul-83	8.60	8.95	Wrong	10.59	11.87	Wrong
Jan-84	8.72	9.90	Wrong	11.39	13.64	Wrong
Jul-84	10.64	7.84	Wrong	13.78	11.53	Wrong
Jan-85	8.56	6.83	Wrong	11.60	10.44	Wrong
Jul-85	7.31	7.08	Right	10.51	9.27	Wrong
Jan-86	6.96	5.98	Right	9.45	7.28	Wrong
Jul-86	6.14	5.66	Wrong	7.63	7.49	Right
Jan-87	4.98	5.73	Wrong	7.05	8.50	Wrong
Jul-87	5.91	5.67	Wrong	8.45	8.98	Wrong
Jan-88	5.70	6.54	Right	8.65	8.83	Right
Jul-88	6.77	8.09	Right	9.36	8.99	Right
Jan-89	8.29	7.98	Wrong	9.25	8.04	Wrong
Jul-89	7.76	7.79	Right	8.12	7.97	Wrong
Jan-90	7.03	7.98	Wrong	7.62	8.40	Wrong
Jul-90	7.56	6.62	Right	8.16	8.24	Right
Jan-91	6.14	5.62	Right	7.65	8.41	Wrong
Jul-91	5.84	3.93	Wrong	8.22	7.39	Right
Jan-92	3.80	3.63	Right	7.30	7.78	Wrong
Jul-92	3.54	3.15	Right	7.61	7.39	Right
Jan-93	3.41	3.07	Wrong	7.44	6.67	Wrong
Jul-93	3.34	3.05	Wrong	6.84	6.34	Wrong
Jan-94	3.40	4.15	Right	6.26	7.61	Wrong
Jul-94	4.67	5.70	Right	7.30	7.87	Wrong
Jan-95	6.50	5.44	Wrong	7.94	6.62	Wrong
Jul-95	5.45	5.08	Wrong	6.62	5.94	Wrong
Jan-96	4.90	5.15	Wrong	6.00	6.89	Right
Jul-96	5.31	5.19	Right	6.86	6.64	Right
Jan-97	5.10	?	?	6.52	?	?

Again, this is the good news. The yield on the thirty-year bond has moved more than 100 basis points on ten occasions. The consensus estimate was in the *wrong direction* on eight of these occasions. One of the two correct guesses was a consensus estimate of a 19-basis point drop when rates dropped 102 basis points. Economists therefore essentially missed on nine of the ten biggest interest rate movements in the last fourteen years.

The survey data from the *Wall Street Journal* clearly show that economists a group cannot predict interest rates. Might there be some individual economists, however, who can successfully predict interest rates? Further analysis suggests everyone is almost equally inaccurate.

Forty-four economists have participated in ten or more contests. Of these, only thirteen participants guessed the right direction of long-term interest rates more than 50% of the time; none of these professionals exceeded a 60% accuracy rate.[1] The median accuracy rate is 44%. The figures are only slightly better for the three-month rate, with twenty-four economists above 50%, and one expert actually getting the direction right two-thirds of the time.

For a final test, I examined future predictions of the economists with the most accurate predictions to determine if success could continue for the short term. The three economists in each survey with the closest prediction for the thirty-year bond were examined, although ties cause as many as seven economists to be included in this winner's bracket. Only 44% of these economists (48 of 108) were in the top half of the next survey, suggesting that economists with the closest forecasts cannot repeat their performance.

IMPLICATIONS FOR INVESTORS

The inability of economists to forecast interest rates has important implications for investors. Bond prices depend almost entirely on two factors: default risk and interest rates.[2] To earn above-market returns in the bond market, one needs to be able to predict default risk or interest rates better than the market. Bond rating agencies like Moody's and Standard & Poor's do an outstanding job at predicting default risk. Consequently, it is improbable that fixed-income fund managers can predict default risk better than the market consensus.

The ability to earn above-market returns in bonds then boils down to predicting interest rates correctly, but my analysis of the *Wall Street Journal* survey clearly shows that economists working for top investment banks, commercial banks, money management firms, and investment newsletters have no ability in this department.

If fund managers cannot accurately predict interest rates, actively managed bond funds have no edge over passively managed funds. Once management fees are factored in, the advantage goes to index funds. Indeed, there is overwhelming evidence that the bond market is brutally efficient, and the performance of bond managers reflects this efficiency.

For example, as of June 1, 1996, only 23.4% of taxable bond funds and 33.9% of tax-free bond funds had a one-year record better than the relevant bond index, compared with 44.1% of general equity funds and 58.5% of aggressive growth funds. In a longer-term study, Firman [1994] observes that only 128 of 800 fixed-income pension managers (16%) have a ten-year record better than the relevant bond index.[3]

CONCLUSION

Economists participating in the *Wall Street Journal* forecasting survey have no ability to predict interest rates. Since interest rates cannot be predicted, bond managers have no reliable method with which to earn above-market returns. Instead, actively managed bond funds, shackled by management fees, and with no superior ability to predict interest rates, have generally underperformed the relevant bond index. Bond index funds should appeal to investors for this reason.

ENDNOTES

[1]Six participants in the most recent survey predicted the yield on the thirty-year Treasury bond out to the second decimal point (e.g., 6.79% instead of rounding to 6.8%).

[2]Some bonds are also subject to changes in the tax code, as the inverse relationship between the price of municipal bonds and the popularity of flat tax proposals clearly indicates.

[3]See Blake, Elton, and Gruber [1993] for further evidence. For an overview on the efficiency of capital markets, see Fama [1991].

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Professional Forecasts of Interest Rates and Exchange Rates: Evidence from the Wall Street Journal's Panel of Economists

Karlyn Mitchell
Department of Business Management
North Carolina State University

Douglas K. Pearce*
Department of Economics
North Carolina State University

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Abstract

We use individual economists' 6-month-ahead forecasts of interest rates and exchange rates from the *Wall Street Journal*'s survey to test for forecast unbiasedness, accuracy, and heterogeneity. We find that a majority of economists produced unbiased forecasts but that none predicted directions of changes more accurately than chance. We find that the forecast accuracy of most of the economists is statistically indistinguishable from that of the random walk model when forecasting the Treasury bill rate but that the forecast accuracy is significantly worse for many of the forecasters for predictions of the Treasury bond rate and the exchange rate. Regressions involving deviations in economists' forecasts from forecast averages produced evidence of systematic heterogeneity across economists, including evidence that independent economists make more radical forecasts.

JEL code: E47

Keywords: Forecast evaluation, interest rates, exchange rate

* Corresponding author: Douglas K. Pearce, Department of Economics, North Carolina State University, Raleigh, NC 27695-8110, phone: 919-513-2880, e-mail: Doug Pearce@ncsu.edu

Professional Forecasts of Interest Rates and Exchange Rates: Evidence from the Wall Street Journal's Panel of Economists

Professional forecasters' predictions of macroeconomic variables are of widespread interest. Governments, businesses, and households purchase forecasts, presumably to help them form their own expectations and aid in economic decision-making.[1] Economic researchers increasingly use surveys of professional forecasters' predictions as proxies of otherwise unobservable expectations in studying asset price determination.[2] But compared with the effort put into making macroeconomic forecasts, the effort put into assessing forecast quality ex post is small (Fildes and Stekler (2002), p 462).

Ex post assessments of forecast quality are potentially valuable to forecasters and users of forecasts alike. The theory of rational expectations implies that, if professional forecasters understand fundamental economic processes, they will produce unbiased, identical forecasts given access to the same information and presented with similar incentives with respect to forecast accuracy. If ex post assessments show forecasters' predictions to be unbiased and statistically identical, they serve to increase confidence in the profession's knowledge of economic processes, researchers' use of forecasts to proxy economic expectations, and agents' use of forecasts to inform economic decision-making. But if assessments yield evidence of bias or heterogeneity, they call for a reexamination of assumptions about information access, incentives and, possibly, understanding of economic processes.

[1] For example, Carroll (2003) reports evidence that households use the reported forecasts of professional economists in forming their own expectations.

[2] For example, Anderson et al (2003) and the references cited by them, discuss researchers' use of professional economists' forecasts of macroeconomic variables to distinguish expected from unexpected macroeconomic announcements in studies of financial market reactions to economic news. Frankel and Froot (1987) and MacDonald (2000) observe that forecasts of interest rates and exchange rates potentially enable researchers to separate the confounding effects of expectations and time-varying risk premiums.

Of the studies that assess forecast quality from survey data, most focus on inflation, GDP and exchange rate forecasts and several cast doubt on the rationality of forecasters (MacDonald (2000)). For example Ito (1990), using survey data of individual economists' exchange rate forecasts, finds evidence of heterogeneous expectations, as do MacDonald and Marsh (1996), who use individual economists' exchange rate forecasts from a different survey. Lamont (2002) finds that the patterns of economists' forecasts of real GDP, the unemployment rate and the inflation rate are inconsistent with the single goal of forecast accuracy, suggesting strategic behavior. Laster *et al.* (1999) also finds evidence of strategic behavior by forecasters making real GDP forecasts from survey data which groups forecasters by industry rather than identifying them individually, which raises the issue of how carefully survey participants make their predictions when they are not identified. Compared with inflation, GDP and exchange rate forecasting, interest rate forecasting has received less attention.

To help address the comparative dearth of forecast assessments and to contribute to the debate on forecaster rationality we analyze interest rate and exchange rate forecasts from a highly visible but relatively little studied survey of forecasters, the *Wall Street Journal's* panel of economists. This survey is particularly well-suited to assessing forecast quality because the names and employers of the forecaster-economists are published along side their forecasts, which should give the economists strong incentives to think carefully about their forecasts. We focus on interest rate and exchange rate forecasts because their actual values are never subject to subsequent revision, unlike, say GDP, so there is no question about the actual values economists were predicting.[3] In addition, the *Wall Street Journal* surveys contain consistent data on interest rate and exchange rate forecasts for a longer period than on other variables. We proceed by testing whether economists' forecasts are unbiased, more accurate than naïve prediction rules,

[3] Keane and Runkle (1990) present evidence that using preliminary versus revised data can change the conclusions from unbiasedness tests.

and heterogeneous or indicative of strategic behavior by economists. We study the forecasts of individual economists as well as the survey means, allowing for the possibility that the interest rates and exchanges rates forecasted are non-stationary. We are unaware of previous papers that allow for non-stationarity in the actual data when applying tests of forecast unbiasedness to individual data. We are also unaware of previous papers using interest rate and exchange rate forecasts from the *Wall Street Journal* survey to study forecast unbiasedness, assess the statistical significance of forecast accuracy, or investigate forecast heterogeneity and possibly strategic behavior by economists.

To preview our results, we find that a majority of economists produce forecasts that are unbiased and that most produce forecasts that are less accurate than the forecasts generated by a random walk model. While efficient financial markets should make accurate forecasting of interest rates or exchange rates impossible, rational forecasters should not do significantly worse than a random walk model. We find that the economists' forecasts exhibit the same kind of heterogeneity found by Ito (1990) and MacDonald and Marsh (1996), using Japanese and European survey data, respectively. When we apply the models of Laster *et al.* (1999) and Lamont (2002) to our economists' forecasts we find evidence of strategic behavior similar to Laster *et al*, but contrary to Lamont's finding that economists make more extreme forecasts as they age, we find that more experienced economists make less radical forecasts.

The rest of the paper is organized as follows. Section 1 briefly reviews some of the past work on evaluating survey measures of expectations. Section 2 describes our data. Section 3 reports our empirical results and section 4 offers some conclusions.

1. Review of Past Work

Although researchers have put less effort towards assessing professional economists' forecasts than seems warranted, the existing research focuses on three issues.[4] The first is whether mean or median responses, usually referred to as consensus forecasts, give misleading inferences about the unbiasedness and rationality of individual forecasters. Figlewski and Wachtel (1981) report that pooling individuals' inflation forecasts from the Livingston survey produces stronger evidence of bias than using survey averages. Keane and Runkle (1990) find that individuals' inflation forecasts from the Survey of Professional Forecasters (SPF) are generally unbiased whereas Bonham and Cohen (2001) find many of the forecasters in the SPF to be biased and systematically heterogeneous so that pooling their forecasts is inappropriate.[5] The finding of bias in inflation expectations runs contrary to rational expectations, and might reflect heterogeneity of expectations. Whether the individual forecasts of interest rates and exchange rates of professional economists are similarly plagued by bias is a question addressed below.

A second issue of research focus is whether the standard tests of economists' forecast unbiasedness are rendered invalid by nonstationarity in the variables economists' forecast.[6] Liu and Maddala (1992) find that exchange rate forecasts from the Money Market Services (MMS) survey appear to be nonstationary but cointegrated with the actual data and thus, potentially unbiased; when they introduce a restricted cointegration test they find that the forecasts are indeed unbiased. In contrast, Aggarwal *et al.* (1995) and Schirm (2003) find that only about half

[4] Much of the work on evaluating survey measures of expectations focuses on inflation forecasts. See Croushore (1998) and Thomas (1999) for reviews of this work. MacDonald (2000) examines previous work on financial market expectations.
[5] Bonham and Cohen (2001) test whether the coefficients of the standard unbiasedness equation are the same across individuals and reject this hypothesis. Batchelor and Dua (1991) use individual forecast data from the Blue Chip Economic Indicators and find that most individuals are unbiased.
[6] The standard test is to regress the actual value being forecasted on the forecast and test that the intercept is zero and the slope is one.

the macroeconomic variables forecasted by economists in the MMS surveys appear unbiased after testing for nonstationarity and cointegration.[7] But Osterberg (2000), applying the Liu-Maddala techniques to more recent exchange rate forecasts in the MMS survey, finds that these forecasts are unbiased. The aforementioned tests, it should be noted, all use the median responses from the MMS surveys rather than forecasts of individual economists. To our knowledge the issue of variable non-stationarity and forecast unbiasedness has not been investigated using forecasts by individual economists.

A third issue of research focus concerns forecast heterogeneity and strategic behavior by forecasters as a potential source of such heterogeneity. Study of this issue has been furthered by the availability of data reporting forecasts by individuals. Ito (1990) and MacDonald and Marsh (1996) use individual data and report evidence supporting systematically heterogeneous expectations about exchange rate movements. The latter paper also finds that variations in the degree of heterogeneity can help explain the volume of trading in financial markets. Scharfstein and Stein (1990) and Erbeck and Waldmann (1996) argue that the incentive structure facing forecasters leads to "herding," that is, making forecasts that are close to the mean or "consensus" forecast. In contrast, Laster *et al.* (1999) and Lamont (2002) suggest that incentives could lead forecasters to make forecasts that are more extreme than their true expectations if forecasters are rewarded not only for being right but for being right when others are wrong. Laster *et al* (1999) find evidence consistent with strategic forecasting using forecasts of real GDP from the Blue Chip Economic Indicators, although their data are not ideal for testing their theory since

[7] These variables include the consumer price index, the producer price index, the M_1 money supply, personal income, durable goods, industrial production, retail sales, the index of leading indicators, housing starts, the trade balance, and unemployment.

individual forecasters are not identified, only the industry of their employment.[8] Lamont (2002) uses *Business Week's* annual set of economists' forecasts for real GDP growth, inflation, and unemployment to test whether forecasters make more radical predictions when they own their own firms, and hence may gain the most from publicity. He finds support for this hypothesis, as well as evidence that forecasters produce forecasts that deviate more from the mean forecast as they age. Perhaps due to the paucity of data on interest rate and exchange rate forecasts by individuals, the issue of heterogeneity in interest rate forecasts and strategic behavior in forecasting interest rates and exchange rates remains largely unstudied.

To investigate the rationality, accuracy, and heterogeneity for individual forecasters' interest rate and exchange rate forecasts we use data from the *Wall Street Journal's* bi-annual survey of economists. Several researchers have used these data previously, mainly to examine forecast accuracy. Kolb and Stekler (1996) examine the six-month-ahead interest rate forecasts from 1982 through January 1990 and find little evidence that forecasters, individually or on average, can predict the sign of interest rate changes. Greer reports similar evidence for predicting the direction of one-year changes for various variables for 1984-1997 (Greer (1999)) and for the long-term interest rate for 1984-1998 (Greer (2003)). Cho (1996) evaluates the six-month-ahead predictions of twenty-four forecasters who participated in all the surveys from December 1989 through June 1994. He finds that about 80 percent of the forecasters predicted the short-term interest rate more accurately than a random walk model but that very few predicted the long-term interest rate or the exchange rate better than a random walk model. Eisenbeis *et al.* (2002) uses the *Wall Street Journal* data from 1986 to 1999 to illustrate a new approach to ranking forecasters across variables that differ in volatility and cross-correlation.

[8] Pons-Novell (2003), using Livingston survey data on forecasts of the unemployment rate, found support for industry effects as in Laster *et al.* (1999) but not the age effect found by Lamont(2002) . The Livingston data, however, do not identify the individual respondents by name.

But to our knowledge, researchers have not previously used the *Wall Street Journal* data to test for unbiasedness of individual forecasts or to test for strategic forecasting by individual forecasters.

After describing our data, we employ them to investigate the dominating issues in the recent work on expectations of economic variables: unbiasedness of individuals' forecasts, the implications of nonstationarity of the data for the accuracy of unbiasedness tests, and systematic heterogeneity of forecasts, possibly as a result of strategic behavior. In addition, we go beyond past researchers' use of the *Wall Street Journal* data by examining the statistical significance of the surveyed economists' forecast accuracy.

2. The *Wall Street Journal* survey data

Since 1981 the *Wall Street Journal* has published forecasts of several economic variables by a set of economists at the beginning and at the mid-point of each year. The economists are identified both by name and by employer. The survey is dominated by economists employed by banks and securities firms but it also includes representatives from non-financial industries, consulting and forecasting companies, universities and professional associations.[9] The initial survey presented economists' forecasts of the prime rate. In January 1982 the survey introduced forecasts of the Treasury bill and Treasury bond interest rates. Additional forecasts have been added including the CPI inflation rate, real GDP growth, and the dollar-yen exchange rate, among others. In the January survey economists are asked for their forecasts of the Treasury bill rate, Treasury bond rate, and the dollar-yen exchange rates for the last business day of June, and

[9] For respondents that appeared in at least six surveys from January 1982 through July 2002, the employer mix is as follows: banks (30 individuals and 394 observations), econometric modelers (5 and 108), independent forecasters (26 and 325), industrial corporations (5 and 41), securities firms (39 and 626), and others (10 and 154).

in the July survey they are asked for their forecasts for the last business day of December.[10] The surveys are published in the first week of January and July, along with commentary on the forecasts and, more recently, discussion of the accuracy of the last set of forecasts.[11]

In this paper we examine the six-month-ahead forecasts of the Treasury bill and Treasury bond rates that began in 1982 along with the six-month-ahead forecasts of the dollar-yen exchange rate that began in 1989. Our sample ends with the July 2002 survey. This long time period allows larger sample sizes for individual forecasters and a larger number of participants. We choose the interest rate and exchange rate variables both because they appear on the largest number of surveys and because the actual data are not revised so there is no question of what variable the forecasters were predicting.[12]

Table 1 reports the means and standard deviations of the survey responses along with the range, and number of respondents. The number of respondents varies over time: only twelve economists participated in the January 1982 survey compared with fifty-five in the July 2002 survey. There is also considerable turnover in the respondents themselves. Table 1 also reports the actual values for the Treasury bill rate, the Treasury bond rate, and the yen-dollar exchange rate on the last business day of June and December.

For several tests we restrict the sample to the set of respondents that made at least twenty forecasts. Table 2 reports the names, participation dates, and professional affiliations of these respondents from 1982 through 2002.

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[10] Respondents have often been asked for 12-month ahead forecasts but these are not available for the entire period.

[11] The selection of survey respondents does not depend on their past performance. The *Journal* tries to get broad representation but also wants to include the chief economists from major financial institutions. We thank Jon Hilsenrath of the *Wall Street Journal* for this information.

[12] There was a change in the definition of the three-month Treasury bill rate from the discount yield to the bond-equivalent yield starting with the July 1989 survey. The long-term bond rate refers to the thirty-year bond until the July 2001 survey when it was changed to the ten-year rate. All data are available from the authors on request.

Figures 1-3 show the dispersion in the forecast errors, defined as actual minus predicted, of the Treasury bill rate, the Treasury bond rate, and the yen-dollar exchange rate. The figures are similar in showing a considerable spread in forecasts. The assumption that agents form unique rational expectations using the same model and same information is clearly not supported by the data. Figure 1 indicates that the errors in predicting the Treasury bill rate are largely of one sign for about half the surveys, suggesting that while expectations vary across individuals a common source exists for at least some of the error. Figures 2 and 3 provide stronger support for this interpretation, where an even higher proportion of the survey errors are of the same sign for the long-term bond rate and the exchange rate. The correlation coefficient for the two interest rate forecast errors is .66, indicating that most of the forecast errors are from unpredicted shifts in the yield curve rather than unpredicted changes in its slope. There is little evidence of correlation in the errors for interest rates and the exchange rate.[13]

3. Evaluating the survey data

3.1. Tests of unbiasedness

A major issue in the literature on economic expectations is unbiasedness, which is a requirement for rationality when a forecaster's loss function is symmetric about the forecast error. Denoting the forecast of a variable made at time (t-1) for time t as ${}_{t-1}F_t$ and the actual value of the variable as A_t, the usual test involves estimating

$$A_t = \alpha + \beta \, {}_{t-1}F_t + \varepsilon_t \qquad [1]$$

[13] For the forecast errors in the figures, the correlation between the Treasury bill forecast errors and the exchange rate errors is .02 and the correlation between the Treasury bond forecast errors and the exchange rate errors is –.07.

where ε_t is a random error term. A forecast series is unbiased if the joint hypothesis that $\alpha=0$ and $\beta=1$ cannot be rejected.[14]

As is well-known estimating [1] may produce misleading inferences when A and F are nonstationary and not cointegrated since the error term will also be nonstationary, resulting in the spurious regression problem noted by Granger and Newbold (1974). If the actual series is nonstationary, an unbiased forecast must also be nonstationary and the two series must be cointegrated with a cointegrating vector of zero and one. Liu and Maddala (1992) suggest a restricted cointegration test when A and F are I(1): impose the restrictions $\alpha=0$ and $\beta=1$ and use the data to compute forecast errors; if the forecast errors are stationary, the restrictions are supported and the forecasts are unbiased since the cointegrating vector is unique with only two series.[15] We perform the Liu-Maddala test below after first establishing whether A and F are I(1).

To establish that the As – the daily Treasury bill, Treasury bond and exchange rate data sampled at six-month intervals, the data frequency that matches our forecast series -- are I(1), we perform unit root tests. Using levels data we cannot reject the hypothesis of a unit root for any of the three series, but using first-differenced data we can reject the unit root hypothesis for all three. Thus all three actual series appear to be I(1).[16]

To establish that the Fs -- the Treasury bill, Treasury bond and yen-dollar exchange rate forecast series of the thirty-three economists listed in Table 2 who responded to at least 20 surveys -- are I(1), we perform 99 unit root tests (three forecast series for each of the thirty-three

[14] Rationality tests often include a test that ε_t is not autocorrelated and may also include other information available at time (t-1) on the right hand side of equation [1]. Rationality requires that all such variables have zero coefficients.
[15] Papers employing this restricted cointegration test include Hakkio and Rush (1989) and Osterberg (2000).

[16] The ADF statistics using 1 lag for the levels of the Treasury Bill rate, Treasury bond rate, and yen-dollar exchange rate are -.867, -.970, and -2.396 respectively, indicating that each series has at least one unit root. The ADF statistics for the first differences are -4.950, -6.143, and -3.612 indicating that all series are I(1). Rose (1988) and Rapach and Weber (2004) also find that the nominal interest rate has a unit root while Baillie and Bollerslev (1989) report similar findings for nominal exchange rates.

economists). The t statistics for augmented Dickey-Fuller (ADF) unit root tests performed on levels and first differences for individual forecasters are reported in the second column of Tables 3-5. Starred values indicate rejection of the unit root hypothesis at the 0.01, 0.05 or 0.10 levels of significance. Of the 99 forecast series, 71 appear to be I(1) using the 10% significance level or better.

To complete the Liu-Maddala test we impose the restriction that $\alpha=0$ and $\beta=1$ on [1], use the As and Fs to compute the forecast errors, and perform ADF tests to determine whether the forecast errors are I(0). The third columns in Tables 3-5 report ADF t statistics for the case of a zero intercept since the null hypothesis is that the residuals have an expected value of zero. Box-Ljung Q statistics to test for serial correlation in the residuals appear beneath the t statistics. Of the 99 forecast error series all but four are I(0) at the 10% level or better and only four show evidence of serially correlated errors.

To pass the Liu-Maddala test the Fs must be I(1) and the forecast residuals must be I(0). Nearly 60 % of the Treasury bill rate forecasts reported in Table 3 meet both criteria.[17] In addition, over three-quarters of the Treasury bond rate forecast series in Table 4 and two-thirds of the exchange rate forecast series in Table 5 meet both criteria.[18] Altogether, two-thirds (67) of the 99 forecast series pass the Liu-Maddala test of unbiasedness. Moreover, the three series of mean survey responses pass the Liu-Maddala test, as indicated in the last row of each table.

While the results of the Liu-Maddala tests are encouraging to proponents of forecaster rationality, Lopes (2000) provides evidence that the power of their restricted cointegration test

[17] About one-third of the forecast series appear to be I(0) despite the Treasury bill rate series being I(1). First differences of four other forecast series appear to be nonstationary even though the first difference of the Treasury bill rate series is stationary; the forecast errors in these four cases do appear stationary, however. For some individuals there are gaps, usually just one, in the forecast series. While Shin and Sarker (1993) find that occasional missing values do not change the asymptotic distribution of the standard Dickey-Fuller tests, our samples are small so that the results with a gap remain suspect.

[18] Of the eleven exchange rate forecast series that failed, three had ten or fewer observations.

may be low, as is usual with unit root tests. He uses Monte Carlo techniques to show that a more powerful test of unbiasedness in finite samples is a simple t-test for the hypothesis that a forecast series' mean forecast error is zero. Accordingly, we also report the mean forecast error and its t-statistic in column 4 of each table. We fail to reject at the 10% level the null hypothesis of unbiasedness for 73% of the Treasury bill forecast series, 67% of the Treasury bond forecast series, and 88% of the exchange rate forecast series.[19] Of the forecast series with test statistics that reject the null, all of the Treasury bill rate and exchange rate forecast series and about two-thirds of the Treasury bond rate forecast series err on the high side. Biased forecasts by some forecasters did not serve to impart bias to the survey mean forecasts, however: the average forecast errors of the survey mean forecasts were statistically indistinguishable from zero, implying unbiasedness.

In summary, about two-thirds of the forecast series appear to be statistically unbiased, as do all three series of mean survey responses. Economists whose forecasts appeared to be biased usually overestimated the 6-month-ahead level of the Treasury bill, Treasury bond or yen-dollar exchange rate, with overestimation occurring more frequently in predicting interest rates than exchange rates. Based on the t-tests for unbiasedness at the 10% level, about 60 % of the survey economists were statistically unbiased in their predictions of the Treasury bill, Treasury bonds and exchange rate; about 10% made biased forecasts of one of the three rates; and the remaining 30% made biased forecasts of two series. No economist made biased predictions of all three rates.[20]

[19] At the less stringent 5% level, 80%, 73% and 91%, respectively, of the Treasury bill, Treasury bond, and exchange rate series fail to reject the null of unbiasedness.

[20] If the less stringent 5% level is used to judge unbiasedness, 67% of the survey forecasters were statistically unbiased in their predictions of all three rates; about 6% made biased forecasts of one of the rates; and the remaining 27% made biased forecasts of two rates.

3.2 Measures of predictive ability

While unbiasedness is a requirement for rationality of forecasters with symmetric loss functions, predictive ability is a hallmark of forecasters who "know the true model" determining macroeconomic variables. We take two approaches to measuring predictive accuracy: first, we assess forecasters' success at predicting the direction of interest rate and exchange rate changes;[21] second, we compare forecasters' accuracy to the accuracy of a traditional benchmark, the random walk model without drift, and test whether the accuracy metrics are statistically different. Although previous researchers have employed the *Wall Street Journal* survey to assess predictive accuracy using one approach or the other (but not both), they reach contradictory conclusions.[22] Moreover, we are unaware of any previously published research using the *Wall Street Journal* survey that tests for statistical differences in the accuracy of individual economists' forecasts versus forecasts of the random walk model.

In our first approach to predictive accuracy we use standard techniques to assess economists' accuracy in predicting the direction of change in the Treasury bill rate, Treasury bond rate, and yen-dollar exchange rate over 6-month intervals. The results appear in columns five and six of Tables 3-5. Column 5 reports the fraction of correctly-predicted changes along with the p-value for Fisher's exact test of the hypothesis that predicted and actual changes were independent. Column 6 reports the standard χ^2 statistic and the Pesaran-Timmerman (1992) test

[21] Leitch and Tanner (1991) argue that the direction of change is more closely related to profits than say the mean square error for interest rate predictions.
[22] Kolb and Stekler (1996) and Greer (1999, 2003) present tests of directional change whereas Cho (1996) compares economists' forecast errors against the forecast errors made by the naïve model of no change. Kolb and Stekler and Greer find that little evidence that economists can predict the direction of change, whereas Cho finds that eighty percent of the economists outperformed the naive model when forecasting the Treasury bill rate.

statistic, also with a χ^2 distribution with 1 degree of freedom, of the same independence hypothesis.[23]

The directional accuracy tests suggest that the surveyed economists provide no useful information.[24] In forecasting the Treasury bill rate about two-thirds of economists predicted the direction of change correctly more than half the time, but for no economist was the percentage of correctly predicted directions significantly greater than expected by chance; moreover for a few, the percentage was significantly lower. In predicting the Treasury bond rate, only about one-third of economists forecasted directional change correctly more than half the time; nevertheless, few predicted directional change less accurately than chance. The surveyed economists were more successful in predicting directional change in the yen-dollar exchange rate: about 80 predicted correctly more than half the time; nevertheless none predicted correctly more often than would be expected by chance. Finally, the survey means successfully predicted the direction of Treasury bill rate and exchange-rate changes about as accurately as chance, but predicted the direction of Treasury bond rate changes significantly more poorly than chance. Thus, when set the task of predicting the direction of interest rate and exchange rate changes, the surveyed economists acquit themselves modestly, at best.

In our second approach to predictive accuracy, we compare the accuracy of the surveyed economists' predictions to the accuracy of a model predicting that interest rates and exchange rates follow a random walk without drift. Specifically, we computed the ratio of the mean square errors (MSEs) of each economist's forecast series to the MSEs of forecast series covering the

[23] For each forecaster we constructed a contingency table with the number of times the forecaster predicted a decline and there was a decline, the number of times the forecaster predicted an increase and there was an increase, the number of times the forecaster incorrectly predicted a decrease, and the number of times the forecaster incorrectly predicted an increase.

[24] We also performed the test of Cumby and Modest (1987), suggested by Stekler and Petrei (2003), in which the actual change is regressed on a binary variable taking the value of one if the forecaster predicted an increase and zero otherwise. These tests, not reported, also indicated that the respondents were unable to provide useful information on the direction of change.

same dates but using as forecasts the six-month-earlier actual values (that is, actuals on the last business day in December and June, respectively, to forecast values for the last business day in June and December, respectively; these actuals are usually published along side the forecasts in the *Wall Street Journal)*. The question becomes whether individual economists can outperform the random walk model by achieving a ratio less than one. In addition to analyzing this ratio we follow the recommendation of Fildes and Stekler (2002) and test for statistically significant differences between individuals' forecasts and random walk forecasts of no change using the modified Diebold-Mariano (1995) test statistic proposed by Harvey *et al.* (1997). Specifically, this statistic tests whether the mean difference between the squared forecast errors of the economist and of the random walk model is significantly different from zero; this statistic has a t-distribution under the null hypothesis that the mean is zero. We report our results in Tables 3-5. The next-to-the last column reports the number of forecasts made by each economist together with the sum of the squared forecast errors. The last column reports the ratio of each economist's MSE to the MSE from a random walk model and the Diebold-Marino statistic in parentheses.

The statistical evidence indicates that economists generally fail to beat and tend to be statistically less accurate than the random walk model. Although in predicting the Treasury bill rate eight of thirty-three economists achieve a MSE ratio less than one, the Diebold-Marino statistics indicate that no economist forecasts significantly better than the random walk model (i.e. a t-statistic that is significantly less than zero) and five do significantly worse at the 10% level. In predicting the Treasury bond rate, no economist achieved a MSE ratio less than one; moreover, about two-thirds of economists predicted significantly worse than a random walk model, judging by the Diebold-Marino statistics (i.e., a t-statistic significantly greater than zero). Accuracy in predicting the yen-dollar exchange was little better: no economist achieved a MSE ratio less than one, and half predicted significantly worse than a random walk model, judged by

the Diebold-Marino statistics. Economists' poor predictive ability is reflected in the survey mean predictions. Although survey mean predictions of the Treasury bill rate achieve a MSE ratio less than one, the survey mean predictions do not differ statistically from the random walk predictions. Survey mean predictions of neither the Treasury bond rate nor the yen-dollar exchange rate achieved MSE ratios less than one, and although the mean predictions of the Treasury bond rate did not differ statistically from the random walk predictions, the mean exchange-rate predictions were significantly worse than the random walk predictions.

Taken all together, the evidence on predictive ability suggests that agents who use forecasts and prize accuracy would have suffered less disappointment by assuming that interest rates and exchange rates stay at their last observed levels rather than by relying on forecasts from the *Wall Street Journal* survey. The dismal predictive accuracy of many of the economists leads us to ask whether the forecasts are systematically heterogeneous, possibly because some economists face incentives to forecast large interest rate and exchange rate changes.

3.3. Tests of systematic heterogeneity of forecasts

Professional economists who are rational, who know the "true model," and who, in addition, have access to the same macroeconomic information relevant to forecasting interest rates and exchange rates – as a priori reasoning suggests is probably the case – should produce homogenous (identical) forecasts. In this section we examine whether forecasts of the economists in the *Wall Street Journal* survey are homogeneous or systematically heterogeneous.

To test for homogeneity in forecasts we follow Ito (1990), who posits a fixed-effects model. Ito models the forecast for time t of the jth economist, $f_{j,t}$, as being a function of common information, I_t, an individual effect represented by an individual-specific dummy variable, g_j, and a random error term, $u_{j,t}$:

$$f_{j,t} = f(I_t) + g_j + u_{j,t} . \qquad [2]$$

Ito assumes further that $f(I_t)$ contains a constant so that the average of the g_js may be set to zero. Averaging equation [2] across all economists and then subtracting the average from [2] yields:

$$f_{j,t} - f_{AVE,t} = g_j + (u_{j,t} - u_{AVE,t}) . \qquad [3]$$

Homogeneity of forecasts can be tested by estimating [3] on forecast data for individual economists and testing that the estimated values of g_j are identical across economists.[25] [26]

Table 6 presents the results from estimating [3] using the Treasury bill rate, Treasury bond rate and the yen-dollar exchange rate forecasts of the economists in the *Wall Street Journal* survey and testing for forecast homogeneity. Like Ito (1990) we estimate [3] twice, first letting the g_js represent dummy variables for individual economists and again letting the g_js represent dummy variables for the economists' sector of employment. Panels A and B, respectively, report results from the two estimations. We report results for two sub-samples of economists, one including all economists having at least six survey responses (Panel 1) and another including all economists having at least twenty responses (Panel 2), the same economists whose forecasts were examined in sections 3.1 and 3.2.[27]

The evidence in Table 6 overwhelmingly rejects the hypothesis of homogeneous forecasts. In Panel A, F tests reject the null hypothesis of identical g_j estimates for all economists at the 0.01 level for all the data sets, indicating the presence of significant individual effects. In

[25] An essentially identical approach is to regress the individual forecasts on a set of time dummies as well as a set of individual dummies and test for individual effects.

[26] Ito uses [3] to test for heterogeneity in exchange rate forecasts made by Japanese economists. He finds that the data reject the hypothesis of homogeneous forecasts both when the g_js are individual dummy variables and when the g_js represent the industry of the economist's employment. Ito also finds that economists employed in export industries have a depreciation bias whereas those employed in the import business have an appreciation bias, a pattern he terms the "wishful thinking" effect. MacDonald and Marsh (1996) also find evidence of heterogeneity across exchange rate forecasters from a large survey of European economists. In addition they report that the dispersion of forecasts is positively related to the volume of foreign exchange trading. MacDonald and Marsh report that the European economists are generally less accurate than a random walk for 3-month predictions but that a substantial number of economists beat a random walk when making 12-month forecasts.

[27] These are unbalanced panels since participants change over time.

Panel B, coefficient estimates of five employment sectors appear (top number, standard errors beneath) along with F tests of the null hypothesis that the estimated coefficients are identical (reported in the last row). The data soundly reject the null for all data sets. The coefficient estimates indicate that, compared with other economists, independent forecasters made significantly lower forecasts of the Treasury bill and Treasury bond rate and significantly higher forecasts of the yen-dollar exchange rate. Economists employed by securities firms also made comparatively low forecasts of the Treasury bond rate, but not as low as economists employed by independent firms. Economists affiliated with banks produced forecasts statistically indistinguishable from the consensus, as did economists employed by econometric modeling firms, except for yen-dollar exchange rate forecasts made by Panel 2, which were statistically lower.

In summary, the evidence from the *Wall Street Journal* survey suggests that the economists' forecasts are indeed systematically heterogeneous. This finding leads us to investigate whether individual forecasters behave strategically in making their forecasts.

3.4. Tests of strategic forecasting

Laster *et al.* (1999) and Lamont (2002) suggest that the incentive structure facing professional economists potentially motivates them to supply heterogeneous forecasts. Specifically, they argue that if economists are rewarded both for forecast accuracy and for "standing out from the crowd," economists may announce more extreme predictions than if they were rewarded for forecast accuracy alone.[28] To investigate this possibility we estimate a model combining elements of Lamont (2002) and Laster *et al.* (1999):

[28] Lamont (2002) models forecasters' payoff function as follows:

$$w_j = R(|f_j - a|, |f_j - f_{c(-j)}|)$$

$$|f_j - f_{c(-j)}|_t = \beta_0 + \beta_1 AGE_{j,t} + \beta_2 AGE_{j,t} * MODEL_{j,t} + \beta_3 AVEDEV(-j)_t$$
$$+ \beta_4 OWN_{j,t} + \sum \gamma_i D_{i,t} + \varepsilon_{j,t} \qquad [4]$$

Following Lamont our dependent variable – a measure of "standing out from the crowd" – is the absolute value of the difference between an individual economist's time t forecast and the average time t forecast omitting that economist's forecast. AGE is the number of years an economist had participated in the *Wall Street Journal* survey at the time of survey t while the interaction term AGE*MODEL allows the effect of an economist's age to differ if the economist is employed by an econometric modeling firm.[29] AGE is included to control for changing incentive structures: incentives might encourage young forecasters to make extreme forecasts so as to gain publicity while encouraging older forecasters to make less extreme forecasts so as to protect the reputations; alternatively, incentives might encourage young forecasters to make less extreme forecasts so as to hide their inexperience while encouraging seasoned, secure forecasters to make more radical forecasts. AVEDEV(-j) is the average absolute deviation of the forecasts from the mean, omitting the jth economist; this latter variable controls for variations in the spread of the forecasts over time. The dummy variable, OWN, equals one if an economist is employed at a firm that bears his name. Finally, following Laster *et al.*, we add dummy variables for the industry employing the jth economist at the time of survey t, the D_{jt}s. Our industries include banks, securities firms, finance departments of corporations, econometric modelers, and economists employed by independent firms not bearing the economists' names, similar to Laster

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where w_j is the payoff to forecaster the jth forecaster, $|f_j - a|$ is the absolute value of the jth forecaster's forecast from the actual value, and $|f_j - f_{c(-j)}|$ is the absolute value of the jth forecaster's forecast from the consensus forecast, omitting the jth forecaster's forecast. Lamont assumes the partial derivative of R with respect to the first argument, R_1, is negative: inaccurate forecasts reduce a forecaster's payoff. But he allows that the partial derivative of R with respect to the second argument, R_2, is an empirical question.

[29] Lamont found that this variable was important and that the effect of age was not significant for forecasts from econometric models.

et al. The hypothesis that economists behave strategically is supported by statistically significant coefficients on AGE, AGE*MODEL, OWN, and the D_{jt}s, as well as by statistical differences among the estimated coefficients of the D_{jt}s.

Table 7 presents estimates of [4] using the Treasury bill rate, Treasury bond rate and the yen-dollar exchange rate forecasts of the economists in the *Wall Street Journal* survey. As in the previous section we report estimates for two sub-samples of economists, one including all economists having at least six survey responses (Panel 1) and another including all economists having at least twenty responses (Panel 2), the same economists whose forecasts were examined in sections 3.1 and 3.2.

The Table 7 estimates show overwhelming evidence of strategic behavior by economists in the form of statistically significant estimated coefficients of AGE, OWN and several of the D_{jt}s, as well as statistical differences among the D_{jt}s. The estimated coefficients of AGE are negative and usually statistically significant, implying that economists make less extreme forecasts the longer they are surveyed.[30] This age effect holds for all economists including those employed by econometric modeling firms, since the estimated coefficient of AGE*MODEL never achieves significance. Though pervasive, the estimated age effects are small in absolute terms: compared with a first-time respondent, an economist in the survey for 10 years (20 surveys) is about 4 basis points closer to the mean interest rate forecast and a little less than one yen closer to the mean exchange rate forecast. Larger in absolute terms is the effect of employment by a forecasting firm bearing one's name: forecasts of such economists deviate more from the mean forecasts than forecasts of other economists by amounts ranging from 13 to

[30] As noted above, the *Wall Street Journal* does not systematically drop forecasters with poor records so a negative coefficient should not be due to a survivorship bias. It is possible, however, that people who make extreme and inaccurate forecasts drop out to avoid negative publicity. We also estimated a model with age and AVEDEV(-j) as explanatory variables for each of the individuals listed in Table 2. Age was statistically significant at the .10 level for only about one-third of the panel and was negative in most cases. No individual had significantly positive coefficients on age for all three variables being forecasted.

22 basis points for the interest rates and 1.7 yen, on average, for the exchange rate. The name effect appears to drive economists' strategic behavior rather than independence per se: only in forecasting the Treasury bond rate did economists employed by independent firms named for others make forecasts statistically more extreme than the consensus, and even then the effect was absolutely small. Surveyed economists employed by banks appeared to make less extreme forecasts than other economists, judging from the consistently negative and statistically significant estimated coefficients of Banks. Economists employed by securities firms, corporations and econometric modeling firms also tended to make less extreme forecasts, judging from the generally negative although inconsistently significant estimated coefficients of their respective dummy variables. When the hypothesis that economists' forecasts deviated equally from the consensus regardless of employment is tested, F statistics soundly and universally reject the hypothesis. Because it seems unlikely that economists in different industries had differential access to the macroeconomic data needed to make interest rate and exchange rate forecasts, we conclude that incentive structures encourage economists employed in different industries to supply heterogeneous forecasts, with economists from firms bearing their own names being more likely to make extreme forecasts because they gain the most from being right when others are wrong.[31]

3.5 Discussion of results

We believe that the results presented in sections 3.1 – 3.4 present a consistent story. Our findings from section 3.1 – that 30% of economists produced biased forecasts, generally in the upward direction – and from section 3.2 – that economists generally failed to forecast as

[31] We also estimated equation [4] allowing for individual fixed effects or individual random effects. These models gave similar estimates for the effects of AGE and AVEDEV but wiped out the statistical significance of the industry effects. Since individuals change industries occasionally in our sample, as indicated in Table 2, the industry differences appear to be captured by the individual effects.

accurately as the random walk model and sometime forecasted less accurately – is consistent with the heterogeneity of forecasts we found in section 3.3. When we tested for evidence of strategic behavior by economists in section 3.4 by using a synthesis of the Lamont (2002) and Laster *et al.* (1999), we obtained some results similar to theirs. Like Lamont and Laster *et al.* we found that economists from independent firms tend to make more extreme forecasts and, like Lamont, we found that economists whose firms bear their names make forecasts that consistently deviate more from the survey mean than other economists. But whereas Lamont found evidence that economists make more extreme forecasts the longer they are surveyed, we found the opposite to be true: the estimated coefficients of AGE are consistently negative and usually statistically significant.

Although our results on strategic behavior bear some similarities to Lamont and Laster *et al.*'s, we believe it is important to note the advantages of the *Wall Street Journal* survey data on interest rates and exchange rates for testing strategic behavior compared with *Business Week* survey data used by Lamont and the Blue Chip Economic Indicators data used by Laster *et al.* Although the *Business Week* survey publishes forecasts of economists by name, Lamont studied economists' forecasts of real GDP growth, inflation and unemployment, all of which are subject to revision, which raises the issue of which values economists were forecasting. Laster *et al.* also study economists' forecasts of real GDP growth, so the caveats that apply to Lamont apply to Laster *et al.* as well. In addition, the Blue Chip Indicators data Laster *et al.* use groups forecasters by industry rather than identifying them individually; hence the incentives to forecast strategically are not as strong.

Our finding that the *Wall Street Journal's* panel of economists cannot predict changes in interest rates and exchange rates more accurately than a random walk model is not surprising,

given the efficiency of financial markets. What is perhaps surprising is that so many of the panel forecast significantly worse than the random walk model. The explanation of these results we favor is that many of the economists face incentives that reward the exceptionally right guess but do not equally penalize the exceptionally wrong guess. An alternative explanation is that even if the economists know the random walk model to be more accurate over time, this leaves them with no story to spin about their forecasts. Always telling customers that you predict no change in interest rates or exchange rates may simply be too truthful to keep one employed.

4. Conclusions

While widespread public interest in forecasts of macroeconomic variables has led professional economists to put considerable effort in generating forecasts, less effort has gone into assessing the quality of these forecasts. The theory of rational expectations implies that professional economists' forecasts should be unbiased and identical given access to the same information and similar incentives with respect to predictive accuracy. Previous studies employing survey data of professional economists' forecasts to assess forecast quality have tended to lack comprehensiveness, suffer from data problems, or produce inconclusive results.

This paper has sought to help fill the void by using semi-annual survey data from the *Wall Street Journal*'s panel of economists to study interest rate and exchange rate forecasts of individual economists. We found that while about 60% of the surveyed economists produced unbiased estimates, virtually all failed to make 6-month ahead forecasts of the Treasury bill rate, Treasury bond rate and yen-dollar exchange rate that beat a naïve random walk model for accuracy, and many made forecasts significantly less accurate than the random walk model. When we tested for homogeneity of interest rate and exchange rate forecasts, we found them to be systematic heterogeneous. In particular, we found that independent economic forecasters (those not employed by banks, security firms, corporations' finance departments, or econometric

model firms) made significantly lower forecasts of the Treasury bill rate and Treasury bond rate and significantly higher forecasts of the yen-dollar exchange rate. Evidence of systematically heterogeneous forecasts led us to consider whether economists faced economic incentives to produce heterogeneous forecasts. When we estimated an incentives model combining elements of models estimated by Lamont (2002) and Laster *et al.* (1999), we found evidence that economists who would be expected to gain the most from favorable publicity – those employed by firms named for them – make more extreme forecasts, whereas economists employed by other institutions tend to make more conservative, less extreme forecasts. We found no evidence that economists become more radical with age. If anything, experienced economists appear to preserve their reputations by deviating less from the consensus forecast than inexperienced economists.

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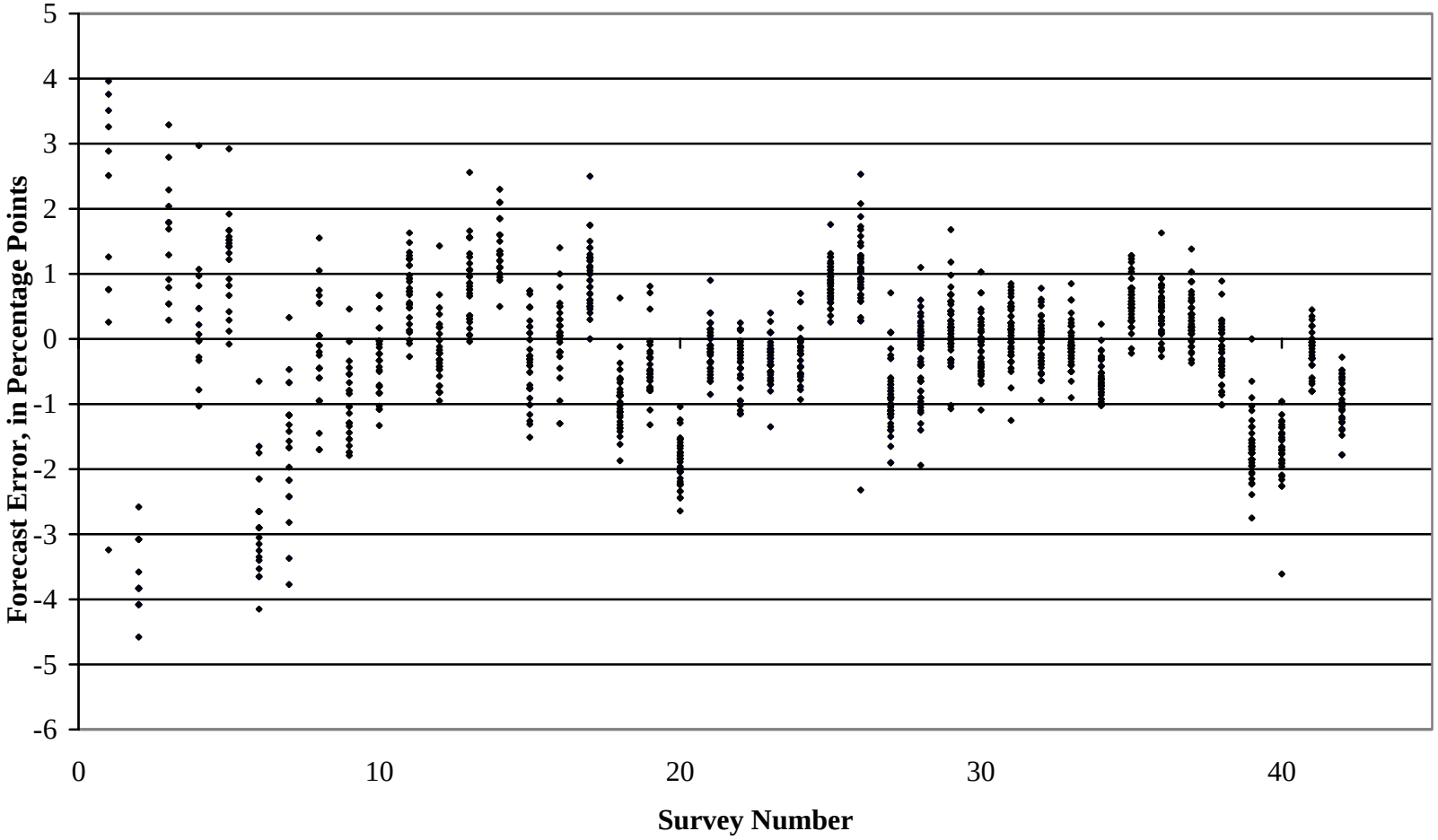
Figure 1

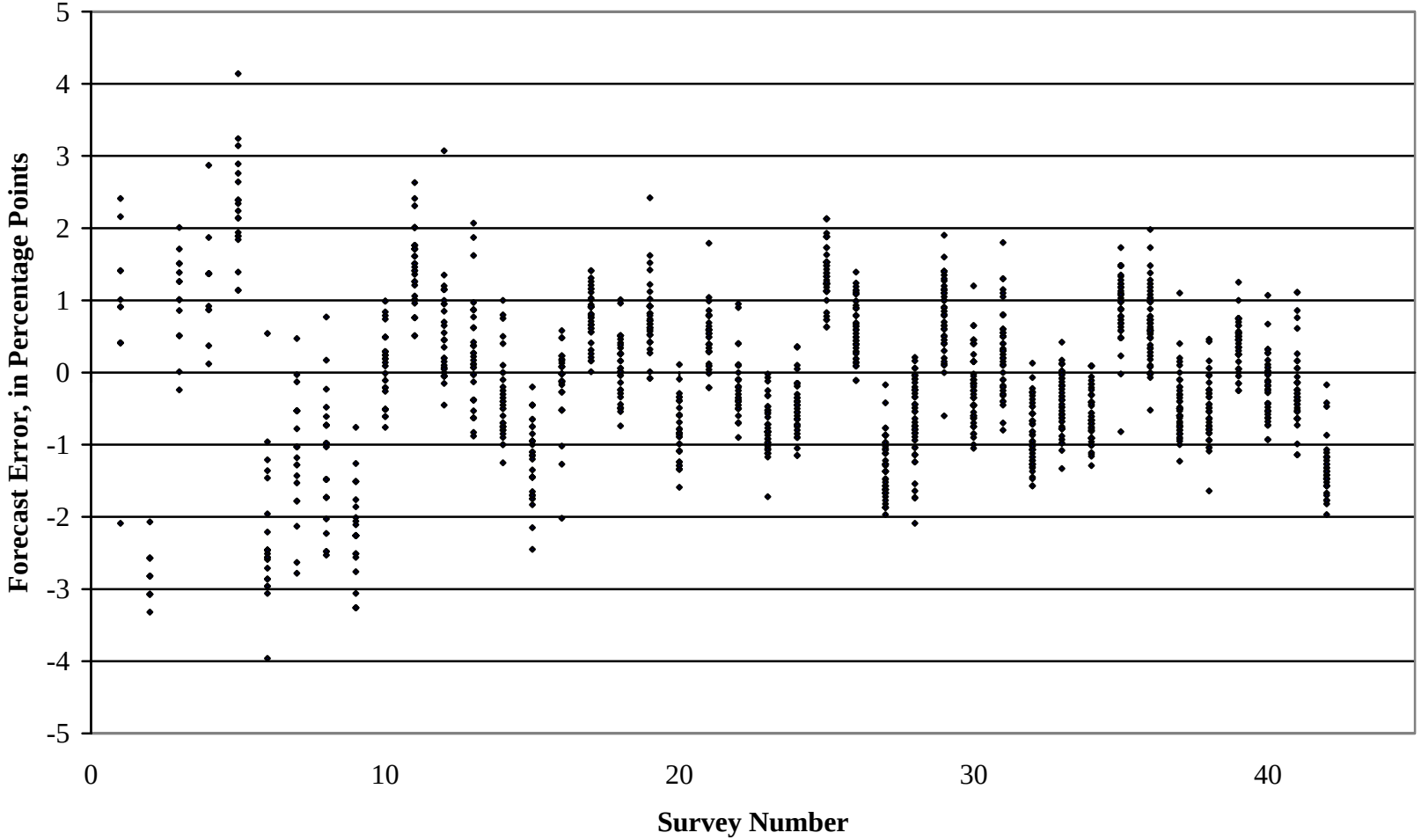
Forecast Errors of the Treasury Bill Rate



Note: Forecast errors are measured as the actual rate minus forecasters' predictions on the survey date, six months earlier. Forecast errors are shown for the 42 surveys beginning with January 1982 and ending with July 2002.

Figure 2

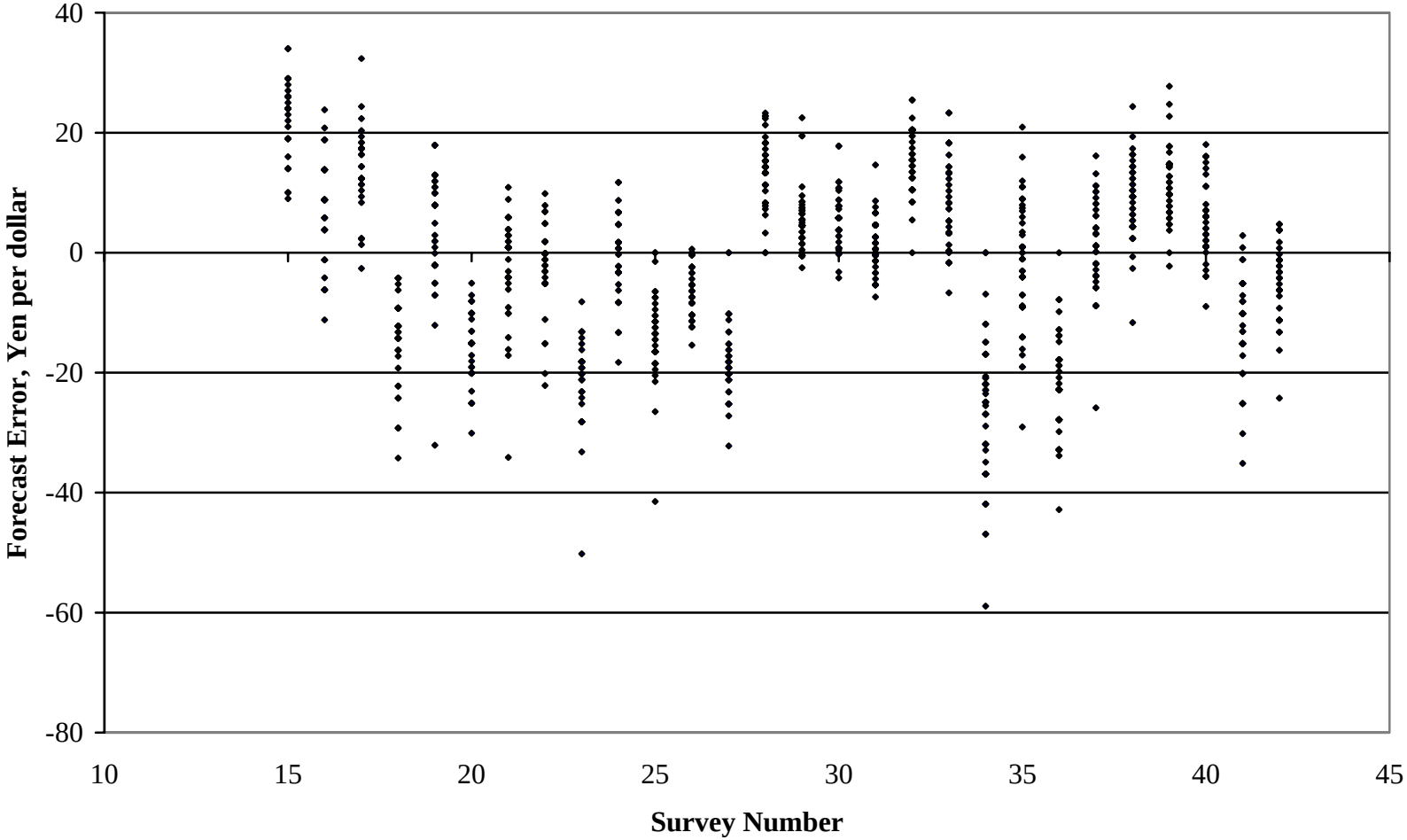
Forecast Errors for theTreasury Bond Rate



See notes to Figure 1.

Figure 3

Forecast Errors for the Yen-Dollar Exchange Rate



Note: Forecasts of the yen-dollar exchange rate were added to the *Wall Street Journal* survey in January 1989. Forecast errors are shown for the 28 surveys from January 1989 to July 2002, which correspond to survey numbers 15-24 in our sample.

Table 1
Summary Statistics for Survey Forecasts

Survey Date	Treasury bill Rate			Treasury bond Rate			Yen-Dollar Rate		
year_mo	Mean S.D.	Range N	Actual	Mean S.D.	Range N	Actual	Mean S.D.	Range N	Actual
1982_01	11.06 2.05	8.8-16 12	12.76	13.05 1.13	11.5-16 12	13.91			
1982_07	11.61 .54	10.5-12.5 14	7.92	13.27 .35	12.5-13.75 14	10.43			
1983_01	7.37 .94	5.5-9.625 17	8.79	10.11 .71	9-11.625 17	11.01			
1983_07	8.60 .89	6-10 17	8.97	10.59 .60	9-11.75 17	11.87			
1984_01	8.72 .64	7-10 24	9.92	11.39 .68	9.5-12.5	13.64			
1984_07	10.62 .76	8.5-12 24	7.85	13.75 .85	11-14.75 24	11.54			
1985_01	8.56 .98	6.5-10.6 24	6.83	11.60 .80	10-13.25 24	10.47			
1985_07	7.31 .82	5.5-8.75 25	7.05	10.51 .83	8.5-11.8 25	9.27			
1986_01	6.96 .58	5.5-7.75 25	5.96	9.45 .63	8-10.5 25	7.24			
1986_07	6.02 .51	5-7 30	5.67	7.41 .51	6.5-8.25 30	7.49			
1987_01	4.98 .48	4.1- 6 35	5.73	7.05 .53	5.88-8 35	8.51			
1987_07	5.91 .50	4.25-6.63 35	5.68	8.45 .66	5.88-9.4 35	8.95			
1988_01	5.70 .58	4-6.6 36	6.56	8.65 .71	6.8-9.75 36	8.87			
1988_07	6.78 .39	5.8-7.6 32	8.1	9.36 .56	8-10.25 32	9			
1989_01	8.29 .60	7.25-9.5 38	7.99	9.25 .49	8.25-10.5 38	8.05	121.37 6.15	110-135 38	144
1989_07	7.76 .52	6.4-9.1 38	7.8	8.12 .48	7.4-10 38	7.98	136.53 8.47	120-135 38	143.8
1990_01	7.03 .48	5.5-8 40	8	7.62 .35	7-8.4 40	8.41	137.78 6.81	120-155 40	152.35
1990_07	7.56 .43	6-8.5 40	6.63	8.16 .40	7.25-9 40	8.26	149.78 7.14	140-170 40	135.75
1991_01	6.14 .42	4.9-7.03 40	5.71	7.65 .46	6-8.5 40	8.42	133.65 9.69	120-170 40	137.9
1991_07	5.84 .35	5-6.6 40	3.96	8.22 .38	7.3-9 40	7.41	140.78 5.61	130-155 40	124.9
1992_01	3.80 .34	2.75-4.5 42	3.65	7.30 .37	6-8 42	7.79	127.64 8.07	115-160 42	125.87
1992_07	3.54 .39	2.9-4.3 42	3.15	7.61 .38	6.45-8.3 42	7.4	127.33 7.07	115-147 42	124.85
1993_01	3.41 .32	2.7-4.45 44	3.1	7.44 .33	6.7-8.4 44	6.68	127.70 7.07	115-157 44	106.8

Table 1, continued

Survey Date	Treasury bill Rate			Treasury bond Rate			Yen-Dollar Rate		
year_mo	Mean S.D.	Range N	Actual	Mean S.D.	Range N	Actual	Mean S.D.	Range N	Actual
1993_07	3.34 .31	2.37-4 44	3.07	6.84 .35	5.99-7.5 44	6.35	112.16 6.44	100-130 44	111.7
1994_01	3.40 .28	2.5-4 51	4.26	6.26 .38	5.5-7 51	7.63	113.10 5.90	100-140 49	98.51
1994_07	4.67 .60	3.15-8 58	5.68	7.30 .39	6.5-8.1 58	7.89	106.85 3.69	99-115 52	99.6
1995_01	6.50 .49	4.89-7.5 59	5.6	7.94 .38	6.8-8.6 59	6.63	104.09 4.00	95-117 57	84.78
1995_07	5.44 .56	4-7.04 62	5.1	6.61 .52	5.75-8.05 62	5.96	89.23 4.24	80-100 60	103.28
1996_01	4.98 .45	3.5-6.25 64	5.18	6.03 .44	5-7.5 64	6.9	104.71 4.56	87-112 62	109.48
1996_07	5.31 .40	4.18-6.3 58	5.21	6.86 .47	5.45-7.7 58	6.65	109.99 4.25	98-120 56	115.77
1997_01	5.16 .41	4.4-6.5 57	5.25	6.52 .52	5-7.6 57	6.8	113.45 4.15	100-122 55	114.61
1997_07	5.41 .35	4.58-6.3 55	5.36	6.79 .40	5.8-7.5 55	5.93	114.89 4.66	105-125 54	130.45
1998_01	5.18 .30	4.25-6 56	5.1	6.02 .37	5.2-6.95 56	5.62	130.41 7.03	115-145 54	138.29
1998_07	5.08 .25	4.25-5.5 55	4.48	5.72 .36	5-6.38 55	5.09	141.28 10.38	120-172 53	113.08
1999_01	4.20 .33	3.5-5 54	4.78	5.05 .44	4.25-6.8 54	5.98	122.77 9.93	100-150 52	120.94
1999_07	4.89 .34	3.7-5.6 54	5.33	5.83 .48	4.5-7 54	6.48	124.75 7.19	110-145 53	102.16
2000_01	5.58 .35	4.5-6.25 53	5.88	6.38 .40	4.8-7.13 53	5.9	105.32 7.20	90-132 53	106.14
2000_07	6.11 .41	5-6.9 53	5.89	6.01 .39	5-7.1 53	5.46	105.34 5.94	90-126 53	114.35
2001_01	5.36 .38	4.3-6.4 52	3.65	5.35 .31	4.5-6 54	5.75	113.21 5.39	97-127 53	124.73
2001_07	3.39 .42	2.7-5.35 54	1.74	5.28 .40	4-6 54	5.07	126.48 6.18	113-140 54	131.04
2002_01	1.89 .32	1.25-2.5 55	1.7	5.06 .51	3.75-6 55	4.86	132.76 7.34	117-115 55	119.85
2002_07	2.19 .33	1.5-3 54	1.22	5.21 .36	4-6.25 55	3.83	123.58 6.53	110-143 55	118.75

Note: Survey respondents are asked early in January and July for their forecasts for the last business day of July and December, respectively. The mean, standard deviation (S.D.) and range of the forecasts in each survey are shown. The number of respondents (N) varies across surveys. The actual values of the variables forecasted are shown in the "Actual" column.

Table 2
Participants Responding To At Least Twenty Surveys

Person	Firm	start	end	gaps	missing dates
David Berson	Fannie Mae	199001	200207	0	
Paul Boltz	T. Rowe Price	198401	199801	0	
Philip Braverman		198401	199901	0	
	Briggs Schaedle	198401	198807		
	Irving Securities	198901	198907		
	DKB Securities	199001	199901		
Dewey Daane	Vanderbilt Univ.	198807	200207	0	
Robert Dederick	Northern Trust	198607	199607	0	
Gail Fosler	Conference Board	199101	200207	0	
Maury Harris		198607	200207	0	
	Paine Webber Inc.	198607	200007		
	UBS Warburg	200107	200207		
Richard Hoey		198401	199401	1	199107
	A.G. Becker	198401	198407		
	Drexel Burnham	198501	199101		
	Dreyfus Corp.	199201	199401		
Stuart G. Hoffman	PNC Bank, Fin Serv	198801	200207	1	199401
William Hummer		199301	200207	0	
	Wayne Hummer	199301	199707		
	Hummer Invest.	199807	200207		
Edward Hyman		198301	200207	1	198901
	C.J. Lawrence	198301	199107		
	ISI Group	199201	200207		
Saul Hymans	Univ. of Michigan	198607	200207	0	for yen:199407 199607 199807 199901
David Jones	Aubrey G. Lanston	198201	199301	0	
Irwin Kellner	ManuHan-Chem-Chase	198201	199701	1	198407
Carol Leisenring	CoreStates Finl.	198707	199801	0	
Alan Lerner		198201	199307	1	198401
	Bankers Trust	198201	199207		
	Lerner Consulting	199301	199301		
Mickey Levy		198507	200207	0	
	Fidelity Bank	198507	199107		
	CRT Govt. Securities	199201	199307		
	NationsBank Cap. Mk	199401	199807		
	Bank of America	199901	200207		
Arnold Moskowitz		198401	200007	1	198807
	Dean Witter	198401	199107		
	Moskowitz Capital	199201	200007		
John Mueller	LBMC	199107	200207	2	199401 199507
Elliott Platt	Donaldson Lufkin(DLJ)	198807	200001	1	199207
Maria Ramirez		199207	200207	1	199401
	Ramirez Inc.	199207	199307		
	MF Ramirez	199407	200107		
	MFR	200201	200207		
Donald Ratajczak		198701	200101	0	
	Georgia State Univ.	198701	200001		
	Morgan Keegan	200007	200101		
David Resler		198407	200207	0	
	First Chicago	198407	198701?		
	Nomura Securities I	198707	200207		
Alan Reynolds		198607	200001	1	199501
	Polyconomics	198607	199107		
	Hudson Institute	199201	200001		
Richard Rippe		199001	200207	0	
	Dean Witter	199001	199107		
	Prudential Securities	199201	200207		

Table 2, continued
Participants Responding To At Least Twenty Surveys

Person	Firm	start	end	gaps	missing dates
Norman Robertson		198201	199601	1	199407
	Mellon Bank	198207	199207		
	Carnegie Mellon	199301	199601		
A. Gary Shilling	Shilling & Co.	198201	200207	4	198307 198401 198901 198907
Alan Sinai		198201	200207		198807 199707
	Data resources	198207	198307		
	Lehman Bros Shearson	198401	198801		
	The Boston Co.(Lehman)	198901	199207		
	Economic Advisors Inc (Lehman)	199301	199307		
	Lehman Brothers	199401	199701		
	WEFA Group	199801	199801		
	(Primark) Decision Economic	199807	200207		
James Smith		198701	200207	2	198807 199401
	UT-Austin	198701	198801		
	Univ. of N.C.	198901	199901		
	Natl Assn of Realtors	199907	200001		
	Univ. of N.C.	200007	200207		
Donald Straszheim		198607	200207	11	198807 199707-200201
	Merril Lynch	198607	199701		
	Strszheim Global Advisors	200207	200207		
Raymond Worseck	A.G. Edwards	198901	199901	0	
David Wyss		198401	200207	4	198807 199407(yen) 200001-200101
	Data Resources	198401	199907		
	Standard & Poor's (McGraw-Hill)	200107	200207		
Edward Yardeni		198607	200007	1	198807
	Prudential Bache	198607	199107		
	C.J. Lawrence	199201	199507		
	Deutsche Bank	199601	200007		

Table 3
Unbiasedness and Accuracy of Treasury Bill Rate Forecasts

Individual	Liu-Maddala Restricted CointegrationTest of Unbiasedness ADF(forecast) ADF(Δforecast)	 ADF(error) Q(4)	Mean Forecast Error and t-test for Unbiasedness	Fraction of Correct Directions (p-value for independence test)[a]	χ^2 and Pesaran-Timmerman Tests of Independence[b]	Accuracy Σ (A-F)^2 n	 MSE Ratio to Random Walk (Modified DM statistic)[c]
David Berson	-3.149** -3.030**	-2.426** 4.260	-.351 (-2.369)**	.577 (.453)	.735 .765	17.488 26	.877 (-.754)
Paul Boltz	-2.720* -2.833*	-2.901*** .541	-.460 (-2.257)**	.517 (.694)	.348 .361	39.928 29	1.929 (1.810)*
Phillip Braverman	-3.768*** -3.931***	-4.680*** 1.696	.203 (1.027)	.483 (.368)	1.178 1.217	37.695 31	1.780 (1.225)
Dewey Daane	-2.289 -3.632**	-2.775*** 2.200	-.382 (-2.584)**	.517 (.694)	.348 .361	21.981 29	.984 (-.066)
Robert Dederick	-1.559 -2.984**	-2.758*** 2.752	-.084 (-.477)	.524 (1.000)	.029 .031	13.270 21	1.008 (.039)
Gail Fosler	-3.171** -4.061***	-3.313*** 6.633	-.514 (-2.776)**	.542 (.653)	.697 .728	25.241 24	1.402 (1.370)
Maury Harris	-1.571 -3.275**	-3.185*** 2.009	-.092 (-.639)	.545 (.728)	.308 .318	22.264 33	.958 (-.211)
Richard Hoey	-1.660 -2.334	-2.290** 3.560	-.425 (-1.765)*	.350 (.613)	.848 .892	25.598 20	1.674 (1.698)
Stuart G. Hoffman	-1.954 -3.870***	-3.245*** .842	-.164 (-1.043)	.621 (.264)	1.830 1.896	20.978 29	.966 (-.160)
William Hummer	-2.047 -2.516	-1.819* 2.019	-.380 (-2.190)**	.600 (.582)	1.250 1.316	14.282 20	1.038 (.220)
Edward Hyman	-1.784 -4.026***	-4.399*** 6.248	.289 (1.672)	.564 (.706)	.416 .427	47.690 39	1.515 1.076
Saul Hymans	-2.545 -3.900***	-2.828*** 8.681	-.196 (-1.210)	.455 (.733)	.203 .209	28.911 33	1.245 (2.010)*
David Jones	-1.701 -4.117***	-2.770*** 4.205	-.316 (-.882)	.391 (.400)	1.245 1.301	67.325 23	1.533 (1.052)
Irwin Kellner	-3.635** -4.854***	-4.828*** 1.172	-.102 (-.421)	.333 (.141)	3.274* 3.387*	51.619 30	1.190 (1.480)
Carol Leisenring	-1.669 -3.114**	-2.430** 3.773	.025 (.147)	.455 (1.000)	.188 .197	12.913 22	.982 (-.081)
Alan Lerner	-1.765 -5.333***	-3.887*** 6.775	-.583 (-1.990)*	.652 (.221)	1.806 1.888	51.187 23	1.188 (.505)
Mickey Levy	-2.409 -4.476***	-3.810*** 3.691	-.152 (-.991)	.514 (1.000)	.000 .000	28.724 35	1.175 (.888)

Arnold Moskowitz	-2.800* -4.842***	-3.934** 3.671	-.078 (-.425)	.333 (.072)*	4.332** 4.468**	36.167 33	1.863 (1.512)
John Mueller	-2.937* -3.442**	-2.221** 3.907	-.310 (-1.512)	.238 (.030)**	5.743** 6.030**	26.525 21	1.711 (.996)
Elliott Platt	-2.725* -3.202**	-3.248*** 2.597	.077 (.461)	.522 (1.000)	.034 .035	14.410 23	1.092 (.379)
Maria Ramirez	-2.117 -2.585	-1.692* 1.803	-.374 (-2.678)**	.600 (.319)	1.684 1.772	10.209 20	.810 (-.593)
Donald Ratajczak	-2.023 -3.382**	-3.022*** .705	-.135 (-.939)	.586 (.462)	.909 .941	17.279 29	.897 (-.506)
David Resler	-2.485 -4.057***	-4.401*** 3.540	-.099 (-.629)	.514 (1.000)	.036 .037	33.284 37	1.117 (.658)
Alan Reynolds	-1.331 -2.891*	-1.995** 7.928	.104 (.569)	.519 (1.000)	.030 .031	23.776 27	1.662 (1.711)*
Richard Rippe	-3.192** -3.667**	-2.583** 1.481	-.349 (-2.185)**	.577 (.428)	1.009 1.049	19.738 26	.990 (-.051)
Norman Robertson	-2.562 -4.123***	-3.836*** 3.265	-.207 (-.841)	.571 (.701)	.289 .300	47.190 28	1.034 (.133)
A. Gary Shilling	-3.126** -5.300***	-3.388*** 2.056	.338 (1.446)	.553 (1.000)	.080 .082	80.992 38	1.428 (1.110)
Alan Sinai	-2.086 -4.320***	-4.063*** 5.303	-.278 (-1.459)	.525 (1.000)	.102 .105	59.551 40	1.075 (.292)
James Smith	-2.660 -3.588**	-2.577** 9.800*	.202 (.882)	.467 (.358)	1.701 1.760	46.689 30	2.415 (2.560)**
Donald Straszheim	-1.035 -1.936	-2.347** 2.171	-.076 (-.465)	.524 (1.000)	.002 .002	12.906 22	1.171 (.169)
Raymond Worseck	-2.049 -2.828*	-2.390** 1.238	-.291 (-1.619)	.524 (.656)	.404 .424	15.336 21	1.464 (1.657)
David Wyss	-2.208 -3.958***	-4.242*** 2.417	-.210 (-1.301)	.559 (.728)	.215 .222	30.722 34	1.336 (1.180)
Edward Yardeni	-1.928 -3.110**	-2.626*** .868	.254 (1.626)	.393 (.102)	4.044* 4.194*	20.197 28	1.690 (2.339)**
Survey Mean	-2.647 -4.950***	-4.309*** 1.709	-.223 (-1.318)	.524 (1.000)	.096 .098	51.444 42	.891 (-557)

Notes:
***, **, * signify statistical significance at the .01, .05, and .10 levels
[a] The number in parentheses is the significance level of the test for independence of predicted and actual changes using the Fisher exact test.
[b] These are Chi-square statistics for the test of independence of predicted and actual changes, see Pesaren and Timmerman (1992)
[c] The modified DM test is the modification of the Diebold-Mariano (1995) test of differences in squared forecast errors given in Harvey *et al* (1997).

Table 4
Unbiasedness and Accuracy of Treasury bond Rate Forecasts

Individual	Liu-Maddala Restricted Cointegration Test of Unbiasedness ADF(forecast) ADF(Δforecast)	 ADR(error) Q(4)	Mean Forecast Error and t-test for Unbiasedness	Fraction of Correct Directions (p-value for independence)	χ^2 and Pesaran-Timmerman Tests of Independence	Forecast Accuracy Σ (A-F)^2 n	 MSE Ratio to Random Walk (Modified DM statistic)
David Berson	-1.424 -5.626***	-4.789*** 8.454	-.163 (-1.074)	.269 (.043)**	5.110** 5.310**	15.612 26	1.388 (2.963)***
Paul Boltz	-3.171** -3.529**	-2.857*** 2.837	-.455 (-2.216)**	.414 (.669)	.232 .240	40.280 29	1.664 (2.199)**
Phillip Braverman	-5.037*** -4.235***	-3.891*** 1.226	.269 (1.298)	.581 (1.000)	.057 .059	42.084 31	1.664 (1.377)
Dewey Daane	-2.382 -6.463***	-4.107*** 4.773	-.490 (-3.254)***	.310 (.164)	2.653 2.748	25.412 29	2.088 (2.431)**
Robert Dederick	-1.894 -4.943***	-4.993*** 4.133	-.046 (-.254)	.409 (.659)	.833 1.458	13.946 21	1.533 (2.216)**
Gail Fosler	-1.312 -4.553***	-2.392** 7.005	-.590 (-3.742)***	.500 (.615)	.825 .861	22.078 24	1.999 (2.187)**
Maury Harris	-1.191 -4.870***	-5.221*** 8.784	.095 (.713)	.545 (1.000)	.021 .021	19.213 33	1.426 (1.668)
Richard Hoey	-2.140 -2.535	-2.602** 11.496**	-.443 (-1.414)	.300 (.160)	3.039* 3.199*	41.128 20	2.135 (2.274)**
Stuart G. Hoffman	-1.695 -5.522***	-4.168*** 4.667	-.183 (-1.462)	.345 (.128)	3.131* 4.137**	13.755 29	1.304 (1.942)*
William Hummer	-1.631 -4.453***	-3.236*** 10.435*	-.387 (-2.434)**	.300 (.290)	1.832 1.928	12.605 20	1.300 (1.354)
Edward Hyman	-1.501 -5.486***	-4.109*** 7.866	.501 (2.743)***	.538 (1.000)	.030 .031	59.230 39	2.123 (1.801)*
Saul Hymans	-1.402 -5.948***	-5.403*** 12.111**	-.186 (-1.390)	.455 (1.000)	.122 .520	20.005 33	1.486 (2.073)*
David Jones	-2.074 -3.742**	-3.124*** 2.073	-.276 (-1.006)	.478 (1.000)	.048 .050	39.840 23	1.252 (.967)
Irwin Kellner	-2.579 -7.460***	-4.899*** 7.124	-.159 (-.767)	.433 (.272)	2.143 2.217	38.332 30	1.190 (.676)
Carol Leisenring	-1.522 -6.388***	-5.804*** 8.473	-.010 (-.067)	.591 (.655)	.282 .002	10.413 22	1.175 (.941)
Alan Lerner	-2.183 -4.813***	-3.882*** 4.164	-.523 (-1.921)*	.652 (.685)	1.806 .320	43.875 23	1.525 (2.129)**
Mickey Levy	-2.581 -7.662***	-6.895*** 5.468	-.088 (-.571)	.514 (1.000)	.008 .150	28.397 35	1.471 (2.153)**

Arnold Moskowitz	-2.831* -6.454***	-5.387*** 5.660	.012 (.055)	.424 (.278)	1.636 1.688	45.956 33	1.764 (1.706)*
John Mueller	-1.397 -4.429***	-1.842* 7.100	-.362 (-2.035)*	.381 (.361)	1.527 1.604	16.028 21	1.796 (2.154)**
Elliott Platt	-2.569 -4.903***	-4.729*** 4.268	.069 (.385)	.435 (.680)	.434 .454	16.210 23	1.593 (2.221)**
Maria Ramirez	-1.435 -5.654***	-2.077** 4.222	-.456 (-3.708)***	.350 (1.000)	.019 .020	9.906 20	1.206 (.949)
Donald Ratajczak	-1.152 -4.745***	-5.111*** 5.544	-.092 (-.634)	.310 (.067)*	3.948** 5.798**	17.389 29	1.469 (2.948)***
David Resler	-3.229** -4.704***	-4.442*** 3.581	.018 (.105)	.541 (.687)	.315 1.016	37.129 37	1.510 (2.558)**
Alan Reynolds	-1.482 -3.878***	-2.964*** 2.142	.204 (1.229)	.407 (.420)	1.187 1.232	20.397 27	2.031 (2.778)**
Richard Rippe	-1.196 -6.679***	-3.391*** 3.371	-.137 (-.911)	.308 (.105)	3.718** 3.867**	15.103 26	1.343 (1.472)
Norman Robertson	-2.248 -4.483***	-4.526*** 3.287	-.201 (-.828)	.286 (.030)**	5.320** 5.517**	45.725 28	1.254 (2.124)**
A. Gary Shilling	-2.636* -5.943***	-3.083*** 2.280	.534 (2.754)***	.553 (1.000)	.011 .011	63.702 38	1.761 (2.111)**
Alan Sinai	-2.275 -5.397***	-5.222*** 4.684	-.027 (-.146)	.500 (.730)	.234 .240	51.929 40	1.293 (1.299)
James Smith	-1.391 -5.143***	-4.429*** 3.802	.604 (3.431)***	.600 (1.000)	.599 .620	37.865 30	3.222 (2.228)**
Donald Straszheim	-1.120 -4.352***	-4.463*** 5.540	.004 (.021)	.476 (1.000)	.043 .046	15.843 22	1.560 (2.291)**
Raymond Worseck	-.587 -4.222***	-3.240*** 2.295	-.177 (-.972)	.429 (.659)	.531 1.458	14. 601 21	1.503 (1.803)*
David Wyss	-3.683** -4.514***	-4.753*** 3.412	-.137 (-.831)	.294 (.032)**	6.103** 6.287**	31.063 34	1.147 (.906)
Edward Yardeni	-1.152 -5.295***	-3.493*** 7.406	.575 (3.896)***	.536 (1.000)	.778 .807	25.757 28	2.182 (2.346)**
Mean	-2.459 -5.832***	-5.570*** 7.109	-.135 (-.832)	.333 (.024)**	6.133** 6.283**	46.418 42	1.132 (1.072)
Notes: See notes to Table 3							

Table 5
Unbiasedness and Accuracy of Yen-Dollar Exchange Rate Forecasts

Individual	Liu-Maddala Restricted Cointegration Test of Unbiasedness		Mean Forecast Error and t-test for Unbiasedness	Fraction of Correct Directions (p-value for independence)	χ^2 and Pesaran-Timmerman Tests of Independence	Forecast Accuracy	
	ADF(forecast) ADF(Δforecast)	ADF(error) Q(4)				Σ (A-F)^2 n	MSE Ratio to Random Walk (Modified DM statistic)
David Berson	-2.504 -3.589**	-2.721*** 1.681	-3.118 (-1.133)	.385 (.217)	2.275 2.366	5175.980 26	1.518 (2.452)**
Paul Boltz	-1.122 -2.735*	-2.120** 4.258	2.563 (.841)	.474 (1.000)	.003 .003	3301.963 19	1.397 (1.930)*
Phillip Braverman	-2.007 -3.097**	-2.847*** 1.481	-.204 (-.072)	.667 (.198)	2.291 2.405	3404.713 21	1.113 (.381)
Dewey Daane	-2.105 -3.535**	-3.209*** 3.265	2.873 (.996)	.393 (.441)	1.011 1.048	6518.140 28	1.729 (2.012)*
Robert Dederick	-.791 -2.042	-2.185** 3.752	1.146 (.320)	.563 (1.000)	.152 .163	3109.605 16	1.518 (1.921)*
Gail Fosler	-3.116** -3.357**	-2.699** 3.660	2.701 (.918)	.542 (.653)	.697 .728	4957.834 24	1.621 (1.828)*
Maury Harris	-1.917 -3.212**	-2.695** 3.536	-2.724 (-1.078)	.571 (.698)	.324 .336	5034.540 28	1.336 (1.642)
Richard Hoey	-1.370 -2.073	-1.984** 3.865	4.253 (.786)	.500 (1.000)	.000 .000	2685.864 10	2.170 (2.201)**
Stuart G. Hoffman	-1.874 -2.827*	-2.980*** 3.403	-1.251 (-.474)	.444 (.448)	.759 .788	4941.500 27	1.374 (2.028)*
William Hummer	-1.755 -2.847*	-2.432** 2.423	.240 (.080)	.550 (1.000)	.135 .142	3451.686 20	1.197 (1.400)
Edward Hyman	-2.179 -3.404**	-2.260** 2.403	-5.529 (-2.225)**	.543 (.569)	.675 .701	5159.600 27	1.513 (2.025)*
Saul Hymans	-1.982 -2.312	-2.291** 3.291	1.873 (.789)	.458 (1.000)	.084 .088	3194.330 25	1.055 (.593)
David Jones	-.792 -1.962	-1.722* 2.238	.136 (.028)	.444 (1.000)	.225 .253	1648.664 9	1.364 (2.071)*
Irwin Kellner	-1.135 -3.155**	-2.831*** 3.259	3.762 (1.191)	.647 (.294)	2.082 2.212	2955.657 17	1.442 (1.056)
Carol Leisenring	-1.138 -1.606	-1.947* 4.245	-.385 (-.134)	.526 (1.000)	.003 .003	2809.424 19	1.190 (.904)
Alan Lerner	-1.537 -2.670*	-.814 2.892	-7.008 (-1.372)	.500 (1.000)	.476 .529	2839.654 10	2.301 (2.358)**
Mickey Levy	-1.842 -3.257**	-2.598** 4.886	-3.438 (-1.435)	.607 (.560)	.778 .867	4672.100 28	1.239 (1.350)

Arnold Moskowitz	-1.373 -2.827*	-2.315** 2.750	-2.802 (-.960)	.583 (.673)	.243 .358	4893.624 24	1.399 (1.635)
John Mueller	-2.405 -2.739*	-2.550** 3.444	2.911 (1.063)	.524 (.659)	.311 .327	3329.745 21	1.311 (.826)
Elliott Platt	-1.764 -3.366**	-2.376** 3.983	-1.493 (-.495)	.636 (.384)	1.352 1.416	4245.175 22	1.239 (1.331)
Maria Ramirez	-2.369 -2.784*	-2.648** 6.150	-2.993 (-.920)	.500 (1.000)	.159 .167	4202.448 20	1.550 (1.908)*
Donald Ratajczak	-1.683 -3.186**	-3.075*** 3.363	2.600 (.927)	.400 (.653)	.329 .343	4886.268 25	1.357 (1.716)*
David Resler	-1.673 -3.116**	-2.991*** 4.052	-1.367 (-.580)	.536 (1.000)	.050 .052	4245.559 28	1.126 (1.132)
Alan Reynolds	-1.309 -2.814*	-2.296** 2.255	-.762 (-.279)	.591 (.666)	.627 .657	3470.269 22	1.082 (.466)
Richard Rippe	-2.688* -3.759***	-2.942*** 1.791	.305 (.118)	.577 (.453)	.735 .765	4343.981 26	1.275 (1.621)
Norman Robertson	-.327 -2.730*	-2.072** 2.063	-.216 (-.058)	.571 (1.000)	.286 .308	2517.032 14	1.254 (1.109)
A. Gary Shilling	-2.298 -3.653**	-1.483 2.917	-13.233 (-3.983)***	.538 (1.000)	.763 .793	11728.621 26	3.441 (3.582)***
Alan Sinai	-2.613 -3.434**	-2.506** 3.374	-1.653 (-.554)	.519 (1.000)	.008 .008	6320.800 27	1.796 (1.654)
James Smith	-1.800 -4.013***	-1.616 3.248	-11.881 (-4.713)***	.630 (.407)	1.511 1.569	9506.039 27	2.644 (2.294)**
Donald Straszheim	-1.093 -3.058**	-3.770*** 4.067	1.350 (.476)	.588 (.620)	.701 .745	2237.738 18	1.092 (.293)
Raymond Worseck	-1.305 -3.308**	-1.530 6.685	-3.109 (-1.003)	.571 (.673)	.269 .283	4235.650 21	1.385 (1.297)
David Wyss	-2.522 -3.551**	-2.805*** 2.847	.080 (.024)	.542 (1.000)	.168 .175	6049.966 24	1.693 (3.278)***
Edward Yardeni	-1.578 -2.717*	-2.302** 2.356	-4.860 (-1.810)*	.667 (.163)	3.055 3.187	4546.241 24	1.300 (1.360)
Mean	-1.941 -3.147**	-2.838*** 3.596	-1.529 (-.645)	.464 (.687)	.491 .509	4594.172 28	1.219 (2.114)**
Notes: See notes to Table 3							

Table 6
Tests of Heterogeneity of Forecasts Across Survey Respondents

Dependent variable: Deviation of an individual's time t forecast from the mean time t forecast

Data set	Panel 1[3]			Panel 2[4]		
Number of forecasters	93	93	79	33	33	33
Number of forecasts	1650	1650	1280	924	924	722
Forecast variable	T-Bill rate	T-Bond rate	Yen/$ rate	T-Bills rate	T-Bonds Rate	Yen/$ Rate
Panel A: Models with Individual Dummy Variables						
Tests for individual effects[1]	4.09***	8.63***	6.76***	5.96***	15.38***	12.23***
Panel B: Models with Employment Dummy Variables						
Banks	-.009 (.039)	-.025 (.038)	.837 (.594)	-.013 (.056)	-.041 (.053)	.343 (.784)
Security firms	-.044 (.036)	-.145*** (.035)	.423 (.540)	-.054 (.049)	-.136*** (.046)	-.175 (.656)
Independent Forecasters	-.158*** (.044)	-.262*** (.043)	1.653** (.653)	-.240*** (.062)	-.350*** (.059)	2.618*** (.824)
Corporate forecasters	-.033 (.083)	-.090 (.080)	1.874 (1.214)	na	Na	na
Econometric models	-.047 (.064)	-.107 (.062)	-1.483 (.974)	.014 (.077)	-.062 (.074)	-2.552** (1.113)
Constant	.047 (.031)	.108 (.030)	-.582 (-1.28)	.015 (.041)	.069 (.039)	-.454 (.529)
F test for differences across employers[2]	3.46***	10.91***	2.93**	4.95***	10.58***	5.92***

, * represent statistical significance at the .05 and .01 levels
[1] This F statistic tests that the coefficients for all individuals are the same.
[2] This F statistic tests that the coefficients for all employer types are the same.
[3] Panel 1 includes all economists having at least 6 forecasts.
[4] Panel 2 includes all economists having at least 20 forecasts.

Table 7
OLS Estimates of Incentives Model

Dependent variable: Absolute value of the deviation of an economist's time t forecast from the time t forecast mean excluding that economist

Data set	Panel 1			Panel 2		
Number of forecasters	93	93	79	33	33	33
Number of forecasts	1650	1650	1280	924	924	722
Forecast variable	T-Bill	T-Bond	Yen/$	T-Bill	T-Bond	Yen/$
AGE	-.0018*	-.0021**	-.0428***	-.0022	-.0029**	-.0435**
	(.0011)	(.0010)	(.0149)	(.0015)	(.0014)	(.0206)
AGE*MODEL	.0002	-.0041	.0214	.0040	-.0011	-.0165
	(.0045)	(.0042)	(.0720)	(.0054)	(.0049)	(.0956)
AVEDEV	.8436***	.6983***	.8610***	1.0475***	.9218***	.6490***
	(.0512)	(.0765)	(.0793)	(.0830)	(.1148)	(.1108)
OWN	.1697***	.1298***	1.7425***	.2185***	.2042***	1.6198**
	(.0382)	(.0364)	(.5638)	(.0514)	(.0470)	(.6782)
Independent but not OWN	.0527	.0710**	.2293	.0370	.1095**	.1236
	(.0333)	(.0318)	(.4760)	(.0505)	(.0462)	(.6422)
Banks	-.0742***	-.0944***	-.9469***	-.1388***	-.1574***	-1.9637***
	(.0269)	(.0257)	(.3983)	(.0396)	(.0362)	(.5339)
Securities firms	-.0254	.0115	-.3453	-.0844**	-.0495	-1.7803***
	(.0248)	(.0236)	(.3616)	(.0344)	(.0316)	(.4485)
Corporate forecasters	-.1133**	-.0966*	-.7845			
	(.0572)	(.0539)	(.8384)			
Econometric Models	-.1476**	-.0974	-1.1935	-.2706***	-.2020**	-1.1726
	(.0334)	(.0698)	(1.3083)	(.0962)	(.0875)	(1.9129)
Constant	.0979***	.1492***	1.5665***	.0836*	.1319**	3.4837***
	(.0334)	(.0397)	(.5343)	(.0502)	(.0573)	(.7448)
F test for differences across industries	9.20***	10.53***	4.40***	11.82***	14.38***	8.51***
R^2	.185	.097	.101	.218	.150	.100
*, **, and *** represent statistical significance at the .10, .05, and .01 levels						

FEDERAL RESERVE BANK OF ST. LOUIS

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Predicting Interest Rates: A Comparison of Professional and Market-Based Forecasts

Michael T. Belongia

Interest rates have varied substantially in recent years. Since 1981, for example, the monthly average three-month Treasury bill rate has ranged between 5.18 percent and 16.30 percent while the Baa corporate bond rate ranged between 9.61 percent and 17.18 percent; the prime rate during this time reached a high of 20.5 percent and fell to a low of 7.5 percent. Interest rate movements are important, of course, because they affect the present value of streams of future payments, that is, wealth. Moreover, the risk of interest rate changes is related directly to the level of interest rates.[1] During the 1980s, therefore, firms and individuals have faced substantial exposure to interest rate risk.

There are at least two approaches that can be taken to reduce the magnitude of this problem. The first is to hedge interest rate risk, which has been discussed at length in this *Review* and elsewhere.[2] The second is to forecast the likely course of interest rates. This article investigates the reliability of such forecasts in general and assesses the specific usefulness of forecasts by professional economists.

Michael T. Belongia is a senior economist at the Federal Reserve Bank of St. Louis. Paul Crosby provided research assistance.

[1]Interest rate risk, for a firm whose portfolio is composed of streams of future receipts and payments, is measured by the interest elasticity of the portfolio; for a single asset, this can be expressed as $-n(i/1+i)$, where n is the term to maturity. A more general expression for a portfolio of assets and liabilities is derived in Belongia and Santoni (1987). In either case, the level of interest rate risk rises with the interest rate.

[2]See Belongia and Santoni (1984, 1985).

INTEREST RATE FORECASTS: THEORY AND EVIDENCE

Given the popular attention that such forecasts command, it is surprising to note what economic theory says about them: they are unlikely to provide accurate insights about the future. This argument is stated clearly by Zarnowitz:

> It might be argued that these are *forecasts* of people who study the economy (experts), which are quite unlike the *expectations* of those who act in the economy (agents). On the one hand, the experts are usually credited with more knowledge of the economy at large than the agents have. On the other hand, the experts are often charged with being less strongly motivated to predict optimally than the agents who are seen as having more at stake.[3]

Economists, at least on one level, lack sufficient incentives to make forecasts that are more accurate than information already available in the marketplace. Moreover, previous studies have shown there is little systematic difference among professional forecasts, at least partly because they "use to a large extent the same data, receive the same news, interact, and draw upon a common pool of knowledge and techniques."[4]

The key issue, however, really is not whether experts have more (or better) information than the public, but whether individuals who consistently can fore-

[3]See Zarnowitz (1983), p. 2.

[4]See Zarnowitz (1986), p. 6, and the references cited therein.

cast interest rates more accurately than the market are likely to make their forecasts public. The reason has to do with individual self-interest. Quite simply, why would anyone reveal valuable insight about the future when he could increase his wealth directly by appropriately trading in financial markets using this information?

If, for example, a person *knew* that the three-month Treasury bill rate would be 6.50 percent in December, while the futures market currently priced it at 7.00 percent, the forecaster's wealth gain would be limited only by his ability to buy December Treasury bill futures; in this example, he would make a profit of $1,250 on every contract he could buy.[5] Certainly, he has no incentive to make the same forecast public without appropriate compensation, at least until he had taken as large a position in the market as he could. Of course, forecasters may have incentives to sell forecasts that are of no value to their wealth; it is not clear, however, why other individuals would pay for such predictions.

As a general rule, the accuracy of economic forecasts varies widely across variables. Previous research has found that predictions of the three-month Treasury bill rate six months into the future by major commercial forecasters are within two percentage points of the actual rate only 67 percent of the time.[6] Thus, if in June, the three-month Treasury bill rate was forecast to be 7 percent in December, there is only a 0.67 probability that the actual December rate would be somewhere between 5 percent and 9 percent. Other studies have shown that error statistics often double in size when the forecast horizon is extended as little as from one to two quarters ahead.[7]

The Efficient Markets Hypothesis and Interest Rate Forecasts

A model of interest rate determination demonstrates why individuals are unable (as opposed to unwilling) to forecast interest rates more accurately, on average, than the forecasts already implied by current spot rates or prices in the interest rate futures markets. This model, known as the efficient markets model, states that the *expected* interest rate at some specified future point in time, given all information presently available, is equal to the current interest rate plus whatever change in the interest rate is suggested by currently available information.[8]

The driving force behind the efficient markets model is the information available to traders in the market and the incentives they have to use this information. Current market rates and expectations of future rates are influenced by changes in information that affect expectations about the future. Because new information is unknown until it actually is released, success in predicting future interest rates depends upon predicting both future changes in the information *and* the market's reaction to such "news."

An Illustration of the Efficient Markets Model

One illustration of the efficient markets model applied to actual data is the change in interest rates that follows the weekly Federal Reserve M1 announcement that usually occurs at 4:30 p.m. [EST] each Thursday. The assumption is that the interest rate at 3:30 p.m., just prior to the announcement, fully reflects all currently available information relevant to the Treasury bill rate, including various forecasts of the Fed's yet-to-be-announced change in M1; thus, the available information at 3:30 p.m. includes both actual and predicted data.

When the Fed announces the M1 change at 4:30 p.m., the market's information set is revised with the actual M1 change replacing its predicted value. If no other significant information is released until rates are observed again at 5 p.m., the change in the Treasury bill rate from 3:30 to 5 p.m. reflects the market's reaction to the news in the M1 announcement. If the actual and predicted M1 values are different, the efficient markets model predicts that interest rates will react to the new information in the Fed's M1 announcement; many studies have found this result empirically.[9]

[5]Treasury bill futures are priced by subtracting the Treasury bill interest rate from 100. Thus, interest rates of 7.00 and 6.50 percent imply contract prices of 93.00 and 93.50, respectively. Moreover, each basis-point change in the interest rate is worth $25 on the value of a contract. Buying one contract at 93.00 and selling at 93.50 would show a simple profit of 50 basis points × $25 = $1,250, abstracting from commission and other costs.

[6]McNees, p. 11.

[7]Typically, the criterion is root-mean-squared error (RMSE); see McNees (1986). Also, see Zarnowitz (1983).

[8]The efficient markets model applied to interest rate determination can be expressed as:

$$E(i_{t+1}|\Omega_t) = i_t(1 + E(i_{t+1} - i_t|\Omega_t)),$$

where E is the expectations operator and Ω_t is the information available to agents at the time forecasts are made. For more detail on this model, see Fama and Miller (1972) or Mishkin (1983).

[9]See Sheehan (1985) and Belongia and Sheehan (1987) for a survey and critique of these studies.

This example demonstrates the major point of the efficient markets model: changes in interest rates depend on changes in information. A forecast that interest rates will be higher six months from now than what already is implied by the underlying term structure really is a forecast that new information will be revealed which will cause market participants to raise the rate of interest. Such forecasts are potentially useful only if the forecasters consistently have better information, on average, than the other market participants generally possess. Or, to state the proposition differently, a useful forecast is not simply an accurate one; it also must tell something about the future that is not already reflected in current market interest rates.

A COMPARISON OF INTEREST RATE FORECASTS

A comparison of alternative interest rate forecasts is essentially a comparison of information sets that forecasters possess. The futures market, as well as forecasts that simply assume the future will resemble the present, provide useful alternatives to forecasts produced by specialized forecasting services. If all forecasts have similar accuracy, it would suggest that market participants use essentially the same information.

Survey Forecasts

The information content of economists' forecasts is intriguing for a variety of reasons. Presumably, their specialized training gives them insight to the workings of financial markets. In return for their services, the economists involved earn relatively large salaries; moreover, some command considerable public attention. The latter group should include those whose forecasts are among the best of competing alternatives.

Market Forecasts

The futures market offers an interesting perspective on forecasts. At a given point in time, individuals may enter into agreements to buy or sell interest-sensitive assets, such as Treasury bills, at a date as much as two years into the future. The collective actions of investors betting that interest rates will rise from today's level (who will sell Treasury bill futures short) and investors betting that interest rates will fall (who will buy, or go long in, Treasury bill futures) determine, at each moment in time, the "market's" expectation of what interest rates will be at a specified future date. Such forecasts are interesting for two reasons: they reflect all available information held by market participants and these participants have a compelling reason to forecast accurately. If they are wrong, the money lost is their own!

A naive or no-change model is an interesting third alternative because, as previously noted, predicting interest rates really involves predicting changes in information and the market's reaction to this news. If one believes it is impossible to predict actions by OPEC, changes in macroeconomic policy, revisions in economic data and other factors that affect expectations of future interest rates, the best strategy would be to predict no change in information and, hence, no change in interest rates. Certainly, as the length of the forecast horizon grows shorter, the probability of large changes in information (and interest rates) declines as well.

Sources of Forecasts: Professional and Market Data

The six-month-ahead forecasts of the three-month Treasury bill rate by nine economists surveyed regularly by the *Wall Street Journal* were collected over the period December 1981 through June 1986. These forecasts, which are published on or about each January 1 and July 1, yielded 10 forecast periods and 90 predictions to be evaluated. Each forecast was assumed to be made the day before publication.[10]

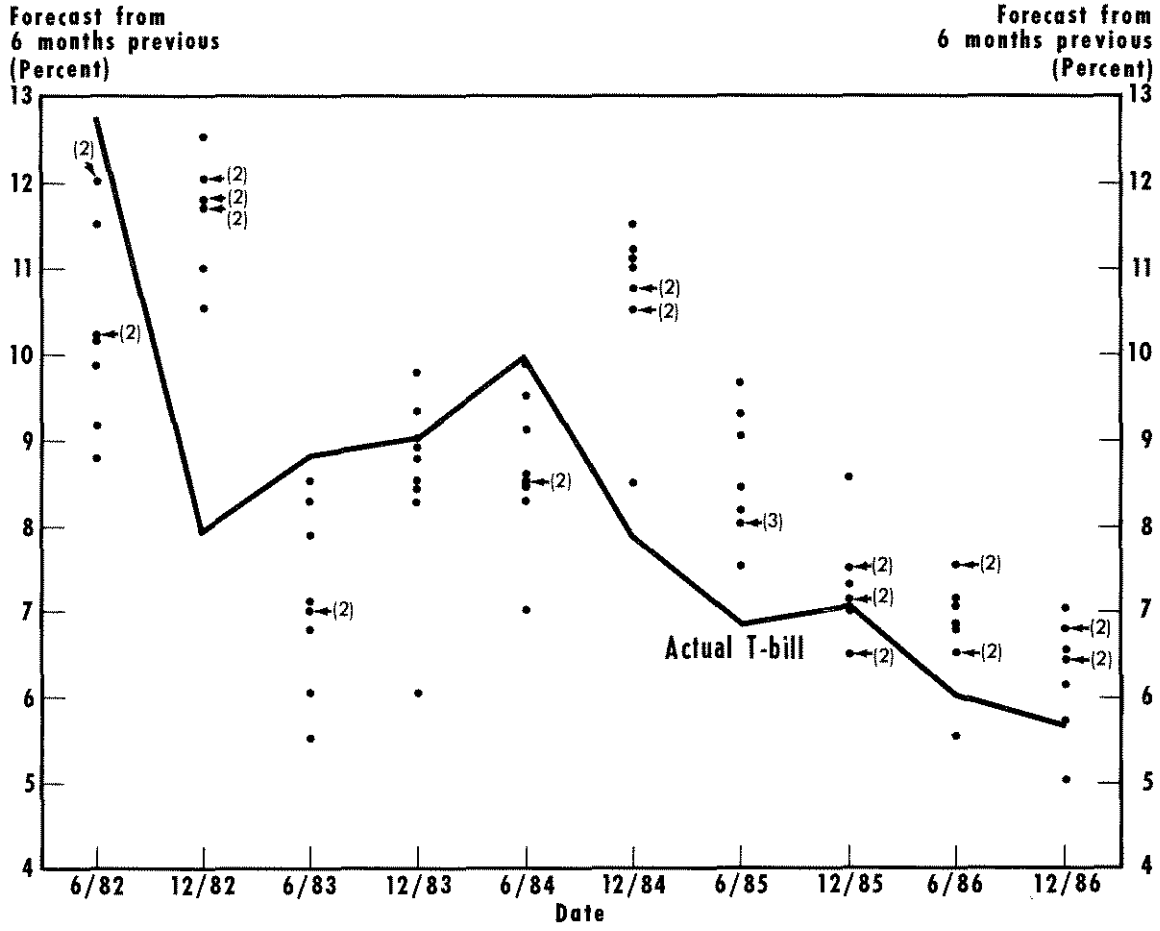
Comparable forecasts from the futures market were derived by observing on June 30 the three-month Treasury bill rate implied by the December Treasury bill futures contract and on December 31 the rate implied by the June contract. A larger sample to be used later also employed observations on the March futures contract from the previous September 30 and on the September contract from March 31. These data were compared with actual Treasury bill rates on the day the relevant futures contract ceased trading.[11] The procedure yielded 40 observations, of which 10 coincided with dates of the economists' forecasts. The naive or no-change forecast was obtained by observing the spot Treasury bill rates on the last business days of March, June, September and December and predicting that same rate would exist on the last day of the month six months hence. Again there are 40 observa-

[10]The full *Wall Street Journal* survey includes many more economists, but only nine individuals have responded consistently since the initial survey in December 1981.

[11]Treasury bill futures contracts usually are liquidated in the third week of their terminal months, not the last day of the month as with the economist forecasts.

Chart 1

Treasury Bill Rates: Actual and Predicted



tions over the 1977–86 interval with 10 coinciding with dates of the economist survey. Although this sample of market-based forecasts includes only 10 observations that coincide with the economists' forecasts, it serves as the basis for the first comparison. Subsequent analysis uses the entire sample back to 1977 for a stronger test of forecast accuracy.

Forecasts of Direction of Change

A first assessment about the accuracy of the professional forecasts was made against a relatively weak criterion, the predicted *direction* of change. That is, if rates were forecast to increase (or decrease), did they? The individual forecasts relative to subsequent actual values are plotted in chart 1.

The 90 individual expert predictions correctly forecast the *direction* of change on 38 occasions, or 42 percent of the time. If interest rate movements are random, a 50 percent record of accuracy would be expected.[12] Only one of the nine forecasters guessed

[12]This type of performance — the strategies of professional investors yielding returns inferior to those of simple rules — is common. For example, the mean equity fund managed by professional institutional money managers rose 16.7 percent in 1986 compared with an 18.7 percent rise in the S&P 500 index. Moreover, more than 67 percent of the money managers produced returns in 1986 smaller than the general increase in market values, as measured by the S&P 500; see Wallace (1987). For a more extensive discussion of this result and a similar finding of inferior performance by mutual fund managers over time, see Malkiel (1985), pp. 147–82, and the references to his chapter 7.

Table 1
Summary Statistics for Errors from Alternative Forecasts: June 1982-December 1986

	MAE	Mean error	RMSE	n
Economist individual forecasts	1.625	–0.406	2.056	90
Economist mean forecast	1.550	–0.406	1.889	10
Futures market forecast	1.466	–1.132	2.253	10
Naive forecast	1.321	–0.543	1.859	10

the direction of change correctly more than one-half of the time; he was correct on six of 10 occasions. Three others guessed the correct direction of change on five of 10 occasions. The worst individual performance was two correct predictions.

For the 40 quarterly predictions derived from futures market observations, 22, or nearly 55 percent, correctly forecast the direction of change. Over the shorter 1982–86 sample, five of 10 directions of change were predicted correctly by the futures market. On the simple criterion of direction of change, the futures market outperforms the economists surveyed.[13]

Point Forecasts

A different criterion by which to evaluate forecasts is a comparison of the point estimates of the predicted changes in interest rates with the actual changes. These comparisons were analyzed several ways. First, forecasts by the nine experts provided 90 individual predictions of the Treasury bill rate. These individual predictions also could be aggregated to form a consensus, or average, prediction for the nine economists at a specific moment in time. The performance of the experts relative to the futures market and naive forecasts first was judged over the short 1982–86 sample that coincided with the economist survey. Differences between actual Treasury bill rates and, respectively, the economist, futures market and naive forecasts were calculated to generate values for forecast errors. All errors were calculated as actual minus predicted values. Table 1 shows the summary statistics for these errors.

The entries in table 1 represent the mean absolute error (MAE), mean error and root-mean-squared error (RMSE) from forecasts for the three-month Treasury bill rate six months into the future. The first two rows are associated with the individual and consensus forecasts from the survey of experts. The third row is based on the differences between the actual Treasury bill rate and the futures market prediction. The fourth row is based on the naive predictions, the differences between current and previous actual rates.

The most interesting aspect of these summary statistics is their remarkable similarity. Of course, this result was predicted by the earlier theoretical discussion, which emphasized that all available information would be reflected in current market rates. The mean errors for all forecasts are negative, indicating that these methods tended to overestimate the interest rate; the futures market, however, tended to be the most bearish forecaster on this account by overpredicting the Treasury bill rate an average of 1.132 percentage points. MAE statistics also are similar, with a range of about 30 basis points between the best (naive) and worst (individual economist). The RMSE statistic, which is a measure of the dispersion of forecast errors, shows the naive and economist consensus to perform best.[14]

[13]There is no meaningful way to construct a direction-of-change criterion for the naive forecast.

[14]The likely explanation for the futures prediction having the highest RMSE is the method of calculation. The RMSE will tend to be lower for forecasts that made many errors of a similar size relative to forecasts that had smaller errors, on average, but had several very large errors. This result occurs, of course, because calculating the RMSE involves squaring the forecast errors. The effects of random variation in small samples also is a potential source of distortion. Thus, two very large futures market errors offset a record of generally accurate forecasts as indicated by other statistics.

Table 2
Market-Based Forecasts Over a Longer Horizon: March 31, 1977 - December 31, 1986

	MAE	Mean Error	RMSE	n
Futures market forecast				
Daily data	1.676	-0.163	2.589	40
Weekly averages	1.702	-0.141	2.634	40
Naive forecast				
Daily data	1.740	0.035	2.578	40
Weekly averages	1.788	0.027	2.695	40

Longer Sample Results for Market-Based Forecasts

Error statistics from the longer 10-year sample of quarterly observations described earlier are reported in table 2. Because daily interest rate changes are volatile and a large, one-day change could affect the results, forecasts for a specific date also were compared with the average Treasury bill rate for the week in which that date occurred.

Relative to the previous results, the futures market average errors declined substantially to near 15 basis points, compared with the shorter sample mean error of about 113 basis points. MAE and RMSE values increased slightly, however, for the longer sample. The forecast errors do not appear to vary with the use of daily or weekly average values for the terminal period spot rate. The naive forecast also shows slight increases in MAE and RMSE values but its mean error falls about 50 basis points to near zero. Again, while these statistics are not directly comparable with the economist forecasts because of the different sample periods, nothing in them suggests superior performance by the economists.

Market Reaction to Forecasts

As a final check on the information content of the expert forecasts, daily Treasury bill rates were divided into two groups: those for days when the experts' forecasts were published and those for other trading days. (Recall that the forecasts are useful to the market only if they add to the existing pool of market information.) To test whether this is true, equation (1) was estimated:

$$(1)\ TB_t = \underset{(1.02)}{0.015} + \underset{(657.2)}{0.998}\, TB_{t-1} + \underset{(0.95)}{0.049}\, ANNOUNCEMENT + e_t,$$
$$\bar{R}^2 = 0.99 \qquad DW = 1.77$$

where the daily value of the Treasury bill rate (TB_t) is regressed on the previous day's value (TB_{t-1}) and a dummy variable (ANNOUNCEMENT) that takes a value of one on the 11 days that the expert forecasts were released.[15] If the expert forecasts add to the market's information, the coefficient for the ANNOUNCEMENT variable should be significantly different from zero; as the t-statistic of 0.95 reveals, however, we cannot reject the hypothesis that the forecast announcements have no effect on Treasury bill rates. Apparently, the Treasury bill market had already incorporated the information underlying these forecasts prior to their public release.

SUMMARY

Interest rate risk has been substantial in the 1980s, and, by no coincidence, the demand for interest rate forecasts has increased. There are strong theoretical reasons to believe, however, that such forecasts are subject to large errors. Moreover, anyone who could predict interest rates more accurately, on average, than other market participants would have no reason to make his forecasts publicly. Comparisons of interest rate forecast errors support the notion that several market-based forecasts, using information easily accessible to the general public, predict the Treasury bill rate six months into the future as well as a panel of prominent forecasters.

Why, then, do economists make public forecasts of interest rates and seemingly earn large salaries for doing so? Several explanations related to other primary functions of corporate economists seem plausible. First, economists may serve an advertising function for their firms: they are paid, in part, to get the

[15]It is possible to use the January 3, 1987, survey for this estimation.

firm's name mentioned in the press often, and forecasting interest rates is one way to achieve this end. Second, economists may provide a managerial insurance function. If a business decision has the potential to cause large losses, managers who have relied on the input of economists cannot be held negligent, in the sense of acting without seeking "the best information available at the time." Finally, forecasting interest rates may be a trivial portion of an economist's overall function; his compensation may be based primarily on analytical performance in other areas. It is unlikely, however, that economists are employed primarily for their ability to predict interest rates more accurately than the market.

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2021 10-K Proxy Group Company Credit Ratings and Regulated Revenues

			[1]	[2]		[3]		[4]		
								2021 ($M)		
Total No.	**Company Name**	**Ticker**	**Industry**	**S&P Credit Ratings**	**S&P Rating Scores**	**Moody's Credit Ratings**	**Moody's Rating Scores**	**Regulated Utility Revenue**	**Total Revenue**	**% Utility Revenue**
1.	Allete Inc	ALE	Central	BBB	9	Baa1	8	$1,228	$1,419	86.5%
2.	Alliant Energy Corp.	LNT	Central	A-	7	Baa2	9	3,586	3,669	97.7%
3.	Ameren Corp.	AEE	Central	BBB+	8	Baa1	8	6,394	6,394	100.0%
4.	American Electric Power Co. Inc.	AEP	Central	A-	7	Baa2	9	14,316	16,792	85.3%
5.	Avista Corp.	AVA	West	BBB	9	Baa2	9	1,438	1,439	100.0%
6.	Black Hills Corp.	BKH	West	BBB+	8	Baa2	9	1,852	1,949	95.0%
7.	CenterPoint Energy Inc.	CNP	Central	BBB+	8	Baa2	9	8,042	8,352	96.3%
8.	CMS Energy Corp.	CMS	Central	BBB+	8	Baa2	9	7,021	7,329	95.8%
9.	Consolidated Edison Inc.	ED	East	A-	7	Baa2	9	12,655	13,676	92.5%
10.	Dominion Energy	D	East	BBB+	8	Baa2	9	11,354	13,964	81.3%
11.	Duke Energy Corp.	DUK	East	BBB+	8	Baa2	9	24,327	25,097	96.9%
12.	Edison International	EIX	West	BBB	9	Baa3	10	14,874	14,905	99.8%
13.	Entergy Corp.	ETR	Central	BBB+	8	Baa2	9	11,045	11,743	94.1%
14.	Eversource Energy	ES	East	A-	7	Baa1	8	9,863	9,863	100.0%
15.	Hawaiian Electric Industries Inc.	HE	West	BBB-	10	Baa1	8	2,540	2,850	89.1%
16.	IDACORP Inc.	IDA	West	BBB	9	Baa2	9	1,455	1,458	99.8%
17.	NextEra Energy Inc.	NEE	East	A-	7	Baa1	8	14,103	17,069	82.6%
18.	Northwestern Corporation	NWE	West	BBB	9	Baa2	9	1,372	1,372	100.0%
19.	OGE Energy Corp.	OGE	Central	BBB+	8	Baa1	8	3,654	3,654	100.0%
20.	Pinnacle West Capital Corp.	PNW	West	BBB+	8	Baa1	8	3,500	3,804	92.0%
21.	Portland General Electric Company	POR	West	BBB+	8	A3	7	2,141	2,396	89.4%
22.	PPL Corp.	PPL	East	A-	7	Baa1	8	5,750	5,783	99.4%
23.	Public Service Enterprise Group Inc.	PEG	East	BBB+	8	Baa2	9	7,331	9,722	75.4%
24.	Sempra Energy	SRE	West	BBB+	8	Baa2	9	10,991	12,857	85.5%
25.	Southern Company	SO	East	BBB+	8	Baa2	9	19,232	23,113	83.2%
26.	WEC Energy Group	WEC	Central	A-	7	Baa1	8	8,134	8,316	97.8%
27.	Xcel Energy Inc.	XEL	West	A-	7	Baa1	8	$13,337	$13,431	99.3%
	Average:			**BBB+**	**7.96**	**Baa1/Baa2**	**8.59**			**93.1%**

Sources:
[1] Value Line
[2] Standard and Poor's (CapitalIQ)
[3] Moody's Investor Services
[4] Company's 2021 Annual Report / 10-K

LEGEND:		
S&P	Moody's	Score
AA+	Aa1	2
AA	Aa2	3
AA-	Aa3	3
A+	A1	4
A	A2	6
A-	A3	7
BBB+	Baa1	8
BBB	Baa2	9
BBB-	Baa3	10
BB+	Ba1	11
BB	Ba2	12
BB-	Ba3	13

2021 10-K Value Line Universe Company Ratings and Regulated Revenues

			[1]	[2]		
				2021 ($M)		
Total No.	Company Name	Ticker	Industry	Regulated Utility Revenue	Total Revenue	% Utility Revenue
1.	Allete Inc.	ALE	Central	$1,228	$1,419	86.5%
2.	Alliant Energy Corp.	LNT	Central	3,586	3,669	97.7%
3.	Ameren Corp.	AEE	Central	6,394	6,394	100.0%
4.	American Electric Power Co. Inc.	AEP	Central	14,316	16,792	85.3%
5.	AVANGRID Inc.	AGR	East	5,531	6,974	79.3%
6.	Avista Corp.	AVA	West	1,438	1,439	100.0%
7.	Black Hills Corp.	BKH	West	1,852	1,949	95.0%
8.	CenterPoint Energy Inc.	CNP	Central	8,042	8,352	96.3%
9.	CMS Energy Corp.	CMS	Central	7,021	7,329	95.8%
10.	Consolidated Edison Inc.	ED	East	12,655	13,676	92.5%
11.	Dominion Energy	D	East	11,354	13,964	81.3%
12.	DTE Energy Company	DTE	Central	7,288	14,964	48.7%
13.	Duke Energy Corp.	DUK	East	24,327	25,097	96.9%
14.	Edison International	EIX	West	14,874	14,905	99.8%
15.	Entergy Corp.	ETR	Central	11,045	11,743	94.1%
16.	Evergy Inc.	EVRG	Central	4,230	5,587	75.7%
17.	Eversource Energy	ES	East	9,863	9,863	100.0%
18.	Exelon Corp.	EXC	East	17,709	36,347	48.7%
19.	FirstEnergy Corp.	FE	East	11,112	11,132	99.8%
20.	Fortis Inc.	FTS	Central	9,350	9,448	99.0%
21.	Hawaiian Electric Industries Inc.	HE	West	2,540	2,850	89.1%
22.	IDACORP Inc.	IDA	West	1,455	1,458	99.8%
23.	MGE Energy Inc.	MGEE	Central	607	607	100.0%
24.	NextEra Energy Inc	NEE	East	14,103	17,069	82.6%
25.	Northwestern Corporation	NWE	West	1,372	1,372	100.0%
26.	OGE Energy Corp.	OGE	Central	3,654	3,654	100.0%
27.	Otter Tail Corp.	OTTR	Central	480	1,197	40.1%
28.	PG&E Corp.	PCG	West	20,642	20,642	100.0%
29.	Pinnacle West Capital Corp.	PNW	West	3,500	3,804	92.0%
30.	PNM Resources Inc	PNM	West	1,306	1,780	73.4%
31.	Portland General Electric Company	POR	West	2,141	2,396	89.4%
32.	PPL Corp.	PPL	East	5,750	5,783	99.4%
33.	Public Service Enterprise Group Inc.	PEG	East	7,331	9,722	75.4%
34.	Sempra Energy	SRE	West	10,991	12,857	85.5%
35.	Southern Company	SO	East	19,232	23,113	83.2%
36.	Unitil Corp.	UTL	East	473	473	100.0%
37.	WEC Energy Group	WEC	Central	8,134	8,316	97.8%
38.	Xcel Energy Inc.	XEL	West	$13,337.00	$13,431.00	99.3%

[1] Value Line
[2] Company's 2021 Annual Report / 10-K

Calculation of Electric ROE

DCF Method

(B)		(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)
Company[1]	Ticker	Beta[1]	Stock Price[2] June-Aug 2022	EPS 2026	DPS 2022	DPS 2023	DPS 2026	BPS 2022	BPS 2023	BPS 2026	Number of Shares 2022	Number of Shares 2026
1. Allete, Inc	ALE	0.90	60.26	4.75	2.60	2.70	3.00	47.45	48.90	54.00	57.00	61.00
2. Alliant Energy Corp.	LNT	0.80	59.88	3.50	1.71	1.81	2.15	25.05	26.25	30.25	251.00	253.00
3. Ameren Corp.	AEE	0.80	90.26	5.25	2.36	2.52	3.10	40.20	42.90	51.25	262.50	280.00
4. American Electric Power	AEP	0.75	97.33	6.50	3.17	3.35	4.00	47.30	50.30	59.00	514.00	545.00
5. Avista Corp	AVA	0.90	42.36	2.75	1.76	1.83	2.05	30.85	31.75	34.75	74.50	83.00
6. Black Hills Corp.	BKH	0.95	74.04	5.20	2.41	2.53	2.95	43.60	44.45	46.50	66.50	71.00
7. Centerpoint Energy	CNP	1.15	30.52	1.80	0.71	0.77	0.95	14.75	15.50	18.00	630.00	634.00
8. CMS Energy Corp.	CMS	0.75	67.27	3.75	1.84	1.94	2.30	23.20	24.35	29.25	290.00	300.00
9. Consolidated Edison	ED	0.75	95.34	5.50	3.16	3.24	3.52	58.85	60.85	67.25	365.00	380.00
10. Dominion Energy	D	0.80	80.35	5.30	2.67	2.83	3.40	34.40	36.25	43.00	835.00	870.00
11. Duke Energy	DUK	0.85	107.10	6.50	3.98	4.06	4.30	62.75	64.50	70.00	770.00	770.00
12. Edison International	EIX	0.95	65.95	6.15	2.84	3.00	3.55	38.60	40.30	48.25	382.00	385.00
13. Entergy Corp.	ETR	0.90	113.73	8.50	4.09	4.30	5.10	60.30	63.55	74.00	206.00	214.00
14. Eversource	ES	0.90	87.03	5.30	2.55	2.70	3.30	44.35	46.40	53.50	347.00	365.00
15. Hawaiian Electric	HE	0.80	41.12	2.55	1.40	1.44	1.60	22.00	23.25	26.00	110.00	113.00
16. IDACORP, Inc.	IDA	0.80	107.44	6.00	3.05	3.25	4.00	54.55	56.00	63.45	50.70	52.00
17. NextEra Energy	NEE	0.95	81.52	4.00	1.70	1.87	2.50	19.65	22.65	27.00	1980.00	2025.00
18. NorthWestern Corp.	NWE	0.95	56.62	4.00	2.52	2.56	2.68	44.55	46.15	49.50	58.00	62.00
19. OGE Energy Corp.	OGE	1.00	39.63	3.25	1.66	1.70	1.85	22.20	23.25	27.00	200.10	200.10
20. Pinnacle West Capital	PNW	0.90	73.08	5.25	3.44	3.52	3.76	52.85	53.60	58.50	113.00	118.00
21. Portland General Electric	POR	0.85	50.25	3.40	1.79	1.89	2.25	31.05	32.10	35.50	89.50	89.50
22. PPL	PPL	1.10	28.33	1.95	1.07	0.96	1.18	19.25	20.05	22.35	737.00	745.00
23. Public Service Enterprise G	PEG	0.90	64.30	4.30	2.16	2.28	2.72	28.05	29.40	34.00	496.00	496.00
24. Sempra Energy	SRE	0.95	156.93	10.75	4.58	4.80	5.60	82.85	86.50	100.75	315.00	305.00
25. Southern Co.	SO	0.90	73.97	4.75	2.70	2.78	3.10	27.05	28.00	32.25	1070.00	1070.00
26. WEC Energy Group	WEC	0.80	100.75	5.50	2.91	3.11	3.80	35.90	37.35	42.00	315.43	315.43
27. Xcel Energy, Inc.	XEL	0.80	71.61	4.00	1.95	2.08	2.50	30.15	31.65	37.00	547.00	561.00
	Median:	**0.90**										
	Average:	**0.88**	**74.70**									

Sources:

[1]Value Line Investment Survey

[2]S&P Capital IQ

Calculation of Electric ROE

DCF Method

(B)		(C)	(N)	(O)	(P)	(Q)	(R)	(S)	(V)	(W)	(X)
Company[1]	Ticker	Beta[1]	DPS Growth 2026	Retention Rate 2026	Return on Equity 2026	B x R	S Increase in Shares	V MBR -1 2022	S x V	Sustainable Growth	Long Form ROE
1. Allete, Inc	ALE	0.90	3.57	0.37	8.94	3.29	1.71	0.27	0.46	3.76	8.18%
2. Alliant Energy Corp.	LNT	0.80	5.91	0.39	11.84	4.57	0.20	1.39	0.28	4.84	7.90%
3. Ameren Corp.	AEE	0.80	7.15	0.41	10.55	4.32	1.63	1.25	2.03	6.35	9.14%
4. American Electric Power	AEP	0.75	6.09	0.38	11.31	4.35	1.47	1.06	1.56	5.91	9.32%
5. Avista Corp	AVA	0.90	3.86	0.25	8.03	2.04	2.74	0.37	1.02	3.07	7.44%
6. Black Hills Corp.	BKH	0.95	5.25	0.43	11.27	4.88	1.65	0.70	1.15	6.03	9.33%
7. Centerpoint Energy	CNP	1.15	7.25	0.47	10.25	4.84	0.16	1.07	0.17	5.01	7.63%
8. CMS Energy Corp.	CMS	0.75	5.84	0.39	13.21	5.11	0.85	1.90	1.62	6.73	9.49%
9. Consolidated Edison	ED	0.75	2.80	0.36	8.31	2.99	1.01	0.62	0.63	3.62	6.92%
10. Dominion Energy	D	0.80	6.31	0.36	12.68	4.54	1.03	1.34	1.38	5.92	9.43%
11. Duke Energy	DUK	0.85	1.93	0.34	9.41	3.19	0.00	0.71	0.00	3.19	6.83%
12. Edison International	EIX	0.95	5.77	0.42	13.13	5.55	0.20	0.71	0.14	5.69	10.19%
13. Entergy Corp.	ETR	0.90	5.85	0.40	11.78	4.71	0.96	0.89	0.85	5.56	9.32%
14. Eversource	ES	0.90	6.92	0.38	10.14	3.83	1.27	0.96	1.22	5.05	8.26%
15. Hawaiian Electric	HE	0.80	3.57	0.37	9.99	3.72	0.67	0.87	0.59	4.31	7.71%
16. IDACORP, Inc.	IDA	0.80	7.17	0.33	9.65	3.22	0.63	0.97	0.62	3.83	7.08%
17. NextEra Energy	NEE	0.95	10.16	0.38	15.25	5.72	0.56	3.15	1.77	7.49	9.87%
18. NorthWestern Corp.	NWE	0.95	1.54	0.33	8.18	2.70	1.68	0.27	0.46	3.15	7.46%
19. OGE Energy Corp.	OGE	1.00	2.86	0.43	12.34	5.31	0.00	0.79	0.00	5.31	9.30%
20. Pinnacle West Capital	PNW	0.90	2.22	0.28	9.11	2.58	1.09	0.38	0.42	3.00	7.69%
21. Portland General Electric	POR	0.85	5.98	0.34	9.74	3.29	0.00	0.62	0.00	3.29	7.28%
22. PPL	PPL	1.10	7.12	0.39	8.88	3.51	0.27	0.47	0.13	3.64	7.30%
23. Public Service Enterprise G	PEG	0.90	6.06	0.37	12.95	4.76	0.00	1.29	0.00	4.76	8.38%
24. Sempra Energy	SRE	0.95	5.27	0.48	10.94	5.24	0.00	0.89	0.00	5.24	8.26%
25. Southern Co.	SO	0.90	3.70	0.35	15.08	5.24	0.00	1.73	0.00	5.24	8.81%
26. WEC Energy Group	WEC	0.80	6.91	0.31	13.35	4.13	0.00	1.81	0.00	4.13	7.40%
27. Xcel Energy, Inc.	XEL	0.80	6.32	0.38	11.09	4.16	0.63	1.38	0.87	5.03	7.98%
Median:		**0.90**								**5.01**	**8.18%**
Average:		**0.88**	**5.31**		**11.01**		**0.76**			**4.78**	**8.29%**

Sources:

[1]Value Line Investment Survey

[2]S&P Capital IQ

Blue Chip Economic Indicators®

Top Analysts' Forecasts of the U.S. Economic Outlook for the Year Ahead

Vol. 47, No. 3, March 11, 2022

Wolters Kluwer

Long-Range Consensus U.S. Economic Projections

I. The table below shows the latest U.S. Blue Chip Consensus projections by years for 2024 through 2028, an average for the five-year period 2024-2028, and an average for the next five-year period 2029-2033. There are also Top 10 and Bottom 10 averages for each variable. *Apply these projections cautiously. For the most part economic and political forces over such long time spans cannot be evaluated with accuracy.*

ECONOMIC VARIABLE		YEAR 2024	2025	2026	2027	2028	Five-Year Averages 2024-28	2029-33
		Percent Change, Full Year-Over-Prior Year						
1. Real GDP (chained, 2012 dollars)	CONSENSUS	2.1	2.0	2.0	1.9	1.9	2.0	1.9
	Top 10 Avg.	2.5	2.3	2.2	2.1	2.2	2.3	2.2
	Bottom 10 Avg.	1.7	1.6	1.7	1.7	1.7	1.7	1.6
2. GDP Chained Price Index	CONSENSUS	2.2	2.1	2.1	2.1	2.1	2.1	2.1
	Top 10 Avg.	2.6	2.5	2.4	2.4	2.3	2.4	2.3
	Bottom 10 Avg.	1.9	1.8	1.8	1.8	1.8	1.8	1.9
3. Nominal GDP (current dollars)	CONSENSUS	4.4	4.1	4.1	4.0	4.0	4.1	4.0
	Top 10 Avg.	5.0	4.7	4.5	4.4	4.4	4.6	4.4
	Bottom 10 Avg.	3.8	3.5	3.7	3.7	3.7	3.7	3.7
4. Consumer Price Index (for all urban consumers)	CONSENSUS	2.3	2.2	2.2	2.2	2.2	2.2	2.2
	Top 10 Avg.	2.6	2.5	2.4	2.4	2.5	2.5	2.4
	Bottom 10 Avg.	2.0	2.0	2.0	1.9	1.9	2.0	2.0
5. Industrial Production (total)	CONSENSUS	2.2	1.9	2.1	1.9	1.9	2.0	2.0
	Top 10 Avg.	2.9	2.5	2.6	2.3	2.3	2.5	2.3
	Bottom 10 Avg.	1.7	1.4	1.6	1.5	1.5	1.5	1.6
6. Disposable Personal Income (chained, 2012 dollars)	CONSENSUS	2.2	2.0	1.9	2.0	2.0	2.0	2.0
	Top 10 Avg.	2.7	2.3	2.2	2.3	2.3	2.4	2.3
	Bottom 10 Avg.	1.8	1.7	1.7	1.7	1.7	1.7	1.8
7. Personal Consumption Expenditures (chained, 2012 dollars)	CONSENSUS	2.3	2.2	2.1	2.1	2.1	2.1	2.1
	Top 10 Avg.	2.7	2.6	2.4	2.3	2.3	2.5	2.3
	Bottom 10 Avg.	1.8	1.7	1.9	1.8	1.9	1.8	1.9
8. Non-Residential Fixed Investment (chained, 2012 dollars)	CONSENSUS	3.6	3.4	3.5	3.5	3.5	3.5	3.4
	Top 10 Avg.	4.6	4.7	4.5	4.3	4.4	4.5	4.3
	Bottom 10 Avg.	2.7	2.2	2.5	2.8	2.6	2.6	2.6
9. Corporate Profits, Pretax (current dollars)	CONSENSUS	3.5	4.3	4.6	4.4	4.5	4.2	4.2
	Top 10 Avg.	4.6	5.5	5.4	5.1	5.2	5.1	4.7
	Bottom 10 Avg.	2.5	3.0	3.7	3.6	3.6	3.3	3.7
10. PCE Price Index (chain-type)	CONSENSUS	2.2	2.1	2.0	2.0	2.0	2.1	2.1
	Top 10 Avg.	2.5	2.4	2.2	2.2	2.2	2.3	2.2
	Bottom 10 Avg.	1.9	1.8	1.9	1.8	1.9	1.8	1.9
		Annual Average						
11. Treasury Bills, 3-Month (percent per annum)	CONSENSUS	2.1	2.1	2.1	2.2	2.2	2.1	2.1
	Top 10 Avg.	2.6	2.7	2.6	2.6	2.5	2.6	2.5
	Bottom 10 Avg.	1.5	1.5	1.6	1.8	1.8	1.6	1.8
12. Treasury Notes, 10-Year (yield per annum)	CONSENSUS	2.9	3.0	3.0	3.0	3.0	3.0	3.0
	Top 10 Avg.	3.6	3.7	3.7	3.5	3.5	3.6	3.5
	Bottom 10 Avg.	2.3	2.3	2.4	2.5	2.5	2.4	2.5
13. Unemployment Rate (% of civilian labor force)	CONSENSUS	3.6	3.7	3.8	3.8	3.8	3.8	4.0
	Top 10 Avg.	4.0	4.2	4.3	4.2	4.2	4.2	4.4
	Bottom 10 Avg.	3.3	3.3	3.3	3.4	3.5	3.4	3.5
		Total Units in Millions						
14. Housing Starts (millions of units)	CONSENSUS	1.54	1.51	1.50	1.49	1.48	1.50	1.47
	Top 10 Avg.	1.64	1.63	1.62	1.62	1.61	1.63	1.62
	Bottom 10 Avg.	1.44	1.39	1.37	1.35	1.34	1.38	1.32
15. Total Auto & Light Truck Sales (millions of units)	CONSENSUS	16.8	16.7	16.6	16.6	16.6	16.6	16.6
	Top 10 Avg.	17.3	17.3	17.1	17.1	17.1	17.2	17.1
	Bottom 10 Avg.	16.2	16.0	16.0	16.1	16.1	16.1	16.2
		Billions of Chained 2012 Dollars						
16. Net Exports (billions of chained 2012 dollars)	CONSENSUS	-1381.9	-1390.0	-1409.9	-1419.2	-1433.1	-1406.8	-1470.3
	Top 10 Avg.	-1290.6	-1290.5	-1305.5	-1307.5	-1303.8	-1299.6	-1294.1
	Bottom 10 Avg.	-1474.5	-1493.0	-1518.0	-1530.9	-1562.5	-1515.8	-1646.5

Independent Statistics & Analysis
U.S. Energy Information Administration

Annual Energy Outlook 2022

with projections to 2050

Narrative

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Washington, DC 20585

Introduction

Key takeaways from the Reference case and side cases

Petroleum and natural gas remain the most-consumed sources of energy in the United States through 2050, but renewable energy is the fastest growing

- Motor gasoline remains the most prevalent transportation fuel despite electric vehicles gaining market share
- Energy-related carbon dioxide (CO_2) emissions dip through 2035 before climbing later in the projection years
- Energy consumption increases through 2050 as population and economic growth outweighs efficiency gains
- Electricity continues to be the fastest-growing energy source in buildings, with renewables and natural gas providing most of the incremental electricity supply

Wind and solar incentives, along with falling technology costs, support robust competition with natural gas for electricity generation, while the shares of coal and nuclear power decrease in the U.S. electricity mix

- Electricity demand grows slowly across the projection period, which increases competition among fuels
- Renewable electricity generation increases more rapidly than overall electricity demand through 2050
- Battery storage complements growth in renewables generation and reduces natural gas-fired and oil-fired generation during peak hours
- As coal and nuclear generating capacity retire, new capacity additions come largely from wind and solar technologies

U.S. crude oil production reaches record highs, while natural gas production is increasingly driven by natural gas exports

- U.S. production of natural gas and petroleum and other liquids rises amid growing demand for exports and industrial uses
- Driven by rising prices, U.S. crude oil production in the Reference case returns to pre-pandemic levels in 2023 and stabilizes over the long term
- Refinery closures lower domestic crude oil distillation operating capacity, but refinery utilization rates remain flat over the long term
- Consumption of renewable diesel increases as a share of the domestic fuel mix

The *Annual Energy Outlook 2022* explores long-term energy trends in the United States

- Projections in the Reference case of our *Annual Energy Outlook 2022* (AEO2022) are not predictions of what will happen, but rather, they are modeled projections of what may happen given certain assumptions and methodologies. The Reference case serves as a baseline for comparison between side cases that explain alternative trends. By varying Reference case assumptions and methodologies in side cases, AEO2022 can illustrate important factors in future energy production and use in the United States.
- Energy market projections are uncertain because we cannot foresee with certainty many of the events that shape energy markets—as well as future developments in technologies, demographics, and resources. To illustrate the importance of key assumptions, AEO2022 includes a baseline Reference case and several side cases that systematically vary important underlying assumptions.
- We developed AEO2022 by using the National Energy Modeling System (NEMS), an integrated model that captures interactions of economic changes and energy supply, demand, and prices.
- We publish the AEO2022 to satisfy the Department of Energy Organization Act of 1977, which requires the EIA Administrator to prepare annual reports on trends and projections for energy use and supply.

What is the AEO2022 Reference case?

- The AEO2022 Reference case represents our assessment of how U.S. and world energy markets would operate through 2050. Our key assumptions in the Reference case provides a baseline for exploring long-term trends, based on current laws and regulations as of November 2021. The current laws and regulations included in the AEO and a paper addressing the Bipartisan Infrastructure Law are available on the AEO website.
- We based the economic and demographic trends reflected in the Reference case on the current views of leading economic forecasters and demographers. For example, the Reference case projection assumes improvement in known energy production, delivery, and consumption technologies.
- The Reference case serves as the benchmark to compare with alternative policy-based cases, so in general, it assumes that current laws and regulations that affect the energy sector, including laws that have end dates, remain unchanged throughout the projection period.

What are the side cases?

- We run eight standard side cases each year in addition to the Reference case. We also publish Issues *in Focus* analyses to explore emerging issues in the energy sector. The standard side cases are:
    - High Oil Price case
    - Low Oil Price case
    - High Oil and Gas Supply case
    - Low Oil and Gas Supply case
    - High Economic Growth case
    - Low Economic Growth case
    - High Renewable Cost case
    - Low Renewable Cost case

- Global market balances, primarily non-domestic supply and demand factors, will drive future crude oil prices. To account for these factors, oil prices are an external assumption in our analysis. In the AEO2022 High Oil Price case, the price of Brent crude oil, in 2021 dollars, reaches $170 per barrel (b) by 2050, compared with $90/b in the Reference case and $45/b in the Low Oil Price case.

- Compared with the Reference case, the High Oil and Gas Supply case assumes that the estimated ultimate recovery per well for tight oil, tight gas, or shale gas in the United States is 50% higher. This side case assumes that undiscovered resources in Alaska and the offshore Lower 48 states are 50% higher than in the Reference case. Rates of technological improvement that reduce costs and increase productivity in the United States are also 50% higher than in the Reference case. Conversely, the Low Oil and Gas Supply case assumes that the estimated ultimate recovery per well for tight oil, tight gas, or shale gas in the United States; the undiscovered resources in Alaska and the offshore Lower 48 states; and rates of technological improvement are all 50% lower.

- The High Renewables Cost case and the Low Renewables Cost case examine the sensitivities surrounding capital costs for renewable electric power generation and diurnal storage technologies. We assume capital cost reductions for an electric power-generating technology occur from learning by doing as commercialization expands and construction and manufacturing experience accelerates. The High Renewables Cost case assumes no cost reductions from learning by doing for any renewable generation or diurnal storage technologies. The Low Renewables Cost case assumes faster technology learning for renewable generation and diurnal storage technologies through 2050, resulting in a cost reduction of about 40%, compared with the Reference case, by 2050. In addition, we assume fixed operating and maintenance costs will decline along with the capital cost from technology improvement.

- The High Economic Growth case and Low Economic Growth case address the effects of economic assumptions on the energy consumption modeled in the AEO2022. From 2021 to 2050, the High Economic Growth case assumes the compound annual growth rate for U.S. GDP

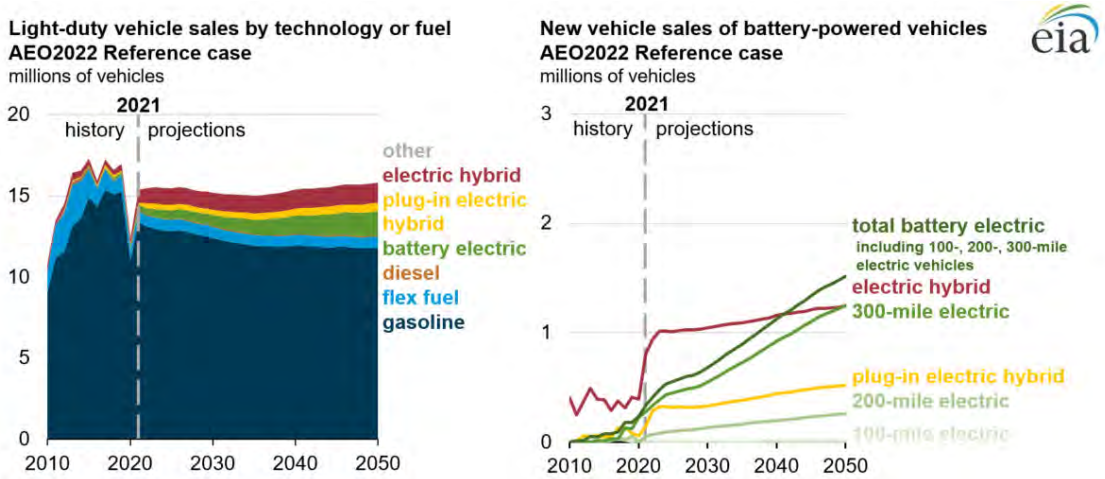
is 2.7%, and the Low Economic Growth case assumes a rate of 1.8%. However, the Reference case assumes the U.S. GDP annual growth rate is 2.2% over the projection period.

- AEO2022 cases do not include the potential effects of proposed legislation, regulations, or standards, except as specifically noted in *Issues in Focus* analyses.

Consumption

Motor gasoline remains the most prevalent transportation fuel despite electric vehicles gaining market share

Figure 1



Source: U.S. Energy Information Administration, *Annual Energy Outlook 2022* (AEO2022) Reference case

Gasoline remains the dominant light-duty vehicle (LDV) fuel, but consumption does not return to pre-pandemic levels during the projection period

LDVs accounted for 54% of the energy consumed in U.S. transportation in 2021. Their share falls to 51% by 2050. LDV energy consumption generally decreases through 2038 and then increases through the end of the projection period. Total LDV sales do not return to 2019 pre-pandemic levels by 2050, and sales of conventional motor gasoline vehicles decrease through the projection period because of increasing sales of battery-electric vehicles (BEVs), hybrid-electric vehicles (HEVs), and plug-in hybrid-electric vehicles (PHEVs).

We project that the combined share of sales of internal combustion engine (ICE) LDVs—including gasoline, diesel, flex-fuel, natural gas, and propane powertrains—will decrease from 92% in 2021 to 79% in 2050 because of growth in sales of BEVs, PHEVs, and HEVs. Through the projection period, 200- and 300-mile BEV sales grow, increasing from 0.34 million in 2021 to 1.52 million in 2050, while sales of PHEVs increase from 144,000 in 2021 to 521,000 in 2050. PHEVs demonstrate fast growth and market penetration between 2021 and 2024. Growth in PHEV sales slows after 2024 as a result of declining battery prices, which pushes BEVs into the highest electric LDV market share. We project BEVs and PHEVs combined account for 13% of total LDV sales in 2050.

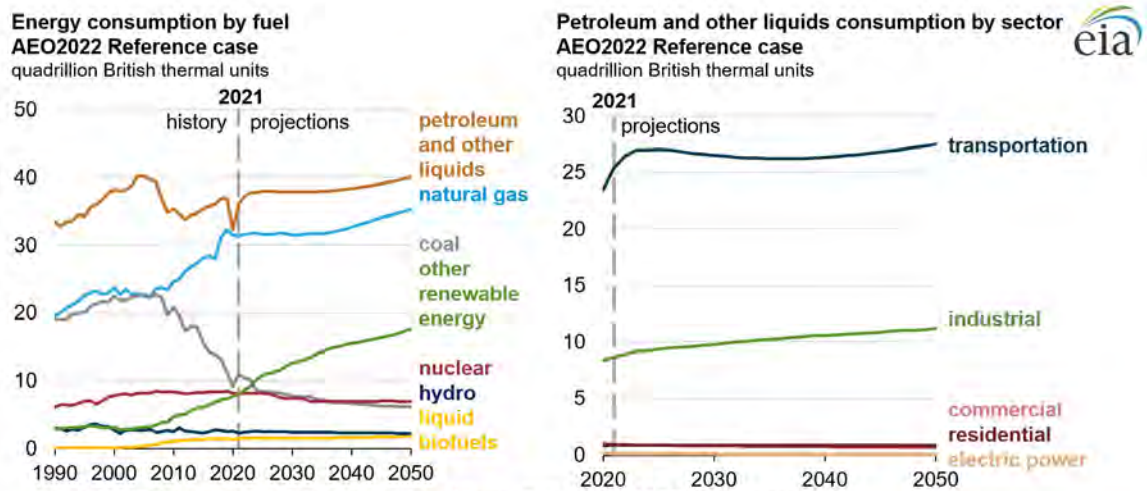
The on-road vehicle stock shifts more slowly than sales because electric vehicles replace older, retired ICE vehicles

We project that the total electric vehicle share—including BEVs and PHEVs—of on-road LDV stock grows from less than 3% in 2021 to 13% in 2050, based on current laws and regulations as of November 2021. This shift occurs even as the on-road LDV stock likely grows from 260 million to 288 million vehicles over that timeframe. Increased electrification of the on-road LDV fleet increases electricity consumption from

less than 0.5% to more than 2% of total consumption of energy in the transportation sector between 2019 and 2050 in the Reference case.

Energy-related carbon dioxide (CO_2) emissions dip through 2035 before climbing later in the projection years

Figure 2



Source: U.S. Energy Information Administration, *Annual Energy Outlook 2022* (AEO2022) Reference case
Note: Biofuels are shown separately and included in petroleum and other liquids.

Vehicles and industrial processes are the main consumers of petroleum in the Reference case

Petroleum and other liquids remain the most-consumed fuels in the Reference case. In the United States, petroleum and other liquids, particularly motor gasoline and distillate fuel oil, are mostly consumed in transportation. In the Reference case, we assume that current fuel economy standards remain constant after 2026 for light-duty vehicles and after 2027 for heavy-duty vehicles. As travel continues to increase, consumption of petroleum and other liquids increases later in the projection period.

In the U.S. industrial sector through 2050, hydrocarbon gas liquids (HGLs) used as a feedstock drive most of the growth in demand for petroleum. Petroleum also remains a major fuel for refining processes and in nonmanufacturing industries (agriculture, construction, and mining).

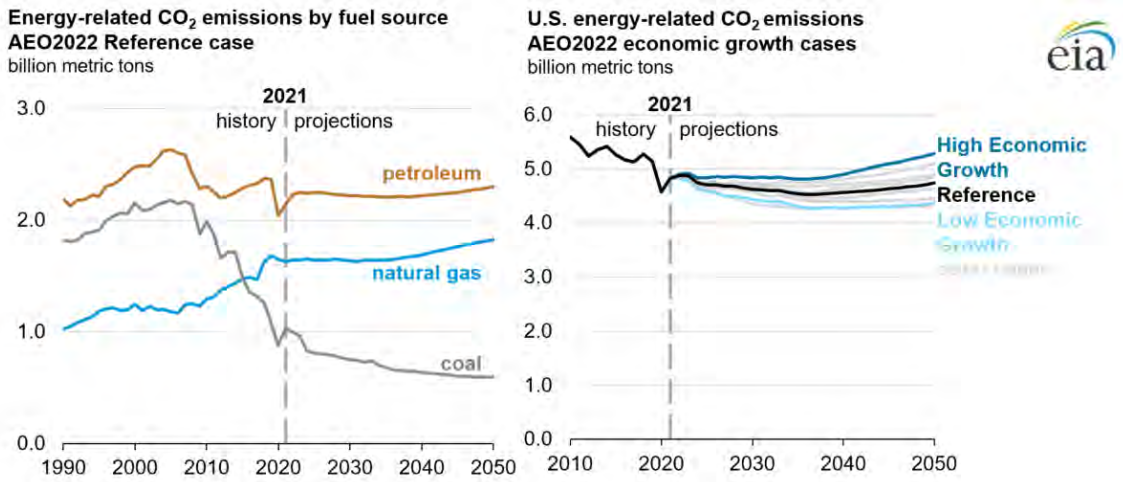
Consumption of renewable energy increases steadily as natural gas maintains a large market share and coal continues a steady decline

In all cases, we project that renewable energy will be the fastest-growing U.S. energy source through 2050. Policies at the state and federal levels continue to provide incentives for significant investment in renewable resources for electricity generation and transportation fuels. New technologies continue to lower the cost to install wind and solar generation, further increasing their competitiveness in the electricity market, even as the policy effects we assume level out over time. Federal regulations continue to provide incentives for using biofuels, primarily ethanol, as energy during the projection period. However, relatively modest increases in demand for electricity and liquid fuels limit the projected growth of renewable energy in the Reference case.

We project that consumption of natural gas will keep growing as well, maintaining the second-largest market share overall. The expected growth in natural gas consumption is driven by expectations that natural gas prices will remain low compared with historical levels. In the Reference case, the industrial sector has the largest share of natural gas consumption, starting in the early 2020s, driven by greater use of natural gas as a feedstock in the chemical industries and by increased heat-and-power consumption across multiple industries.

Changes in fuel mix reduce energy-related CO_2 emissions in the Reference case through 2037, despite steadily increasing energy consumption

Figure 3.



Source: U.S. Energy Information Administration, *Annual Energy Outlook 2022* (AEO2022)

Note: Series does not include greenhouse gases other than carbon dioxide (CO_2). Industrial sector CO_2 emissions do not include process emissions, such as the emissions from cement clinker production.

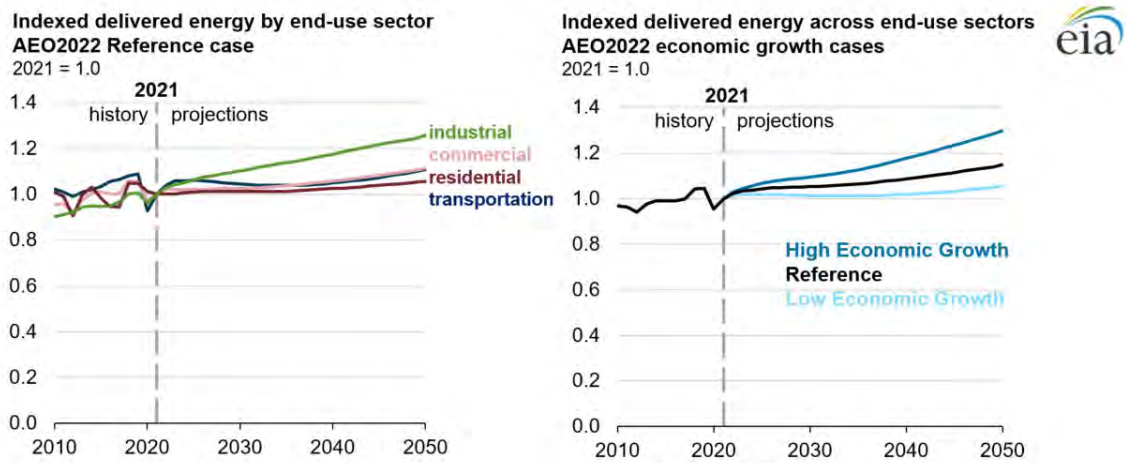
Changes over time in U.S. energy-related CO_2 emissions in the Reference case reflect shifts in the quantity and CO_2 intensity (CO_2 per unit of energy) of fuel consumption. Emissions decrease from 2022 to 2037 because of a transition away from more carbon-intensive coal to less carbon-intensive natural gas and renewable energy for electricity generation and because of an overall decrease in energy intensity (energy consumption per unit of GDP). After 2037, CO_2 emissions begin to trend upward as increasing energy consumption, resulting from population and economic growth, outpaces continuing reductions in energy intensity and CO_2 intensity. This trend occurs in all AEO2022 side cases. The High Economic Growth case has the highest level of CO_2 emissions over the projection period, and the Low Oil and Gas Supply case has the lowest. Even in the High Economic Growth case, annual energy-related CO_2 emissions through 2050 remain below the 2007 peak of 6 billion metric tons.

Energy consumption increases through 2050 as population and economic growth outweighs efficiency gains

U.S. energy consumption grows through 2050, driven by population and economic growth

Economic growth is a key driver of the longer-term trends in energy consumption, and the High and Low Economic Growth cases explore future growth trajectories in the U.S. economy. These cases modify population growth and productivity assumptions throughout the projection period to yield higher or lower compound annual growth rates for U.S. GDP compared with the Reference case. The economic growth cases show the highest and lowest levels of projected energy consumption across cases. From 2021 to 2050, the High Economic Growth case assumes a U.S. GDP compound annual growth rate of 2.7%, the Low Economic Growth case assumes 1.8%, and the Reference case assumes 2.2%.

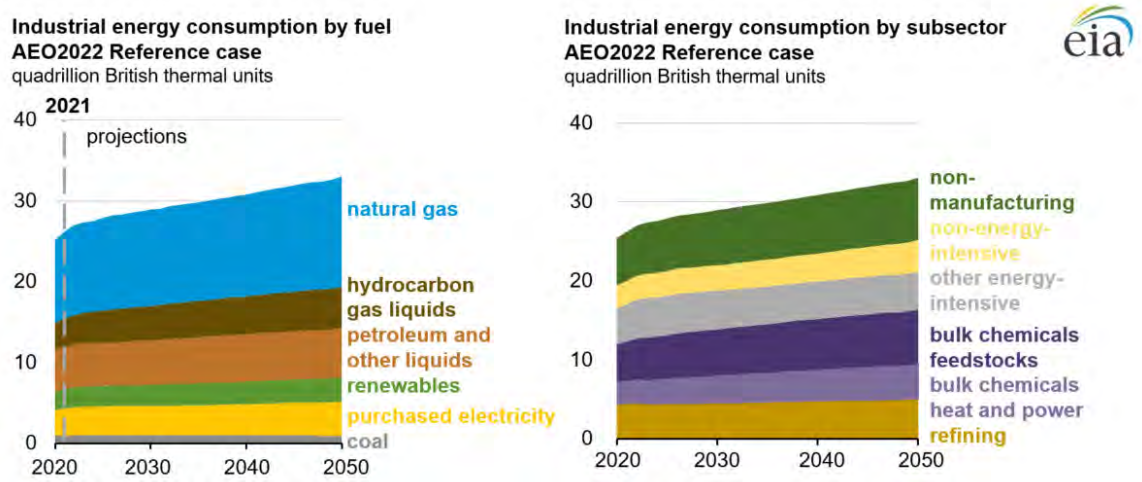
Figure 4.



Source: U.S. Energy Information Administration, *Annual Energy Outlook 2022* (AEO2022)

Overall industrial energy consumption grows rapidly, but not all industries return to pre-pandemic levels

Figure 5.



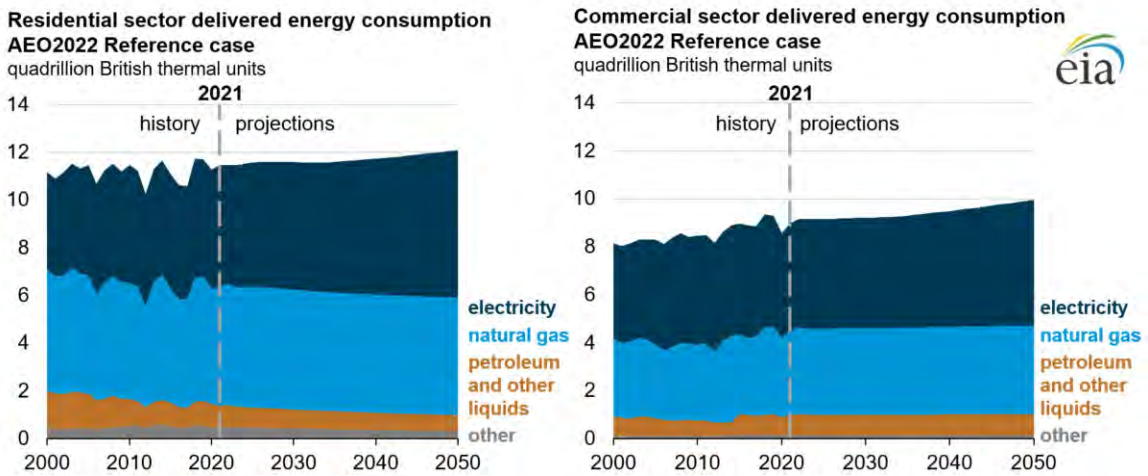
Source: U.S. Energy Information Administration, *Annual Energy Outlook 2022* (AEO2022) Reference case

In the Reference case, we project the U.S. industrial sector's energy consumption will grow more than twice as fast as any other end-use sector from 2021 to 2050. We expect industrial energy consumption in the United States to exceed pre-pandemic levels by 2022, although specific industries may remain below or take longer to return to pre-pandemic levels. For example, we do not project the glass and steel industries to return to 2019 levels of energy consumption by 2050. These industries were decreasing their energy use before the pandemic because shifts in their respective industrial production processes increased efficiencies. Moreover, U.S. steel production is more or less flat after 2025, further contributing to this industry's declining energy consumption in the long term. We assume that most major energy-consuming industries will have declines in energy intensity (the amount of energy used to produce a unit of output) as a result of efficiency gains, which results in energy consumption growth that is slower than the growth in shipments.

The U.S. bulk chemicals industry is the largest industrial energy user throughout the projection period and consumes the most energy in the industrial sector as a whole. We project that through the mid-2020s, the bulk chemicals industry will build facilities that use natural gas and HGL feedstocks to produce chemicals such as nitrogenous fertilizer and ethylene. Some chemical products derive from heavier liquid petrochemicals (mainly naphtha), but feedstock use of heavy petrochemicals does not grow during the projection period. Growth in natural gas and HGL feedstock consumption slows after the first half of the 2020s as growth in the bulk chemicals industry shifts to secondary chemical production (that is, derivative chemicals produced from commodity chemicals, as opposed to HGLs or natural gas).

Growth in residential housing stocks and commercial floorspace contributes to increasing energy consumption across the buildings sector

Figure 6.



Source: U.S. Energy Information Administration, *Annual Energy Outlook 2022* (AEO2022) Reference case

Housing stocks and commercial floorspace increase over the projection period and are key drivers of energy consumption in buildings. However, as a result of efficiency gains, delivered energy consumption in U.S. buildings[1] grows at 0.3% per year, more slowly than housing stocks (0.8% per year) and commercial floorspace (1.0% per year) grow between 2021 and 2050 in the Reference case.

Between 2021 and 2050, U.S. housing stocks, led by growth in single-family homes, increase by 23% in the Reference case. Single-family homes consume more energy per square foot, on average, than multifamily or mobile homes. However, efficiency gains in new homes cause energy use to grow more slowly than the U.S. housing stock overall, continuing the long-term decline in residential energy intensity per square foot.

Similarly, the commercial building stock expands by more than one-third between 2021 and 2050. However, energy consumption in commercial buildings grows more slowly than commercial floorspace. Energy efficiency improvements enable buildings to meet growing demand for energy-consuming services without a one-for-one increase in energy use. We project the energy intensity of the commercial building stock to decline at an average rate of 0.6% per year from 2021 through 2050.

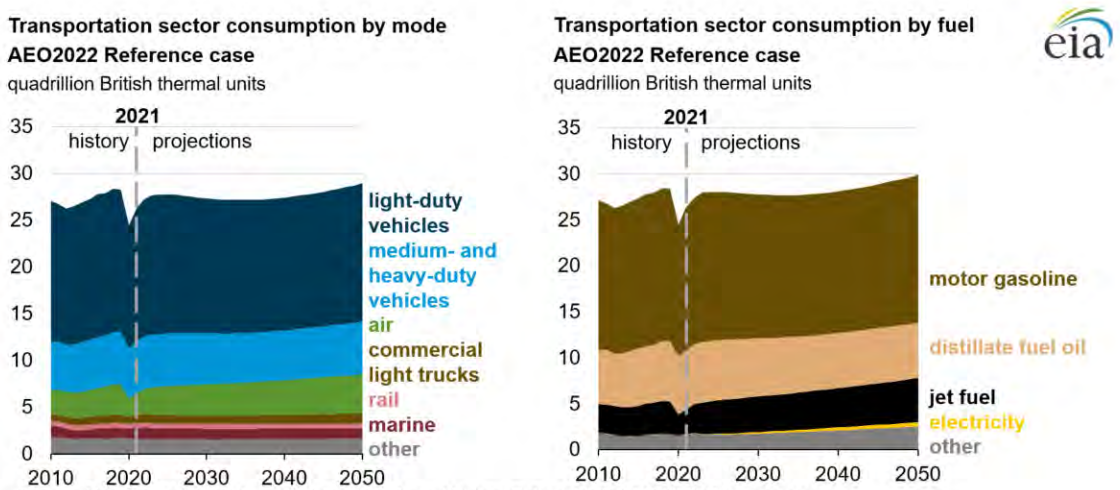
In our Reference case, we project that electricity consumption in U.S. residences will grow 22% between 2021 and 2050. Onsite generation, largely from solar photovoltaics (PV), reduces the amount of energy that must be delivered to buildings to meet energy demand. Energy consumption from onsite sources grows at an average annual rate of 6.1%. This growth occurs despite our expectation that PV system costs will decline more slowly than in the past. PV costs decline more slowly following near-term pandemic impacts and related supply constraints on materials needed to manufacture PV panels, as well as restrictions for certain PV panel imports, both of which have lasting effects through the projection period.

[1] Delivered energy excludes electricity-related losses. In addition, this measurement excludes onsite energy generated for use in a home or commercial building.

Natural gas consumption for space heating, which is the largest single contributor to both U.S. commercial and residential delivered energy consumption throughout the Reference case projection period, declines through 2050. We project that buildings will consume less energy for space heating as the United States experiences warmer winters and as the population increasingly migrates to warmer parts of the country, reducing the heating degree days we use to project space heating requirements.[2]

Despite steep declines during the pandemic, consumption of energy for transportation returns to pre-pandemic levels

Figure 7.



Source: U.S. Energy Information Administration, *Annual Energy Outlook 2022* (AEO2022) Reference case

In the Reference case, energy consumption in the transportation sector nearly returns to the 2019 pre-pandemic level of 28.4 quadrillion British thermal units (quads) in 2025 before declining slowly through 2035. Energy consumption in the sector then rises through the remainder of the projection period to 29.9 quads. Motor gasoline, distillate fuel oil, and jet fuel account for more than 90% of the transportation sector's energy consumption throughout the projection period. Electricity is the fastest-growing fuel used for transportation, growing from less than 0.5% of total consumption in 2019 to nearly 2% in 2050.

In the Reference case, on-road passenger light-duty vehicle (LDV) travel mainly uses motor gasoline as its energy source through 2050. LDV fuel economy and projected vehicle miles traveled (VMT) are key factors that determine the level of future gasoline consumption. New vehicle fuel economy improvements are driven by increasingly stringent fuel economy standards from the U.S. Environmental Protection Agency (EPA) and the National Highway Traffic Safety Administration through 2026, after which we assume that the standards remain constant and improvement in fuel economy slows. Passenger VMT grows steadily with population and income throughout the projection period, growing 26% higher in 2050 than it was in 2019. We project that the confluence of fuel economy improvement

[2] Heating degree days are a measure of how far temperatures fall below a reference temperature, indicating demand for indoor heating. Reference case projections use a 30-year trend of historical population-weighted degree days from the National Oceanic and Atmospheric Administration (NOAA).

and increasing VMT results in gasoline consumption falling through 2038 and then rising for the remainder of the projection period.

Rising diesel consumption is largely a result of projected medium- and heavy-duty freight truck travel, which accounts for around 77% of consumption of diesel in the transportation sector throughout the projection period. Both the trend and its explanation are similar to that of gasoline. After fuel economy returns to pre-pandemic levels, we project that fuel economy increases for trucks, which generally reduces consumption through 2041. Slowing gains in fuel economy and rising freight truck travel demand gradually cause consumption to rise through 2050. After returning from its 2020 pandemic low, commercial jet fuel consumption continues to grow throughout the projection period as a result of growing income and population. We project that U.S. commercial aircraft will consume 4.2 quads of jet fuel in 2050, a 32% increase from 2019.

We project that different transportation modes, and as a result, different fuels, will return to pre-pandemic (2019) levels at different rates:

- Light-duty vehicle travel as measured by VMT in 2022
- Freight truck VMT in 2021
- Air travel as measured in revenue passenger-miles (RPMs) in 2025
- Bus as measured in passenger-miles traveled (PMT) in 2028
- Passenger rail PMT in 2025

Improving efficiencies across all modes results in slower increases in consumption. Gasoline consumption does not reach its 2019 total during the projection period, diesel returns to its 2019 level in 2023, and commercial jet fuel returns to its 2019 level in 2027.

Electricity continues to be the fastest-growing energy source in buildings, with renewables and natural gas providing most of the incremental electricity supply

Over the projection period, use of electricity expands to meet a variety of needs in homes and commercial spaces

Electricity continues to be the fastest-growing source of energy used in buildings, even as lighting, air-conditioning, and other end uses see efficiency gains. In our Reference case, onsite generation from solar PV grows faster than purchased grid electricity for buildings during the projection period. We project distributed generation technologies such as solar PV will grow to supply 8% of electricity consumed in households and 6% of electricity consumed in commercial buildings in 2050, despite declining electricity prices.

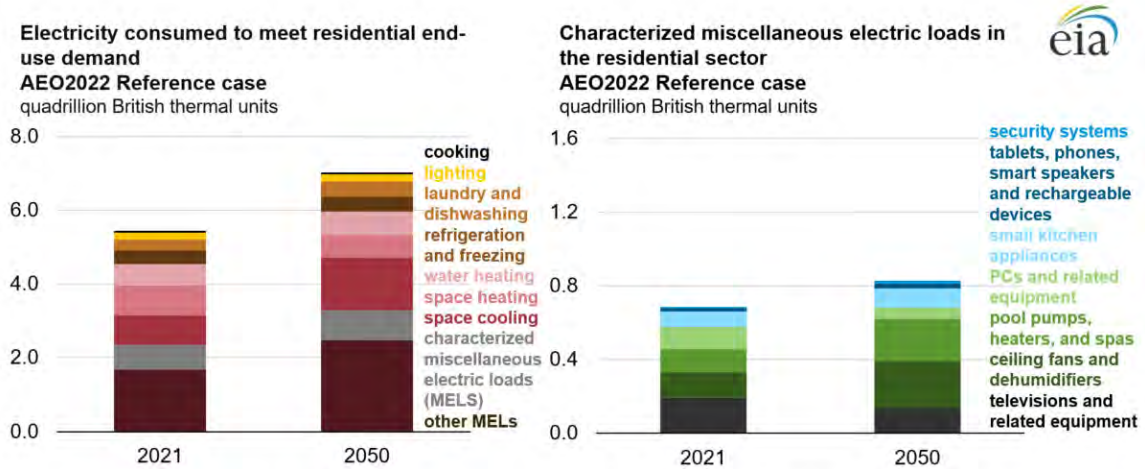
Federal minimum energy efficiency standards, the availability of subsidies for energy-efficient equipment, and technological improvements increase the efficiency of commercial equipment and household appliances in the Reference case. Incremental increases in equipment efficiency reduce consumption, offsetting the effects of household and floorspace growth.

The Reference case reflects evolving consumer demand for electricity over time

U.S. consumption of electricity for many major end uses—including space heating, water heating, refrigeration, and lighting—decreases over time. Growing adoption of space cooling equipment and increasing cooling demand in the residential sector cause associated electricity consumption to grow

77% from 2021 to 2050. At the same time, we project residential electricity used to serve *miscellaneous electric loads* (MELs) to grow 20% by 2050 for devices and technologies that we explicitly model. MELs include televisions, personal computers (PCs), smartphones, tablets, pool pumps, and other uses.

Figure 8.

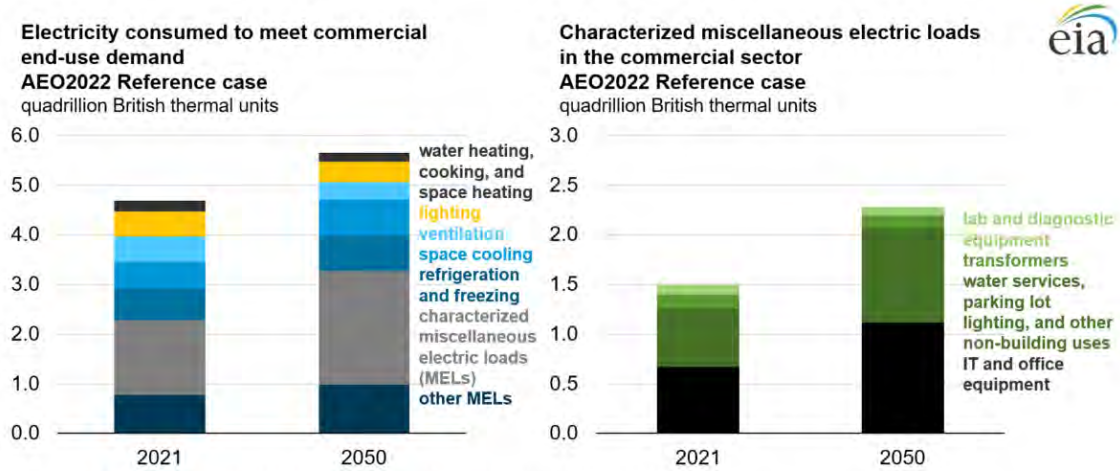


Source: U.S. Energy Information Administration, *Annual Energy Outlook 2022* (AEO2022) Reference case

We project that energy consumed by traditional computing equipment, specifically desktop PCs and laptops, will decrease through 2050, offset in part by increasing numbers of monitors per computer. We project electricity consumed by tablets to increase over time, and we project electricity used to recharge smartphones in U.S. households will grow at a faster annual rate than population. We project the average number of smartphones per household to grow 8% between 2021 and 2050, up to 2.4 phones per household, on average. In 2050, we project that an average of 2.5 people live in each U.S. household.

Projected electricity used by televisions and related equipment declines as newer models replace less energy-efficient televisions through 2050, despite increased use of video game consoles. Consumption of electricity from other MELs generally continues to increase over time as personal disposable income grows.

Figure 9.



Source: U.S. Energy Information Administration, *Annual Energy Outlook 2022* (AEO2022) Reference case

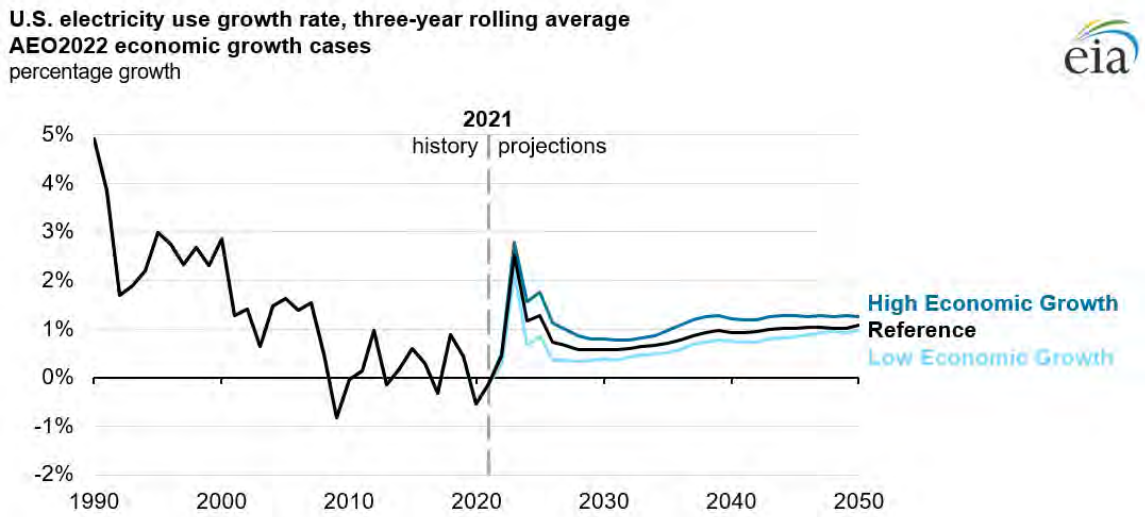
In the commercial sector, electricity for space cooling grows by 38% over the projection period. We project MELs to consume 29% more electricity in 2050 than in 2021 in U.S. commercial buildings. Not all equipment, appliances, and devices contribute to these increases. For example, we project the number of monitors per computer to increase relative to 2021 levels. However, we project the associated energy consumption to decrease by more than half in 2050 compared with 2021 as new monitors replace older models that consume more energy. Meanwhile, consumption by data center servers in commercial buildings expands through 2050. As a result, by 2050, we project energy use by commercial IT and office equipment to increase by 67% from 2021 levels. Projected increases in service sector output drives additional growth in other commercial MELs.

Electricity

Electricity demand grows slowly across the projection period, which increases competition among fuels

The U.S. annual average electricity growth rate remains below 1% for much of the projection period in the Reference case

Figure 10.

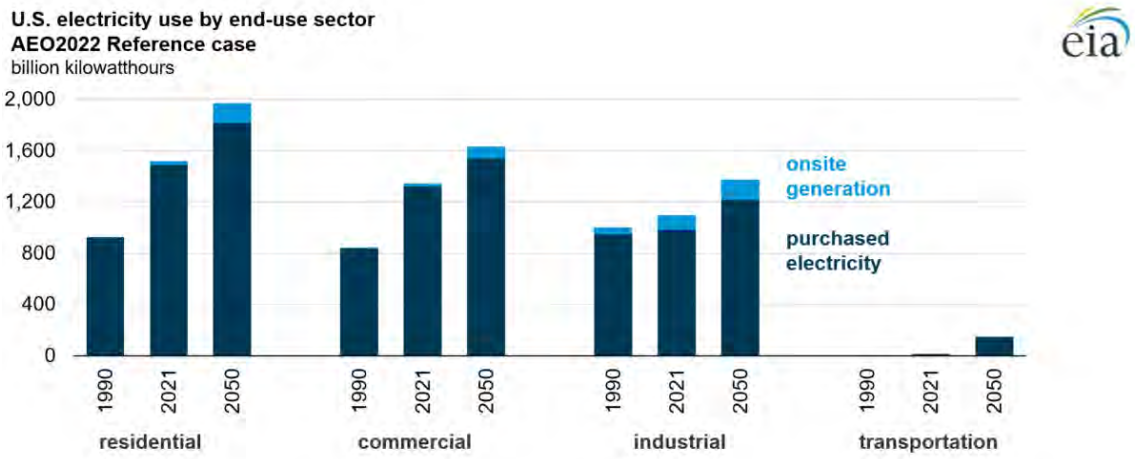


Source: U.S. Energy Information Administration, *Annual Energy Outlook 2022* (AEO2022)

The three-year rolling average growth rate of electricity consumption in the United States peaks in 2023 as the economy returns to pre-pandemic levels of economic activity. In the short term, demand for electricity may fluctuate as a result of year-to-year weather, economic shocks, or other unpredictable events. Economic growth drives longer-term trends in electricity consumption, although the growth is somewhat offset by efficiency improvements. In the Reference case, the average annual growth rate of electricity consumption surpasses 1% but not until near the end of the projection period. Electricity demand in the AEO2022 High Economic Growth case grows about 0.25% faster than in the Reference case, and it grows about 0.25% slower in the Low Economic Growth case.

The share of onsite electricity generation increases across non-transportation sectors

Figure 11.



Source: U.S. Energy Information Administration, *Annual Energy Outlook 2022* (AEO2022) Reference case
Note: Onsite generation is electricity produced onsite for own use.

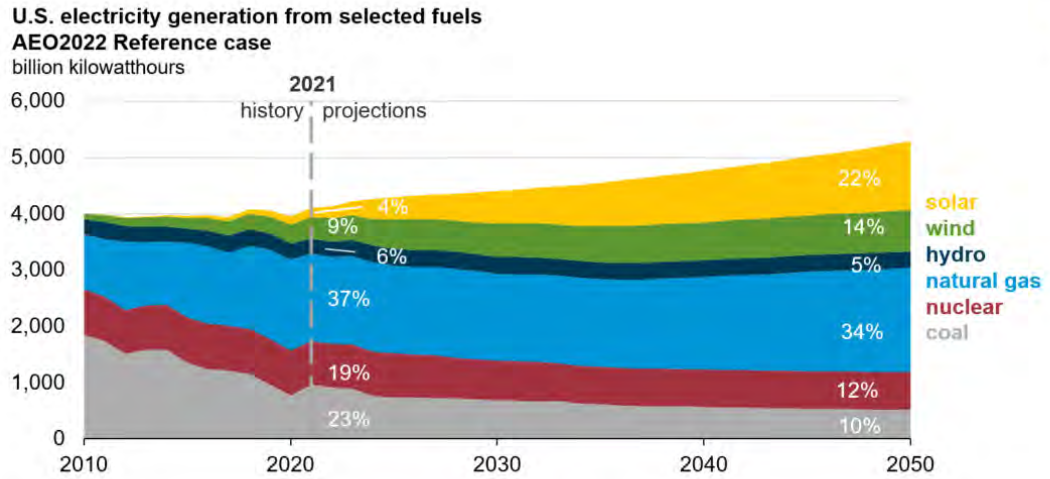
Through the projection period, onsite generation of electricity expands significantly in the U.S. residential, commercial, and industrial sectors, reducing growth in electricity purchased from centralized generators. We project that residential, commercial, and industrial sector onsite solar PV systems will account for more than 8% of total electricity generation by 2050, almost double the share held by onsite power generators in 2021.

Electricity demand in transportation remains low

We project that demand for electricity grows fastest in the transportation sector, even as consumption in that sector remains less than 3% of economy-wide electricity consumption in the Reference case. Fully electric vehicles grow from less than 1% of the on-road LDV fleet in 2021 to a little over 7% in 2050 in the Reference case. The increase in demand primarily follows evolutionary electric vehicle (EV) technology and market developments, as well as current fuel economy regulations. Both vehicle sales and utilization (miles driven) would need to increase substantially for EVs to raise electric power demand growth rates by more than a fraction of a percentage point per year. The transportation sector's share of electricity consumption is greatest in the High Oil Price case, where it reaches 5% of the total in 2050.

Renewable electricity generation increases more rapidly than overall electricity demand through 2050

Figure 12.



Source: U.S. Energy Information Administration, *Annual Energy Outlook 2022* (AEO2022) Reference case
Note: Solar includes both utility-scale and end-use photovoltaic electricity generation.

Renewable electricity generation meets incremental demand growth

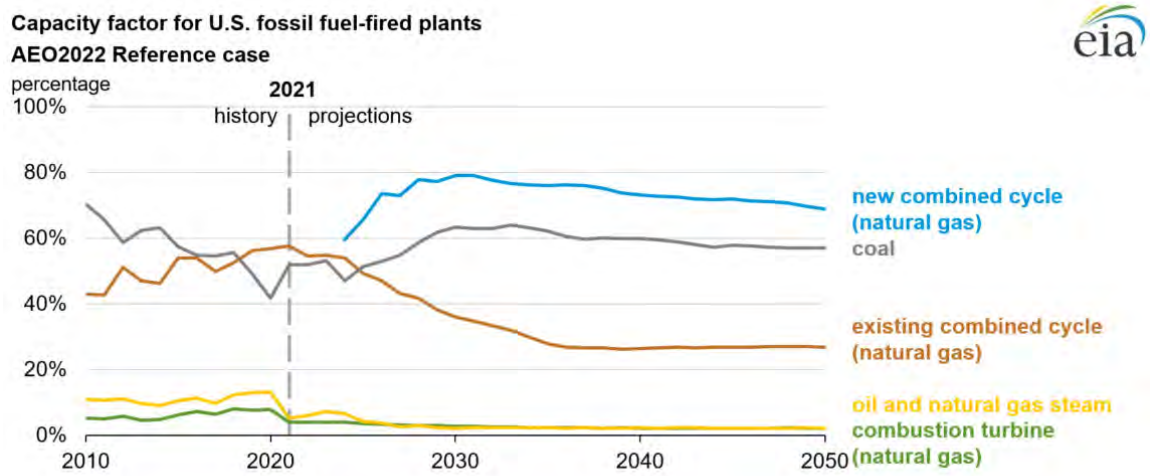
The share of renewables in the U.S. electricity generation mix more than doubles from 2021 to 2050. Wind grows more than any other renewable generation type from 2021 through 2024, accounting for more than two-thirds of those increases in electricity generation during that period. After the production tax credit (PTC) for wind phases out at the end of 2024, solar generation accounts for almost three-quarters of the increase for renewable energy. In the Reference case, we model existing legislation for the investment tax credit (ITC): solar receives a 30% tax credit through 2024, which then reduces to 26% for projects coming online in 2024 and 2025 before phasing down to a non-expiring credit of 10% starting in 2026.

Sustained low natural gas prices keep natural gas generation at the highest market share in the Reference case

The share of natural gas in the generation mix remains relatively constant, at about one-third from 2021 to 2050. Although the share remains the same, projected natural gas prices stay below $4.00 per million British thermal units (MMBtu) for most of the projection period. The natural gas share remains consistent despite significant projected coal and nuclear generating unit retirements, which cause the shares from those sources to drop by half. Generation from renewable sources increases to offset the natural gas share, largely because regulatory programs and market factors incentivize these sources.

After near-term natural gas prices stabilize, and as more solar and wind energy integrates into the electricity grid, natural gas-fired generating unit capacity factors steadily decrease. The average capacity factor of the coal fleet increases as inefficient units are retired throughout the projection period

Figure 13.



Source: U.S. Energy Information Administration, *Annual Energy Outlook 2022* (AEO2022) Reference case

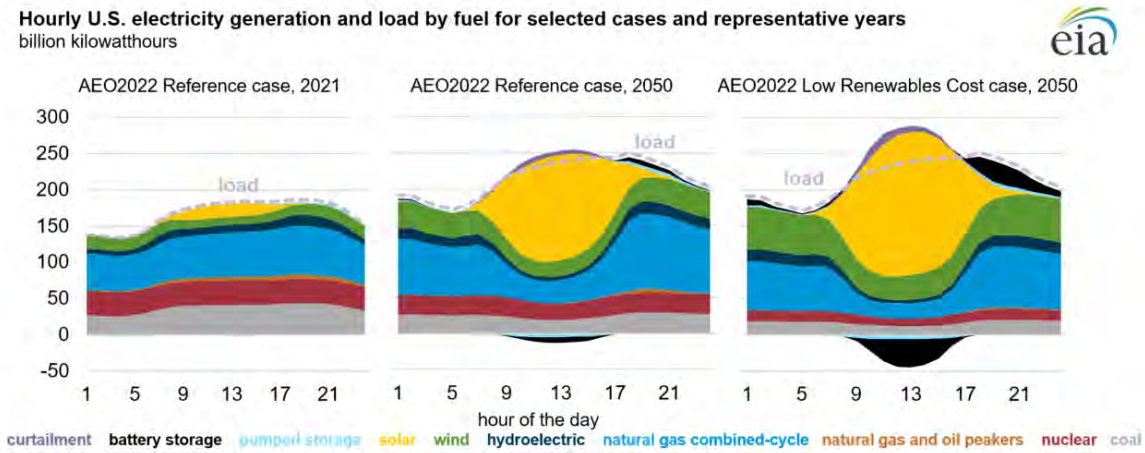
As more wind and solar capacity is added, both existing and new natural gas-fired generation is displaced, and capacity factors for existing combined-cycle units drop by nearly half from a peak of 60% in 2020. Because natural gas-fired generating capacity grows faster than natural gas-fired generation from 2020 to 2050, capacity factors for natural gas units decline steadily across all plant technology types. The average capacity factor of operating coal plants increases over the projection period as relatively old and inefficient coal plants retire and the more efficient and cost competitive plants remain. Natural gas accounts for more than 40% of cumulative capacity additions from 2020 to 2050. About half of natural gas capacity additions through 2050 are low-utilization combustion turbines, which are economically attractive when mostly used to provide infrequent peaking capacity.

Energy storage systems, such as stand-alone batteries or solar-battery hybrid systems, will compete with natural gas-fired turbines as sources of back-up capacity for nondispatchable renewable energy sources. Storage systems can act as an arbitrage tool to move solar and other generation from periods of high supply and low demand to periods of low supply and high demand, and they can provide capacity for grid reliability in times when nondispatchable generation is not available.

Battery storage complements growth in renewables generation and reduces natural gas-fired and oil-fired generation during peak hours

Battery storage complements solar capacity additions, captures solar generation that would otherwise be curtailed, and reduces nonrenewable generation to meet peak electric demand

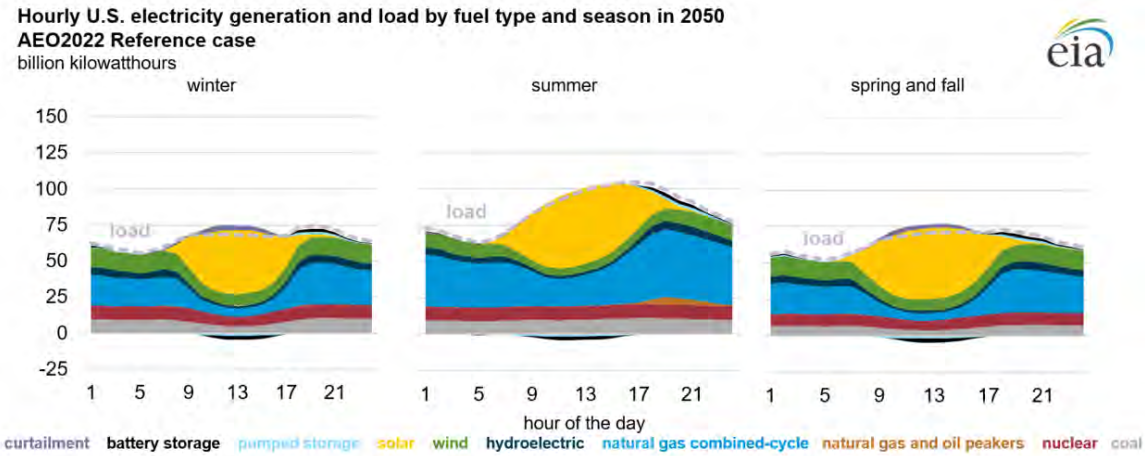
Figure 14.



Source: U.S. Energy Information Administration, *Annual Energy Outlook 2022* (AEO2022)
Note: Negative generation represents charging of energy storage technologies such as pumped hydro and battery storage. Hourly dispatch estimates are illustrative and are developed to determine curtailment and storage operations; final dispatch estimates are developed separately and may differ from total utilization as this figure shows. Solar includes both utility-scale and end-use photovoltaic electricity generation.

In 2021, limited surplus generation occurred throughout all hours of the day in the Reference case; however, by 2050, the large amounts of added solar capacity cause a surplus of generation in the middle of the day. Because solar has essentially zero variable operating costs, its high midday generation levels cause a large decrease in generation from natural gas-fired combined-cycle plants during these hours, as well as a slight decrease in generation from coal and nuclear plants. Once the solar generation is not available in the evening hours, the other generators ramp back up to meet demand. Batteries are also used to move excess solar generation during the daylight hours into the evening hours when demand is still relatively high.

Figure 15.

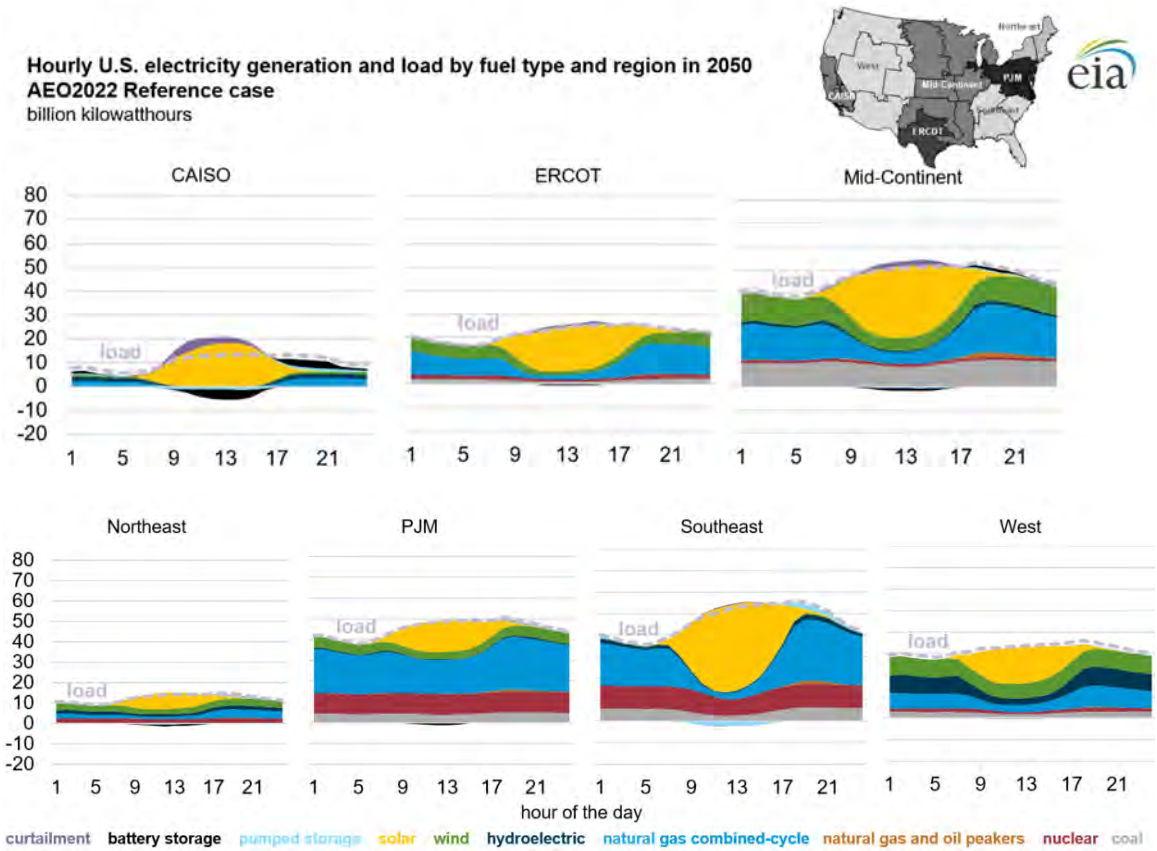


Source: U.S. Energy Information Administration, *Annual Energy Outlook 2022* (AEO2022) Reference case
Note: Negative generation represents charging of energy storage technologies such as pumped hydro and battery storage. Hourly dispatch estimates are illustrative and are developed to determine curtailment and storage operations; final dispatch estimates are developed separately and may differ from total utilization in Figure 15. Solar includes both utility-scale and end-use photovoltaic electricity generation.

When utilities generate more electricity than needed to meet load, the excess energy can either be *curtailed* (not used) by the grid operator or stored. Because solar and wind generators are not dispatchable, curtailment often happens during very sunny and windy periods when energy storage is not economical or available. Only a small percentage of solar and wind generation is curtailed through the projection period in the Reference case. Most curtailment occurs during the winter and shoulder (spring/fall) seasons when demand is low. In the summer months, higher demand in midday hours results in less curtailment.

Daily hourly generation patterns vary widely by season and region, affecting decisions on strategies to support solar generation

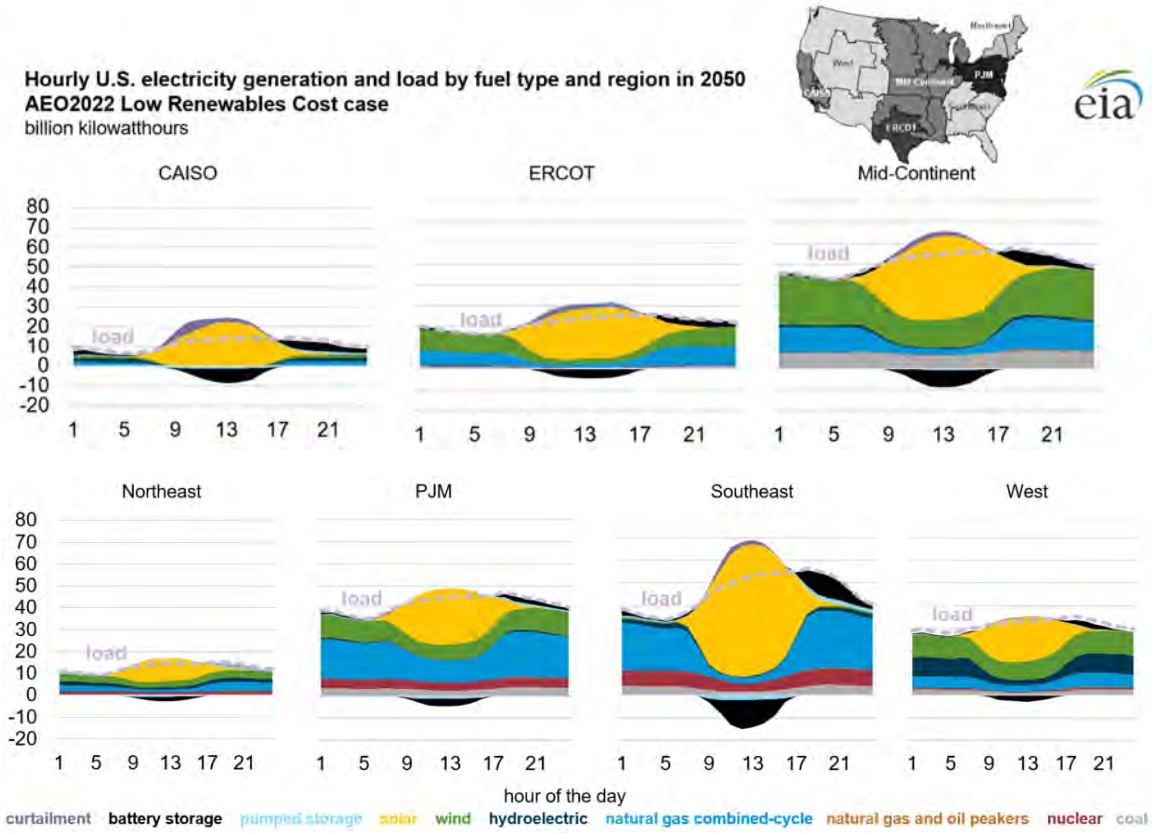
Figure 16.



Source: U.S. Energy Information Administration, *Annual Energy Outlook 2022* (AEO2022) Reference case
Note: Negative generation represents charging of energy storage technologies such as pumped hydro and battery storage. Hourly dispatch estimates are illustrative and are developed to determine curtailment and storage operations; final dispatch estimates are developed separately and may differ from total utilization in Figure 16. Solar includes both utility-scale and end-use photovoltaic electricity generation.

In the Reference case, by 2050, most projected solar curtailments occur in the California ISO (CAISO), Electric Reliability Council of Texas (ERCOT), and Mid-Continent regions. These regions have a higher percentage of their load met by solar during the afternoon hours than most other regions. The Southeast region also has a relatively large percentage of load met by solar in midday hours, but it has fewer curtailments because its demand profile better coincides with solar generation than the other regions' profiles. Some of the energy that would otherwise be curtailed is used for charging pumped hydro or battery energy storage sites. In the Reference case, most of the electricity provided by battery storage is in CAISO due to the relatively larger proportion of midday solar curtailments and resulting larger price disparity between midday and evening hours. Other regions meet their respective evening ramp periods, when solar generation decreases, with natural gas units.

Figure 17.



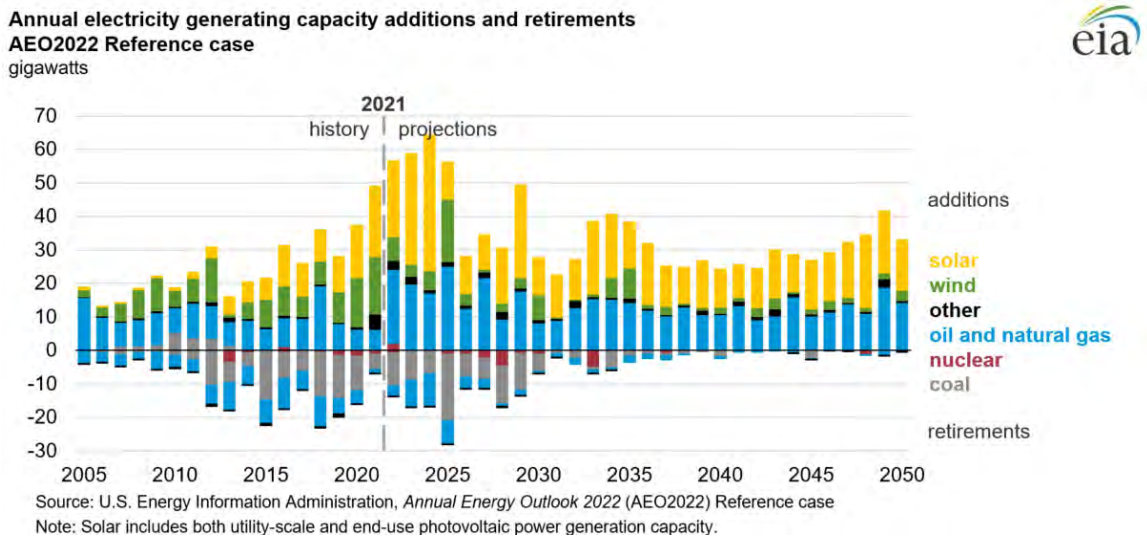
Source: U.S. Energy Information Administration, *Annual Energy Outlook 2022* (AEO2022) Low Renewables Cost case
Note: Negative generation represents charging of energy storage technologies such as pumped hydro and battery storage. Hourly dispatch estimates are illustrative and are developed to determine curtailment and storage operations; final dispatch estimates are developed separately and may differ from total utilization in Figure 17. Solar includes both utility-scale and end-use photovoltaic electricity generation.

In the Low Renewables Cost case, by 2050, lower costs for solar and battery storage signficantly affect the daily hourly electricity generation profiles in all regions. In additon to the CAISO, ERCOT, and Mid-Continent regions, the Southeast region also curtails significant amounts of generation. All regions use much more battery storage than in the Reference case, most notably in the Mid-Continent and Southeast. Use of battery storage in each of these regions surpass CAISO, the region with the largest amount of installed battery capacity in 2021.

As coal and nuclear generating capacity retire, new capacity additions come largely from wind and solar technologies

Renewable technologies account for the majority of the projected capacity additions

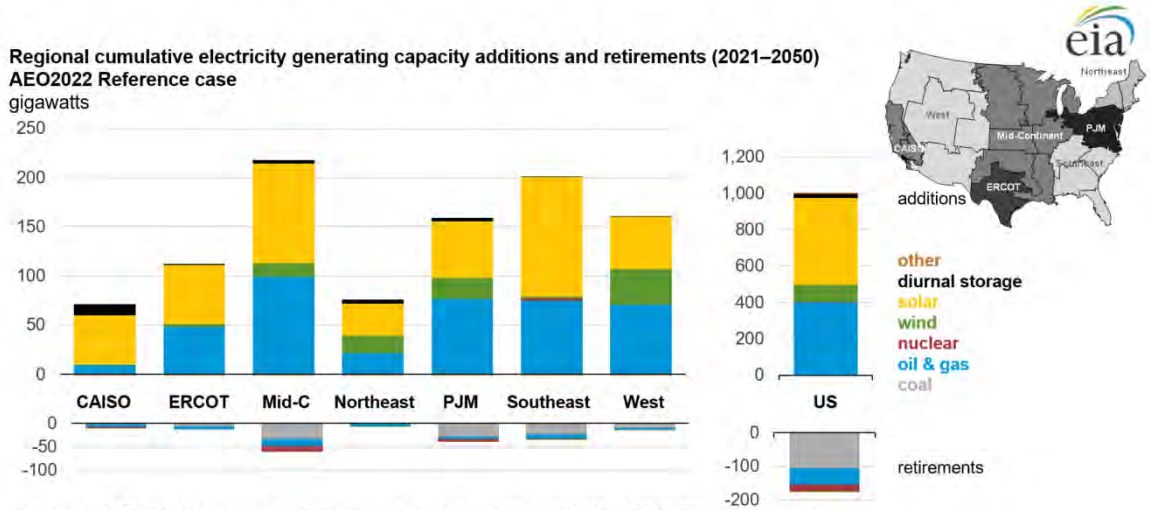
Figure 18.



Renewable electric generating technologies account for over 57% of the approximately 1,000 gigawatts (GW) of cumulative capacity additions that we project in the Reference case from 2021 to 2050. This large share is a result of not only declining capital costs, but also continuing legislative incentives, such as state renewable portfolio standard (RPS) targets and the extension of federal and state tax credits. Although wind capacity is added steadily throughout the projection period, much less wind capacity is added than solar. Solar capacity accounts for 47% of electric generating capacity additions, and wind accounts for about 10%. Generating technologies fueled by natural gas make up most of the remaining share of new capacity additions (39%), some of which is used to generate electricity when intermittent wind and solar resources are not available.

Solar accounts for the majority of U.S. capacity additions in most regions. The majority of coal and nuclear retirements come from the Mid-Continent, PJM, and Southeast regions

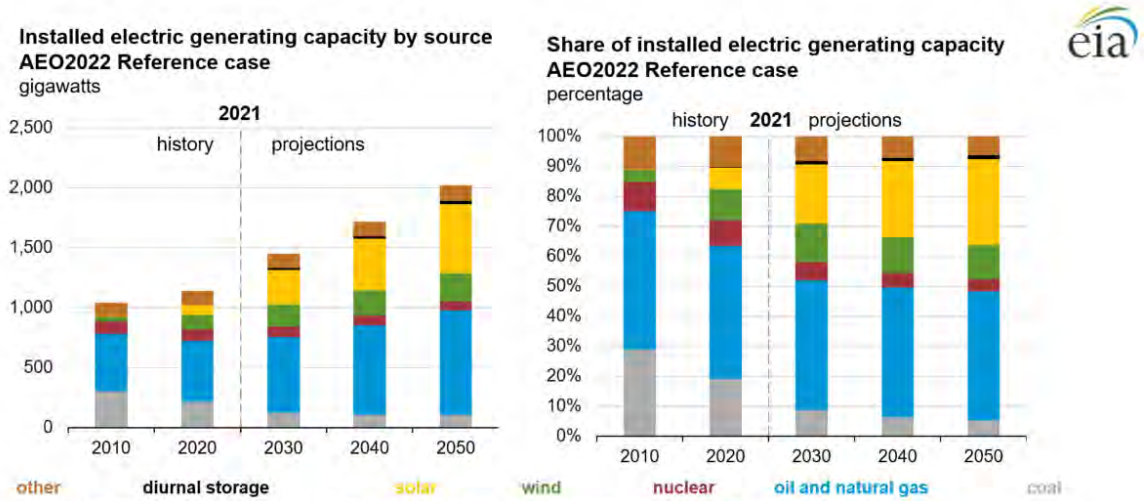
Figure 19.



Source: U.S. Energy Information Administration, *Annual Energy Outlook 2022* (AEO2022) Reference case
Note: Solar includes both utility-scale and end-use photovoltaic power generation capacity.

Solar generating capacity grows steadily across all regions of the United States in the Reference case. Some regions build diurnal storage capacity to support larger daily price fluctuations from the solar capacity additions. We project that California will add nearly 13 GW of diurnal storage power capacity through 2050 in the Reference case, compared with 8.4 GW of natural gas-fired generation capacity. PJM and the West are the only regions that add more natural gas capacity than solar capacity, but these regions also show high growth in solar. Cheaper solar and wind energy, accompanied by natural gas-fired plants, replaces coal and nuclear in the Mid-Continent, PJM, and Southeast regions. Solar's share of total U.S. capacity increases from 7% in 2020 to 29% in 2050. About 70% of solar additions are utility-scale PV power plants, and 30% come from end-use PV such as residential and commercial rooftop solar installations.

Figure 20.



Source: U.S. Energy Information Administration, *Annual Energy Outlook 2022* (AEO2022) Reference case
Note: Solar includes both utility-scale and end-use photovoltaic power generation capacity.

Wind additions are largely tied to policy

The Reference case assumes the production tax credit (PTC) for wind will be available through 2024, following a one-year extension in 2020. Although capital costs for wind continue to decline throughout the projection period, most projected wind additions take advantage of available federal tax credits. Nearly half of cumulative wind capacity additions from 2021 to 2050 occur before the PTC expires for projects coming online after 2025. The steadier pace of solar additions reflects, in part, the continued availability of a 10% investment tax credit (ITC), which has no fixed expiration date after 2026, when the current 30% phases out.

Natural gas continues to have the largest share of fossil fuel capacity additions in all regions

Although renewable electric-generating technologies account for about 60% of cumulative capacity additions throughout the projection period in the Reference case, natural gas-fired capacity accounts for almost the entire remaining balance of additions—about 40% through 2050. These natural gas-fired generator additions are almost evenly split between combined-cycle technologies and combustion turbines, which both provide energy and help balance the intermittent output from wind and solar generators.

Coal-fired generating unit retirements largely take place by 2030

EPA's Affordable Clean Energy (ACE) rule (84 FR 32520) was vacated by the U.S. Court of Appeals for the District of Columbia Circuit on January 19, 2021. This has been incorporated into the Reference case, leading some plants that retired in the AEO2021 Reference case to continue operating past 2025. Despite that development, the Reference case still shows substantial coal plant retirements, most of which take place by 2030. Those retirements are a result of both regulatory measures and market factors. In particular, low natural gas prices in the early years of the projection period contribute to the retirements of coal-fired plants and nuclear plants. Natural gas-fired generation sets power prices in wholesale electricity markets most of the time, and the lower natural gas prices affect the profitability of coal and nuclear units, which have high fixed costs. In addition, owners of many coal-fired plants have announced closings as part of meeting goals to decarbonize their systems.

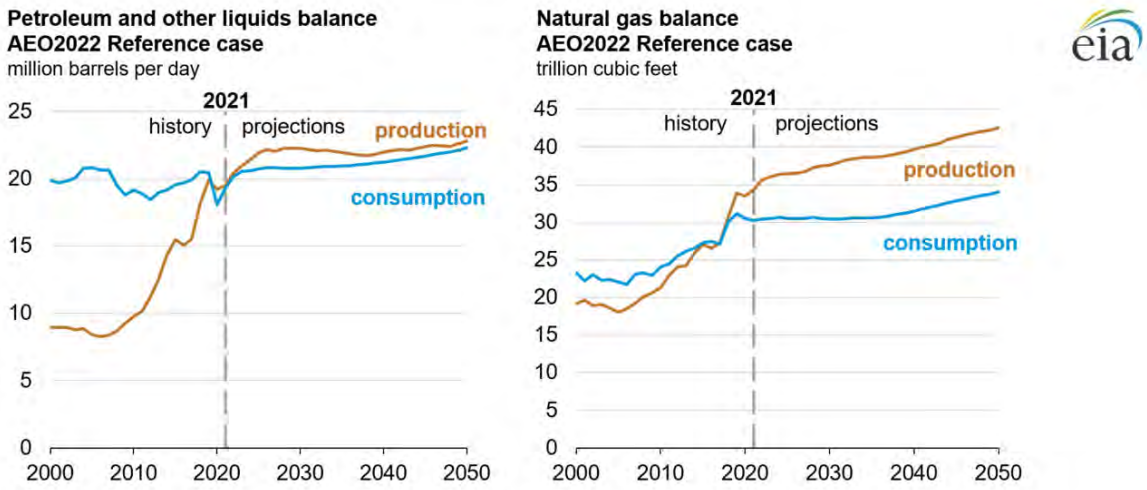
The civil nuclear credit program, passed as part of the Infrastructure Investment and Jobs Act, supports continued use of existing nuclear power facilities. This act, along with several state support programs, provides out-of-market payments that will likely keep reactors in affected regions profitable over the next 5–10 years. We project nuclear capacity retirements to occur after 2030, partially because we assume that these plants will no longer receive those credit payments when the current legislation expires.

Production

U.S. production of natural gas and petroleum and other liquids rises amid growing demand for exports and industrial uses

Oil and natural gas production in the Reference case remains at historically high levels through the projection period

Figure 21.

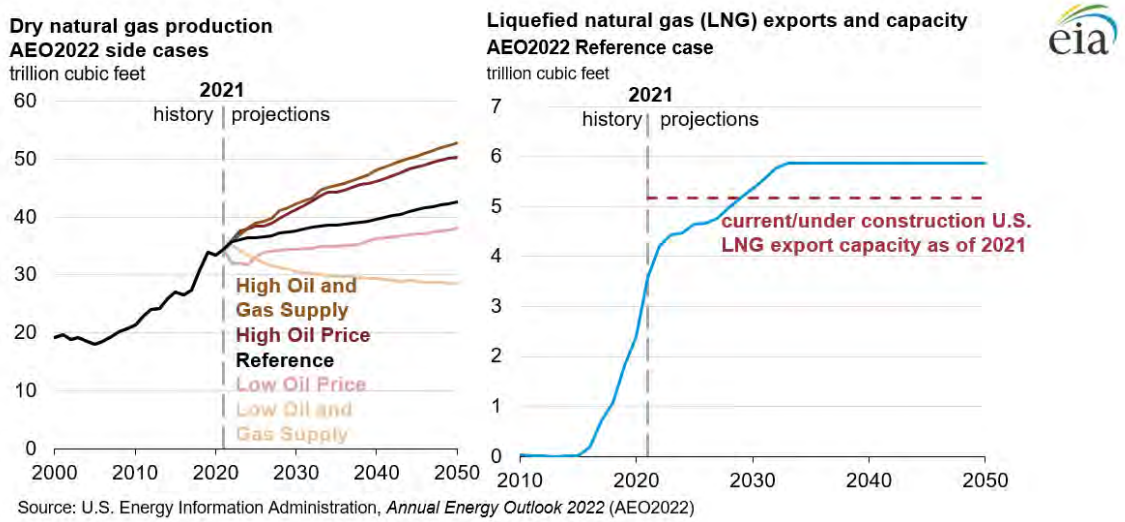


Source: U.S. Energy Information Administration, *Annual Energy Outlook 2022* (AEO2022) Reference case

We project U.S. consumption and production of petroleum and other liquids to grow through 2050. Domestic consumption and production levels of petroleum and other liquids remain relatively close to one another through most of the projection period in the Reference case. Consumption increases by 15%, and production increases by 17% from 2021 to 2050. However, consumption and production of specific petroleum products vary. We also project consumption and production of natural gas to grow through 2050. During the projection period, natural gas production grows by almost 24%, approximately twice as fast as consumption. Much of this growth in natural gas production is exported as liquefied natural gas (LNG). By 2050, we project that approximately 25% more natural gas will be produced than consumed in the United States. Together, these Reference case trends highlight the continued growth in demand for U.S. natural gas and petroleum products.

Natural gas exports increase with production, driven by global demand and continued construction of new LNG export facilities

Figure 22.

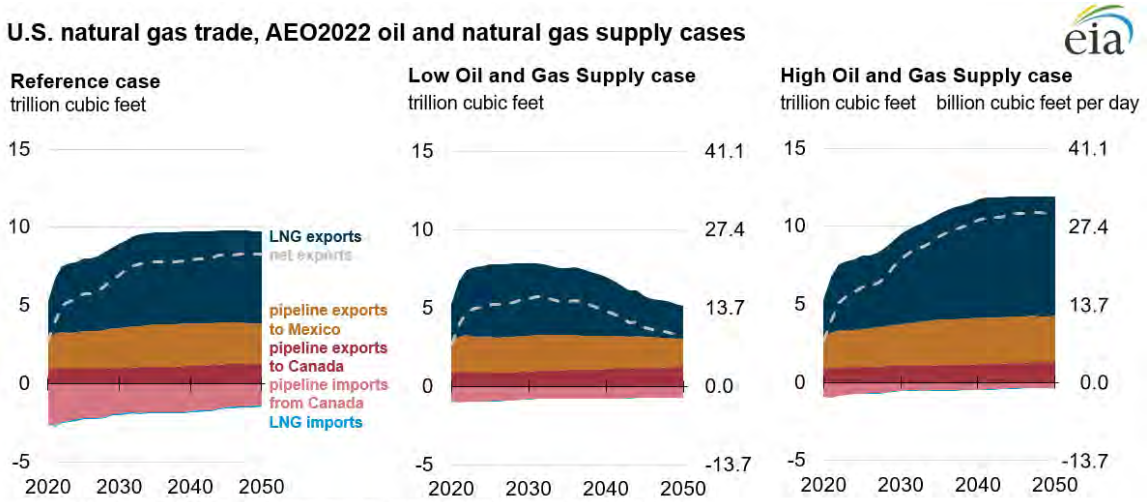


Source: U.S. Energy Information Administration, *Annual Energy Outlook 2022* (AEO2022)

In the Reference case, U.S. natural gas production increases through 2050, and more than 35% of gross additions are exported. U.S. natural gas production increases in all cases except in the Low Oil and Gas Supply case. Projected U.S. natural gas exports rise through 2050, primarily driven by increased LNG capacity and growing global natural gas consumption.[3] Increases in pipeline exports to Mexico and Canada also contribute to the increase in U.S. natural gas exports.

[3] According the our *International Energy Outlook 2021*, we project global natural gas consumption to continue growing through 2050 in absolute terms (and as a share of the world energy mix) because of its economics and lower carbon emissions relative to other sources of energy.

Figure 23.



Source: U.S. Energy Information Administration, *Annual Energy Outlook 2022* (AEO2022)

In 2021, U.S. natural gas exports reached a record high. We project continued growth in natural gas exports through 2025 because of increases in LNG capacity from facilities currently under construction. LNG export facilities at Sabine Pass, Calcasieu Pass, and Golden Pass will likely enter service much earlier than we had anticipated in the AEO2021, increasing the amount of infrastructure available for converting natural gas to LNG for export. Additional completed natural gas pipeline infrastructure will also increase takeaway capacity into Mexico.

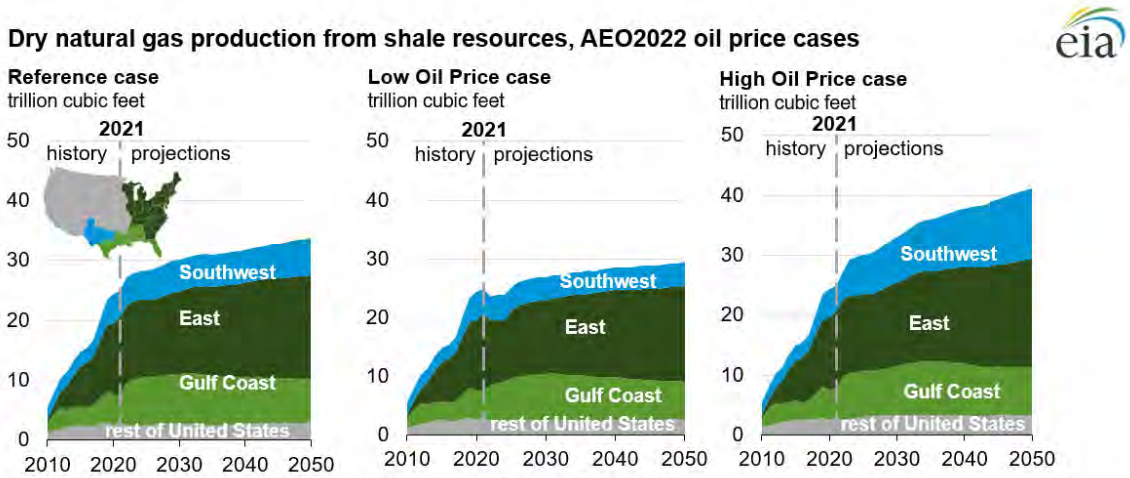
Beyond 2025, we project that natural gas production will ramp up to meet growing export demand, the majority of which will be LNG. We project global demand for U.S. natural gas to exceed current and announced LNG export capacity; therefore, additional LNG export facilities will be economical to build. These LNG capacity expansions, coupled with high demand for natural gas abroad, result in our projection of an increase in LNG exports to 5.86 trillion cubic feet (16.1 Bcf/d) by 2033 in the Reference case, prompting natural gas production growth in the medium and long term.

The oil and gas supply cases illustrate the relationship between LNG exports and production. The Low Oil and Gas Supply case assumes higher costs and less resource availability, which increases natural gas prices, so LNG exports begin to decline in the mid-2030s. In the High Oil and Gas Supply case, which assumes lower natural gas prices, LNG exports grow twice as fast as in the Reference case, leveling off during the mid-2040s.

More than half of projected U.S. natural gas production growth comes from associated natural gas produced from tight oil plays

Shale gas and associated natural gas from tight oil plays are the primary contributors to the long-term growth of U.S. natural gas production through 2050. In the Reference case, more than half of the growth in natural gas production between 2020 and 2050 is associated natural gas from tight oil plays, primarily the Wolfcamp play in the Permian Basin (Southwest region). For shale gas production during this same period, the Marcellus and Utica shale gas plays in the Appalachia Basin (East region) and the Haynesville play in the Mississippi-Louisiana Salt Basins (Gulf Coast region) account for the majority of growth.

Figure 24.



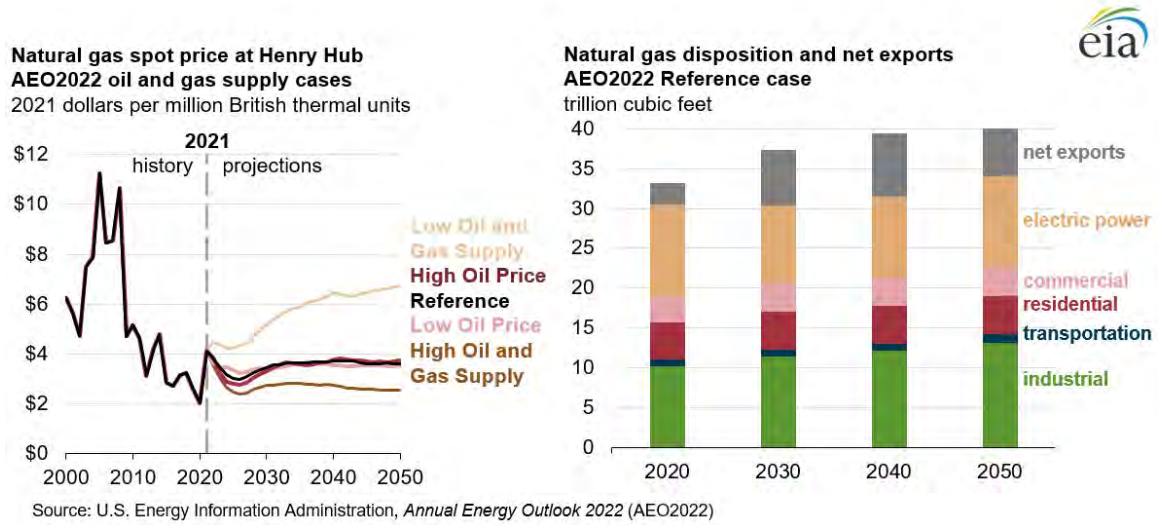
Source: U.S. Energy Information Administration, Annual Energy Outlook 2022 (AEO2022)
Note: *Shale resources* includes natural gas production from tight oil formations and excludes natural gas from tight gas formations.

The amount of associated gas that will be available from tight oil plays in our projection is particularly sensitive to world oil price assumptions. Higher world oil prices, such as those in the High Oil Price case, increase the incentive to target oil plays, increasing the projected amount of associated natural gas. The opposite occurs in the Low Oil Price case: LNG exports are largest in the High Oil Price case, which is prompted by growth in production in the Southwest.

We project growth in natural gas production from the Wolfcamp and Haynesville plays, in part, because of these production regions' proximity to LNG export terminals. Natural gas from the Marcellus and Utica plays also reach export markets, but pipeline infrastructure constrains the Appalachia region's access to export terminals. So, natural gas production growth in the Appalachia region is predominantly driven by the region's relatively low production costs.

Despite LNG export growth and increased domestic demand for natural gas, we project that the Henry Hub price will remain below $4/MMBtu throughout the projection period in most cases

Figure 25.



Source: U.S. Energy Information Administration, *Annual Energy Outlook 2022* (AEO2022)

Amid growth in LNG exports, the natural gas spot price at the Henry Hub faces upward pressure from the mid-2020s through the early 2040s across all cases except the High Oil and Gas Supply case. Steady growth in natural gas demand in the industrial sector and growing electric power sector demand for natural gas after 2035 also put upward pressure on the Henry Hub price during this time.

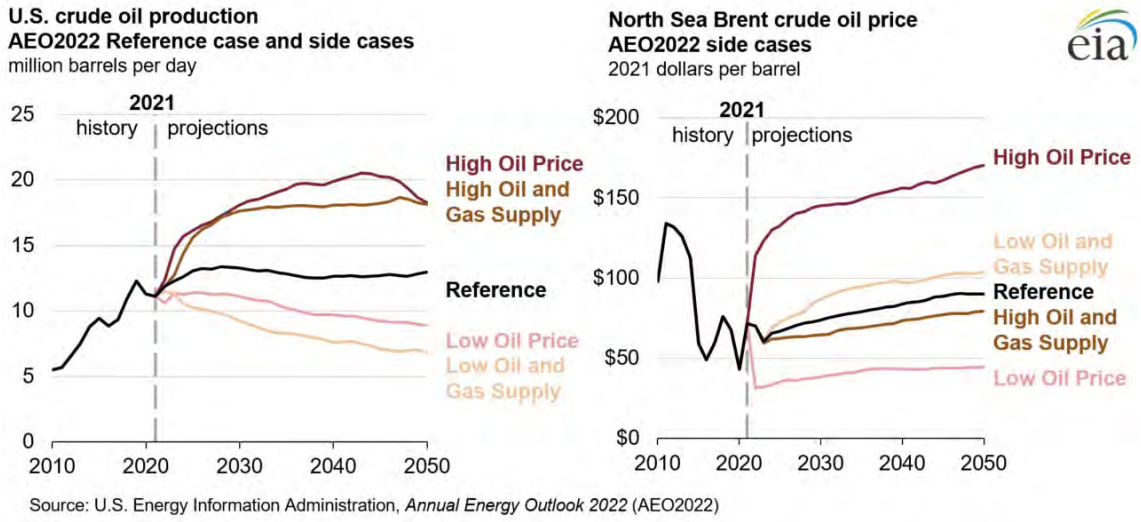
The oil and gas supply cases indicate that the natural gas spot price at Henry Hub is very sensitive to reduced supply and somewhat less sensitive to increased supply. In 2050, the projected natural gas price is almost twice as high in the Low Oil and Gas Supply case as in the Reference case, while in the High Oil and Gas Supply case, the price is approximately 29% lower than in the Reference case.

Driven by rising prices, U.S. crude oil production in the Reference case returns to pre-pandemic levels in 2023 and stabilizes over the long term

Projected U.S. crude oil production in the Reference case peaks in the late 2020s and remains near that peak through 2050

During 2021, crude oil production did not grow, even as benchmark prices increased substantially. However, as the global economy returns to pre-pandemic levels, we project that both demand and prices will remain elevated, resulting in crude oil production reaching pre-pandemic levels in the medium term.

Figure 26.

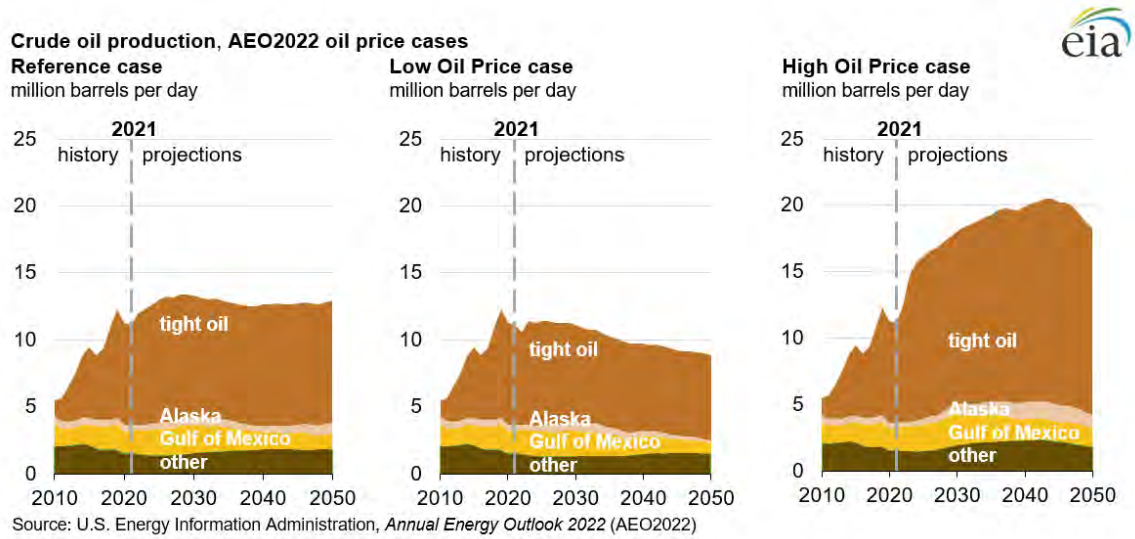


Source: U.S. Energy Information Administration, *Annual Energy Outlook 2022* (AEO2022)

In the AEO2022, crude oil prices primarily drive drilling activity and crude oil production. In the Reference case, crude oil production returns to pre-pandemic levels in 2023 and peaks in the late 2020s. Production then remains relatively flat through 2050. The Reference case projects that prices are high enough to maintain investment at steady crude oil production levels but not high enough to elicit increasing volumes from those levels of investment. The production path involves many factors, including the amount of investment, technology change, costs of operations, and quality of resource geology.

The side cases illustrate how crude oil production responds to changing market conditions. Our analysis indicates that higher prices, such as those found in the High Oil Price case, projects more production, while the Low Oil Price case projects less production. In the High Oil and Gas Supply case, crude oil production increases by up to 40% from the Reference case, while in the Low Oil and Gas Supply case, crude oil production is almost 47% lower in 2050.

Figure 27.



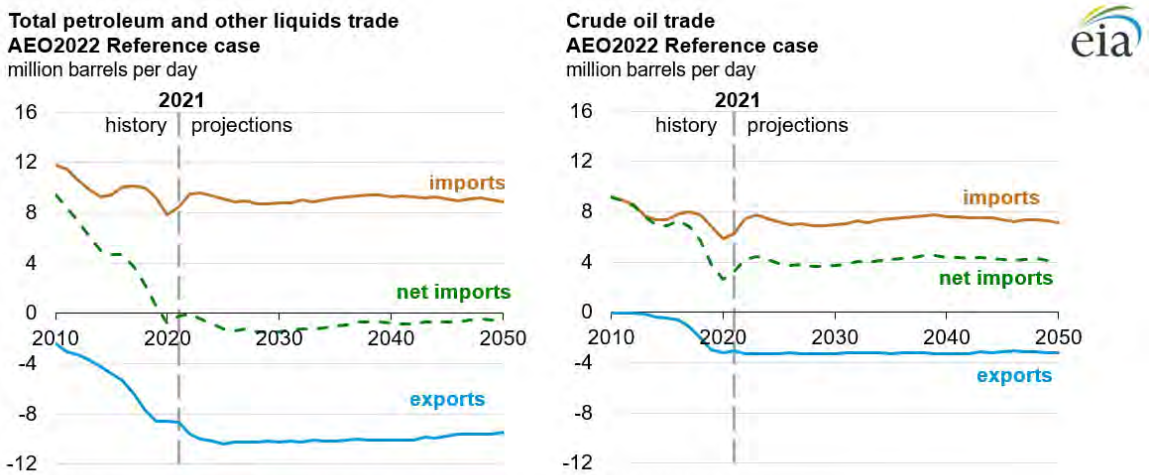
Source: U.S. Energy Information Administration, *Annual Energy Outlook 2022* (AEO2022)

The majority of new U.S. crude oil production comes from tight oil resources. The Wolfcamp play in the Permian Basin (Southwest region) and the Bakken play in the Williston Basin (Northern Great Plains region) lead the growth in U.S. tight oil production. However, estimates of technically recoverable tight or shale crude oil resources are uncertain. The high and low price cases demonstrate the sensitivity of crude oil production to higher and lower oil prices, including tight oil. In the High Oil Price case, high crude oil prices improve the economics of drilling particularly in tight oil formations, resulting in generally increasing domestic production through most of the projection period before declining as drilling moves to less productive areas. The Low Oil Price case results in generally decreasing U.S. crude oil production because of the lack of economic incentive for producers to drill.

U.S. crude oil net imports remain relatively flat over the long run

Although U.S. crude oil production and refinery throughput was less in 2021 than in 2019, crude oil exports have mostly increased in response to growing international demand. Throughout the projection period, from 2021 through 2050, crude oil exports remain near their projected peak, and they remain fairly stable in both gross terms and as a percentage of total domestic crude oil production, according to the Reference case. Projected crude oil imports, meanwhile, rise to pre-pandemic levels by 2023 in the Reference case, and then they remain relatively flat through 2050. We project that the United States will remain a net exporter of petroleum products through 2050 as net petroleum product exports remain mostly flat through the projection period.

Figure 28.



Source: U.S. Energy Information Administration, *Annual Energy Outlook 2022* (AEO2022) Reference case

Refinery closures lower domestic crude oil distillation operating capacity, but refinery utilization rates remain flat over the long term

A number of U.S. refineries have closed over the last two years as a result of pandemic-related demand decreases or conversion to renewable diesel production

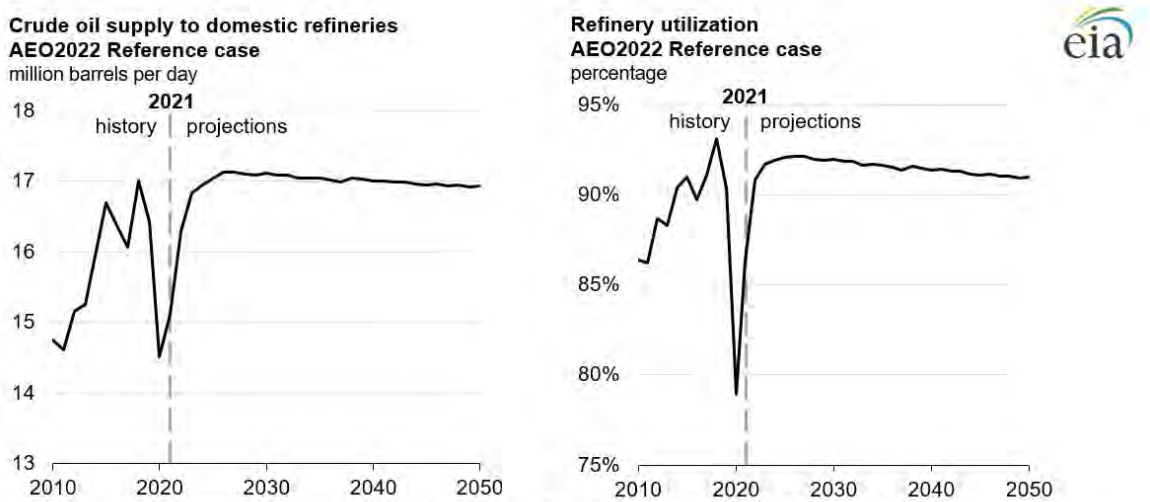
Between 2020 and 2021, six U.S. refineries closed, totaling 750,000 barrels per day (b/d) of total capacity:

- The Western Refining refinery in Gallup, New Mexico
- The Tesoro (Marathon) refinery in Martinez, California
- The Dakota Prairie refinery in Dickinson, North Dakota
- The HollyFrontier refinery in Cheyenne, Wyoming
- The Shell refinery in Convent, Louisiana
- Philadelphia Energy Solutions in Philadelphia, Pennsylvania

Some of these closures are related to decreased demand caused by responses to the global pandemic. However, other refineries, such as HollyFrontier in Cheyenne, Wyoming, and the Dakota Prairie refinery in Dickinson, North Dakota, are converting to produce renewable diesel. Cumulatively, these closures have reduced national crude oil distillation operating capacity by approximately 3.5%.

Refinery utilization rates remain stable over the long run in response to diminished demand

Figure 29.



Source: U.S. Energy Information Administration, *Annual Energy Outlook 2022* (AEO2022) Reference case

Despite the recent reduction in refinery capacity, we project that refinery utilization and throughput (the amount of crude oil processed at refineries) will remain relatively flat over the projection period. The refinery utilization rate (represented as a percentage) measures the volume of gross refinery inputs divided by the total operable crude oil distillation capacity. If capacity declines and utilization remains the same, production of petroleum products declines. We project that utilization rates will return to near historical averages in 2022, but it will not be cost-effective for refineries to make up for lost capacity by increasing utilization beyond this point. As a result of lower capacity and stable utilization, we expect total production of refined products to remain below peak levels over the long run.

Consumption of renewable diesel increases as a share of the domestic fuel mix

The share of renewable diesel in the biomass-based diesel market increases

Although biodiesel has historically been the predominant biomass-based diesel fuel produced in the United States, we project a shift toward renewable diesel capacity in the medium to long term.

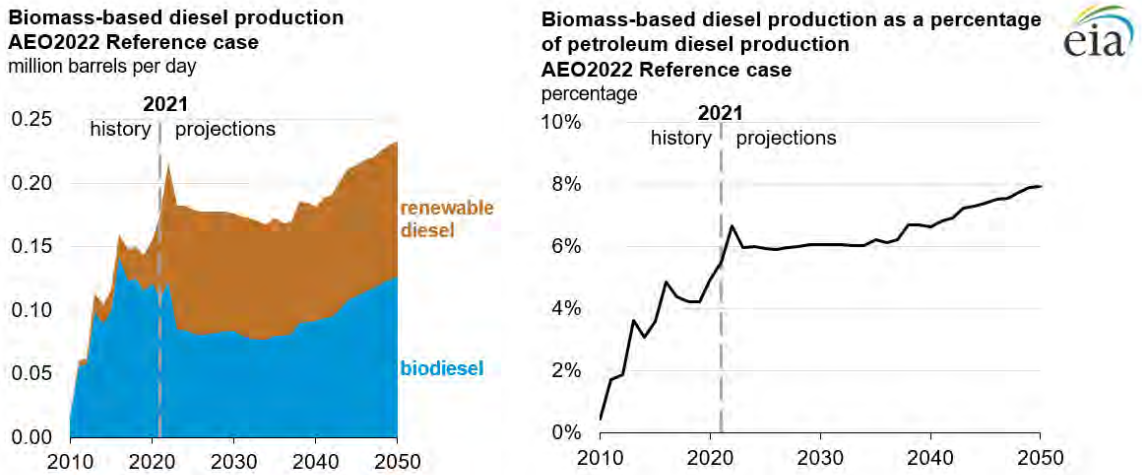
Biomass-based diesel fuels are fuels produced from biomass, such as waste fats and oils. These fuels are predominately used in diesel engines, but they can also be used as heating fuels.

Biomass-based diesel includes biodiesel and renewable diesel. Renewable diesel is chemically indistinguishable from petroleum diesel, meaning that it meets specifications for use in existing infrastructure and diesel engines. Biodiesel is a mixture of chemical compounds known as alkyl esters and is often combined with petroleum diesel in blends of 5% to 20%, known as B5 to B20, respectively. Renewable diesel is not subject to any blending limitations.

Renewable diesel's growth is a result of its fungibility, along with higher state and federal targets for renewable fuel production, favorable tax credits, and the conversion of existing petroleum refineries into renewable diesel refineries. These targets and incentives include the Renewable Fuel Standard, the California Low-Carbon Fuel Standard, and the U.S. biomass-based diesel blender credit, which applies

through 2022 and allows qualified taxpayers to claim a credit of $1.00 per gallon for biodiesel or renewable diesel blended with petroleum diesel. In response to the improved economics of renewable diesel, capacity has increased in the form of new stand-alone facilities and converted petroleum refineries.

Figure 30.

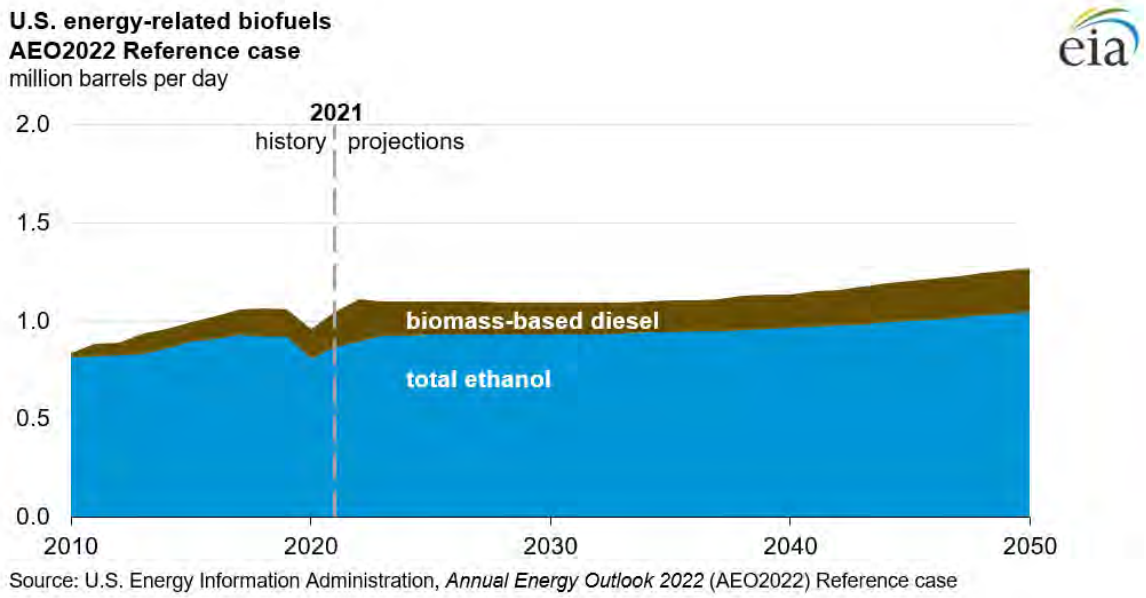


Source: U.S. Energy Information Administration, *Annual Energy Outlook 2022* (AEO2022) Reference case

The current market for biomass-based diesel fuels is constrained by a combination of capacity, feedstock availability, and economics. Because the market penetration for biomass-based diesel fuels is limited by market demand, and renewable diesel and biodiesel compete for the same feedstocks, growth in renewable diesel comes partially at the expense of new biodiesel capacity. In the Reference case, the renewable diesel supply is supported by imported renewable diesel and remains higher than biodiesel supply through 2050.

Biomass-based fuels remain a small but important part of the total fuel mix

Figure 31.



Biomass-based diesel fuels remain a relatively small part of the total diesel market, contributing less than 8% of the total supply in 2050. By comparison, current ethanol consumption as energy in the United States approaches almost 1 million b/d in 2050, almost five times the quantity of biomass-based diesel. So, much more ethanol is consumed as energy than biomass-based diesel fuels because almost all finished motor gasoline sold in the United States is blended with 10% ethanol (E10). However, despite higher blend ratios, future growth of U.S. ethanol consumption as energy is constrained near current levels through 2050 by declining motor gasoline consumption. Renewable diesel, however, does not need to be blended, and biomass-based fuels continue to attract interest and investment because they represent a potential pathway for reducing carbon emissions in the transportation sector and provide an alternative fuel source to petroleum-based diesel fuel. We project that biomass-based diesel will continue to be a growing, but fractional, part of the total diesel fuel mix in the long term.

Quantitative Profiles

Regime model pause yields a glimmer of hope for a soft landing

Late Cycle drags on

Our US Regime Indicator has been in Late Cycle (strong but slowing economic trends) since last August, but stood still this month, averting a more rapid and expected descent into recessionary territory. This lack of deterioration echoes yesterday's Fed comments that the economy can withstand rapidly rising rates. Late Cycle regimes experienced stalls a few other times in the indicator's history back to 1990 – in 2005, 2010 and 2014 – but resumed its decline each time. Whereas some inflation pressures are moderating – pockets of labor returning, big ticket demand waning – investors should brace themselves for a long Late Cycle. As 10+ years of money printing play out: the hallmarks of Late Cycle are thinning margins, capex spenders losing to capex takers, and self-funded companies outperforming as cash re-rates. See Exhibit 9.

Stage set for 2H Value domination

During the six months following previous Late Cycle pauses, Value factors outperformed the equal-wtd. S&P 500 handily (by +9.5ppt on avg over the last three instances) with a 100% hit rate. The best factors were those we have highlighted for today: Free Cash Flow to Enterprise Value (FCF/EV), Price/FCF and EV/EBITDA with average 6mth alpha of 7.6ppt, 6.3ppt and 6.4ppt, respectively. Small Size and Low Quality outperformed the index in two of the three periods. The best performing sectors were Energy, Health Care, Industrials and Tech. A record 86% of factors outperformed the equal-weighted S&P 500 index last month, with Value leading among styles, beating the index by +5.5ppt, the widest margin since Apr. 20. Despite its run, Value remains undervalued and underowned (Exhibit 11 – Exhibit 16).

Record YTD spread between cyclical and secular growth

The cyclical / secular growth bifurcation continued in May, as cyclical factors like EPS Revisions (+6.5%) and EPS Momentum (+4.9%) trounced secular counterparts like Long-term Growth (+2.0%) and Long Duration (-1.6%). The ~15ppt cyclical / secular growth outperformance YTD is the largest in our history since '86. In the previous two 14ppt+ performance divergences (in 2002 and 2021) the trend subsequently reversed, and secular growth outperformed cyclical over six following months. But this time could be different. We worry that in the next recession, secular growth may fare less well given the backdrop of rising discount rates, diminishing access to capital and a multi-year demand pull forward for Tech amid the global pandemic.

Sometimes highest isn't best: revisiting Quintile 2

While quantitative investors tend to focus on the tails of the fundamental distribution (e.g. cheapest, highest growth, longest duration), sometimes extremes are not the best. Given our view that we are shifting from a price return to a total return world, dividend yield and bird-in-the-hand strategies are likely to outperform long duration growth stocks. But in stressed markets, shifting down to Quintile 2 of the Russell 1000 is a prudent way to avoid yield traps – high dividend yielding stocks whose prices are falling ahead of likely dividend cuts. Quintile 2 by Dividend Yield (see Quintile 2 note for stocks) has sported the highest return and lowest downside risk of all yield quintiles since 1986, and has only meaningfully lagged during extreme growth rallies (late 90s, 2020, Exhibit 7).

See the Research Library for all screens/perf. data in Excel.

Timestamp: 16 June 2022 06:16AM EDT

16 June 2022

Equity & Quant Strategy
United States

Savita Subramanian
Equity & Quant Strategist
BofAS
+1 646 855 3878
savita.subramanian@bofa.com

Alex Makedon
Cross-Asset & Quant Strategist
BofAS
+1 646 855 5982
alex.makedon@bofa.com

Jill Carey Hall, CFA
Equity & Quant Strategist
BofAS
+1 646 855 3327
jill.carey@bofa.com

Ohsung Kwon, CFA
Equity & Quant Strategist
BofAS
ohsung.kwon@bofa.com

Aybars Atalay
Equity & Quant Strategist
BofAS
aybars.b.atalay@bofa.com

Shuwen Wang
Equity & Quant Strategist
BofAS
shuwen.wang@bofa.com

Nicolas Woods
Equity & Quant Strategist
BofAS
nicolas.woods_barron@bofa.com

Exhibit 1: Best and worst performing screens
As of 5/31/2022

Top 5/bottom 5 screens in May

Top 5 screens in May	Perf.
Forward Earnings Yield	8.5%
Low EV/EBITDA	7.1%
Low Price to Cash Flow	6.8%
Relative Strength (5wk/30wk)	6.8%
Upward Estimate Revisions	6.5%
S&P 500 (Equal weighted)	**0.8%**

Bottom 5 screens in May	Perf.
High Duration	-1.6%
Small Size	0.1%
Analyst Coverage Neglect	0.4%
Institutional Neglect	0.5%
ROE (1-Yr Average)	0.5%
S&P 500 (Equal weighted)	**0.8%**

Source: FactSet, BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Disclaimer: The valuations and screens contained herein are useful in assessing comparative valuations and comparative earnings prospects and are not intended to recommend transactions relating to any specific security. These indicators should be used in investment decisions only with other factors including financial risk, investment risk, management strategies and operating and financial outlooks.

Exhibit 28: BofA Universe Sector/Industry Factor Evaluation (cont'd)
As of 5/31/2022

			Valuation Analysis								Expectation Analysis							
												Earnings (Decile)				PR 5yr	EPS Growth	
	# of Comp	% Univ BofA	Impl. Return	Reqd Return	DDM Alpha	Eqty. Duration	BofA Adj ßeta	P/E Ratio	Price/ Book	Yield	Surprise	Risk	Torp	Disp	Est. Rev.	Growth	2022E	2023E
CONSUMER STAPLES	51	5.91	9.3	8.6	0.7	37.2	0.73	20.5	4.86	2.5	7	5	3	2	6	7.3	4	7
FOOD & STAPLES RETAILING	8	1.24	9.2	8.8	0.4	42.5	0.73	20.2	5.05	1.4	5	4	3	3	5	9.3	3	8
BEVERAGES	11	1.67	8.9	8.9	0	39.0	0.77	25.0	6.33	2.5	7	6	4	2	6	7.8	6	9
FOOD PRODUCTS	23	1.05	9.5	8.4	1.1	36.5	0.72	16.5	2.63	2.3	7	4	4	3	5	6.2	6	1
TOBACCO	2	0.67	11.1	8.8	2.3	22.8	0.75	14.5		5.4	5	4	3	2	7	5.5	-2	9
HOUSEHOLD PRODUCTS	2	1.08	8.6	7.6	1	39.9	0.61	24.4	7.79	2.5	9	6	3	1	6	4.9	2	8
PERSONAL PRODUCTS	5	0.19	10.3	10.9	-0.6	38.8	1.02	30.1	14.37	0.8	4	7	5	3	6	16.7	18	15
HEALTH CARE	276	14.21	10.2	9.6	0.6	36.3	0.86	18.5	4.48	1.5	6	6	4	3	6	9.8	9	3
HEALTH CARE EQUIP	43	2.54	9.3	10.2	-0.9	41.3	0.93	25.8	4.36	1.0	7	6	3	3	6	12.2	-1	8
HEALTH CARE PROV	50	3.20	11.0	10.0	1	33.4	0.92	16.5	3.38	1.1	5	3	5	2	5	12.6	6	12
HEALTH CARE TECH	13	0.23	8.3	10.5	-2.2	48.2	0.94	60.5	3.51	0.3	6	3	5	5	5	14.5	-3	246
BIOTECH	116	2.37	10.7	9.0	1.7	30.6	0.84	21.2	4.99	1.9	7	6	3	6	6	6.7	6	-13
PHARMACEUTICALS	31	4.10	10.0	8.4	1.6	35.0	0.73	14.0	5.47	2.3	7	8	5	4	7	6.9	19	0
LIFE SCIENCES	23	1.76	10.3	10.6	-0.3	40.6	0.98	25.9	4.87	0.2	5	4	3	2	5	11.3	-3	8
FINANCIALS	156	8.64	11.6	11.2	0.4	29.0	1.10	11.4	1.58	2.6	5	4	4	4	5	7.4	-10	14
BANKS	35	3.17	11.8	11.6	0.2	26.7	1.14	10.0	1.27	2.8	5	4	3	4	4	4.8	-17	17
THRIFTS & MORTGAGE FINANCE	9	0.06	13.4	11.9	1.5	23.7	1.14	6.9	0.92	3.4	3	4	5	5	4	5.8	-6	-1
DIV FINANCIALS	3	0.11	14.2	13.8	0.4	25.6	1.39	9.5	2.30	2.6	4	9	7	5	4	16.0	13	20
CONSUMER FINANCE	10	0.61	10.8	11.3	-0.5	33.8	1.18	9.7	1.93	1.6	7	7	3	3	4	10.3	-13	1
CAPITAL MARKETS	49	2.60	11.4	11.6	-0.2	29.1	1.13	13.0	2.03	2.6	4	4	5	4	6	7.2	-3	11
MORTGAGE REITS	17	0.12	11.4	15.2	-3.8	25.2	1.26	8.3	0.98	10.0	5	6	3	5	6	0.1	-11	0
INSURANCE	33	1.98	11.3	9.9	1.4	32.2	0.94	13.5	1.72	1.8	7	5	6	3	5	11.3	0	19
INFO TECH	208	26.59	10.8	11.5	-0.7	36.2	1.09	21.6	7.78	0.9	6	4	5	3	5	16.9	12	13
INTERNET SOFTWARE	1	0.03		13.3		16.5	1.32	19.8		0.0	4		9	8	7	71.9	320	22
IT SERVICES	47	4.39	10.7	11.2	-0.5	35.6	1.07	23.2	5.74	1.1	7	3	6	3	5	15.5	10	20
SOFTWARE	90	9.18	10.7	10.8	-0.1	36.9	1.00	28.7	9.55	0.6	4	4	5	3	6	19.7	14	18
COMMUNICA. EQUIP	8	0.63	11.4	10.9	0.5	30.0	1.01	13.3	4.33	2.7	3	9	4	3	7	10.7	6	9
COMPUTERS & PERIPH	10	6.33	9.7	11.8	-2.1	41.9	1.12	21.0	23.78	0.7	8	1	4	3	6	10.5	9	7
ELECTR EQUIP & INSTR	17	0.62	10.4	11.8	-1.4	36.0	1.13	14.5	3.23	1.1	6	5	6	3	4	10.1	16	7
SEMICONDUCTORS	35	5.42	12.5	12.5	0	28.9	1.19	16.3	5.15	1.3	5	5	6	5	4	22.7	15	13
COMMUNICATION SERVICES	52	10.36	12.0	11.0	1	31.5	1.06	15.2	3.44	0.7	3	4	5	5	7	12.6	4	16
DIVERSIFIED TELECOM SVS	5	1.01	11.5	7.9	3.6	26.6	0.66	9.4	1.36	5.0	7	7	2	3	7	1.4	-12	2
WIRELESS TELECOM SVS	1	0.20		8.1		18.3	0.67	20.2	2.39	0.0	1	6	8	8	2	52.2	112	70
MEDIA	16	0.98	13.1	10.7	2.4	26.0	1.02	12.3	2.20	1.9	6	6	6	6	5	12.9	8	10
ENTERTAINMENT	16	1.26	16.9	11.8	5.1	24.9	1.15	21.4	2.55	0.1	6	6	6	6	8	32.3	22	33
INTERACTIVE MEDIA & SVCS	14	6.92	11.0	11.5	-0.5	35.0	1.11	16.2	5.47	0.0	1	4	5	5	7	9.8	6	18
UTILITIES	60	3.18	9.6	8.1	1.5	34.4	0.67	18.6	2.27	2.9	5	5	4	2	5	7.4	16	10
ELECTRIC UTILITIES	25	1.88	9.8	8.0	1.8	33.7	0.66	17.9	2.21	2.9	5	5	4	2	5	5.4	15	4
GAS UTILITIES	9	0.15	9.7	8.3	1.4	34.2	0.70	17.2	1.89	2.9	7	4	4	2	5	6.6	7	8
MULTI-UTILITIES	15	0.92	9.2	7.9	1.3	35.8	0.65	21.5	2.38	2.9	5	5	3	2	5	5.6	-1	9
WATER UTILITIES	2	0.10	8.6	8.2	0.4	41.1	0.68	30.3	3.08	1.9	7	3	4	1	5	7.6	5	7
INDEP POWER PROD & ENERGY TRAD	9	0.14	10.8	10.2	0.6	29.1	0.93	11.5	2.76	2.8	5	6	7	6	6	47.3	nm	88
REAL ESTATE	97	3.28	9.5	9.6	-0.1	33.9	0.86	20.2	2.74	3.0	5	5	5	2	6	10.7	13	7
REITS	93	3.23	9.5	9.6	-0.1	34.0	0.86	20.1	2.75	3.1	5	5	5	2	6	10.4	12	7
REAL ESTATE MGMT & DEV	4	0.05		12.9		16.5	1.25	36.2	2.07	0.7		9				27.2	377	-23
BofA UNIVERSE	**1403**	**100.00**	**10.8**	**11.0**	**-0.2**	**33.9**	**1.04**	**18.4**	**3.77**	**1.5**						**14.0**	**14**	**12**
S&P 500	**504**	**91.69**	**10.7**	**10.9**	**-0.2**	**34.4**	**1.02**	**17.8**	**3.85**	**1.5**						**12.6**	**10**	**10**

Source: BofA US Equity and Quant Strategy, FactSet

Quantitative Profiles

Soft or hard, how to invest for a landing

Recession afoot: focus on Quality and … Value?

Our US economists forecast a mild recession starting right about now (see the report 2022-23 US outlook). But during economic recessions, we find that there are some similar factors that have tended to outperform as in Late Cycle and Downturn phases – Quality factors overall, and free cash flow based Value factors. (Exhibit 3).

Factor reversals in June are textbook recession plays

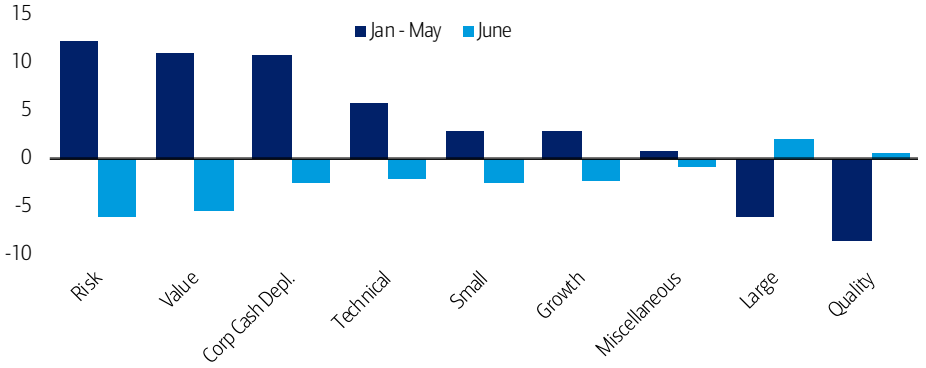
Factor performance in June was a mirror image of performance earlier this year (Exhibit 2), as investors focused on a rising possibility of a recession. Our US Regime Indicator resumed its decline following a pause in May (Exhibit 10), as slowdown continued. Within the S&P 500, Quality (-9.0% on avg.) and Large Size (-7.4%) outperformed in June, while Risk (-15.6%) and Small Size (-12.2%) lagged. High Foreign Exposure stocks continued to lag in June (-13.1%), also true in 1H (-20.3%) amid a rising US dollar.

But Value should outperform Growth even in a downturn

Value and Growth both underperformed in June, but Growth factors (-11.9%, on avg.) led Value factors by 3.1ppt in June (92nd pctl) amid slowing EPS growth concerns: the number of downward EPS revisions in June exceeded the number of upward revisions for the first time since the COVID-related slowdown (Exhibit 4). While slowing EPS growth generally favors Growth stocks over Value, our concern is that today growth is conflated with COVID beneficiaries which saw demand pulled forward, and global stocks facing challenges from supply chain and geopolitical risks, where both themes are likely to see slower earnings growth from here. Value remains underowned and inexpensive vs. Growth on multiple valuations metrics, and actually fares better than Growth during economic recessions historically.

See the Research Library for all screens/perf. data in Excel.

Exhibit 2: Factor performance in June was a mirror image of Jan – May performance
Relative performance vs equal weighted S&P 500 index



Source: BofA US Equity and Quant Strategy, FactSet

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Refer to important disclosures on page 31 to 33. 12437493

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Equity & Quant Strategy
United States

Savita Subramanian
Equity & Quant Strategist
BofAS
+1 646 855 3878
savita.subramanian@bofa.com

Alex Makedon
Cross-Asset & Quant Strategist
BofAS
+1 646 855 5982
alex.makedon@bofa.com

Jill Carey Hall, CFA
Equity & Quant Strategist
BofAS
+1 646 855 3327
jill.carey@bofa.com

Ohsung Kwon, CFA
Equity & Quant Strategist
BofAS
ohsung.kwon@bofa.com

Aybars Atalay
Equity & Quant Strategist
BofAS
aybars.b.atalay@bofa.com

Nicolas Woods
Equity & Quant Strategist
BofAS
nicolas.woods_barron@bofa.com

Exhibit 1: Best and worst performing screens
As of 6/30/2022

Top 5/bottom 5 screens in 1H22

Top 5 screens in 1H22	Perf.
Dividend Yield (Total Return)	0.7%
High EPS Estimate Dispersion	-8.4%
Relative Strength (5wk/30wk)	-8.5%
Low Price	-9.2%
Forward Earnings Yield	-10.3%
S&P 500 (Equal weighted)	**-17.3%**

Bottom 5 screens in 1H22	Perf.
ROE (5-Yr Avg. Adj. by Debt)	-28.8%
ROE (1-Yr Avg. Adj. by Debt)	-28.3%
High Duration	-28.0%
ROA	-26.5%
ROC	-25.9%
S&P 500 (Equal weighted)	**-17.3%**

Source: FactSet, BofA US Equity & Quant Strategy

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Disclaimer: The valuations and screens contained herein are useful in assessing comparative valuations and comparative earnings prospects and are not intended to recommend transactions relating to any specific security. These indicators should be used in investment decisions only with other factors including financial risk, investment risk, management strategies and operating and financial outlooks.

Exhibit 32: BofA Universe Sector/Industry Factor Evaluation (cont'd)
As of 6/30/2022

						Valuation Analysis						Expectation Analysis						
	# of Comp	% Univ BofA	Impl. Return	Reqd Return	DDM Alpha	Eqty. Duration	BofA Adj ßeta	P/E Ratio	Price/ Book	Yield	Surprise	Earnings (Decile) Risk	Torp	Disp	Est. Rev.	PR 5yr Growth	EPS Growth 2022E	2023E
CONSUMER STAPLES	51	6.20	9.4	8.7	0.7	37.0	0.72	19.7	4.80	2.6	7	5	3	2	6	7.3	4	7
FOOD & STAPLES RETAILING	8	1.32	9.1	8.9	0.2	43.0	0.72	19.6	4.75	1.5	5	4	3	3	6	9.2	3	7
BEVERAGES	11	1.76	9.0	9.0	0	38.8	0.75	24.9	6.91	2.5	7	6	4	1	6	7.9	6	9
FOOD PRODUCTS	23	1.12	9.5	8.4	1.1	36.2	0.70	16.1	2.53	2.4	7	4	4	3	5	6.3	6	2
TOBACCO	2	0.64	11.9	9.2	2.7	20.6	0.78	12.6		6.2	4	3	3	2	7	5.5	-2	9
HOUSEHOLD PRODUCTS	2	1.16	8.6	7.8	0.8	39.4	0.60	23.8	7.57	2.5	8	6	3	2	7	4.9	2	8
PERSONAL PRODUCTS	5	0.20	10.3	10.8	-0.5	38.9	0.99	29.0	14.11	0.8	4	7	5	3	7	16.4	18	15
HEALTH CARE	278	15.10	10.2	9.5	0.7	35.8	0.84	18.1	4.38	1.5	6	6	4	3	6	9.6	9	3
HEALTH CARE EQUIP	44	2.54	9.5	10.4	-0.9	39.7	0.94	23.4	3.98	1.1	7	6	3	3	7	12.8	-1	8
HEALTH CARE PROV	50	3.42	11.1	9.9	1.2	32.8	0.89	16.2	3.35	1.2	4	3	5	1	5	12.9	6	12
HEALTH CARE TECH	13	0.19	8.3	9.9	-1.6	48.8	0.91	177.7	3.01	0.0	5	1	4	6	6	16.9	-34	400
BIOTECH	117	2.64	10.8	9.0	1.8	30.4	0.81	22.3	5.12	1.9	7	6	3	6	5	5.8	8	-15
PHARMACEUTICALS	31	4.47	10.0	8.4	1.6	35.1	0.71	14.0	5.46	2.3	7	8	5	4	7	7.0	18	0
LIFE SCIENCES	23	1.83	9.8	10.6	-0.8	41.9	0.96	24.5	4.63	0.2	5	4	3	2	6	9.1	-3	8
FINANCIALS	156	8.37	12.0	11.3	0.7	27.3	1.09	10.1	1.41	2.9	5	4	4	4	5	8.8	-10	14
BANKS	35	3.00	12.4	11.8	0.6	24.2	1.15	8.6	1.11	3.3	5	4	3	5	4	8.5	-17	17
THRIFTS & MORTGAGE FINANCE	9	0.06	13.5	11.8	1.7	22.5	1.13	6.2	0.82	3.7	3	4	5	5	4	6.0	-6	-1
DIV FINANCIALS	3	0.10	15.8	14.2	1.6	21.8	1.39	8.1	1.95	3.0	4	9	7	4	4	15.4	10	21
CONSUMER FINANCE	10	0.52	11.3	11.6	-0.3	31.5	1.21	7.8	1.57	2.0	6	7	3	4	4	9.4	-12	0
CAPITAL MARKETS	49	2.55	11.8	11.6	0.2	27.6	1.12	11.7	1.82	2.9	4	4	5	4	6	7.2	-6	13
MORTGAGE REITS	17	0.12	10.7	14.5	-3.8	25.2	1.26	7.4	0.87	11.3	5	6	3	5	6	0.3	-11	1
INSURANCE	33	2.02	11.5	10.0	1.5	31.6	0.93	12.6	1.63	2.0	6	5	5	3	5	11.5	0	19
INFO TECH	209	26.33	10.9	11.5	-0.6	35.3	1.08	19.8	7.00	1.0	7	4	5	3	6	15.8	11	11
INTERNET SOFTWARE	1	0.02		13.6		15.9	1.36	15.5		0.0	4		9	8	8	71.9	320	22
IT SERVICES	47	4.30	11.0	11.3	-0.3	33.8	1.07	20.6	5.14	1.2	7	3	6	3	6	15.5	10	20
SOFTWARE	91	9.57	10.9	10.8	0.1	36.4	0.99	26.9	9.02	0.6	5	5	5	3	6	19.3	13	18
COMMUNICA. EQUIP	8	0.64	11.6	10.8	0.8	29.0	1.00	12.5	4.06	2.9	4	9	4	3	7	10.7	6	10
COMPUTERS & PERIPH	10	6.30	9.9	11.8	-1.9	40.7	1.13	19.0	21.68	0.8	8	1	4	3	6	10.6	9	7
ELECTR EQUIP & INSTR	17	0.61	10.7	11.9	-1.2	34.5	1.13	13.0	2.88	1.2	6	5	6	3	4	10.0	16	7
SEMICONDUCTORS	35	4.88	12.3	12.5	-0.2	28.8	1.22	14.7	4.22	1.6	8	5	6	5	5	17.0	11	3
COMMUNICATION SERVICES	52	10.51	11.1	11.1	0	33.0	1.04	13.8	3.19	0.7	3	4	5	5	7	12.3	3	13
DIVERSIFIED TELECOM SVS	5	1.09	11.6	8.0	3.6	26.3	0.65	9.2	1.33	5.1	7	7	2	3	7	1.7	-12	2
WIRELESS TELECOM SVS	1	0.22		8.2		18.3	0.65	19.5	2.41	0.0	1	6	8	8	2	52.2	112	70
MEDIA	16	0.93	13.5	10.8	2.7	24.6	1.03	10.8	1.92	2.1	6	6	6	5	5	13.1	8	10
ENTERTAINMENT	16	1.20	16.0	11.8	4.2	22.2	1.16	18.1	2.22	0.1	6	6	6	6	8	32.2	22	34
INTERACTIVE MEDIA & SVCS	14	7.07	10.4	11.6	-1.2	37.1	1.10	14.8	5.12	0.0	1	4	5	5	8	9.8	5	13
UTILITIES	60	3.30	9.8	8.3	1.5	33.2	0.67	17.5	2.15	3.0	4	5	4	2	5	8.0	15	10
ELECTRIC UTILITIES	25	1.96	10.0	8.2	1.8	32.3	0.66	16.9	2.09	3.0	3	5	4	2	6	6.7	14	4
GAS UTILITIES	9	0.15	9.9	8.5	1.4	33.0	0.70	16.1	1.78	3.0	7	4	4	2	5	6.5	7	8
MULTI-UTILITIES	15	0.95	9.4	8.2	1.2	34.7	0.66	20.2	2.24	3.1	5	5	3	2	5	5.5	-1	7
WATER UTILITIES	2	0.11	8.6	8.3	0.3	40.8	0.67	29.7	3.04	1.9	7	3	4	1	6	7.6	5	7
INDEP POWER PROD & ENERGY TRAD	9	0.14	11.0	10.4	0.6	27.8	0.92	10.4	2.61	3.0	5	6	6	6	5	48.6	nm	88
REAL ESTATE	97	3.35	9.8	9.7	0.1	32.6	0.86	18.5	2.51	3.3	5	5	5	2	5	10.2	13	6
REITS	93	3.31	9.8	9.7	0.1	32.8	0.85	18.4	2.53	3.3	5	5	5	2	5	9.9	12	7
REAL ESTATE MGMT & DEV	4	0.04	12.7	12.7	0	17.5	1.26	28.2	1.61	0.9		9				30.4	391	-24
BofA UNIVERSE	**1412**	**100**	**10.9**	**11.0**	**-0.1**	**33.3**	**1.02**	**16.8**	**3.44**	**1.7**						**13.7**	**15**	**11**
S&P 500	**503**	**91.87**	**10.8**	**10.9**	**-0.1**	**33.7**	**1.01**	**16.2**	**3.52**	**1.7**						**12.3**	**11**	**9**

Source: BofA US Equity and Quant Strategy, FactSet

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Quantitative Profiles

Growth > Value, but expect a reversal

Odd couple: Quality and Risk led amid market rally

As markets cheered what they perceived as a less hawkish Fed and interest rates declined (10y UST yield -33bp), equities rallied with the S&P 500 index posting its best July since the Great Depression (see US Performance Monitor). Our return-based Quality factors (High ROE, ROA and ROC, +10.8% on avg.) outperformed other factor groups we follow, likely benefitting from their high exposure to the Tech sector (second best performing sector in July, +13.5%). Risk factors also fared well (+10.5%), with High Beta (+13.2%) and High EPS Estimate Dispersion (+11.4%) leading the charge.

Regime Indicator still in Late Cycle, but declines further

Our US Regime Indicator declined for the 12th consecutive month in July, where it remains in Late Cycle (and corroborates our economists views that we likely haven't fallen into recession yet), but signals an ongoing slowdown (Exhibit 10). We, therefore, remain defensive and favor Quality and Low Risk, as well as self-financing corporates generating high free cash flow (found in High FCF/EV and Low Price/FCF factors).

Growth lead may prove short-lived

Growth factors (+10.5%) led Value factors (+8.3%) in July, where all of the Growth factors we follow cleared the equal weighted S&P 500 index. High Expected Long-Term EPS Growth (+13%) was the best factor overall. High EPS Revisions (+11.4%) also led by a wide margin, as the EPS Revision Ratio (ERR) dipped below its long-term average (Exhibit 3). But companies seeing the most positive revisions have surprisingly not outperformed when upward revisions within the overall market are growing more scarce: historically, following instances when the ERR fell below its L-T average and until it troughed, High EPS Revisions factor underperformed the index by an annualized 4.4ppt, on avg. Also, pulled forward demand due to COVID, the supply chain disruptions and geopolitical risks may weigh on Growth performance in coming months.

Value lagged, but watch out for a rebound

All of the Value factors we follow, except for the High Trailing and Forward EPS Yield factors (+9.2% and +10.2%, respectively), trailed the index. Value vs Growth performance last month was likely macro driven, as falling interest rates tend to favor long duration growth stocks as opposed to shorter duration value stocks. But BofA's 2022 year-end 10-yr Treasury Yield forecast is 2.75%, implying a range-bound path of rates in the remainder of the year. Under this scenario fundamentals and positioning may play a bigger role, where inexpensive and underowned Value may fare well. Also, the high level of valuation dispersion seen today (Exhibit 17) historically preceded Value leadership.

Momentum ailed; Foreign Exposure led

Momentum factors (+5.8%) trailed all other groups we follow in July. All of the Momentum factors we follow lagged the index. Momentum tends to ail as trends reverse. If Value regains its lead over Growth later in the year, Momentum is likely to benefit. Our Foreign Exposure factor (stocks of multinational corporations, MNCs), which was among the bottom five factors overall in 1H, led in July. The factor tends to benefit from a weakening USD, which was the case in July (DXY declined 2.4% intramonth). BofA's forecast for mild weakness in USD in 2H might lend further support for MNCs.

See the Research Library for all screens/perf. data in Excel.

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Equity & Quant Strategy
United States

Savita Subramanian
Equity & Quant Strategist
BofAS
+1 646 855 3878
savita.subramanian@bofa.com

Alex Makedon
Cross-Asset & Quant Strategist
BofAS
+1 646 855 5982
alex.makedon@bofa.com

Jill Carey Hall, CFA
Equity & Quant Strategist
BofAS
+1 646 855 3327
jill.carey@bofa.com

Ohsung Kwon, CFA
Equity & Quant Strategist
BofAS
ohsung.kwon@bofa.com

Aybars Atalay
Equity & Quant Strategist
BofAS
aybars.b.atalay@bofa.com

Victoria Roloff
Equity & Quant Strategist
BofAS
victoria.roloff@bofa.com

Nicolas Woods
Equity & Quant Strategist
BofAS
nicolas.woods_barron@bofa.com

Exhibit 1: Best and worst performing screens
As of 7/31/2022

Top 5/bottom 5 screens in July

Top 5 screens in July	Perf.
High Projected 5-Yr Growth	13.3%
High Beta	13.2%
ROE (5-Yr Avg. Adj. by Debt)	12.3%
ROE (1-Yr Avg. Adj. by Debt)	11.9%
High EPS Estimate Dispersion	11.4%
S&P 500 (Equal weighted)	**8.7%**

Bottom 5 screens in July	Perf.
Price Returns (3-Month)	3.2%
Price Returns (12-m + 1-m)	3.8%
Relative Strength (Price/200D MA)	4.7%
Relative Strength (10wk/40wk)	5.1%
Price Returns (12-Month)	5.3%
S&P 500 (Equal weighted)	**8.7%**

Source: FactSet, BofA US Equity & Quant Strategy

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Disclaimer: The valuations and screens contained herein are useful in assessing comparative valuations and comparative earnings prospects and are not intended to recommend transactions relating to any specific security. These indicators should be used in investment decisions only with other factors including financial risk, investment risk, management strategies and operating and financial outlooks.

Exhibit 31: BofA Universe Sector/Industry Factor Evaluation (cont'd)
As of 7/31/2022

						Valuation Analysis					Expectation Analysis							
	# of Comp	% Univ BofA	Impl. Return	Reqd Return	DDM Alpha	Eqty. Duration	BofA Adj ßeta	P/E Ratio	Price/ Book	Yield	Surprise	Earnings (Decile) Risk	Torp	Disp	Est. Rev.	PR 5yr Growth	EPS Growth 2022E	2023E
CONSUMER STAPLES	50	5.86	9.2	8.3	0.9	38.5	0.71	20.7	4.75	2.5	7	5	4	2	6	7.1	3	6
FOOD & STAPLES RETAILING	8	1.32	8.8	8.6	0.2	44.9	0.73	22.4	5.33	1.4	7	4	4	3	7	8.7	-2	8
BEVERAGES	11	1.68	8.7	8.5	0.2	40.0	0.74	26.0	7.29	2.4	7	6	4	2	5	7.5	6	8
FOOD PRODUCTS	22	1.04	9.6	8.0	1.6	35.4	0.70	16.6	2.60	2.5	6	3	4	3	5	7.3	6	2
TOBACCO	2	0.59	11.1	8.7	2.4	25.7	0.76	12.4		6.2	2	3	4	3	7	4.5	1	4
HOUSEHOLD PRODUCTS	2	1.03	8.4	7.2	1.2	40.0	0.57	23.5		2.6	9	6	4	2	7	3.7	1	10
PERSONAL PRODUCTS	5	0.20	9.8	10.3	-0.5	41.0	0.97	31.8	15.42	0.7	6	7	5	4	7	15.7	16	15
HEALTH CARE	279	14.34	10.3	9.2	1.1	35.9	0.84	18.9	4.13	1.5	5	6	4	3	6	10.8	8	2
HEALTH CARE EQUIP	45	2.47	9.2	10.0	-0.8	41.8	0.94	25.3	4.02	1.1	6	6	3	3	6	12.9	-2	5
HEALTH CARE PROV	51	3.35	10.8	9.5	1.3	33.9	0.89	17.3	3.50	1.1	4	3	5	2	5	12.8	5	12
HEALTH CARE TECH	12	0.18	8.6	9.2	-0.6	47.4	0.87	215.5	3.63	0.0	4	1	4	5	6	15.6	-27	232
BIOTECH	117	2.43	10.5	8.7	1.8	31.2	0.80	23.4	3.90	1.9	7	6	4	6	6	5.9	6	-16
PHARMACEUTICALS	31	4.04	9.9	7.9	2	35.5	0.69	13.7	6.44	2.4	4	8	5	3	7	6.9	20	-1
LIFE SCIENCES	23	1.87	12.8	10.5	2.3	31.8	0.97	27.8	4.81	0.2	7	4	3	2	5	18.1	-4	5
FINANCIALS	157	8.18	11.7	10.8	0.9	28.6	1.09	10.9	1.47	2.8	5	4	4	4	6	7.9	-12	14
BANKS	35	2.93	12.1	11.4	0.7	25.0	1.14	9.1	1.20	3.2	5	4	4	5	4	8.4	-17	17
THRIFTS & MORTGAGE FINANCE	9	0.06	13.3	11.6	1.7	23.6	1.14	7.2	0.92	3.4	3	4	4	5	4	6.0	-9	-2
DIV FINANCIALS	3	0.10	13.1	13.6	-0.5	27.2	1.40	10.2	2.24	2.6	8	9	7	4	7	13.1	2	15
CONSUMER FINANCE	11	0.53	10.7	11.3	-0.6	33.6	1.21	8.7	1.69	1.8	5	7	3	4	5	9.6	-14	-2
CAPITAL MARKETS	49	2.58	11.2	10.8	0.4	31.8	1.12	13.6	2.09	2.9	5	4	4	4	7	4.9	-12	13
MORTGAGE REITS	17	0.13	11.7	13.7	-2	24.1	1.26	8.2	1.03	10.1	5	6	3	5	4	6.8	-8	-3
INSURANCE	33	1.86	11.3	9.4	1.9	31.8	0.90	12.7	1.58	2.0	6	5	6	3	5	10.4	-2	20
INFO TECH	209	27.27	10.4	11.3	-0.9	37.7	1.09	23.0	7.99	0.9	7	4	5	4	6	15.4	9	12
INTERNET SOFTWARE	1	0.02		13.2		16.2	1.35	16.8		0.0	3		9	8	8	71.9	320	22
IT SERVICES	46	4.33	10.7	10.9	-0.2	35.5	1.07	22.5	5.75	1.1	6	3	6	3	5	16.9	11	19
SOFTWARE	92	9.61	10.2	10.5	-0.3	39.4	0.99	30.0	9.78	0.6	7	5	5	4	6	18.0	10	25
COMMUNICA. EQUIP	8	0.64	11.3	10.6	0.7	30.4	1.01	13.5	4.40	2.7	3	9	5	2	7	10.8	6	9
COMPUTERS & PERIPH	10	6.81	9.4	11.7	-2.3	43.3	1.14	23.3	28.01	0.7	8	1	4	3	6	10.6	7	5
ELECTR EQUIP & INSTR	17	0.64	10.2	11.7	-1.5	36.8	1.15	15.0	3.34	1.1	5	5	6	3	4	9.9	16	5
SEMICONDUCTORS	35	5.22	11.9	12.4	-0.5	30.6	1.24	18.0	4.93	1.3	7	5	6	5	5	16.9	7	3
COMMUNICATION SERVICES	53	10.02	11.1	10.9	0.2	35.8	1.03	14.9	3.43	0.7	2	4	4	5	8	11.2	-1	13
DIVERSIFIED TELECOM SVS	5	0.91	12.3	7.6	4.7	26.3	0.60	8.6	1.45	5.6	6	6	2	3	7	-1.9	-16	-2
WIRELESS TELECOM SVS	1	0.22		7.8		18.9	0.65	24.3	2.56	0.0	1	5	8	6	8	51.0	42	123
MEDIA	16	0.84	13.0	10.2	2.8	25.8	0.98	10.9	1.91	2.2	7	6	6	5	5	11.4	7	5
ENTERTAINMENT	16	1.26	17.6	11.7	5.9	22.6	1.18	20.6	2.46	0.1	2	6	6	6	9	32.5	17	38
INTERACTIVE MEDIA & SVCS	15	6.80	9.9	11.1	-1.2	40.1	1.07	16.1	5.30	0.0	1	3	3	6	8	8.3	1	13
UTILITIES	60	3.20	9.8	7.9	1.9	34.1	0.67	18.7	2.32	2.9	4	5	4	2	5	8.7	16	5
ELECTRIC UTILITIES	25	1.90	10.1	7.8	2.3	33.5	0.66	17.8	2.28	2.9	4	5	4	1	5	7.4	16	3
GAS UTILITIES	9	0.15	10.0	8.2	1.8	33.6	0.71	16.8	1.88	2.9	5	4	5	2	5	7.3	7	11
MULTI-UTILITIES	15	0.90	9.2	7.8	1.4	35.6	0.66	20.9	2.36	3.0	4	5	4	2	5	5.5	-1	7
WATER UTILITIES	2	0.11	8.5	8.0	0.5	42.2	0.68	31.6	3.23	1.8	6	3	4	1	5	7.6	5	7
INDEP POWER PROD & ENERGY TRAD	9	0.14	11.5	10.0	1.5	26.9	0.94	15.8	2.86	2.7	6	6	7	6	5	46.9	nm	16
REAL ESTATE	97	3.33	9.5	9.4	0.1	34.2	0.86	20.2	2.67	3.1	5	5	5	2	5	9.5	12	5
REITS	93	3.29	9.5	9.4	0.1	34.4	0.86	20.0	2.69	3.1	5	5	5	2	5	9.1	12	5
REAL ESTATE MGMT & DEV	4	0.04	12.2	12.4	-0.2	18.0	1.25	64.1	1.75	0.9		9				47.1	268	-76
BofA UNIVERSE	**1412**	**100.00**	**10.5**	**10.8**	**-0.3**	**35.3**	**1.04**	**18.6**	**3.76**	**1.6**						**13.4**	**13**	**11**
S&P 500	**503**	**91.77**	**10.4**	**10.7**	**-0.3**	**35.8**	**1.02**	**17.9**	**3.84**	**1.5**						**12.0**	**9**	**9**

Source: BofA US Equity and Quant Strategy, FactSet

Cost of Equity Calculation
Staff Electric Proxy Group

Cost of Market[1]:	*Implied*	*Required*
June 2022	10.70%	10.90%
July 2022	10.80%	10.90%
August 2022	10.40%	10.70%
Cost of Market:	10.73%	

Treasury Rates[2]:	*10 year*	*30 year*
June 2022	3.14%	3.25%
July 2022	2.90%	3.10%
August 2022	2.90%	3.13%
Risk Free Rate:	3.07%	
Market Risk Premium (MRP):	7.66%	
Proxy Group Beta:	0.88	
Traditional CAPM ROE:	9.84%	
Zero Beta CAPM ROE:	10.06%	
Overall CAPM ROE:	9.95%	
DCF ROE:	8.29%	
Return on Equity 2/3 DCF 1/3 CAPM Weighting	**8.84%**	
Rounded:	**8.85%**	

Sources:
[1] Bank of America Securities, Quantitative Profiles Reports - data is average of Implied and Required Returns for S&P 500.
[2] Federal Reserve Bank of St. Louis, Federal Reserve Economic Data (FRED).

VALUE LINE

485Lexington Avenue
New York, New York 10017-2630
Phone: (212) 907-1500 / Fax: (212) 682-6695

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Last Updated January 1, 2014

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After the analyst completes the first draft of a report, it is then subject to a thorough editing process, which includes a review from at least one senior analyst that is very familiar with that particular industry. This may include several rounds of back-and-forth questions and other communication.

When the senior analyst is satisfied, the report is then exposed to a number of other reviews and checks. For instance, a fellow analyst will evaluate the report. It will also be scrutinized by Value Line's Statistics, Quality Control, and Proofreading Departments.

As a final check, an additional senior analyst will read the report one last time, which occurs immediately before all reports are sent to our printer and prepared for Web site posting.

If you have any questions, concerns, or comments about Value Line's report creation process, please contact:

Ian Gendler
Executive Director of Research
(212) 907-1709
igendler@valueline.com

New York State Electric and Gas Corporation
Financial Metrics forecast, April 30, 2024
$000s

	Staff[1]	NYSEG[2]
Net Income:	$ 188,162	295,704
Interest Expense, Long-Term Debt	83,649	87,405
Other Income	57,000	57,000
Income Taxes	66,891	85,549
Depreciation & Amortization	226,875	237,728
Long-Term Debt[3]	2,303,295	2,361,527
Equity[3]	2,126,118	2,361,527
EBIT	338,702	[redacted]
EBITDA	622,577	[redacted]
Cash Flow from Operations	415,037	[redacted]
Changes in Other Current Assets & Liabilities	[redacted]	[redacted]
CFO pre-WC	[redacted]	[redacted]
Capitalized Interest	[redacted]	[redacted]
Depreciation on Operating Leases	[redacted]	[redacted]
Moody's CFO pre-WC, Adj. -	[redacted]	[redacted]
Dividends	[redacted]	[redacted]
Moody's CFO pre-WC-Dividends, Adj. -	[redacted]	[redacted]
Adjusted EBITDA	[redacted]	[redacted]
Capitalized Interest	[redacted]	[redacted]
Cash Interest Paid	[redacted]	[redacted]
Interest on Operating Leases	[redacted]	[redacted]
Funds from Operations, Adj. (FFO) -	[redacted]	[redacted]
EBITDA	[redacted]	[redacted]
Interest on ARO	[redacted]	[redacted]
OLA Rent Expense	[redacted]	[redacted]
Adjusted EBITDA -	[redacted]	[redacted]
LTD Interest Expense	[redacted]	[redacted]
Capitalized Interest	[redacted]	[redacted]
Interest on Pension Liability	[redacted]	[redacted]
Interest on Operating Leases	[redacted]	[redacted]
Moody's Adjusted Total Interest Expense -	[redacted]	[redacted]
Short-term Debt	[redacted]	[redacted]
Long-term Debt	[redacted]	[redacted]
Pension Liability	[redacted]	[redacted]
Operating Leases	[redacted]	[redacted]
Moody's Adjusted Debt -	[redacted]	[redacted]
Total Equity	[redacted]	[redacted]
Capitalized Interest, Taxes	[redacted]	[redacted]
Capitalized Interest, After-tax	[redacted]	[redacted]
Moody's Adjusted Capitalization -	[redacted]	[redacted]
Long-Term Debt	[redacted]	[redacted]
Asset Retirement Obligation	[redacted]	[redacted]
Pension Liability	[redacted]	[redacted]
Operating Leases	[redacted]	[redacted]
S&P Adjusted Debt -	[redacted]	[redacted]
S&P Financial Risk Ratios[4]		
FFO/Debt	21.94% Significant	[redacted]
Debt/EBITDA	3.94x Significant	[redacted]
Moody's Financial Strength Ratios (40%)[5]		
(CFO pre-WC + Interest)/Interest (7.5%):	5.69x A	[redacted]
CFO pre-WC/Debt (15%):	18.46% Baa	[redacted]
(CFO pre-WC-Dividends)/Debt (10%):	18.46% A	[redacted]
Debt/Capitalization (7.5%):	52.98% Baa	[redacted]

Sources:

[1]Reflects Staff's recommended adjustments and Companies adjustments per DPS-578

[2]Per Companies IR Response DPS-578,

[3]NYSEG, the rate base is equal to the capitalization.

[4]S&P Global Ratings, Corporate Methodology, November 19, 2013.

[5]Moody's Investors Service, Rating Methodology, Regulated Electric and Gas Utilities, June 23, 2017.

Rochester Gas & Electric Corporation
Financial Metrics forecast, March 31, 2021
$000s

	Staff[1]	RG&E[2]
Net Income:	$ 118,032	162,205
Interest Expense, Long-Term Debt	61,513	60,827
Other Income	14,000	14,000
Income Taxes	41,867	51,393
Depreciation & Amortization	140,217	143,600
Long-Term Debt[3]	1,457,361	1,421,111
Equity[3]	1,345,257	1,421,111
EBIT	221,412	[redacted]
EBITDA	375,629	[redacted]
Cash Flow from Operations	258,249	[redacted]
Changes in Other Current Assets & Liabilities	[redacted]	[redacted]
CFO pre-WC	[redacted]	[redacted]
Capitalized Interest	[redacted]	[redacted]
Depreciation on Operating Leases	[redacted]	[redacted]
Moody's CFO pre-WC, Adj. -	[redacted]	[redacted]
Dividends	[redacted]	[redacted]
Moody's CFO pre-WC-Dividends, Adj. -	[redacted]	[redacted]
Adjusted EBITDA	[redacted]	[redacted]
Capitalized Interest	[redacted]	[redacted]
Cash Interest Paid	[redacted]	[redacted]
Interest on Operting Leases	[redacted]	[redacted]
Funds from Operations, Adj. (FFO) -	[redacted]	[redacted]
EBITDA	[redacted]	[redacted]
OLA Rent Expense	[redacted]	[redacted]
Adjusted EBITDA -	[redacted]	[redacted]
LTD Interest Expense	[redacted]	[redacted]
Capitalized Interest	[redacted]	[redacted]
Interest on Pension Liability	[redacted]	[redacted]
Interest on Operating Leases	[redacted]	[redacted]
Moody's Adjusted Total Interest Expense -	[redacted]	[redacted]
Short-term Debt	[redacted]	[redacted]
Long-term Debt	[redacted]	[redacted]
Pension Liability	[redacted]	[redacted]
Operating Leases	[redacted]	[redacted]
Moody's Adjusted Debt -	[redacted]	[redacted]
Total Equity	[redacted]	[redacted]
Capitalized Interest, Taxes	[redacted]	[redacted]
Capitalized Interest, After-tax	[redacted]	[redacted]
Moody's Adjusted Capitalization -	[redacted]	[redacted]
Long-Term Debt	[redacted]	[redacted]
Asset Retirement Obligation	[redacted]	[redacted]
Pension Liability	[redacted]	[redacted]
Operating Leases	[redacted]	[redacted]
S&P Adjusted Debt -	[redacted]	[redacted]
S&P Financial Risk Ratios[4]		
FFO/Debt	19.10% Significant	[redacted]
Debt/EBITDA	4.30x Significant	[redacted]
Moody's Financial Strength Ratios (40%)[5]		
(CFO pre-WC + Interest)/Interest (7.5%):	5.23x A	[redacted]
CFO pre-WC/Debt (15%):	19.27% A	[redacted]
(CFO pre-WC-Dividends)/Debt (10%):	19.27% A	[redacted]
Debt/Capitalization (7.5%):	54.18% Baa	[redacted]

Sources:

[1]Reflects Staff's recommended adjustments and Companies adjustments per DPS-578

[2]Per Companies IR Response DPS-578,

[3]RG&E, the rate base is equal to the capitalization.

[4]S&P Global Ratings, Corporate Methodology, November 19, 2013.

S&P Global Ratings

RatingsDirect®

Criteria | Corporates | General:

Corporate Methodology

November 19, 2013

(***Editor's Note:*** *On Dec. 15, 2021, we republished this criteria article to make nonmaterial changes. See the "Revisions And Updates" section for details.)*

1. These criteria present S&P Global Ratings' methodology for rating corporate industrial companies and utilities. The criteria organize the analytical process according to a common framework and articulate the steps in developing the stand-alone credit profile (SACP) and issuer credit rating (ICR) for a corporate entity. For the related guidance article, see "Guidance: Corporate Methodology."
2. This article is related to our criteria article "Principles Of Credit Ratings."

SUMMARY OF THE CRITERIA

3. The criteria describe the methodology we use to determine the SACP and ICR for corporate industrial companies and utilities. Our assessment reflects these companies' business risk profiles, their financial risk profiles, and other factors that may modify the SACP outcome (see "General Criteria: Stand-Alone Credit Profiles: One Component Of A Rating," for the definition of SACP). The criteria provide clarity on how we determine an issuer's SACP and ICR and are more specific in detailing the various factors of the analysis. The criteria also provide clear guidance on how we use these factors as part of determining an issuer's ICR. S&P Global Ratings intends for these criteria to provide the market with a framework that clarifies our approach to fundamental analysis of corporate credit risks.
4. The business risk profile comprises the risk and return potential for a company in the markets in which it participates, the competitive climate within those markets (its industry risk), the country risks within those markets, and the competitive advantages and disadvantages the company has within those markets (its competitive position). The business risk profile affects the amount of financial risk that a company can bear at a given SACP level and constitutes the foundation for a company's expected economic success. We combine our assessments of industry risk, country risk, and competitive position to determine the assessment for a corporation's business risk profile.
5. The financial risk profile is the outcome of decisions that management makes in the context of its business risk profile and its financial risk tolerances. This includes decisions about the manner in which management seeks funding for the company and how it constructs its balance sheet. It also reflects the relationship of the cash flows the organization can achieve, given its business risk profile, to the company's financial obligations. The criteria use cash flow/leverage analysis to determine a corporate issuer's financial risk profile assessment.

CRITERIA CONTACTS

Peter Kernan
London
(44) 20-7176-3618
peter.kernan
@spglobal.com

Andrew D Palmer
Melbourne
(61) 3-9631-2052
andrew.palmer
@spglobal.com

Marta Castelli
Buenos Aires
(54) 114-891-2128
marta.castelli
@spglobal.com

ANALYTICAL CONTACTS

Gregg Lemos-Stein, CFA
New York
(1) 212-438-1809
gregg.lemos-stein
@spglobal.com

Michael P Altberg
New York
(1) 212-438-3950
michael.altberg
@spglobal.com

Luciano D Gremone
Buenos Aires
(54) 114-891-2143
luciano.gremone
@spglobal.com

See complete contact list at end of article.

6. We then combine an issuer's business risk profile assessment and its financial risk profile assessment to determine its anchor (see table 3). Additional rating factors can modify the anchor. These are: diversification/portfolio effect, capital structure, financial policy, liquidity, and management and governance. Comparable ratings analysis is the last analytical factor under the criteria to determine the final SACP on a company.
7. These criteria are complemented by sector-specific provisions, included in industry-specific criteria articles called Key Credit Factors (KCFs) or in the guidance related to this criteria article ("Guidance: Corporate Methodology"). The KCFs describe the industry risk assessments associated with each sector and may identify sector-specific criteria that supersede certain factors of these criteria in the analysis. "Guidance: Corporate Methodology" also provides guidelines on the analytical factors we consider when applying "Corporate Methodology" to certain sectors.

SCOPE OF THE CRITERIA

8. This methodology applies to nonfinancial corporate issuer credit ratings globally. Please see "Recovery Rating Criteria For Speculative-Grade Corporate Issuers," and "Reflecting Subordination Risk In Corporate Issue Ratings," for further information on our methodology for determining issue ratings. This methodology does not apply to the following sectors, based on the unique characteristics of these sectors, which require either a different framework of analysis or substantial modifications to one or more factors of analysis: project finance entities, project developers, commodities trading, investment holding companies and companies that maximize their returns by buying and selling equity holdings over time, Japanese general trading companies, corporate securitizations, nonprofit and cooperative organizations (other than agricultural cooperatives), and other entities whose cash flows are primarily derived from partially owned equity holdings.
9. This paragraph has been deleted.
10. This paragraph has been deleted.

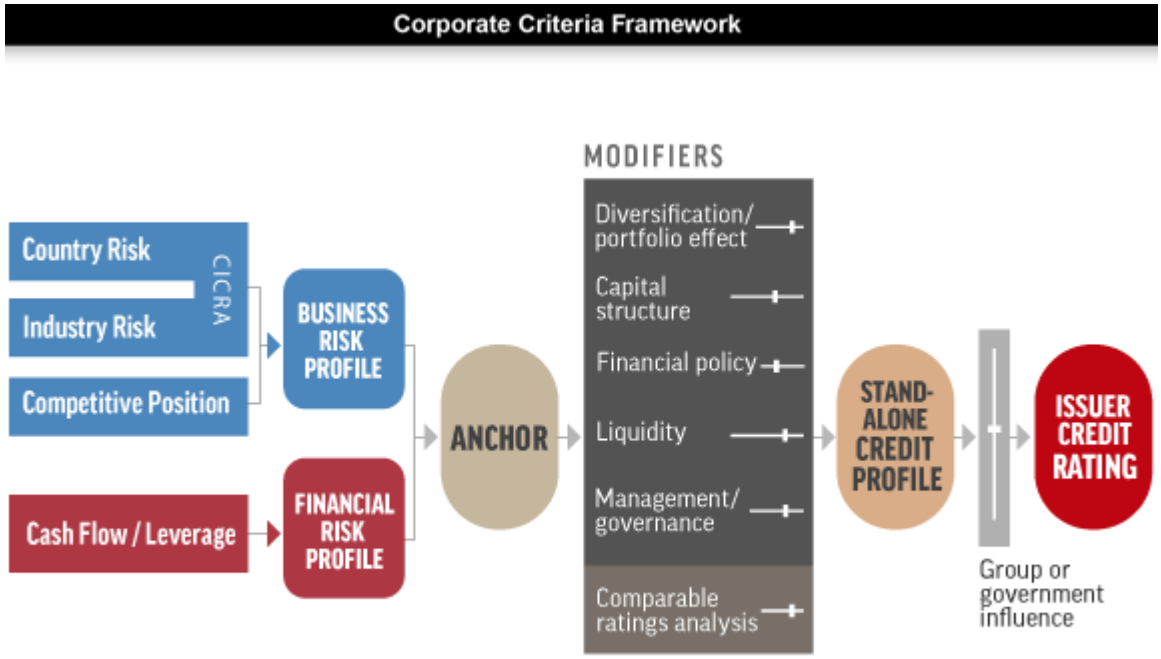
METHODOLOGY

A. Corporate Ratings Framework

11. The corporate analytical methodology organizes the analytical process according to a common framework, and it divides the task into several factors so that S&P Global Ratings considers all salient issues. First we analyze the company's business risk profile, then evaluate its financial risk profile, then combine those to determine an issuer's anchor. We then analyze six factors that could potentially modify our anchor conclusion.
12. To determine the assessment for a corporate issuer's business risk profile, the criteria combine our assessments of industry risk, country risk, and competitive position. Cash flow/leverage analysis determines a company's financial risk profile assessment. The analysis then combines the corporate issuer's business risk profile assessment and its financial risk profile assessment to determine its anchor. In general, the analysis weighs the business risk profile more heavily for investment-grade anchors, while the financial risk profile carries more weight for speculative-grade anchors.
13. After we determine the anchor, we use additional factors to modify the anchor. These factors are: diversification/portfolio effect, capital structure, financial policy, liquidity, and management and

governance. The assessment of each factor can raise or lower the anchor by one or more notches--or have no effect. These conclusions take the form of assessments and descriptors for each factor that determine the number of notches to apply to the anchor.

14. The last analytical factor the criteria call for is comparable ratings analysis, which may raise or lower the anchor by one notch based on a holistic view of the company's credit characteristics.



15. The three analytic factors within the business risk profile generally are a blend of qualitative assessments and quantitative information. Qualitative assessments distinguish risk factors, such as a company's competitive advantages, that we use to assess its competitive position. Quantitative information includes, for example, historical cyclicality of revenues and profits that we review when assessing industry risk. It can also include the volatility and level of profitability we consider in order to assess a company's competitive position. The assessments for business risk profile are: 1, excellent; 2, strong; 3, satisfactory; 4, fair; 5, weak; and 6, vulnerable.

16. In assessing cash flow/leverage to determine the financial risk profile, the analysis focuses on quantitative measures. The assessments for financial risk profile are: 1, minimal; 2, modest; 3, intermediate; 4, significant; 5, aggressive; and 6, highly leveraged.

17. The ICR results from the combination of the SACP and the support framework, which determines the extent of the difference between the SACP and the ICR, if any, for group or government influence. Extraordinary influence is then captured in the ICR. Please see "Group Rating Methodology," and "Rating Government-Related Entities: Methodology And Assumptions," for our methodology on group and government influence.

18. Ongoing support or negative influence from a government (for government-related entities), or from a group, is factored into the SACP (see "SACP criteria"). While such ongoing support/negative influence does not affect the industry or country risk assessment, it can affect any other factor in business or financial risk. For example, such support or negative influence can affect: national

industry analysis, other elements of competitive position, financial risk profile, the liquidity assessment, and comparable ratings analysis.

19. The application of these criteria will result in an SACP that could then be constrained by the relevant sovereign rating and transfer and convertibility (T&C) assessment affecting the entity when determining the ICR. In order for the final ICR to be higher than the applicable sovereign rating or T&C assessment, the entity will have to meet the conditions established in "Ratings Above The Sovereign--Corporate And Government Ratings: Methodology And Assumptions."

1. Determining the business risk profile assessment

20. Under the criteria, the combined assessments for country risk, industry risk, and competitive position determine a company's business risk profile assessment. A company's strengths or weaknesses in the marketplace are vital to its credit assessment. These strengths and weaknesses determine an issuer's capacity to generate cash flows in order to service its obligations in a timely fashion.

21. Industry risk, an integral part of the credit analysis, addresses the relative health and stability of the markets in which a company operates. The range of industry risk assessments is: 1, very low risk; 2, low risk; 3, intermediate risk; 4, moderately high risk; 5, high risk; and 6, very high risk. The treatment of industry risk is in section B.

22. Country risk addresses the economic risk, institutional and governance effectiveness risk, financial system risk, and payment culture or rule of law risk in the countries in which a company operates. The range of country risk assessments is: 1, very low risk; 2, low risk; 3, intermediate risk; 4, moderately high risk; 5, high risk; and 6, very high risk. The treatment of country risk is in section C.

23. The evaluation of an enterprise's competitive position identifies entities that are best positioned to take advantage of key industry drivers or to mitigate associated risks more effectively--and achieve a competitive advantage and a stronger business risk profile than that of entities that lack a strong value proposition or are more vulnerable to industry risks. The range of competitive position assessments is: 1, excellent; 2, strong; 3, satisfactory; 4, fair; 5, weak; and 6, vulnerable. The full treatment of competitive position is in section D.

24. The combined assessment for country risk and industry risk is known as the issuer's Corporate Industry and Country Risk Assessment (CICRA). Table 1 shows how to determine the combined assessment for country risk and industry risk.

Table 1

Determining The CICRA

	--Country risk assessment--					
Industry risk assessment	**1 (very low risk)**	**2 (low risk)**	**3 (intermediate risk)**	**4 (moderately high risk)**	**5 (high risk)**	**6 (very high risk)**
1 (very low risk)	1	1	1	2	4	5
2 (low risk)	2	2	2	3	4	5
3 (intermediate risk)	3	3	3	3	4	6
4 (moderately high risk)	4	4	4	4	5	6
5 (high risk)	5	5	5	5	5	6
6 (very high risk)	6	6	6	6	6	6

25.

The CICRA is combined with a company's competitive position assessment in order to create the issuer's business risk profile assessment. Table 2 shows how we combine these assessments.

Table 2

Determining The Business Risk Profile Assessment

	--CICRA--					
Competitive position assessment	**1**	**2**	**3**	**4**	**5**	**6**
1 (excellent)	1	1	1	2	3*	5
2 (strong)	1	2	2	3	4	5
3 (satisfactory)	2	3	3	3	4	6
4 (fair)	3	4	4	4	5	6
5 (weak)	4	5	5	5	5	6
6 (vulnerable)	5	6	6	6	6	6

*See paragraph 26.

26. A small number of companies with a CICRA of 5 may be assigned a business risk profile assessment of 2 if all of the following conditions are met:

- The company's competitive position assessment is 1.
- The company's country risk assessment is no riskier than 3.
- The company produces significantly better-than-average industry profitability, as measured by the level and volatility of profits.
- The company's competitive position within its sector transcends its industry risks due to unique competitive advantages with its customers, strong operating efficiencies not enjoyed by the large majority of the industry, or scale/scope/diversity advantages that are well beyond the large majority of the industry.

27. For issuers with multiple business lines, the business risk profile assessment is based on our assessment of each of the factors--country risk, industry risk, and competitive position--as follows:

- Country risk: We use the weighted average of the country risk assessments for the company across all countries where companies generate more than 5% of sales or EBITDA, or where more than 5% of fixed assets are located.
- Industry risk: We use the weighted average of the industry risk assessments for all business lines representing more than 20% of the company's forecasted earnings, revenues or fixed assets, or other appropriate financial measures if earnings, revenue, or fixed assets do not accurately reflect the exposure to an industry.
- Competitive position: We assess all business lines identified above for the components competitive advantage, scope/scale/diversity, and operating efficiency (see section D). They are then blended using a weighted average of revenues, earnings, or assets to form the preliminary competitive position assessment. The level of profitability and volatility of profitability are then assessed based on the consolidated financials for the enterprise. The preliminary competitive position assessment is then blended with the profitability assessment, as per section D.5, to assess competitive position for the enterprise.

2. Determining the financial risk profile assessment

28. Under the criteria, cash flow/leverage analysis is the foundation for assessing a company's financial risk profile. The range of assessments for a company's cash flow/leverage is 1, minimal; 2, modest; 3, intermediate; 4, significant; 5, aggressive; and 6, highly leveraged. The full treatment of cash flow/leverage analysis is the subject of section E.

3. Merger of financial risk profile and business risk profile assessments

29. An issuer's business risk profile assessment and its financial risk profile assessment are combined to determine its anchor (see table 3). If we view an issuer's capital structure as unsustainable or if its obligations are currently vulnerable to nonpayment, and if the obligor is dependent upon favorable business, financial, and economic conditions to meet its commitments on its obligations, then we will determine the issuer's SACP using "Criteria For Assigning 'CCC+', 'CCC', 'CCC-', And 'CC' Ratings." If the issuer meets the conditions for assigning 'CCC+', 'CCC', 'CCC-', and 'CC' ratings, we will not apply Table 3.

Table 3

Combining The Business And Financial Risk Profiles To Determine The Anchor

	--Financial risk profile--					
Business risk profile	**1 (minimal)**	**2 (modest)**	**3 (intermediate)**	**4 (significant)**	**5 (aggressive)**	**6 (highly leveraged)**
1 (excellent)	aaa/aa+	aa	a+/a	a-	bbb	bbb-/bb+
2 (strong)	aa/aa-	a+/a	a-/bbb+	bbb	bb+	bb
3 (satisfactory)	a/a-	bbb+	bbb/bbb-	bbb-/bb+	bb	b+
4 (fair)	bbb/bbb-	bbb-	bb+	bb	bb-	b
5 (weak)	bb+	bb+	bb	bb-	b+	b/b-
6 (vulnerable)	bb-	bb-	bb-/b+	b+	b	b-

30. When two anchor outcomes are listed for a given combination of business risk profile assessment and financial risk profile assessment, an issuer's anchor is determined as follows:

- When a company's financial risk profile is 4 or stronger (meaning, 1-4), its anchor is based on the comparative strength of its business risk profile. We consider our assessment of the business risk profile for corporate issuers to be points along a possible range within its category (e.g., "strong"). Consequently, each of these assessments that ultimately generate the business risk profile for a specific issuer can be at the upper or lower end of such a range. Issuers with a stronger business risk profile for the range of anchor outcomes will be assigned the higher anchor. Those with a weaker business risk profile for the range of anchor outcomes will be assigned the lower anchor.
- When a company's financial risk profile is 5 or 6, its anchor is based on the comparative strength of its financial risk profile. Issuers with stronger cash flow/leverage ratios for the range of anchor outcomes will be assigned the higher anchor. Issuers with weaker cash flow/leverage ratios for the range of anchor outcomes will be assigned the lower anchor. For example, a company with a business risk profile of (1) excellent and a financial risk profile of (6) highly leveraged would generally be assigned an anchor of 'bb+' if its ratio of debt to EBITDA was 8x or greater and there were no offsetting factors to such a high level of leverage.

4. Building on the anchor

31. The analysis of diversification/portfolio effect, capital structure, financial policy, liquidity, and management and governance may raise or lower a company's anchor. The assessment of each modifier can raise or lower the anchor by one or more notches--or have no effect in some cases (see tables 4 and 5). We express these conclusions using specific assessments and descriptors that determine the number of notches to apply to the anchor. However, this notching in aggregate can't lower an issuer's anchor below 'b-' (see "Criteria For Assigning 'CCC+', 'CCC', 'CCC-', And 'CC' Ratings," for the methodology we use to assign 'CCC' and 'CC' category SACPs and ICRs to issuers).

32. The analysis of the modifier diversification/portfolio effect identifies the benefits of diversification across business lines. The diversification/portfolio effect assessments are 1, significant diversification; 2, moderate diversification; and 3, neutral. The impact of this factor on an issuer's anchor is based on the company's business risk profile assessment and is described in Table 4. Multiple earnings streams (which are evaluated within a firm's business risk profile) that are less-than-perfectly correlated reduce the risk of default of an issuer (see Appendix D). We determine the impact of this factor based on the business risk profile assessment because the benefits of diversification are significantly reduced with poor business prospects. The full treatment of diversification/portfolio effect analysis is the subject of section F.

Table 4

Modifier Step 1: Impact Of Diversification/Portfolio Effect On The Anchor

	--Business risk profile assessment--					
Diversification/portfolio effect	**1 (excellent)**	**2 (strong)**	**3 (satisfactory)**	**4 (fair)**	**5 (weak)**	**6 (vulnerable)**
1 (significant diversification)	+2 notches	+2 notches	+2 notches	+1 notch	+1 notch	0 notches
2 (moderate diversification)	+1 notch	+1 notch	+1 notch	+1 notch	0 notches	0 notches
3 (neutral)	0 notches	0 notches	0 notches	0 notches	0 notches	0 notches

33. After we adjust for the diversification/portfolio effect, we determine the impact of the other modifiers: capital structure, financial policy, liquidity, and management and governance. We apply these four modifiers in the order listed in Table 5. As we go down the list, a modifier may (or may not) change the anchor to a new range (one of the ranges in the four right-hand columns in the table). We'll choose the appropriate value from the new range, or column, to determine the next modifier's effect on the anchor. And so on, until we get to the last modifier on the list––management and governance. For example, let's assume that the anchor, after adjustment for diversification/portfolio effect but before adjusting for the other modifiers, is 'a'. If the capital structure assessment is very negative, the indicated anchor drops two notches, to 'bbb+'. So, to determine the impact of the next modifier––financial policy––we go to the column 'bbb+ to bbb-' and find the appropriate assessment––in this theoretical example, positive. Applying that assessment moves the anchor up one notch, to the 'a- and higher' category. In our example, liquidity is strong, so the impact is zero notches and the anchor remains unchanged. Management and governance is satisfactory, and thus the anchor remains 'a-' (see chart following table 5).

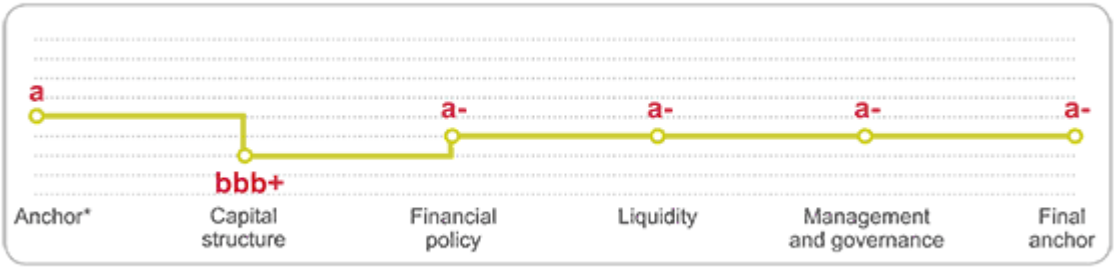
Table 5

Modifier Step 2: Impact Of Remaining Modifier Factors On The Anchor

	--Anchor range--			
	'a-' and higher	'bbb+' to 'bbb-'	'bb+' to 'bb-'	'b+' and lower
Factor/Assessment				
Capital structure (see section G)				
1 (Very positive)	2 notches	2 notches	2 notches	2 notches
2 (Positive)	1 notch	1 notch	1 notch	1 notch
3 (Neutral)	0 notches	0 notches	0 notches	0 notches
4 (Negative)	-1 notch	-1 notch	-1 notch	-1 notch
5 (Very negative)	-2 or more notches	-2 or more notches	-2 or more notches	-2 notches
Financial policy (FP; see section H)				
1 (Positive)	+1 notch if M&G is at least satisfactory	+1 notch if M&G is at least satisfactory	+1 notch if liquidity is at least adequate and M&G is at least satisfactory	+1 notch if liquidity is at least adequate and M&G is at least satisfactory
2 (Neutral)	0 notches	0 notches	0 notches	0 notches
3 (Negative)	-1 to -3 notches(1)	-1 to -3 notches(1)	-1 to -2 notches(1)	-1 notch
4 (FS-4, FS-5, FS-6, FS-6 [minus])	N/A(2)	N/A(2)	N/A(2)	N/A(2)
Liquidity (see section I)				
1 (Exceptional)	0 notches	0 notches	0 notches	+1 notch if FP is positive, neutral, FS-4, or FS-5 (3)
2 (Strong)	0 notches	0 notches	0 notches	+1 notch if FP is positive, neutral, FS-4, or FS-5 (3)
3 (Adequate)	0 notches	0 notches	0 notches	0 notches
4 (Less than adequate [4])	N/A	N/A	-1 notch(5)	0 notches
5 (Weak)	N/A	N/A	N/A	'b-' cap on SACP
Management and governance (M&G; see section J)				
1 (Strong)	0 notches	0 notches	0, +1 notches(6)	0, +1 notches(6)
2 (Satisfactory)	0 notches	0 notches	0 notches	0 notches
3 (Fair)	-1 notch	0 notches	0 notches	0 notches
4 (Weak)	-2 or more notches(7)	-2 or more notches(7)	-1 or more notches(7)	-1 or more notches(7)

(1) Number of notches depends on potential incremental leverage. (2) See "Financial Policy," section H.2. (3) Additional notch applies only if we expect liquidity to remain exceptional or strong. (4) See "Methodology And Assumptions: Liquidity Descriptors For Global Corporate Issuers." SACP is capped at 'bb+.' (5) If issuer SACP is 'bb+' due to cap, there is no further notching. (6) This adjustment is one notch if we have not already captured benefits of strong management and governance in the analysis of the issuer's competitive position. (7) Number of notches depends upon the degree of negative effect to the enterprise's risk profile.

Example: How Remaining Modifiers Can Change The Anchor



*After adjusting for diversification/portfolio effect. See paragraph 33.

34. Our analysis of a firm's capital structure assesses risks in the firm's capital structure that may not arise in the review of its cash flow/leverage. These risks include the currency risk of debt, debt maturity profile, interest rate risk of debt, and an investments subfactor. We assess a corporate issuer's capital structure on a scale of 1, very positive; 2, positive; 3, neutral; 4, negative; and 5, very negative. The full treatment of capital structure is the subject of section G.

35. Financial policy serves to refine the view of a company's risks beyond the conclusions arising from the standard assumptions in the cash flow/leverage, capital structure, and liquidity analyses. Those assumptions do not always reflect or adequately capture the long-term risks of a firm's financial policy. The financial policy assessment is, therefore, a measure of the degree to which owner/managerial decision-making can affect the predictability of a company's financial risk profile. We assess financial policy as 1) positive, 2) neutral, 3) negative, or as being owned by a financial sponsor. We further identify financial sponsor-owned companies as "FS-4", "FS-5", "FS-6", or "FS-6 (minus)." The full treatment of financial policy analysis is the subject of section H.

36. Our assessment of liquidity focuses on the monetary flows--the sources and uses of cash--that are the key indicators of a company's liquidity cushion. The analysis also assesses the potential for a company to breach covenant tests tied to declines in earnings before interest, taxes, depreciation, and amortization (EBITDA). The methodology incorporates a qualitative analysis that addresses such factors as the ability to absorb high-impact, low-probability events, the nature of bank relationships, the level of standing in credit markets, and the degree of prudence of the company's financial risk management. The liquidity assessments are 1, exceptional; 2, strong; 3, adequate; 4, less than adequate; and 5, weak. An SACP is capped at 'bb+' for issuers whose liquidity is less than adequate and 'b-' for issuers whose liquidity is weak, regardless of the assessment of any modifiers or comparable ratings analysis. (For the complete methodology on assessing corporate issuers' liquidity, see "Methodology And Assumptions: Liquidity Descriptors For Global Corporate Issuers.")

37. The analysis of management and governance addresses how management's strategic competence, organizational effectiveness, risk management, and governance practices shape the company's competitiveness in the marketplace, the strength of its financial risk management, and the robustness of its governance. The range of management and governance assessments is: 1, strong; 2, satisfactory; 3, fair; and 4, weak. Typically, investment-grade anchor outcomes reflect strong or satisfactory management and governance, so there is no incremental benefit. Alternatively, a fair or weak assessment of management and governance can lead to a lower anchor. Also, a strong assessment for management and governance for a weaker entity is viewed as a favorable factor, under the criteria, and can have a positive impact on the final SACP outcome. For the full treatment of management and governance, see "Methodology: Management And Governance Credit Factors For Corporate Entities."

5. Comparable ratings analysis

38. The anchor, after adjusting for the modifiers, could change one notch up or down in order to arrive at an issuer's SACP based on our comparable ratings analysis, which is a holistic review of a company's stand-alone credit risk profile, in which we evaluate an issuer's credit characteristics in aggregate. A positive assessment leads to a one-notch improvement, a negative assessment leads to a one-notch reduction, and a neutral assessment indicates no change to the anchor. The application of comparable ratings analysis reflects the need to 'fine-tune' ratings outcomes, even after the use of each of the other modifiers. A positive or negative assessment is therefore likely to be common rather than exceptional.

B. Industry Risk

39. The analysis of industry risk addresses the major factors that S&P Global Ratings believes affect the risks that entities face in their respective industries. (See "Methodology: Industry Risk.")

C. Country Risk

40. The analysis of country risk addresses the major factors that S&P Global Ratings believes affect the country where entities operate. Country risks, which include economic, institutional and governance effectiveness, financial system, and payment culture/rule of law risks, influence overall credit risks for every rated corporate entity. (See "Country Risk Assessment Methodology And Assumptions.")

1. Assessing country risk for corporate issuers

41. The following paragraphs explain how the criteria determine the country risk assessment for a corporate entity. Once it's determined, we combine the country risk assessment with the issuer's industry risk assessment to calculate the issuer's CICRA (see section A, table 1). The CICRA is one of the factors of the issuer's business risk profile. If an issuer has very low to intermediate exposure to country risk, as represented by a country risk assessment of 1, 2, or 3, country risk is neutral to an issuer's CICRA. But if an issuer has moderately high to very high exposure to country risk, as represented by a country risk assessment of 4, 5, or 6, the issuer's CICRA could be influenced by its country risk assessment.

42. Corporate entities operating within a single country will receive a country risk assessment for that jurisdiction. For entities with exposure to more than one country, the criteria prospectively measure the proportion of exposure to each country based on forecasted EBITDA, revenues, or fixed assets, or other appropriate financial measures if EBITDA, revenue, or fixed assets do not accurately reflect the exposure to that jurisdiction.

43. Arriving at a company's blended country risk assessment involves multiplying its weighted-average exposures for each country by each country's risk assessment and then adding those numbers. For the weighted-average calculation, the criteria consider countries where the company generates more than 5% of its sales or where more than 5% of its fixed assets are located, and all weightings are rounded to the nearest 5% before averaging. We round the assessment to the nearest integer, so a weighted assessment of 2.2 rounds to 2, and a weighted assessment of 2.6 rounds to 3 (see table 6).

Table 6

Hypothetical Example Of Weighted-Average Country Risk For A Corporate Entity

Country	Weighting (% of business*)	Country risk§	Weighted country risk
Country A	45	1	0.45
Country B	20	2	0.4
Country C	15	1	0.15
Country D	10	4	0.4
Country E	10	2	0.2
Weighted-average country risk assessment (rounded to the nearest whole number)	--	--	2

*Using EBITDA, revenues, fixed assets, or other financial measures as appropriate. §On a scale from 1-6, lowest to highest risk.

44. A weak link approach, which helps us calculate a blended country risk assessment for companies with exposure to more than one country, works as follows: If fixed assets are based in a higher-risk country but products are exported to a lower-risk country, the company's exposure would be to the higher-risk country. Similarly, if fixed assets are based in a lower-risk country but export revenues are generated from a higher-risk country and cannot be easily redirected elsewhere, we measure exposure to the higher-risk country. If a company's supplier is located in a higher-risk country, and its supply needs cannot be easily redirected elsewhere, we measure exposure to the higher-risk country. Conversely, if the supply chain can be re-sourced easily to another country, we would not measure exposure to the higher risk country.

45. Country risk can be mitigated for a company located in a single jurisdiction in the following narrow case. For a company that exports the majority of its products overseas and has no direct exposure to a country's banking system that would affect its funding, debt servicing, liquidity, or ability to transfer payments from or to its key counterparties, we could reduce the country risk assessment by one category (e.g., 5 to 4) to determine the adjusted country risk assessment. This would only apply for countries where we considered the financial system risk subfactor a constraint on the overall country risk assessment for that country. For such a company, other country risks are not mitigated: economic risk still applies, albeit less of a risk than for a company that sells domestically (potential currency volatility remains a risk for exporters); institutional and governance effectiveness risk still applies (political risk may place assets at risk); and payment culture/rule of law risk still applies (legal risks may place assets and cross-border contracts at risk).

46. Companies will often disclose aggregated information for blocks of countries, rather than disclosing individual country information. If the information we need to estimate exposure for all countries is not available, we use regional risk assessments. Regional risk assessments are calculated as averages of the unadjusted country risk assessments, weighted by gross domestic product of each country in a defined region. The criteria assess regional risk on a 1-6 scale (strongest to weakest). Please see Appendix A, Table 26, which lists the constituent countries of the regions.

47. If an issuer does not disclose its country-level exposure or regional-level exposure, its individual country risk exposures or regional exposures will be estimated.

2. Adjusting the country risk assessment for diversity

48. We will adjust the country risk assessment for a company that operates in multiple jurisdictions and demonstrates a high degree of diversity of country risk exposures. As a result of this diversification, the company could have less exposure to country risk than the rounded weighted average of its exposures might indicate. Accordingly, the country risk assessment for a corporate entity could be adjusted if an issuer meets the conditions outlined in paragraph 49.

49. The preliminary country risk assessment is raised by one category to reflect diversity if all of the following four conditions are met:

- If the company's head office, as defined in paragraph 51, is located in a country with a risk assessment stronger than the preliminary country risk assessment;
- If no country, with a country risk assessment equal to or weaker than the company's preliminary country risk assessment, represents or is expected to represent more than 20% of revenues, EBITDA, fixed assets, or other appropriate financial measures;
- If the company is primarily funded at the holding level, or through a finance subsidiary in a similar or stronger country risk environment than the holding company, or if any local funding could be very rapidly substituted at the holding level; and
- If the company's industry risk assessment is '4' or stronger.

50. The country risk assessment for companies that have 75% or more exposure to one jurisdiction cannot be improved and will, in most instances, equal the country risk assessment of that jurisdiction. But the country risk assessment for companies that have 75% or more exposure to one jurisdiction can be weakened if the balance of exposure is to higher risk jurisdictions.

51. We consider the location of a corporate head office relevant to overall risk exposure because it influences the perception of a company and its reputation--and can affect the company's access to capital. We determine the location of the head office on the basis of 'de facto' head office operations rather than just considering the jurisdiction of incorporation or stock market listing for public companies. De facto head office operations refers to the country where executive management and centralized high-level corporate activities occur, including strategic planning and capital raising. If such activities occur in different countries, we take the weakest country risk assessment applicable for the countries in which those activities take place.

D. Competitive Position

52. Competitive position encompasses company-specific factors that can add to, or partly offset, industry risk and country risk--the two other major factors of a company's business risk profile.

53. Competitive position takes into account a company's: 1) competitive advantage, 2) scale, scope, and diversity, 3) operating efficiency, and 4) profitability. A company's strengths and weaknesses on the first three components shape its competitiveness in the marketplace and the sustainability or vulnerability of its revenues and profit. Profitability can either confirm our initial assessment of competitive position or modify it, positively or negatively. A stronger-than-industry-average set of competitive position characteristics will strengthen a company's business risk profile. Conversely, a weaker-than-industry-average set of competitive position characteristics will weaken a company's business risk profile.

54. These criteria describe how we develop a competitive position assessment. They provide guidance on how we assess each component based on a number of subfactors. The criteria define the

weighting rules applied to derive a preliminary competitive position assessment. And they outline how this preliminary assessment can be maintained, raised, or lowered based on a company's profitability. S&P Global Ratings' competitive position analysis is both qualitative and quantitative.

1. The components of competitive position

55. A company's competitive position assessment can be: 1, excellent; 2, strong; 3, satisfactory; 4, fair; 5, weak; or 6, vulnerable.

56. The analysis of competitive position includes a review of:

- Competitive advantage;
- Scale, scope, and diversity;
- Operating efficiency; and
- Profitability.

57. We follow four steps to arrive at the competitive position assessment. First, we separately assess competitive advantage; scale, scope, and diversity; and operating efficiency (excluding any benefits or risks already captured in the issuer's CICRA assessment). Second, we apply weighting factors to these three components to derive a weighted-average assessment that translates into a preliminary competitive position assessment. Third, we assess profitability. Finally, we combine the preliminary competitive position assessment and the profitability assessment to determine the final competitive position assessment. Profitability can confirm, or influence positively or negatively, the competitive position assessment.

58. We assess the relative strength of each of the first three components by reviewing a variety of subfactors (see table 7). When quantitative metrics are relevant and available, we use them to evaluate these subfactors. However, our overall assessment of each component is qualitative. Our evaluation is forward-looking; we use historical data only to the extent that they provide insight into future trends.

59. We evaluate profitability by assessing two subcomponents: level of profitability (measured by historical and projected nominal levels of return on capital, EBITDA margin, and/or sector-specific metrics) and volatility of profitability (measured by historically observed and expected fluctuations in EBITDA, return on capital, EBITDA margin, or sector specific metrics). We assess both subcomponents in the context of the company's industry.

Table 7

Competitive Position Components And Subfactors

Component	Explanation	Subfactors
1. Competitive advantage (see Appendix B, section 1)	The strategic positioning and attractiveness to customers of a company's products or services, and the fragility or sustainability of its business model	• Strategy • Differentiation/uniqueness/product positioning/bundling • Brand reputation and marketing • Product and/or service quality • Barriers to entry and customers' switching costs • Technological advantage and capabilities and vulnerability to/ability to drive technological displacement • Asset base characteristics
2. Scale, scope, and diversity (see Appendix B, section 2)	The concentration or diversification of business activities	• Diversity of products or services • Geographic diversity • Volumes, size of markets and revenues, and market share • Maturity of products or services
3. Operating efficiency (see Appendix B, section 3)	The quality and flexibility of a company's asset base and its cost management and structure	• Cost structure • Manufacturing processes • Working capital management • Technology
4. Profitability		• Level of profitability (historical and projected return on capital, EBITDA margin, and/or sector-relevant measure) • Volatility of profitability

2. Assessing competitive advantage, scale, scope, and diversity, and operating efficiency

60. We assess competitive advantage; scale, scope, and diversity; and operating efficiency as: 1, strong; 2, strong/adequate; 3, adequate; 4, adequate/weak; or 5, weak. Tables 8, 9, and 10 provide guidance for assessing each component.

61. In assessing the components' relative strength, we place significant emphasis on comparative analysis. Peer comparisons provide context for evaluating the subfactors and the resulting component assessment. We review company-specific characteristics in the context of the company's industry, not just its narrower subsector. (See list of industries and subsectors in Appendix B, table 27.) For example, when evaluating an airline, we will benchmark the assessment against peers in the broader transportation-cyclical industry (including the marine and trucking subsectors), and not just against other airlines. Likewise, we will compare a home furnishing manufacturer with other companies in the consumer durables industry, including makers of appliances or leisure products. We might occasionally extend the comparison to other industries if, for instance, a company's business lines cross several industries, or if there are a limited

number of rated peers in an industry, subsector, or region. Additionally, our qualitative assessment of a company's competitive position can be influenced by environmental and social credit factors that, in our view, could positively or negatively affect an obligor's competitive position. If material and sufficiently certain, we could, for example, capture such environmental and social credit factors in the subfactors of brand reputation and cost structure. For example, a negative compliance track record, or the prospect of rapidly increasing pressure with respect to carbon emissions regulation, can result in wide-ranging adverse credit impacts, including a decline in market position and a significant hit to brand reputation.

62. An assessment of strong means that the company's strengths on that component outweigh its weaknesses, and that the combination of relevant subfactors results in lower-than-average business risk in the industry. An assessment of adequate means that the company's strengths and weaknesses with respect to that component are balanced and that the relevant subfactors add up to average business risk in the industry. A weak assessment means that the company's weaknesses on that component override any strengths and that its subfactors, in total, reveal higher-than-average business risk in the industry.

63. Where a component is not clearly strong or adequate, we may assess it as strong/adequate. A component that is not clearly adequate or weak may end up as adequate/weak.

64. Although we review each subfactor, we don't assess each individually--and we seek to understand how they may reinforce or weaken each other. A component's assessment combines the relative strengths and importance of its subfactors. For any company, one or more subfactors can be unusually important--even factors that aren't common in the industry. The industry KCF articles or "Guidance: Corporate Methodology" can identify subfactors that are consistently more important, or happen not to be relevant, in a given industry.

65. Not all subfactors may be equally important, and a single one's strength or weakness may outweigh all the others. For example, if notwithstanding a track record of successful product launches and its strong brand equity, a company's strategy doesn't appear adaptable, in our view, to changing competitive dynamics in the industry, we will likely not assess its competitive advantage as strong. Similarly, if its revenues came disproportionately from a narrow product line, we might view this as compounding its risk of exposure to a small geographic market and, thus, assess its scale, scope, and diversity component as weak.

66. From time to time companies will, as a result of shifting industry dynamics or strategies, expand or shrink their product or service lineups, alter their cost structures, encounter new competition, or have to adapt to new regulatory environments. In such instances, we will reevaluate all relevant subfactors (and component assessments).

Table 8

Competitive Advantage Assessment

Qualifier	What it means	Guidance
Strong	• The company has a major competitive advantage due to one or a combination of factors that supports revenue and profit growth, combined with lower-than-average volatility of profits. • There are strong prospects that the company can sustain this advantage over the long term. • This should enable the company to withstand economic downturns and competitive and technological threats better than its competitors can. • Any weaknesses in one or more subfactors are more than offset by strengths in other subfactors that produce sustainable and profitable revenue growth.	• The company's business strategy is highly consistent with, and adaptable to, industry trends and conditions and supports its leadership in the marketplace. • It consistently develops and markets well-differentiated products or services, aligns products with market demand, and enhances the attractiveness or uniqueness of its value proposition through bundling. • Its superior track record of product development, service quality, and customer satisfaction and retention support its ability to maintain or improve its market share. • Its products or services command a clear price premium relative to its competitors' thanks to its brand equity, technological leadership, or quality of service; it is able to sustain this advantage with innovation and effective marketing. • It benefits from barriers to entry from regulation, market characteristics, or intrinsic benefits (such as patents, technology, or customer relationships) that effectively reduce the threat of new competition. • It has demonstrated a commitment and ability to effectively reinvest in its asset base, as evidenced by a continuous pipeline of new products and/or improvement in key capabilities, such as employee retention, customer care, distribution, and supplier relations. These tangible and intangible assets support long term prospects of sustainable and profitable growth.
Adequate	• The company has some competitive advantages, but not so large as to create a superior business model or durable benefit compared to its peers'. • It has some but not all drivers of competitiveness. Certain factors support the business' long-term viability and should result in average profitability and average profit volatility during recessions or periods of increased competition. However, these drivers are partially offset by the company's disadvantages or lack of sustainability of other factors.	• The company's strategy is well adapted to marketplace conditions, but it is not necessarily a leader in setting industry trends. • It exhibits neither superior nor subpar abilities with respect to product or service differentiation and positioning. • Its products command no price premium or advantage relative to competing brands as a result of its brand equity or its technological positioning. • It may enjoy some barriers to entry that provide some defense against competitors but don't overpower them. It faces some risk of product/service displacement or substitution longer term. • Its metrics of product or service quality and customer satisfaction or retention are in line with its industry's average. The company could lose customers to competitors if it makes operational missteps. • Its asset profile does not exhibit particularly superior or inferior characteristics compared to other industry participants. These assets generate consistent revenue and profit growth although long-term prospects are subject to some uncertainty.

Weak	• The company has few, if any, competitive advantages and a number of competitive disadvantages. • Because the company lacks many competitive advantages, its long-term prospects are uncertain, and its profit volatility is likely to be higher than average for its industry. • The company is less likely than its competitors to withstand economic, competitive, or technological threats. • Alternatively, the company has weaknesses in one or more subfactors that could keep its profitability below average and its profit volatility above average during economic downturns or periods of increased competition.	• The company's strategy is inconsistent with, or not well adapted to, marketplace trends and conditions. • There is evidence of little innovation, slowness in developing and marketing new products, an inability to raise prices, and/or ineffective bundling. • Its products generally enjoy no price premium relative to competing brands and it often has to sell its products at a lower price than its peers can command. • It has suffered or is at risk of suffering customer defections due to falling quality and because customers perceive its products or services to be less valuable than those of its competitors. • Its revenues and market shares are vulnerable to aggressive pricing by existing or new competitors or to technological displacement risks over the near to medium term. • Its metrics of product or service quality and customer satisfaction or retention are weaker than the industry average. • Its reinvestment in its business is lower than its peers', its ability to retain operational talent is limited, its distribution network is inefficient, and its revenue could stagnate or decline as result.

Table 9

Scale, Scope, And Diversity

Qualifier	What it means	Guidance
Strong	• The company's overall scale, scope, and diversity supports stable revenues and profits by rendering it essentially invulnerable to all but the most disruptive combinations of adverse factors, events, or trends. • Its significant advantages in scale, scope, and diversity enable it to withstand economic, regional, competitive, and technological threats better than its competitors can.	• The company's range of products or services is among the most comprehensive in its sector. It derives its revenue and profits from a broader set of products or services than the industry average. • Its products and services enjoy industry-leading market shares relative to other participants in its industry. • It does not rely on a particular customer or small group of customers. If it does, the customer(s) is/are of high credit quality, their demand is highly sustainable, or the company and its customer(s) have significant interdependence. • It does not depend on any particular supplier or related group of suppliers that it could not easily replace. If it does, the supplier(s) is/are of high credit quality, or the company and its supplier(s) have significant interdependence. • It enjoys broader geographic diversity than its peers and doesn't overly depend on a single regional or local market. If it does, the market is local, often for regulatory reasons. The company's production or service centers are diversified across several locations. • It holds a strategic investment that provides positive business diversification.
Adequate	• The company's overall scale, scope, and diversity is comparable to its peers'. • Its ability to withstand economic, competitive, or technological threats is comparable to the ability of others within its sector.	• The company has a broad range of products or services compared with its competitors and doesn't depend on a particular product or service for the majority of its revenues and profits. • Its market share is average compared with that of its competitors. • Its dependence on or concentration of key customers is no higher than the industry average, and the loss of a top customer would be unlikely to pose a high risk to its business stability. • It isn't overly dependent on any supplier or regional group of suppliers that it couldn't easily replace. • It doesn't depend excessively on a single local or regional market, and its geographic footprint of production and revenue compares with that of other industry participants.

Weak	• The company's lack of scale, scope, and diversity compromises the stability and sustainability of its revenues and profits. • The company's vulnerability to, or reliance on, various elements of scale, scope, and diversity leaves it less likely than its competitors to withstand economic, competitive, or technological threats.	• The company's product or service lineup is somewhat limited compared to those of its sector peers. The company derives its profits from a narrow group of products or services, and has not achieved significant market share compared with its peers. • Demand for its products or services is lower than for its competitors', and this trend isn't improving. • It relies heavily on a particular customer or small group of customers, and the characteristics of the customer base do not mitigate this risk. • It depends on a particular supplier or group of suppliers, which it would not be able to easily replace without incurring high switching costs. • It depends disproportionately on a single local or regional economy for selling its goods or services, and the company's industry is global. • Key production assets are concentrated by location, and the company has limited ability to quickly replace them without incurring high costs relative to its profits.

Table 10

Operating Efficiency Assessment

Qualifier	What it means	Guidance
Strong	• The company maximizes revenues and profits via intelligent use of assets and by minimizing costs and increasing efficiency. • The company's cost structure should enable it to withstand economic downturns better than its peers.	• The company has a lower cost structure than its peers resulting in higher profits or margins even if capacity utilization or demand are well below ideal levels and during down economic and industry cycles. • It has demonstrated its ability to efficiently manage fixed and variable costs in cyclical downturns, and has a history of successful and often ongoing cost reductions programs. • Its capacity utilization is close to optimal at the peak of the industry cycle and outperforms the industry average over the cycle. • It has demonstrated that it can pass along increases in input costs and we expect this will continue. • It has a very high ability to adjust production and labor costs in response to changes in demand without repercussions for product quality, or has demonstrated the ability to operate very profitably in a more costly or less flexible labor environment. • Its suppliers have demonstrated an ability to meet swings in demand without causing bottlenecks or quality issues, and can absorb all but the most severe supply chain disruptions. • It has superior working capital management, as evidenced by a consistently better-than-average "cash conversion cycle" and other working capital metrics, supporting higher cash flow and lower funding costs. • Its investments in technology are likely to increase revenue growth and/or improve its cost structure and operating efficiency.

Adequate	• A combination of cost structure and efficiency should support sustainable profits with average profit volatility relative to the company's peers. Its cost structure is similar to its peers'.	• The company has demonstrated the ability to manage some fixed and most variable costs except during periods of extremely weak demand, and has some history of cutting costs in good and bad times. • Its cost structure permits some profitability even if capacity utilization or customer demand is well below ideal levels. The company can at least break even during most of the industry/demand cycle. • Its cost structure is in line with its peers'. For example, its selling, general, and administrative (SG&A) expense as a percent of revenue is similar to its peers' and is likely to be stable. • It has demonstrated an ability to adjust labor costs in most scenarios without hurting product output and quality, or can operate profitability in a more costly or less flexible labor environment; it has some success passing on input cost increases, although perhaps only partially or with time lag. • Its suppliers have met typical swings in demand without causing widespread bottlenecks or quality issues, and the company has some capacity to withstand limited supply chain disruptions. • It has good working capital management, evidenced by its cash conversion cycle and working capital metrics that are on par with its peers'. • Its investments in technology are likely to help it at least maintain its cost structure and current level of operating efficiency.
Weak	• The company's operating efficiency leaves it with lower profitability than its peers' due to lower asset utilization and/or a higher, less flexible cost structure.	• The company's cost structure permits better-than-marginal profitability only if capacity utilization is at the top of the cycle or during periods of strong demand. The company needs solid and sustained industry conditions to generate fair profitability. • It has limited success or capability of managing fixed costs and even most typically variable costs are fixed in the next two to three years. • It has a limited track record of successful cost reductions, such as reducing labor costs in the face of swings in demand, or it has limited ability to pass along increases in input costs. • Its costs are higher than its peers'. For example, the company's SG&A expense as a percent of revenue is above that of its peers, and likely to remain so. • Its suppliers may face bottlenecks or quality issues in the event of modest swings in demand, or have limited technological capabilities. There is evidence that a limited supply chain disruption would make it difficult for suppliers to meet their commitments to the company. • Its working capital management is weak, as evidenced by working capital metrics that are significantly worse than those of its peers, resulting in lower cash flow and higher funding costs. • It lacks investments in technology, which could hurt is revenue growth and/or result in a higher cost structure and less efficient operations relative to its peers'.

3. Determining the preliminary competitive position assessment: Competitive position group profile and category weightings

67. After assessing competitive advantage; scale, scope, and diversity; and operating efficiency, we determine a company's preliminary competitive position assessment by ascribing a specific weight to each component. The weightings depend on the company's Competitive Position Group Profile (CPGP).

68. There are six possible CPGPs: 1) services and product focus, 2) product focus/scale driven, 3) capital or asset focus, 4) commodity focus/cost driven, 5) commodity focus/scale driven, and 6) national industry and utilities (see table 11 for definitions and characteristics).

Table 11

Competitive Position Group Profile (CPGP)

	Definition and characteristics	Examples
Services and product focus	Brands, product quality or technology, and service reputation are typically key differentiating factors for competing in the industry. Capital intensity is typically low to moderate, although supporting the brand often requires ongoing reinvestment in the asset base.	Typically, these are companies in consumer-facing light manufacturing or service industries. Examples include branded drug manufacturers, software companies, and packaged food.
Product focus/scale driven	Product and geographic diversity, as well as scale and market position are key differentiating factors. Sophisticated technology and stringent quality controls heighten risk of product concentration. Product preferences or sales relationships are more important than branding or pricing. Cost structure is relatively unimportant.	The sector most applicable is medical device/equipment manufacturers, particularly at the higher end of the technology scale. These companies largely sell through intermediaries, as opposed to directly to the consumer.
Capital or asset focus	Sizable capital investments are generally required to sustain market position in the industry. Brand identification is of limited importance, although product and service quality often remain differentiating factors.	Heavy manufacturing industries typically fall into this category. Examples include telecom infrastructure manufacturers and semiconductor makers.
Commodity focus/cost driven	Cost position and efficiency of production assets are more important than size, scope, and diversification. Brand identification is of limited importance	Typically, these are companies that manufacture products from natural resources that are used as raw materials by other industries. Examples include forest and paper products companies that harvest timber or produce pulp, packaging paper, or wood products.
Commodity focus/scale driven	Pure commodity companies have little product differentiation, and tend to compete on price and availability. Where present, brand recognition or product differences are secondary or of less importance.	Examples range from pure commodity producers and most oil and gas upstream producers, to some producers with modest product or brand differentiation, such as commodity foods.
National industries and utilities	Government policy or control, regulation, and taxation and tariff policies significantly affect the competitive dynamics of the industry (see paragraphs 72-73).	An example is a water-utility company in an emerging market.

69. The nature of competition and key success factors are generally prescribed by industry characteristics, but vary by company. Where service, product quality, or brand equity are important competitive factors, we'll give the competitive advantage component of our overall assessment a higher weighting. Conversely, if the company produces a commodity product, differentiation comes less into play, and we will more heavily weight scale, scope, and diversity as well as operating efficiency (see table 12).

Table 12

Competitive Position Group Profiles (CPGPs) And Category Weightings

Component	--(%)--					
	Services and product focus	**Product focus/scale driven**	**Capital or asset focus**	**Commodity focus/cost driven**	**Commodity focus/scale driven**	**National industries and utilities**
1. Competitive advantage	45	35	30	15	10	60
2. Scale, scope, and diversity	30	50	30	35	55	20
3. Operating efficiency	25	15	40	50	35	20
Total	100	100	100	100	100	100
Weighted-average assessment*	1.0-5.0	1.0-5.0	1.0-5.0	1.0-5.0	1.0-5.0	1.0-5.0

*1 (strong), 2 (strong/adequate), 3 (adequate), 4 (adequate/weak), 5 (weak).

70. We place each of the defined industries (see Appendix B, table 27) into one of the six CPGPs (see above and Appendix B, table 27). This is merely a starting point for the analysis, since we recognize that some industries are less homogenous than others, and that company-specific strategies do affect the basis of competition.

71. In fact, the criteria allow for flexibility in selecting a company's group profile (with its category weightings). Reasons for selecting a profile different than the one suggested in the guidance table could include:

- The industry is heterogeneous, meaning that the nature of competition differs from one subsector to the next, and possibly even within subsectors. The KCF article for the industry or the relevant section in "Guidance: Corporate Methodology" will identify such circumstances.
- A company's strategy could affect the relative importance of its key factors of competition.

72. For example, the standard CPGP for the telecom and cable industry is services and product focus. While this may be an appropriate group profile for carriers and service providers, an infrastructure provider may be better analyzed under the capital or asset focus group profile. Other examples: In the capital goods industry, a construction equipment rental company may be analyzed under the capital or asset focus group profile, owing to the importance of efficiently managing the capital spending cycle in this segment of the industry, whereas a provider of hardware, software, and services for industrial automation might be analyzed under the services and product focus group profile, if we believe it can achieve differentiation in the marketplace based on product performance, technology innovation, and service.

73. In some industries, the effects of government policy, regulation, government control, and taxation and tariff policies can significantly alter the competitive dynamics, depending on the country in which a company operates. That can alter our assessment of a company's competitive advantage; scale, size, and diversity; or operating efficiency. When industries in given countries have risks that differ materially from those captured in our global industry risk profile and assessment (see "Methodology: Industry Risk," section B), we will weight competitive advantage more heavily to capture the effect, positive or negative, on competitive dynamics. The assessment of competitive advantage; scale, size, and diversity; and operating efficiency will reflect advantages or disadvantages based on these national industry risk factors. Table 13 identifies the circumstances under which national industry risk factors are positive or negative.

Table 13

National Industry Risk Factors	
National industry risk factors are positive	• Government policy including regulation, ownership, and taxation is supportive and has a good track record of mitigating risks to the stability of industry margins. • Any government ownership, tariff, and taxation policy supports growth prospects for revenues and profit generation. • There is very little discernible risk of negative policy, regulatory, ownership, or taxation changes that could threaten business stability.
National industry risk factors are negative	• Government policy and regulation has a weak track record of stabilizing margins and reducing industry risks. • Any government ownership, tariff, and taxation policy undermine growth prospects for revenues and profit generation. • There is an increasing risk of negative policy, ownership, and taxation changes that could undermine industry stability.

74. When national industry risk factors are positive for a company, typically they support revenue growth, profit growth, higher EBITDA margins, and/or lower-than-average volatility of profits. Often, these benefits provide barriers to entry that impede or even bar new market entrants, which should be reflected in the competitive advantage assessment. These benefits may also include risk mitigants that enable a company to withstand economic downturns and competitive and technological threats better in its local markets than its global competitors can. The scale, scope, and diversity assessment might also benefit from these policies if the company is able to withstand economic, regional, competitive, and technological threats better than its global competitors can. Likewise, the company's operating efficiency assessment may improve if, as a result, it is better able than its global competitors to withstand economic downturns, taking into account its cost structure.

75. Conversely, when national industry risk factors are negative for a company, typically they detract from revenue growth and profit growth, shrink EBITDA margins, and/or increase the average volatility of profits. The company may also have less protection against economic downturns and competitive and technological threats within its local markets than its global competitors do. We may also adjust the company's scale, scope, and diversity assessment lower if, as a result of these policies, it is less able to withstand economic, regional, competitive, and technological threats than its global competitors can. Likewise, we may adjust its operating efficiency assessment lower if, as a result of these policies, it is less able to withstand economic downturns, taking into account the company's cost structure.

76. An example of when we might use a national industry risk factor would be for a telecommunications network owner that benefits from a monopoly network position, supported by substantial capital barriers to entry, and as a result is subject to regulated pricing for its services. Accordingly, in contrast to a typical telecommunications company, our analysis of the company's competitive position would focus more heavily on the monopoly nature of its operations, as well as the nature and reliability of the operator's regulatory framework in supporting future revenue and earnings. If we viewed the regulatory framework as being supportive of the group's future earnings stability, and we considered its monopoly position to be sustainable, we would assess these

national industry risk factors as positive in our assessment of the group's competitive position.

77. The weighted average assessment translates into the preliminary competitive position assessment on a scale of 1 to 6, where one is best. Table 14 describes the matrix we use to translate the weighted average assessment of the three components into the preliminary competitive position assessment.

Table 14

Translation Table For Converting Weighted-Average Assessments Into Preliminary Competitive Position Assessments

Weighted average assessment range	Preliminary competitive position assessment
1.00 – 1.50	1
>1.50 – 2.25	2
>2.25 – 3.00	3
>3.00 – 3.75	4
>3.75 – 4.50	5
>4.50 – 5.00	6

4. Assessing profitability

78. We assess profitability on the same scale of 1 to 6 as the competitive position assessment.

79. The profitability assessment consists of two subcomponents: level of profitability and the volatility of profitability, which we assess separately. We use a matrix to combine these into the final profitability assessment.

a) Level of profitability

80. The level of profitability is assessed in the context of the company's industry. We most commonly measure profitability using return on capital (ROC) and EBITDA margins, but we may also use sector-specific ratios. Importantly, as with the other components of competitive position, we review profitability in the context of the industry in which the company operates, not just in its narrower subsector. (See list of industries and subsectors in Appendix B, table 27.)

81. We assess level of profitability on a three-point scale: above average, average, and below average. We may establish numeric guidance, for instance by stating that an ROC above 12% is considered above average, between 8%-12% is average, and below 8% is below average for the industry, or by differentiating between subsectors in the industry. In the absence of numeric guidance, we compare a company against its peers across the industry. When establishing numeric guidance for assessing profitability within an industry or subsector, we typically consider the distribution of profitability measures across rated issuers in the sector. Depending on the shape of the distribution, we choose logical breakpoints between above average, average, and below average profitability. For instance, for a distribution that resembles a normal curve, we typically assess the top quartile of the relevant profitability indicator to be above average, the two middle quartiles average, and the bottom quartile below average. For a relatively flat distribution curve, we typically assess the top third to be above average, the middle third to be average, and the bottom third to be below average. We also may take averages of historical data or adjust the thresholds between the three ranges to consider factors such as variation over the business cycle and across regions. Finally, we may incorporate our expertise in the sector to adjust for underlying M&A trends or

other distortions, as appropriate.

82. We calculate profitability ratios generally based on a five-year average, consisting of two years of historical data, our projections for the current year (incorporating any reported year-to-date results and estimates for the remainder of the year), and the next two financial years. There may be situations where we consider longer or shorter historical results or forecasts, depending on such factors as availability of financials, transformational events (such as mergers or acquisitions [M&A]), cyclical distortion (such as peak or bottom of the cycle metrics that we do not deem fully representative of the company's level of profitability), and we take into account improving or deteriorating trends in profitability ratios in our assessment. For example, a company's profitability trend may be forecast to decline over the next two years because of levied carbon taxes and our anticipation that such carbon tax rates will increase each year as regulations tighten.

b) Volatility of profitability

83. We base the volatility of profitability on the standard error of the regression (SER) for a company's historical EBITDA, EBITDA margins, or return on capital. The KCF articles and "Guidance: Corporate Methodology" detail which measures are most appropriate for a given industry or set of companies. For each of these measures, we divide the standard error by the average of that measure over the time period in order to ensure better comparability across companies.

84. The SER is a statistical measure that is an estimate of the deviation around a 'best fit' linear trend line. We regress the company's EBITDA, EBITDA margins, or return on capital against time. A key advantage of SER over standard deviation or coefficient of variation is that it doesn't view upwardly trending data as inherently more volatile. At the same time, we recognize that SER, like any statistical measure, may understate or overstate expected volatility and thus we will make qualitative adjustments where appropriate (see paragraphs 86-90). Furthermore, we only calculate SER when companies have at least seven years of historical annual data and have not significantly changed their line of business during the timeframe, to ensure that the results are meaningful.

85. As with the level of profitability, we evaluate a company's SER in the context of its industry group. For most industries, we establish a six-point scale with 1 capturing the least volatile companies, i.e., those with the lowest SERs, and 6 identifying companies whose profits are most volatile. We have established industry-specific SER parameters using the most recent seven years of data for companies within each sector. We believe that seven years is generally an adequate number of years to capture a business cycle. (See "Guidance: Corporate Methodology" for industry-specific SER parameters.) For companies whose business segments cross multiple industries, we evaluate the SER in the context of the organization's most dominant industry--if that industry represents at least two-thirds of the organization's EBITDA, sales, or other relevant metric. If the company is a conglomerate and no dominant industry can be identified, we will evaluate its profit volatility in the context of SER guidelines for all nonfinancial companies.

86. In certain circumstances, the SER derived from historical information may understate--or overstate--expected future volatility, and we may adjust the assessment downward or upward. The scope of possible adjustments depends on certain conditions being met as described below.

87. We might adjust the SER-derived volatility assessment to a worse assessment (i.e., to a higher assessment for greater volatility) by up to two categories if the expected level of volatility isn't apparent in historical numbers, and the company either:

- Has a weighted country risk assessment of 4 or worse, which may, notwithstanding past performance, result in a less stable business environment going forward;

- Operates in a subsector of the industry that may be prone to higher technology or regulation changes, or other potential disruptive risks that have not emerged over the seven year period;
- Is of limited size and scope, which will often result in inherently greater vulnerability to external changes; or
- Has pursued material M&A or internal growth projects that obscure the company's underlying performance trend line. As an example, a company may have consummated an acquisition during the trough of the cycle, masking what would otherwise be a significant decline in performance.

88. The choice of one or two categories depends on the degree of likelihood that the related risks will materialize and our view of the likely severity of these risks.

89. Conversely, we may adjust the SER-derived volatility assessment to a better assessment (i.e., to a lower assessment reflecting lower volatility) by up to two categories if we observe that the conditions historically leading to greater volatility have receded and are misrepresentative. This will be the case when:

- The company grew at a moderately faster, albeit more uneven, pace relative to the industry. Since we measure volatility around a linear trend line, a company growing at a constant percentage of moderate increase (relative to the industry) or an uneven pace (e.g., due to "lumpy" capital spending programs) could receive a relatively unfavorable assessment on an unadjusted basis, which would not be reflective of the company's performance in a steady state. (Alternatively, those companies that grow at a significantly higher-than-average industry rate often do so on unsustainable rates of growth or by taking on high-risk strategies. Companies with these high-risk growth strategies would not receive a better assessment and could be adjusted to a worse assessment;)
- The company's geographic, customer, or product diversification has increased in scope as a result of an acquisition or rapid expansion (e.g. large, long-term contracts wins), leading to more stability in future earnings in our view; or
- The company's business model is undergoing material change that we expect will benefit earnings stability, such as a new regulatory framework or major technology shift that is expected to provide a significant competitive hedge and margin protection over time.
- The company has experienced a sharp drop in demand for its products and services due to the materialization of social credit factors related to health and safety, such as a pandemic, which had a significant negative impact on commercial activity for a period of time, but which we view as temporary and not indicative of future earnings trends.
-

90. The choice of one or two categories depends on the degree of likelihood that the related risks will materialize and our view of the likely severity of these risks.

91. If the company either does not have at least seven years of annual data or has materially changed its business lines or undertaken abnormally high levels of M&A during this time period, then we do not use its SER to assess the volatility of profitability. In these cases, we use a proxy to establish the volatility assessment. If there is a peer company that has, and is expected to continue having, very similar profitability volatility characteristics, we use the SER of that peer entity as a proxy.

92. If no such matching peer exists, or one cannot be identified with enough confidence, we perform an assessment of expected volatility based on the following rules:

- An assessment of 3 if we expect the company's profitability, supported by available historical evidence, will exhibit a volatility pattern in line with, or somewhat less volatile than, the industry

average.

- An assessment of 2 based on our confidence, supported by available historical evidence, that the company will exhibit lower volatility in profitability metrics than the industry's average. This could be underpinned by some of the factors listed in paragraph 89, whereas those listed in paragraph 87 would typically not apply.
- An assessment of 4 or 5 based on our expectation that profitability metrics will exhibit somewhat higher (4), or meaningfully higher (5) volatility than the industry, supported by available historical evidence, or because of the applicability of possible adjustment factors listed in paragraph 87.
- Assessments of either 1 or 6 are rarely assigned and can only be achieved based on a combination of data evidence and very high confidence tests. For an assessment of 1, we require strong evidence of minimal volatility in profitability metrics compared with the industry, supported by at least five years of historical information, combined with a very high degree of confidence that this will continue in the future, including no country risk, subsector risk or size considerations that could otherwise warrant a worse assessment as per paragraph 87. For an assessment of 6 we require strong evidence of very high volatility in profitability metrics compared with the industry, supported by at least five years of historical information and very high confidence that this will continue in the future.

93. Next, we combine the level of profitability assessment with the volatility assessment to determine the final profitability assessment using the matrix in Table 15.

Table 15

Profitability Assessment

	--Volatility of profitability assessment--					
Level of profitability assessment	**1**	**2**	**3**	**4**	**5**	**6**
Above average	1	1	2	3	4	5
Average	1	2	3	4	5	6
Below average	2	3	4	5	6	6

5. Combining the preliminary competitive position assessment with profitability

94. The fourth and final step in arriving at a competitive position assessment is to combine the preliminary competitive position assessment with the profitability assessment. We use the combination matrix in Table 16, which shows how the profitability assessment can confirm, strengthen, or weaken (by up to one category) the overall competitive position assessment.

Table 16

Combining The Preliminary Competitive Position Assessment And Profitability Assessment

	--Preliminary competitive position assessment--					
Profitability assessment	**1**	**2**	**3**	**4**	**5**	**6**
1	1	2	2	3	4	5
2	1	2	3	3	4	5

Table 16

Combining The Preliminary Competitive Position Assessment And Profitability Assessment (cont.)

	--Preliminary competitive position assessment--					
Profitability assessment	**1**	**2**	**3**	**4**	**5**	**6**
3	2	2	3	4	4	5
4	2	3	3	4	5	5
5	2	3	4	4	5	6
6	2	3	4	5	5	6

95. We generally expect companies with a strong preliminary competitive position assessment to exhibit strong and less volatile profitability metrics. Conversely, companies with a relatively weaker preliminary competitive position assessment will generally have weaker and/or more volatile profitability metrics. Our analysis of profitability helps substantiate whether management is translating any perceived competitive advantages, diversity benefits, and cost management measures into higher earnings and more stable return on capital and return on sales ratios than the averages for the industry. When profitability differs markedly from what the preliminary/anchor competitive position assessment would otherwise imply, we adjust the competitive position assessment accordingly.

96. Our method of adjustment is biased toward the preliminary competitive position assessment rather than toward the profitability assessment (e.g., a preliminary competitive assessment of 6 and a profitability assessment of 1 will result in a final assessment of 5).

E. Cash Flow/Leverage

97. The pattern of cash flow generation, current and future, in relation to cash obligations is often the best indicator of a company's financial risk. The criteria assess a variety of credit ratios, predominately cash flow-based, which complement each other by focusing on the different levels of a company's cash flow waterfall in relation to its obligations (i.e., before and after working capital investment, before and after capital expenditures, before and after dividends), to develop a thorough perspective. Moreover, the criteria identify the ratios that we think are most relevant to measuring a company's credit risk based on its individual characteristics and its business cycle.

98. For the analysis of companies with intermediate or stronger cash flow/leverage assessments (a measure of the relationship between the company's cash flows and its debt obligations as identified in paragraphs 106 and 124), we primarily evaluate cash flows that reflect the considerable flexibility and discretion over outlays that such companies typically possess. For these entities, the starting point in the analysis is cash flows before working capital changes plus capital investments in relation to the size of a company's debt obligations in order to assess the relative ability of a company to repay its debt. These "leverage" or "payback" cash flow ratios are a measure of how much flexibility and capacity the company has to pay its obligations.

99. For entities with significant or weaker cash flow/leverage assessments (as identified in paragraphs 105 and 124), the criteria also call for an evaluation of cash flows in relation to the carrying cost or interest burden of a company's debt. This will help us assess a company's relative and absolute ability to service its debt. These "coverage"- or "debt service"-based cash flow ratios are a measure of a company's ability to pay obligations from cash earnings and the cushion the company possesses through stress periods. These ratios, particularly interest coverage ratios, become more important the further a company is down the credit spectrum.

1. Assessing cash flow/leverage

100. Under the criteria, we assess cash flow/leverage as 1, minimal; 2, modest; 3, intermediate; 4, significant; 5, aggressive; or 6, highly leveraged. To arrive at these assessments, the criteria combine the assessments of a variety of credit ratios, predominately cash flow-based, which complement each other by focusing attention on the different levels of a company's cash flow waterfall in relation to its obligations. For each ratio, there is an indicative cash flow/leverage assessment that corresponds to a specified range of values in one of three given benchmark tables (see tables 17, 18, and 19). We derive the final cash flow/leverage assessment for a company by determining the relevant core ratios, anchoring a preliminary cash flow assessment based on the relevant core ratios, determining the relevant supplemental ratio(s), adjusting the preliminary cash flow assessment according to the relevant supplemental ratio(s), and, finally, modifying the adjusted cash flow/leverage assessment for any material volatility.

2. Core and supplemental ratios

a) Core ratios

101. For each company, we calculate two core credit ratios--funds from operations (FFO) to debt and debt to EBITDA--in accordance with S&P Global Ratings' ratios and adjustments criteria (see "Corporate Methodology: Ratios And Adjustments"). We compare these payback ratios against benchmarks to derive the preliminary cash flow/leverage assessment for a company. These ratios are also useful in determining the relative ranking of the financial risk of companies.

b) Supplemental ratios

102. The criteria also consider one or more supplemental ratios (in addition to the core ratios) to help develop a fuller understanding of a company's financial risk profile and fine-tune our cash flow/leverage analysis. Supplemental ratios could either confirm or adjust the preliminary cash flow/leverage assessment. The confirmation or adjustment of the preliminary cash flow/leverage assessment will depend on the importance of the supplemental ratios as well as any difference in indicative cash flow/leverage assessment between the core and supplemental ratios as described in section E.3.b.

103. The criteria typically consider five standard supplemental ratios, although the relevant KCF article or "Guidance: Corporate Methodology" may introduce additional supplemental ratios or focus attention on one or more of the standard supplemental ratios. The standard supplemental ratios include three payback ratios--cash flow from operations (CFO) to debt, free operating cash flow (FOCF) to debt, and discretionary cash flow (DCF) to debt--and two coverage ratios, FFO plus interest paid to cash interest paid and EBITDA to interest.

104. The criteria provide guidelines as to the relative importance of certain ratios if a company exhibits characteristics such as high leverage, working capital intensity, capital intensity, or high growth.

105. If the preliminary cash flow/leverage assessment is significant or weaker (see section E.3), then two coverage ratios, FFO plus cash interest paid to cash interest paid and EBITDA to interest, will be given greater importance as supplemental ratios. For the definition of these metrics please see "Corporate Methodology: Ratios And Adjustments".

106. If the preliminary cash flow/leverage assessment is intermediate or stronger, the criteria first

apply the three standard supplemental ratios of CFO to debt, FOCF to debt, and DCF to debt. When FOCF to debt and DCF to debt indicate a cash flow/leverage assessment that is lower than the other payback-ratio-derived cash flow/leverage assessments, it signals that the company has either larger than average capital spending or other non-operating cash distributions (including dividends). If these differences persist and are consistent with a negative trend in overall ratio levels, which we believe is not temporary, then these supplemental leverage ratios will take on more importance in the analysis.

107. If the supplemental ratios indicate a cash flow/leverage assessment that is different than the preliminary cash flow/leverage assessment, it could suggest an unusual debt service or fixed charge burden, working capital or capital expenditure profile, or unusual financial activity or policies. In such cases, we assess the sustainability or persistence of these differences. For example, if either working capital or capital expenditures are unusually low, leading to better indicated assessments, we examine the sustainability of such lower spending in the context of its impact on the company's longer term competitive position. If there is a deteriorating trend in the company's asset base, we give these supplemental ratios less weight. If either working capital or capital expenditures are unusually high, leading to weaker indicated assessments, we examine the persistence and need for such higher spending. If elevated spending levels are required to maintain a company's competitive position, for example to maintain the company's asset base, we give more weight to these supplemental ratios.

108. For capital-intensive companies, EBITDA and FFO may overstate financial strength, whereas FOCF may be a more accurate reflection of their cash flow in relation to their financial obligations. The criteria generally consider a capital-intensive company as having ongoing capital spending to sales of greater than 10%, or depreciation to sales of greater than 8%. For these companies, the criteria place more weight on the supplementary ratio of FOCF to debt. Where we place more analytic weight on FOCF to debt, we also seek to estimate the amount of maintenance or full cycle capital required (see Appendix C) under normal conditions (we estimate maintenance or full-cycle capital expenditure required because this is not a reported number). The FOCF figure may be adjusted by adding back estimated discretionary capital expenditures. The adjusted FOCF to debt based on maintenance or full cycle capital expenditures often helps determine how much importance to place on this ratio. If both the FOCF to debt and the adjusted (for estimated discretionary capital spending) FOCF to debt derived assessments are different from the preliminary cash/flow leverage assessment, then these supplemental leverage ratios take on more importance in the analysis.

109. For working-capital-intensive companies, EBITDA and FFO may also overstate financial strength, and CFO may be a more accurate measure of the company's cash flow in relation to its financial risk profile. Under the criteria, if a company has a working capital-to-sales ratio that exceeds 25% or if there are significant seasonal swings in working capital, we generally consider it to be working-capital-intensive. For these companies, the criteria place more emphasis on the supplementary ratio of CFO to debt. Examples of companies that have working-capital-intensive characteristics can be found in the capital goods, metals and mining downstream, or the retail and restaurants industries. The need for working capital in those industries reduces financial flexibility and, therefore, these supplemental leverage ratios take on more importance in the analysis.

110. For all companies, when FOCF to debt or DCF to debt is negative or indicates materially lower cash flow/leverage assessments, the criteria call for an examination of management's capital spending and cash distribution strategies. For high-growth companies, typically the focus is on FFO to debt instead of FOCF to debt because the latter ratio can vary greatly depending on the growth investment the company is undergoing. The criteria generally consider a high-growth company one that exhibits real revenue growth in excess of 8% per year. Real revenue growth excludes price

or foreign exchange related growth, under these criteria. In cases where FOCF or DCF is low, there is a greater emphasis on monitoring the sustainability of margins and return on capital and the overall financing mix to assess the likely trend of future debt ratios. In addition, debt service ratio analysis will be important in such situations. For companies with more moderate growth, the focus is typically on FOCF to debt unless the capital spending is short term or is not funded with debt.

111. For companies that have ongoing and well entrenched banking relationships we can reflect these relationships in our cash flow/leverage analysis through the use of the interest coverage ratios as supplemental ratios. These companies generally have historical links and a strong ongoing relationship with their main banks, as well as shareholdings by the main banks, and management influence and interaction between the main banks and the company. Based on their bank relationships, these companies often have lower interest servicing costs than peers, even if the macro economy worsens. In such cases, we generally use the interest coverage ratios as supplemental ratios. This type of banking relationship occurs in Japan, for example, where companies that have the type of bank relationship described in this paragraph tend to have a high socioeconomic influence within their country by way of their revenue size, total debt quantum, number of employees, and the relative importance of the industry.

c) Time horizon and ratio calculation

112. A company's credit ratios may vary, often materially, over time due to economic, competitive, technological, or investment cycles, the life stage of the company, and corporate or strategic actions. Thus, we evaluate credit ratios on a time series basis with a clear forward-looking bias. The length of the time series is dependent on the relative credit risk of the company and other qualitative factors and the weighting of the time series varies according to transformational events. A transformational event is any event that could cause a material change in a company's financial profile, whether caused by changes to the company's capital base, capital structure, earnings, cash flow profile, or financial policies. Transformational events can include mergers, acquisitions, divestitures, management changes, structural changes to the industry or competitive environment, product development and capital programs, and/or business disruptions, including those that arise from the materialization of substantial environmental or social risks. This section provides guidance on the timeframe and weightings the criteria apply to calculate the indicative ratios.

113. The criteria generally consider the company's credit ratios for the previous one to two years, current-year forecast, and the two subsequent forecasted financial years. There may be situations where longer--or even shorter--historical results or forecasts are appropriate, depending on such factors as availability of financials, transformational events, or relevance. For example, a utility company with a long-term capital spending program may lend itself to a longer-term forecast, whereas for a company experiencing a near-term liquidity squeeze even a two-year forecast will have limited value. Alternatively, for most commodities-based companies we emphasize credit ratios based on our forward-looking view of market conditions, which may differ materially from the historical period.

114. Historical patterns in cash flow ratios are informative, particularly in understanding past volatility, capital spending, growth, accounting policies, financial policies, and business trends. Our analysis starts with a review of these historical patterns in order to assess future expected credit quality. Historical patterns can also provide an indication of potential future volatility in ratios, including that which results from seasonality or cyclicality. A history of volatility could result in a more conservative assessment of future cash flow generation if we believe cash flow will continue to be volatile.

115. The forecast ratios are based on an expected base-case scenario developed by S&P Global Ratings, incorporating current and near-term economic conditions, industry assumptions, and financial policies. The prospective cyclical and longer-term volatility associated with the industry in which the issuer operates is addressed in the industry risk criteria (see section B) and the longer-term directional influence or event risk of financial policies is addressed in our financial policy criteria (see section H).

116. The criteria generally place greater emphasis on forecasted years than historical years in the time series of credit ratios when calculating the indicative credit ratio. For companies where we have five years of ratios as described in section E.3, generally we calculate the indicative ratio by weighting the previous two years, the current year, and the forecasted two years as 10%, 15%, 25%, 25%, and 25%, respectively.

117. This weighting changes, however, to place even greater emphasis on the current and forecast years when:

- The issuer meets the characteristics described in paragraph 113, and either shorter- or longer-term forecasts are applicable. The weights applied will generally be quite forward weighted, particularly if a company is undergoing a transformational event and there is moderate or better cash flow certainty.
- The issuer is forecast to generate negative cash flow available for debt repayment, which we believe could lead to deteriorating credit metrics. Forecast negative cash flows could be generated from operating activities as well as capital expenditures, share buybacks, dividends, or acquisitions, as we forecast these uses of cash based on the company's track record, market conditions, or financial policy. The weights applied will generally be 30%, 40%, and 30% for the current and two subsequent years, respectively.
- The issuer is in an industry that is prospectively volatile or that has a high degree of cash flow uncertainty. Industries that are prospectively volatile are industries whose competitive risk and growth assessments are either high risk (5) or very high risk (6) or whose overall industry risk assessments are either high risk (5) or very high risk (6). The weights applied will generally be 50% for the current year and 50% for the first subsequent forecast year.
- An issuer experienced a significant business disruption due to exceptional events that are temporary and are not assumed to be repeated. These circumstances may stem, for example, from the materialization of environmental or social credit factors (e.g. an epidemic or pandemic health event, or man-made or natural environmental disaster). In such cases, we may take the view that historical financial performance is not indicative of the issuer's current and future earnings trends and put more weight on future year ratios.

118. When the indicative ratio(s) is borderline (i.e., less than 10% different from the threshold in relative terms) between two assessment thresholds (as described in section E.3 and tables 17, 18, and 19) and the forecast points to a switch in the ratio between categories during the rating timeframe, we will weigh the forecast even more heavily in order to prospectively capture the trend.

119. For companies undergoing a transformational event, the weighting of the time series could vary significantly.

120. For companies undergoing a transformational event and with significant or weaker cash flow/leverage assessments, we place greater weight on near-term risk factors. That's because overemphasis on longer-term (inherently less predictable) issues could lead to some distortion when assessing the risk level of a speculative-grade company. We generally analyze a company using the arithmetic mean of the credit ratios expected according to our forecasts for the current

year (or pro forma current year) and the subsequent financial year. A common example of this is when a private equity firm acquires a company using additional debt leverage, which makes historical financial ratios meaningless. In this scenario, we weight or focus the majority of our analysis on the next one or two years of projected credit measures.

3. Determining the cash flow/leverage assessment

a) Identifying the benchmark table

121. Tables 17, 18, and 19 provide benchmark ranges for various cash flow ratios we associate with different cash flow/leverage assessments for standard volatility, medial volatility, and low volatility industries. The tables of benchmark ratios differ for a given ratio and cash flow/leverage assessment along two dimensions: the starting point for the ratio range and the width of the ratio range.

122. If an industry exhibits low volatility, the threshold levels for the applicable ratios to achieve a given cash flow/leverage assessment are less stringent than those in the medial or standard volatility tables, although the range of the ratios is narrower. Conversely, if an industry exhibits medial or standard levels of volatility, the threshold for the applicable ratios to achieve a given cash flow/leverage assessment are elevated, albeit with a wider range of values.

123. The relevant benchmark table for a given company is based on our Corporate Industry and Country Risk Assessment, or the CICRA (see section A, table 1), as described in the bullet points below, unless otherwise indicated in a sector's KCF criteria or in "Guidance: Corporate Methodology."

- The low volatility table (table 19) will generally apply when a company's CICRA is '1' but can infrequently also apply to a company with a CICRA of '2' if the company exhibits or is expected to exhibit low levels of volatility.
- The medial volatility table (table 18) will generally apply for a company with a CICRA of '2' but can infrequently also apply to a company with a CICRA of '1' if the company exhibits or is expected to exhibit medial levels of volatility.
- The standard volatility table (table 17) serves as the relevant benchmark table for all CICRA scores other than '1', but we will always use it for companies with a CICRA of '1' or '2' whose competitive position is assessed as '5' or '6'.

Table 17

Cash Flow/Leverage Analysis Ratios--Standard Volatility

	--Core ratios--		--Supplementary coverage ratios--		--Supplementary payback ratios--		
	FFO/debt (%)	Debt/EBITDA (x)	FFO/cash interest(x)	EBITDA/interest (x)	CFO/debt (%)	FOCF/debt (%)	DCF/debt (%)
Minimal	60+	Less than 1.5	More than 13	More than 15	More than 50	40+	25+
Modest	45-60	1.5-2	9-13	10-15	35-50	25-40	15-25
Intermediate	30-45	2-3	6-9	6-10	25-35	15-25	10-15
Significant	20-30	3-4	4-6	3-6	15-25	10-15	5-10
Aggressive	12-20	4-5	2-4	2-3	10-15	5-10	2-5

Table 17

Cash Flow/Leverage Analysis Ratios--Standard Volatility (cont.)

	--Core ratios--		--Supplementary coverage ratios--		--Supplementary payback ratios--		
	FFO/debt (%)	Debt/EBITDA (x)	FFO/cash interest(x)	EBITDA/interest (x)	CFO/debt (%)	FOCF/debt (%)	DCF/debt (%)
Highly leveraged	Less than 12	Greater than 5	Less than 2	Less than 2	Less than 10	Less than 5	Less than 2

Table 18

Cash Flow/Leverage Analysis Ratios--Medial Volatility

	--Core ratios--		--Supplementary coverage ratios--		--Supplementary payback ratios--		
	FFO/debt (%)	Debt/EBITDA (x)	FFO/cash interest (x)	EBITDA/interest (x)	CFO/debt (%)	FOCF/debt (%)	DCF/debt (%)
Minimal	50+	less than 1.75	10.5+	14+	40+	30+	18+
Modest	35-50	1.75-2.5	7.5-10.5	9-14	27.5-40	17.5-30	11-18
Intermediate	23-35	2.5-3.5	5-7.5	5-9	18.5-27.5	9.5-17.5	6.5-11
Significant	13-23	3.5-4.5	3-5	2.75-5	10.5-18.5	5-9.5	2.5-6.5
Aggressive	9-13	4.5-5.5	1.75-3	1.75-2.75	7-10.5	0-5	(11)-2.5
Highly leveraged	Less than 9	Greater than 5.5	Less than 1.75	Less than 1.75	Less than 7	Less than 0	Less than (11)

Table 19

Cash Flow/Leverage Analysis Ratios--Low Volatility

	--Core ratios--		--Supplementary coverage ratios--		--Supplementary payback ratios--		
	FFO/debt (%)	Debt/EBITDA (x)	FFO/cash interest (x)	EBITDA/interest (x)	CFO/debt (%)	FOCF/debt (%)	DCF/debt (%)
Minimal	35+	Less than 2	More than 8	More than 13	More than 30	20+	11+
Modest	23-35	2-3	5-8	7-13	20-30	10-20	7-11
Intermediate	13-23	3-4	3-5	4-7	12-20	4-10	3-7
Significant	9-13	4-5	2-3	2.5-4	8-12	0-4	0-3
Aggressive	6-9	5-6	1.5-2	1.5-2.5	5-8	(10)-0	(20)-0
Highly leveraged	Less than 6	Greater than 6	Less than 1.5	Less than 1.5	Less than 5	Less than (10)	Less than (20)

b) Aggregating the credit ratio assessments

124. To determine the final cash flow/leverage assessment, we make these calculations:
1) First, calculate a time series of standard core and supplemental credit ratios, select the relevant benchmark table, and determine the appropriate time weighting of the credit ratios.

- Calculate the two standard core credit ratios and the five standard supplemental credit ratios

over a five-year time horizon.

- Consult the relevant industry KCF article (if applicable) or "Guidance: Corporate Methodology," which may identify additional supplemental ratio(s). The relevant benchmark table for a given company is based on our assessment of the company's associated industry and country risk volatility, or the CICRA.
- Calculate the appropriate weighted average cash flow/leverage ratios. If the company is undergoing a transformational event, then the core and supplemental ratios will typically be calculated based on S&P Global Ratings' projections for the current and next one or two financial years.

2) Second, we use the core ratios to determine the preliminary cash flow assessment.

- Compare the core ratios (FFO to debt and debt to EBITDA) to the ratio ranges in the relevant benchmark table.
- If the core ratios result in different cash flow/leverage assessments, we will select the relevant core ratio based on which provides the best indicator of a company's future leverage.

3) Third, we review the supplemental ratio(s).

- Determine the importance of standard or KCF supplemental ratios based on company-specific characteristics, namely, leverage, capital intensity, working capital intensity, growth rate, or industry.

4) Fourth, we calculate the adjusted cash flow/leverage assessment.

- If the cash flow/leverage assessment(s) indicated by the important supplemental ratio(s) differs from the preliminary cash flow/leverage assessment, we might adjust the preliminary cash flow/leverage assessment by one category in the direction of the cash flow/leverage assessment indicated by the supplemental ratio(s) to derive the adjusted cash flow/leverage assessment. We will make this adjustment if, in our view, the supplemental ratio provides the best indicator of a company's future leverage.
- If there is more than one important supplemental ratio and they result in different directional deviations from the preliminary cash flow/leverage assessment, we will select one as the relevant supplemental ratio based on which, in our opinion, provides the best indicator of a company's future leverage. We will then make the adjustment outlined above if the selected supplemental ratio differs from the preliminary cash flow/leverage assessment and the selected supplemental ratio provides the best overall indicator of a company's future leverage.

5) Lastly, we determine the final cash flow/leverage assessment based on the volatility adjustment.

- We classify companies as stable for these cash flow criteria if cash flow/leverage ratios are expected to worsen by up to one category during periods of stress based on their business risk profile. The final cash flow/leverage assessment for these companies will not be modified from the adjusted cash flow/leverage assessment.
- We classify companies as volatile for these cash flow criteria if cash flow/leverage ratios are expected to move one or two categories worse during periods of stress based on their business risk profiles. Typically, this is equivalent to EBITDA declining about 30% from its current level. The final cash flow/leverage assessment for these companies will be modified to one category weaker than the adjusted cash flow/leverage assessment; the adjustment will be eliminated if cash flow/leverage ratios, as evaluated, include a moderate to high level of stress already.
- We classify companies as highly volatile for these cash flow criteria if cash flow/leverage ratios are expected to move two or three categories worse during periods of stress, based on their

business risk profiles. Typically, this is equivalent to EBITDA declining about 50% from its current level. The final cash flow/leverage assessment for these companies will be modified to two categories weaker than the adjusted cash flow/leverage assessment; the adjustment will be eliminated or reduced to one category if cash flow/leverage ratios, as evaluated, include a moderate to high level of stress already.

125. The volatility adjustment is the mechanism by which we factor a "cushion" of medium-term variance to current financial performance not otherwise captured in either the near-term base-case forecast or the long-term business risk assessment. We make this adjustment based on the following:

- The expectation of any potential cash flow/leverage ratio movement is both prospective and dependent on the current business or economic conditions.
- Stress scenarios include, but are not limited to, a recessionary economic environment, technology or competitive shifts, loss or renegotiation of major contracts or customers, the materialization of ESG credit risks, and key product or input price movements, as typically defined in the company's industry risk profile and competitive position assessment.
- The volatility adjustment is not static and is company specific. At the bottom of an economic cycle or during periods of stressed business conditions, already reflected in the general industry risk or specific competitive risk profile, the prospect of weakening ratios is far less than at the peak of an economic cycle or business conditions.
- The expectation of prospective ratio changes may be formed by observed historical performance over an economic, business, or product cycle by the company or by peers.
- The assessment of which classification to use when evaluating the prospective number of scoring category moves will be guided by how close the current ratios are to the transition point (i.e. "buffer" in the current scoring category) and the corresponding amount of EBITDA movement at each scoring transition.

F. Diversification/Portfolio Effect

126. Under the criteria, diversification/portfolio effect applies to companies that we regard as conglomerates. They are companies that have multiple core business lines that may be operated as separate legal entities. For the purpose of these criteria, a conglomerate would have at least three business lines, each contributing a material source of earnings and cash flow.

127. The criteria aim to measure how diversification or the portfolio effect could improve the anchor of a company with multiple business lines. This approach helps us determine how the credit strength of a corporate entity with a given mix of business lines could improve based on its diversity. The competitive position factor assesses the benefits of diversity within individual lines of business. This factor also assesses how poorly performing businesses within a conglomerate affect the organization's overall business risk profile.

128. Diversification/portfolio effect could modify the anchor depending on how meaningful we think the diversification is, and on the degree of correlation we find in each business line's sensitivity to economic cycles. This assessment will have either a positive or neutral impact on the anchor. We capture any potential factor that weakens a company's diversification, including poor management, in our management and governance assessment.

129. We define a conglomerate as a diversified company that is involved in several industry sectors. Usually the smallest of at least three distinct business segments/lines would contribute at least

10% of either EBITDA or FOCF and the largest would contribute no more than 50% of EBITDA or FOCF, with the long-term aim of increasing shareholder value by generating cash flow. Industrial conglomerates usually hold a controlling stake in their core businesses, have highly identifiable holdings, are deeply involved in the strategy and management of their operating companies, generally do not frequently roll over or reshuffle their holdings by buying and selling companies, and therefore have high long-term exposure to the operating risks of their subsidiaries.

130. In rating a conglomerate, we first assess management's commitment to maintain the diversified portfolio over a longer-term horizon. These criteria apply only if the company falls within our definition of a conglomerate.

1. Assessing diversification/portfolio effect

131. A conglomerate's diversification/portfolio effect is assessed as 1, significant diversification; 2, moderate diversification; or 3, neutral. An assessment of moderate diversification or significant diversification potentially raises the issuer's anchor. To achieve an assessment of significant diversification, an issuer should have uncorrelated diversified businesses whose breadth is among the most comprehensive of all conglomerates'. This assessment indicates that we expect the conglomerate's earnings volatility to be much lower through an economic cycle than an undiversified company's. To achieve an assessment of moderate diversification, an issuer typically has a range of uncorrelated diversified businesses that provide meaningful benefits of diversification with the expectation of lower earnings volatility through an economic cycle than an undiversified company's.

132. We expect that a conglomerate will also benefit from diversification if its core assets consistently produce positive cash flows over our rating horizon. This supports our assertion that the company diversifies to take advantage of allocating capital among its business lines. To this end, our analysis focuses on a conglomerate's track record of successfully deploying positive discretionary cash flow into new business lines or expanding capital-hungry business lines. We assess companies that we do not expect to achieve these benefits as neutral.

2. Components of correlation and how it is incorporated into our analysis

133. We determine the assessment for this factor based on the number of business lines in separate industries (as described in table 27) and the degree of correlation between these business lines as described in table 20. There is no rating uplift for an issuer with a small number of business lines that are highly correlated. By contrast, a larger number of business lines that are not closely correlated provide the maximum rating uplift.

Table 20

Assessing Diversification/Portfolio Effect

	--Number of business lines--		
Degree of correlation of business lines	**3**	**4**	**5 or more**
High	Neutral	Neutral	Neutral
Medium	Neutral	Moderately diversified	Moderately diversified
Low	Moderately diversified	Significantly diversified	Significantly diversified

134. The degree of correlation of business lines is high if the business lines operate within the same industry, as defined by the industry designations in Appendix B, table 27. The degree of correlation of business lines is medium if the business lines operate within different industries, but operate

within the same geographic region (for further guidance on defining geographic regions, see Appendix A, table 26). An issuer has a low degree of correlation across its business lines if these business lines are both a) in different industries and b) either operate in different regions or operate in multiple regions.

135. If we believe that a conglomerate's various industry exposures fail to provide a partial hedge against the consolidated entity's volatility because they are highly correlated through an economic cycle, then we assess the diversification/portfolio effect as neutral.

G. Capital Structure

136. S&P Global Ratings uses its capital structure criteria to assess risks in a company's capital structure that may not show up in our standard analysis of cash flow/leverage. These risks may exist as a result of maturity date or currency mismatches between a company's sources of financing and its assets or cash flows. These can be compounded by outside risks, such as volatile interest rates or currency exchange rates.

1. Assessing capital structure

137. Capital structure is a modifier category, which adjusts the initial anchor for a company after any modification due to diversification/portfolio effect. We assess a number of subfactors to determine the capital structure assessment, which can then raise or lower the initial anchor by one or more notches--or have no effect in some cases. We assess capital structure as 1, very positive; 2, positive; 3, neutral; 4, negative; or 5, very negative. In the large majority of cases, we believe that a firm's capital structure will be assessed as neutral. To assess a company's capital structure, we analyze four subfactors:

- Currency risk associated with debt,
- Debt maturity profile (or schedule),
- Interest rate risk associated with debt, and
- Investments.

138. Any of these subfactors can influence a firm's capital structure assessment, although some carry greater weight than others, based on a tiered approach:

- Tier one risk subfactors: Currency risk of debt and debt maturity profile, and
- Tier two risk subfactor: Interest rate risk of debt.

139. The initial capital structure assessment is based on the first three subfactors (see table 21). We may then adjust the preliminary assessment based on our assessment of the fourth subfactor, investments.

Table 21

Preliminary Capital Structure Assessment

Preliminary capital structure assessment	Subfactor assessments
Neutral	No tier one subfactor is negative.
Negative	One tier one subfactor is negative, and the tier two subfactor is neutral.

Table 21

Preliminary Capital Structure Assessment (cont.)

Preliminary capital structure assessment	Subfactor assessments
Very negative	Both tier one subfactors are negative, or one tier one subfactor is negative and the tier two subfactor is negative.

140. Tier one subfactors carry the greatest risks, in our view, and, thus, could have a significant impact on the capital structure assessment. This is because, in our opinion, these factors have a greater likelihood of affecting credit metrics and potentially causing liquidity and refinancing risk. The tier two subfactor is important in and of itself, but typically less so than the tier one subfactors. In our view, in the majority of cases, the tier two subfactor in isolation has a lower likelihood of leading to liquidity and default risk than do tier one subfactors.

141. The fourth subfactor, investments, as defined in paragraph 153, quantifies the impact of a company's investments on its overall financial risk profile. Although not directly related to a firm's capital structure decisions, certain investments could provide a degree of asset protection and potential financial flexibility if they are monetized. Thus, the fourth subfactor could modify the preliminary capital structure assessment (see table 22). If the subfactor is assessed as neutral, then the preliminary capital structure assessment will stand. If investments is assessed as positive or very positive, we adjust the preliminary capital structure assessment upward (as per table 22) to arrive at the final assessment.

Table 22

Final Capital Structure Assessment

	--Investments subfactor assessment--		
Preliminary capital structure assessment	Neutral	Positive	Very positive
Neutral	Neutral	Positive	Very positive
Negative	Negative	Neutral	Positive
Very negative	Very negative	Negative	Negative

2. Capital structure analysis: Assessing the subfactors

a) Subfactor 1: Currency risk of debt

142. Currency risk arises when a company borrows without hedging in a currency other than the currency in which it generates revenues. Such an unhedged position makes the company potentially vulnerable to fluctuations in the exchange rate between the two currencies, in the absence of mitigating factors. We determine the materiality of any mismatch by identifying situations where adverse exchange-rate movements could weaken cash flow and/or leverage ratios. We do not include currency mismatches under the following scenarios:

- The country where a company generates its cash flows has its currency pegged to the currency in which the company has borrowed, or vice versa (or the currency of cash flows has a strong track record and government policy of stability with the currency of borrowings), examples being the Hong Kong dollar which is pegged to the U.S. dollar, and the Chinese renminbi which is managed in a narrow band to the U.S. dollar (and China's foreign currency reserves are

mainly in U.S. dollars). Moreover, we expect such a scenario to continue for the foreseeable future;

- A company has the proven ability, through regulation or contract, to pass through changes in debt servicing costs to its customers; or
- A company has a natural hedge, such as where it may sell its product in a foreign currency and has matched its debt in that same currency.

143. We also recognize that even if an entity generates insufficient same-currency cash flow to meet foreign currency-denominated debt obligations, it could have substantial other currency cash flows it can convert to meet these obligations. Therefore, the relative amount of foreign denominated debt as a proportion of total debt is an important factor in our analysis. If foreign denominated debt, excluding fully hedged debt principal, is 15% or less of total debt, we assess the company as neutral on currency risk of debt. If foreign-denominated debt, excluding fully hedged debt principal, is greater than 15% of total debt, and debt to EBITDA is greater than 3.0x, we evaluate currency risks through further analysis.

144. If an entity's foreign-denominated debt in a particular currency represents more than 15% of total debt, and if its debt to EBITDA ratio is greater than 3.0x, we identify whether a currency-specific interest coverage ratio indicates potential currency risk. The coverage ratio divides forecasted operating cash flow in each currency by interest payments over the coming 12 months for that same currency. It is often easier to ascertain the geographic breakdown of EBITDA as opposed to operating cash flow. So in situations where we don't have sufficient cash flow information, we may calculate an EBITDA to interest expense coverage ratio in the relevant currencies. If neither cash flow nor EBITDA information is disclosed, we estimate the relevant exposures based on available information.

145. In such an instance, our assessment of this subfactor is negative if we believe any appropriate interest coverage ratio will fall below 1.2x over the next 12 months.

b) Subfactor 2: Debt maturity profile

146. A firm's debt maturity profile shows when its debt needs to be repaid, or refinanced if possible, and helps determine the firm's refinancing risk. Lengthier and more evenly spread out debt maturity schedules reduce refinancing risk, compared with front-ended and compressed ones, since the former give an entity more time to manage business- or financial market-related setbacks.

147. In evaluating debt maturity profiles, we measure the weighted average maturity (WAM) of bank debt and debt securities (including hybrid debt) within a capital structure, and make simplifying assumptions that debt maturing beyond year five matures in year six. WAM = (Maturity1/Total Debt)*tenor1 + (Maturity2/Total Debt)* tenor2 +... (Thereafter/Total Debt)* tenor6

148. In evaluating refinancing risk, we consider risks in addition to those captured under the 12-month to 24-month time-horizons factored in our liquidity criteria (see "Methodology And Assumptions: Liquidity Descriptors For Global Corporate Issuers"). While we recognize that investment-grade companies may have more certain future business prospects and greater access to capital than speculative-grade companies, all else being equal, we view a company with a shorter maturity schedule as having greater refinancing risk compared to a company with a longer one. In all cases, we assess a company's debt maturity profile in conjunction with its liquidity and potential funding availability. Thus, a short-dated maturity schedule alone is not a negative if we believe the company can maintain enough liquidity to pay off debt that comes due in the near term.

149. Our assessment of this subfactor is negative if the WAM is two years or less, and the amount of

these near-term maturities is material in relation to the issuer's liquidity so that under our base-case forecast, we believe the company's liquidity assessment will become less than adequate or weak over the next two years due to these maturities. In certain cases, we may assess a debt maturity profile as negative regardless of whether or not the company passes the aforementioned test. We expect such instances to be rare, and will include scenarios where we believed a concentration of debt maturities within a five-year time horizon poses meaningful refinancing risk, either due to the size of the maturities in relation to the company's liquidity sources, the company's leverage profile, its operating trends, lender relationships, and/or credit market standings.

c) Subfactor 3: Interest rate risk of debt

150. The interest rate risk of debt subfactor analyzes the company's mix of fixed-rate and floating-rate debt. Generally, a higher proportion of fixed-rate debt leads to greater predictability and stability of interest expense and therefore cash flows. The exception would be companies whose operating cash flows are to some degree correlated with interest rate movements--for example, a regulated utility whose revenues are indexed to inflation--given the typical correlation between nominal interest rates and inflation.

151. The mix of fixed versus floating-rate debt is usually not a significant risk factor for companies with intermediate or better financial profiles, strong profitability, and high interest coverage. In addition, the interest rate environment at a given point in time will play a role in determining the impact of interest rate movements. Our assessment of this subcategory will be negative if a 25% upward shift (e.g., from 2.0% to 2.5%) or a 100 basis-point upward shift (e.g., 2% to 3%) in the base interest rate of the floating rate debt will result in a breach of interest coverage covenants or interest coverage rating thresholds identified in the cash flow/leverage criteria (see section E.3).

152. Many loan agreements for speculative-grade companies contain a clause requiring a percentage of floating-rate debt to be hedged for a period of two to three years to mitigate this risk. However, in many cases the loan matures after the hedge expires, creating a mismatched hedge. We consider only loans with hedges that match the life of the loan to be--effectively--fixed-rate debt.

d) Subfactor 4: Investments

153. For the purposes of the criteria, investments refer to investments in unconsolidated equity affiliates, other assets where the realizable value isn't currently reflected in the cash flows generated from those assets (e.g. underutilized real-estate property), we do not expect any additional investment or support to be provided to the affiliate, and the investment is not included within S&P Global Ratings' consolidation scope and so is not incorporated in the company's business and financial risk profile analysis. If equity affiliate companies are consolidated, then the financial benefits and costs of these investments will be captured in our cash flow and leverage analysis. Similarly, where the company's ownership stake does not qualify for consolidation under accounting rules, we may choose to consolidate on a pro rata basis if we believe that the equity affiliates' operating and financing strategy is influenced by the rated entity. If equity investments are strategic and provide the company with a competitive advantage, or benefit a company's scale, scope, and diversity, these factors will be captured in our competitive position criteria and will not be used to assess the subfactor investments as positive. Within the capital structure criteria, we aim to assess nonstrategic financial investments that could provide a degree of asset protection and financial flexibility in the event they are monetized. These investments must be noncore and separable, meaning that a potential divestiture, in our view, has no impact on the company's existing operations.

154. In many instances, the cash flows generated by an equity affiliate, or the proportional share of the associate company's net income, might not accurately reflect the asset's value. This could occur if the equity affiliate is in high growth mode and is currently generating minimal cash flow or net losses. This could also be true of a physical asset, such as real estate. From a valuation standpoint, we recognize the subjective nature of this analysis and the potential for information gaps. As a result, in the absence of a market valuation or a market valuation of comparable companies in the case of minority interests in private entities, we will not ascribe value to these assets.

155. We assess this subfactor as positive or very positive if three key characteristics are met. First, an estimated value can be ascribed to these investments based on the presence of an existing market value for the firm or comparable firms in the same industry. Second, there is strong evidence that the investment can be monetized over an intermediate timeframe--in the case of an equity investment, our opinion of the marketability of the investment would be enhanced by the presence of an existing market value for the firm or comparable firms, as well as our view of market liquidity. Third, monetization of the investment, assuming proceeds would be used to repay debt, would be material enough to positively move existing cash flow and leverage ratios by at least one category and our view on the company's financial policy, specifically related to financial discipline, supports the assessment that the potential proceeds would be used to pay down debt. This subfactor is assessed as positive if debt repayment from the investment sale has the potential to improve cash flow and leverage ratios by one category. We assess investments as very positive if proceeds upon sale of the investment have the potential to improve cash flow and leverage ratios by two or more categories. If the three characteristics are not met, this subfactor will be assessed as neutral and the preliminary capital structure assessment will stand.

156. We will not assess the investments subfactor as positive or very positive when the anchor is 'b+' or lower unless the three conditions described in paragraph 155 are met, and:

- For issuers with less than adequate or weak liquidity, the company has provided a credible near-term plan to sell the investment.
- For issuers with adequate or better liquidity, we believe that the company, if needed, could sell the investment in a relatively short timeframe.

H. Financial Policy

157. Financial policy refines the view of a company's risks beyond the conclusions arising from the standard assumptions in the cash flow/leverage assessment (see section E). Those assumptions do not always reflect or entirely capture the short-to-medium term event risks or the longer-term risks stemming from a company's financial policy. To the extent movements in one of these factors cannot be confidently predicted within our forward-looking evaluation, we capture that risk within our evaluation of financial policy. The cash flow/leverage assessment will typically factor in operating and cash flows metrics we observed during the past two years and the trends we expect to see for the coming two years based on operating assumptions and predictable financial policy elements, such as ordinary dividend payments or recurring acquisition spending. However, over that period and, generally, over a longer time horizon, the firm's financial policies can change its financial risk profile based on management's or, if applicable, the company's controlling shareholder's (see Appendix E, paragraphs 254-257) appetite for incremental risk or, conversely, plans to reduce leverage. We assess financial policy as 1) positive, 2) neutral, 3) negative, or as being owned by a financial sponsor. We further identify financial sponsor-owned companies as "FS-4", "FS-5", "FS-6", or "FS-6 (minus)" (see section H.2).

1. Assessing financial policy

158. First, we determine if a company is owned by a financial sponsor. Given the intrinsic characteristics and aggressive nature of financial sponsor's strategies (i.e. short- to intermediate-term holding periods and the use of debt or debt-like instruments to maximize shareholder returns), we assign a financial risk profile assessment to a firm controlled by a financial sponsor that reflects the likely impact on leverage due to these strategies and we do not separately analyze management's financial discipline or financial policy framework.

159. If a company is not controlled by a financial sponsor, we evaluate management's financial discipline and financial policy framework. Management's financial discipline measures its tolerance for incremental financial risk or, conversely, its willingness to maintain the same degree of financial risk or to lower it compared with recent cash flow/leverage metrics and our projected ratios for the next two years. The company's financial policy framework assesses the comprehensiveness, transparency, and sustainability of the entity's financial policies. We do not assess these factors for financial sponsor controlled firms.

160. The financial discipline assessments can have a positive or negative influence on an enterprise's overall financial policy assessment, or can have no net effect. Conversely, the financial policy framework assessment cannot positively influence the overall financial policy assessment. It can constrain the overall financial policy assessment to no greater than neutral.

161. The separate assessments of a company's financial policy framework and financial discipline determine the financial policy adjustment.

162. We assess management's financial discipline as 1, positive; 2, neutral; or 3, negative. We determine the assessment by evaluating the predictability of an entity's expansion plans and shareholder return strategies. We take into account, generally, management's tolerance for material and unexpected negative changes in credit ratios or, instead, its plans to rapidly decrease leverage and keep credit ratios within stated boundaries.

163. A company's financial policy framework assessment is: 1, supportive or 2, non-supportive. We make the determination by assessing the comprehensiveness of a company's financial policy framework and whether financial targets are clearly communicated to a large number of stakeholders, and are well defined, achievable, and sustainable.

Table 23

Financial Policy Assessments

Assessment	What it means	Guidance
Positive	Indicates that we expect management's financial policy decisions to have a positive impact on credit ratios over the time horizon, beyond what can be reasonably built in our forecasts on the basis of normalized operating and cash flow assumptions. An example would be when a credible management team commits to dispose of assets or raise equity over the short to medium term in order to reduce leverage. A company with a 1 financial risk profile will not be assigned a positive assessment.	If financial discipline is positive, and the financial policy framework is supportive
Neutral	Indicates that, in our opinion, future credit ratios won't differ materially over the time horizon beyond what we have projected, based on our assessment of management's financial policy, recent track record, and operating forecasts for the company. A neutral financial policy assessment effectively reflects a low probability of "event risk," in our view.	If financial discipline is positive, and the financial policy framework is non-supportive. Or when financial discipline is neutral, regardless of the financial policy framework assessment.

Table 23

Financial Policy Assessments (cont.)

Assessment	What it means	Guidance
Negative	Indicates our view of a lower degree of predictability in credit ratios, beyond what can be reasonably built in our forecasts, as a result of management's financial discipline (or lack of it). It points to high event risk that management's financial policy decisions may depress credit metrics over the time horizon, compared with what we have already built in our forecasts based on normalized operating and cash flow assumptions.	If financial discipline is negative, regardless of the financial policy framework assessment
Financial Sponsor*	We define a financial sponsor as an entity that follows an aggressive financial strategy in using debt and debt-like instruments to maximize shareholder returns. Typically, these sponsors dispose of assets within a short to intermediate time frame. Accordingly, the financial risk profile we assign to companies that are controlled by financial sponsors ordinarily reflects our presumption of some deterioration in credit quality in the medium term. Financial sponsors include private equity firms, but not infrastructure and asset-management funds, which maintain longer investment horizons.	We define financial sponsor-owned companies as nonfinancial corporate entities in which one or more financial sponsors own at least 40% of the entity's common equity, or retain the majority of the voting rights and control through preference shares, and where we consider that the sponsors exercise control of the company either solely or jointly.

*Assessed as FS-4, FS-5, FS-6, or FS-6 (minus).

2. Financial sponsor-controlled companies

164. We define a financial sponsor as an entity that follows an aggressive financial strategy in using debt and debt-like instruments to maximize shareholder returns. Typically, these sponsors dispose of assets within a short-to-intermediate time frame. Financial sponsors include private equity firms, but not infrastructure and asset-management funds, which maintain longer investment horizons.

165. We define financial sponsor-owned companies as nonfinancial corporate entities in which one or more financial sponsors own at least 40% of the entity's common equity, or retain the majority of the voting rights and control through preference shares, and where we consider that the sponsors exercise control of the company either solely or jointly. "Control" refers to the sponsors' ability to dictate an entity's strategy and cash flow. The strategic goals of the sponsors must be aligned for us to consider the sponsors as having joint control.

166. We differentiate between financial sponsors and other types of controlling shareholders and companies that do not have controlling shareholders based on our belief that short-term ownership--such as exists in private equity sponsor-owned companies--generally entails financial policies aimed at achieving rapid returns for shareholders typically through aggressive debt leverage.

167. Financial sponsors often dictate policies regarding risk-taking, financial management, and corporate governance for the companies that they control. There is a common pattern of these investors extracting cash in ways that increase the companies' financial risk by utilizing debt or debt like instruments. Accordingly, the financial risk profile we assign to companies that are controlled by financial sponsors ordinarily reflect our presumption of some deterioration in credit quality or steadily high leverage in the medium term.

168. We assess the influence of financial sponsor ownership as "FS-4", "FS-5", "FS-6", and "FS-6 (minus)" depending on how aggressive we assume the sponsor will be and assign a financial risk profile accordingly (see table 24).

169. Generally, financial sponsor-owned issuers will receive an assessment of "FS-6" or "FS-6 (minus)", leading to a financial risk profile assessment of '6', under the criteria. A "FS-6" assessment indicates that, in our opinion, forecasted credit ratios in the medium term are likely be to be consistent with a '6' financial risk profile, based on our assessment of the financial sponsor's financial policy and track record. A "FS-6 (minus)" will likely be applied to companies that we forecast to have near-term credit ratios consistent with a '6' financial risk profile, but we believe the financial sponsor to be very aggressive and that leverage could increase materially even further from our forecasted levels.

170. In a small minority of cases, a financial sponsor-owned entity could receive an assessment of "FS-5". This assessment will apply only when we project that the company's leverage will be consistent with a '5' (aggressive) financial risk profile (see tables 17, 18, and 19), we perceive that the risk of releveraging is low based on the company's financial policy and our view of the owner's financial risk appetite, and liquidity is at least adequate.

171. In even rarer cases, we could assess the financial policy of a financial sponsor-owned entity as "FS-4". This assessment will apply only when all of the following conditions are met: other shareholders own a material (generally, at least 20%) stake, we expect the sponsor to relinquish control over the intermediate term, we project that leverage is currently consistent with a '4' (significant) financial risk profile (see tables 17, 18, and 19), the company has said it will maintain leverage at or below this level, and liquidity is at least adequate.

Table 24

Financial Risk Profile Implications For Sponsor-Owned Issuers

Assessment	What it Means	Guidance
FS-4	Financial risk profile set at '4'	Issuer must meet all of the following conditions: • Other shareholders must own a material (no less than 20%) stake; • We anticipate that the sponsor will relinquish control over the medium term; • For issuers subject to Table 17 (standard volatility), debt to EBITDA is less than 4x, and we estimate that it will remain less than 4x. For issuers that are subject to Table 18 (medial volatility), debt to EBITDA is below 4.5x and we forecast it to remain below that level. Or for issuers subject to Table 19 (low volatility), debt to EBITDA is less than 5x and our estimation is it will remain below that level; • The company has indicated a financial policy stipulating a level of leverage consistent with a significant or better financial risk profile (that is, debt to EBITDA of less than 4x when applying standard volatility tables, 4.5x when applying medial volatility tables, or less than 5x when applying low volatility tables) and • We assess liquidity to be at least adequate, with adequate covenant headroom.
FS-5	Financial risk profile set at '5'	Issuer must meet all of the following conditions: • For issuers subject to the standard volatility table, debt to EBITDA is less than 5x, and we estimate that it will remain less than 5x. For issuers that are subject to the medial volatility table, debt to EBITDA is below 5.5x and we forecast it to remain below that level. Or for issuers subject to the low volatility table, debt to EBITDA is less than 6x and our estimation is it will remain below that level; • We believe the risk of releveraging beyond 5x (standard volatility issuer), 5.5x (medial volatility issuer), or 6x (low volatility issuer) is low; and • We assess liquidity to be at least adequate, with adequate covenant headroom.
FS-6	Financial risk profile set at '6'	Standard & Poor's debt to EBITDA is greater than 5x (when applying the standard volatility table), greater than 5.5x (when applying the medial volatility table), or greater than 6x (when applying the low volatility table). However, we believe leverage is unlikely to increase meaningfully beyond these levels.
FS-6 (minus)	Financial risk profile set at '6', and anchor reduced by one notch (unless this results in a final rating below 'B-')	In determining the anchor the financial risk profile is a '6', but we believe the track record of the financial sponsor indicates that leverage could increase materially from already high levels.

3. Companies not controlled by a financial sponsor

172. For companies not controlled by a financial sponsor we evaluate management's financial discipline and financial policy framework to determine the influence on an entity's financial risk profile beyond what is implied by recent credit ratios and our cash flow and leverage forecasts. This influence can be positive, neutral, or negative.

173. We do not distinguish between management and a controlling shareholder that is not a financial sponsor when assessing these subfactors, as the controlling shareholder usually has the final say

on financial policy.

a) Financial discipline

174. The financial discipline assessment is based on management's leverage tolerance and the likelihood of event risk. The criteria evaluate management's potential appetite to incur unforeseen, higher financial risk over a prolonged period and the associated impact on credit measures. We also assess management's capacity and commitment to rapidly decrease debt leverage to levels consistent with its credit ratio targets.

175. This assessment therefore seeks to determine whether unforeseen actions by management to increase, maintain, or reduce financial risk are likely to occur during the next two to three years, with either a negative or positive effect, or none at all, on our baseline forecasts for the period.

176. This assessment is based on the leverage tolerance of a company's management, as reflected in its plans or history of acquisitions, shareholder remuneration, and organic growth strategies (see Appendix E, paragraphs 258 to 263).

177. We assess financial discipline as positive, neutral, or negative, based on its potential impact on our forward-looking assessment of a firm's cash flow/leverage, as detailed in table 25. For example, a neutral assessment for leverage tolerance reflects our expectation that management's financial policy will unlikely lead to significant deviation from current and forecasted credit ratios. A negative assessment acknowledges a significant degree of event risk of increased leverage relative to our base-case forecast, resulting from the company's acquisition policy, its shareholder remuneration policy, or its organic growth strategy. A positive assessment indicates that the company is likely to take actions to reduce leverage, but we cannot confidently incorporate these actions into our baseline forward-looking assessment of cash flow/leverage.

178. A positive assessment indicates that management is committed and has the capacity to reduce debt leverage through the rapid implementation of credit enhancing measures, such as asset disposals, rights issues, or reductions in shareholder returns. In addition, management's track record over the past five years shows that it has taken actions to rapidly reduce unforeseen increases in debt leverage and that there have not been any prolonged periods when credit ratios were weaker than our expectations for the rating. Management, even if new, also has a track record of successful execution. Conversely, a negative assessment indicates management's financial policy allows for significant increase in leverage compared with both current levels and our forward-looking forecast under normal operating/financial conditions or does not have observable time limits or stated boundaries. Management has a track record of allowing for significant and prolonged peaks in leverage and there is no commitment or track record of management using mitigating measures to rapidly return to credit ratios consistent with our expectations.

179. As evidence of management's leverage tolerance, we evaluate its track record and plans regarding acquisitions, shareholder remuneration, and organic growth strategies (see Appendix E, paragraphs 258 to 263). Acquisitions could increase the risk that leverage will be higher than our base-case forecast if we view management's strategy as opportunistic or if its financial policy (if it exists) provides significant headroom for debt-financed acquisitions. Shareholder remuneration could also increase the risk of leverage being higher than our base-case forecast if management's shareholder reward policies are not particularly well defined or have no clear limits, management has a tolerance for shareholder returns exceeding operating cash flow, or has a track record of sustained cash returns despite weakening operating performance or credit ratios. Organic growth strategies can also result in leverage higher than our base-case forecast if these plans have no clear focus or investment philosophy, capital spending is fairly unpredictable, or there is a track

record of overspending or unexpected or rapid shifts in plans for new markets or products.

180. We also take into account management's track record and level of commitment to its stated financial policies, to the extent a company has a stated policy. Historical evidence and any deviations from stated policies are key elements in analyzing a company's leverage tolerance. Where material and unexpected deviation in leverage may occur (for example, on the back of operating weakness or acquisitions), we also assess management's plan to restore credit ratios to levels consistent with previous expectations through rapid and proactive non-organic measures. Management's track record to execute its deleveraging plan, its level of commitment, and the scope and timeframe of debt mitigating measures will be key differentiators in assessing a company's financial policy discipline.

Table 25

Assessing Financial Discipline

Descriptor	What it means	Guidance
Positive	Management is likely to take actions that result in leverage that is lower than our base-case forecast, but can't be confidently included in our base-case assumptions. Event risk is low.	Management is committed and has capacity to reduce debt leverage and increase financial headroom through the rapid implementation of credit enhancing measures, in line with its stated financial policy, if any. This relates primarily to management's careful and moderate policy with regard to acquisitions and shareholder remuneration as well as to its organic growth strategy. The assessments are supported by historical evidence over the past five years of not showing any prolonged weakening in the company's credit ratios, or relative to our base-case credit metrics' assumptions. Management, even if new, has a track record of successful execution.
Neutral	Leverage is not expected to deviate materially from our base-case forecast. Event risk is moderate.	Management's financial discipline with regard to acquisitions, shareholder remuneration, as well as its organic growth strategy does not result in significantly different leverage as defined in its stated financial policy framework.
Negative	Leverage could become materially higher than our base-case forecast. Event risk is high.	Management's financial policy framework does not explicitly rule out a significant increase in leverage compared to our base-case assumptions, possibly reflecting a greater event risk with regard to its M&A and shareholder remuneration policy as well as to its organic growth strategy. These points are supported by historical evidence over the past five years of allowing for significant and prolonged peaks in leverage, which remained unmitigated by credit supporting measures by management.

b) Financial policy framework

181. The company's financial policy framework assesses the comprehensiveness, transparency, and sustainability of the entity's financial policies (see Appendix E, paragraphs 264-268). This will help determine whether there is a satisfactory degree of visibility into the issuer's future financial risk profile. Companies that have developed and sustained a comprehensive set of financial policies are more likely to build long-term, sustainable credit quality than those that do not.

182. We will assess a company's financial policy framework as supportive or non-supportive based on evidence that supports the characteristics listed below. In order for an entity to receive a supportive assessment for financial policy framework, there must be sufficient evidence of management's financial policies to back that assessment.

183. A company assessed as supportive will generally exhibit the following characteristics:

- Management has a comprehensive set of financial policies covering key areas of financial risk, including debt leverage and liability management. Financial targets are well defined and

quantifiable.

- Management's financial policies are clearly articulated in public forums (such as public listing disclosures and investor presentations) or are disclosed to a limited number of key stakeholders such as main creditors or to the credit rating agencies. The company's adherence to these policies is satisfactory.
- Management's articulated financial policies are considered achievable and sustainable. This assessment takes into consideration historical adherence to articulated policies, existing financial risk profile, capacity to sustain capital structure through nonorganic means, demands of key stakeholders, and the stability of financial policy parameters over time.

184. A company receives a non-supportive assessment if it does not meet all the conditions for a supportive assessment. We expect a non-supportive assessment to be uncommon.

I. Liquidity

185. Our assessment of liquidity focuses on monetary flows--the sources and uses of cash--that are the key indicators of a company's liquidity cushion. The analysis assesses the potential for a company to breach covenant tests related to declines in EBITDA, as well as its ability to absorb high-impact, low-probability events (such as those that may arise from the materialization of ESG risks), the nature of the company's bank relationships, its standing in credit markets, and how prudent (or not) we believe its financial risk management to be (see "Methodology And Assumptions: Liquidity Descriptors For Global Corporate Issuers").

J. Management And Governance

186. The analysis of management and governance addresses how management's strategic competence, organizational effectiveness, risk management, and governance practices shape the issuer's competitiveness in the marketplace, the strength of its financial risk management, and the robustness of its governance. Stronger management of important strategic and financial risks may enhance creditworthiness (see "Methodology: Management And Governance Credit Factors For Corporate Entities").

K. Comparable Ratings Analysis

187. The comparable ratings analysis is our last step in determining a SACP on a company. This analysis can lead us to raise or lower our anchor, after adjusting for the modifiers, on a company by one notch based on our overall assessment of its credit characteristics for all subfactors considered in arriving at the SACP. This involves taking a holistic review of a company's stand-alone credit risk profile, in which we evaluate an issuer's credit characteristics in aggregate. A positive assessment leads to a one-notch upgrade, a negative assessment leads to a one-notch downgrade, and a neutral assessment indicates no change to the anchor.

188. The application of comparable ratings analysis reflects the need to "fine-tune" ratings outcomes, even after the use of each of the other modifiers. A positive or negative assessment is therefore likely to be common rather than exceptional.

189. We consider our assessments of each of the underlying subfactors to be points within a possible range. Consequently, each of these assessments that ultimately generate the SACP can be at the upper or lower end, or at the mid-point, of such a range:

- A company receives a positive assessment if we believe, in aggregate, its relative ranking across the subfactors typically to be at the higher end of the range;
- A company receives a negative assessment if we believe, in aggregate, its relative ranking across the subfactors typically to be at the lower end of the range;
- A company receives a neutral assessment if we believe, in aggregate, its relative ranking across the subfactors typically to be in line with the middle of the range.

190. The most direct application of the comparable ratings analysis is in the following circumstances:

- Business risk assessment. If we expect a company to sustain a position at the higher or lower end of the ranges for the business risk category assessment, the company could receive a positive or negative assessment, respectively.
- Financial risk assessment and financial metrics. If a company's actual and forecasted metrics are just above (or just below) the financial risk profile range, as indicated in its cash flow/leverage assessment, we could assign a positive or negative assessment.

191. We also consider additional factors not already covered, or existing factors not fully captured, in arriving at the SACP. Such factors will generally reflect less frequently observed credit characteristics, may be unique, or may reflect unpredictability or uncertain risk attributes, both positive and negative.

192. This paragraph has been deleted.

APPENDIXES

A. Country Risk

Table 26

Countries And Regions

Region
Western Europe
Southern Europe
Western + Southern Europe
East Europe
Central Europe
Eastern Europe and Central Asia
Middle East
Africa
North America
Central America
Latin America
The Caribbean
Asia-Pacific
Central Asia

Table 26

Countries And Regions (cont.)

East Asia

Australia NZ

Country	Region
South Africa	Africa
Egypt	Africa
Nigeria	Africa
Algeria	Africa
Morocco	Africa
Angola	Africa
Tunisia	Africa
Ethiopia	Africa
Ghana	Africa
Kenya	Africa
Tanzania	Africa
Uganda	Africa
Botswana	Africa
Congo, Democratic Republic of	Africa
Gabon	Africa
Senegal	Africa
Mozambique	Africa
Burkina Faso	Africa
Zambia	Africa
Congo, Republic of	Africa
Zimbabwe	Africa
Eritrea	Africa
Indonesia	Asia-Pacific
Taiwan	Asia-Pacific
Thailand	Asia-Pacific
Malaysia	Asia-Pacific
Philippines	Asia-Pacific
Vietnam	Asia-Pacific
Bangladesh	Asia-Pacific
Sri Lanka	Asia-Pacific
Cambodia	Asia-Pacific
Laos	Asia-Pacific
Papua New Guinea	Asia-Pacific
Mongolia	Asia-Pacific

Table 26

Countries And Regions (cont.)

Australia	Australia NZ
New Zealand	Australia NZ
Guatemala	Central America
Costa Rica	Central America
Panama	Central America
Honduras	Central America
India	Central Asia
Pakistan	Central Asia
Kazakhstan	Central Asia
Bhutan	Central Asia
Poland	Central Europe
Czech Republic	Central Europe
Romania	Central Europe
Hungary	Central Europe
Slovakia	Central Europe
Bulgaria	Central Europe
Croatia	Central Europe
Serbia	Central Europe
Lithuania	Central Europe
Latvia	Central Europe
Bosnia and Herzegovina	Central Europe
Estonia	Central Europe
Albania	Central Europe
Macedonia	Central Europe
China	East Asia
Japan	East Asia
South Korea	East Asia
Hong Kong	East Asia
Singapore	East Asia
Macau	East Asia
Greece	Eastern Europe
Slovenia	Eastern Europe
Cyprus	Eastern Europe
Russia	Eastern Europe and Central Asia
Ukraine	Eastern Europe and Central Asia
Belarus	Eastern Europe and Central Asia
Azerbaijan	Eastern Europe and Central Asia

Table 26

Countries And Regions (cont.)

Georgia	Eastern Europe and Central Asia
Brazil	Latin America
Mexico	Latin America
Argentina	Latin America
Colombia	Latin America
Venezuela	Latin America
Peru	Latin America
Chile	Latin America
Ecuador	Latin America
Bolivia	Latin America
Uruguay	Latin America
El Salvador	Latin America
Paraguay	Latin America
Trinidad and Tobago	Latin America
Suriname	Latin America
Belize	Latin America
Turkey	Middle East
Saudi Arabia	Middle East
United Arab Emirates	Middle East
Israel	Middle East
Qatar	Middle East
Kuwait	Middle East
Iraq	Middle East
Oman	Middle East
Lebanon	Middle East
Jordan	Middle East
Bahrain	Middle East
United States	North America
Canada	North America
Italy	Southern Europe
Spain	Southern Europe
Portugal	Southern Europe
Dominican Republic	The Caribbean
Jamaica	The Caribbean
Bahamas	The Caribbean
Barbados	The Caribbean
Curacao	The Caribbean

Table 26

Countries And Regions (cont.)

Cayman Islands	The Caribbean
Grenada	The Caribbean
Turks and Caicos	The Caribbean
Germany	Western Europe
United Kingdom	Western Europe
France	Western Europe
Netherlands	Western Europe
Belgium	Western Europe
Sweden	Western Europe
Switzerland	Western Europe
Austria	Western Europe
Norway	Western Europe
Denmark	Western Europe
Finland	Western Europe
Ireland	Western Europe
Luxembourg	Western Europe
Iceland	Western Europe
Malta	Western Europe

B. Competitive Position

Table 27

List Of Industries, Subsectors, And Standard Competitive Position Group Profiles

Industry	Subsector	Competitive position group profile
Transportation cyclical	Airlines	Capital or asset focus
	Marine	Capital or asset focus
	Trucking	Capital or asset focus
Auto OEM	Automobile and truck manufacturers	Capital or asset focus
Metals and mining downstream	Aluminum	Commodity focus/cost driven
	Steel	Commodity focus/cost driven
Metals and mining upstream	Coal and consumable fuels	Commodity focus/cost driven
	Diversified metals and mining	Commodity focus/cost driven
	Gold	Commodity focus/cost driven
	Precious metals and minerals	Commodity focus/cost driven
Homebuilders and developers	Homebuilding	Capital or asset focus
Oil and gas refining and marketing	Oil and gas refining and marketing	Commodity focus/scale driven

Table 27

List Of Industries, Subsectors, And Standard Competitive Position Group Profiles (cont.)

Industry	Subsector	Competitive position group profile
Forest and paper products	Forest products	Commodity focus/cost driven
	Paper products	Commodity focus/cost driven
Building Materials	Construction materials	Capital or asset focus
Oil and gas integrated, exploration and production	Integrated oil and gas	Commodity focus/scale driven
	Oil and gas exploration and production	Commodity focus/scale driven
Agribusiness and commodity foods	Agricultural products	Commodity focus/scale driven
Real estate investment trusts (REITs)	Diversified REITs	Real-estate specific*
	Health care REITS	Real-estate specific*
	Industrial REITs	Real-estate specific*
	Office REITs	Real-estate specific*
	Residential REITs	Real-estate specific*
	Retail REITs	Real-estate specific*
	Specialized REITs	Not applicable**
	Self-storage REITs	Real-estate specific*
	Net lease REITs	Real-estate specific*
	Real estate operating companies	Real-estate specific*
Leisure and sports	Casinos and gaming	Services and product focus
	Hotels, resorts, and cruise lines	Services and product focus
	Leisure facilities	Services and product focus
Commodity chemicals	Commodity chemicals	Commodity focus/cost driven
	Diversified chemicals	Commodity focus/cost driven
	Fertilizers and agricultural chemicals	Commodity focus/cost driven
Auto suppliers	Auto parts and equipment	Capital or asset focus
	Tires and rubber	Capital or asset focus
	Vehicle-related suppliers	Capital or asset focus
Aerospace and defense	Aerospace and defense	Services and product focus
Technology hardware and semiconductors	Communications equipment	Capital or asset focus
	Computer hardware	Capital or asset focus
	Computer storage and peripherals	Capital or asset focus
	Consumer electronics	Capital or asset focus
	Electronic equipment and instruments	Capital or asset focus
	Electronic components	Capital or asset focus
	Electronic manufacturing services	Capital or asset focus
	Technology distributors	Capital or asset focus

Table 27

List Of Industries, Subsectors, And Standard Competitive Position Group Profiles (cont.)

Industry	Subsector	Competitive position group profile
	Office electronics	Capital or asset focus
	Semiconductor equipment	Capital or asset focus
	Semiconductors	Capital or asset focus
Specialty Chemicals	Industrial gases	Capital or asset focus
	Specialty chemicals	Capital or asset focus
Capital Goods	Electrical components and equipment	Capital or asset focus
	Heavy equipment and machinery	Capital or asset focus
	Industrial componentry and consumables	Capital or asset focus
	Construction equipment rental	Capital or asset focus
	Industrial distributors	Services and product focus
Engineering and construction	Construction and engineering	Services and product focus
Railroads and package express	Railroads	Capital or asset focus
	Package express	Services and product focus
	Logistics	Services and product focus
Business and consumer services	Consumer services	Services and product focus
	Distributors	Services and product focus
	Facilities services	Services and product focus
	General support services	Services and product focus
	Professional services	Services and product focus
Midstream energy	Oil and gas storage and transportation	Commodity focus/scale driven
Technology software and services	Internet software and services	Services and product focus
	IT consulting and other services	Services and product focus
	Data processing and outsourced services	Services and product focus
	Application software	Services and product focus
	Systems software	Services and product focus
	Consumer software	Services and product focus
Consumer durables	Home furnishings	Services and product focus
	Household appliances	Services and product focus
	Housewares and specialties	Services and product focus
	Leisure products	Services and product focus
	Photographic products	Services and product focus
	Small appliances	Services and product focus
Containers and packaging	Metal and glass containers	Capital or asset focus
	Paper packaging	Capital or asset focus

Table 27

List Of Industries, Subsectors, And Standard Competitive Position Group Profiles (cont.)

Industry	Subsector	Competitive position group profile
Media and entertainment	Ad agencies and marketing services companies	Services and product focus
	Ad-supported online content platforms	Services and product focus
	Broadcast networks	Services and product focus
	Cable TV and OTT networks	Services and product focus
	Newspapers/magazines	Services and product focus
	Data publishing	Services and product focus
	E-Commerce (services)	Services and product focus
	Educational publishing	Services and product focus
	Film and TV programming production	Capital or asset focus
	Miscellaneous media and entertainment	Services and product focus
	Motion picture exhibitors	Services and product focus
	Music publishing and recording	Services and product focus
	Outdoor advertising	Services and product focus
	Printing	Commodity focus/scale driven
	Radio stations	Services and product focus
	Local TV stations	Services and product focus
Oil and gas drilling, equipment and services	Onshore contract drilling	Commodity focus/scale driven
	Offshore contract drilling	Capital or Asset Focus
	Oil and gas equipment and services (oilfield services)	Commodity focus/scale driven
Retail and restaurants	Catalog retail	Services and product focus
	Internet retail	Services and product focus
	Department stores	Services and product focus
	General merchandise stores	Services and product focus
	Apparel retail	Services and product focus
	Computer and electronics retail	Services and product focus
	Home improvement retail	Services and product focus
	Specialty stores	Services and product focus
	Automotive retail	Services and product focus
	Home furnishing retail	Services and product focus
Health care services	Health care services	Commodity focus/scale driven
Transportation infrastructure	Airport services	National industries and utilities

Table 27

List Of Industries, Subsectors, And Standard Competitive Position Group Profiles (cont.)

Industry	Subsector	Competitive position group profile
	Highways	National industries and utilities
	Railtracks	National industries and utilities
	Marine ports and services	National industries and utilities
Environmental services	Environmental and facilities services	Services and product focus
Regulated utilities	Electric utilities	National industries and utilities
	Gas utilities	National industries and utilities
	Multi-utilities	National industries and utilities
	Water utilities	National industries and utilities
Unregulated power and gas	Independent power producers and energy traders	Capital or asset focus
	Merchant power	Capital or asset focus
Pharmaceuticals	Branded pharmaceuticals	Services and product focus
	Generic pharmaceuticals	Commodity focus/scale driven
Health care equipment	High-tech health care equipment	Product focus/scale driven
	Low-tech health care equipment	Commodity focus/scale driven
Branded nondurables	Brewers	Services and product focus
	Distillers and vintners	Services and product focus
	Soft drinks	Services and product focus
	Packaged foods and meats	Services and product focus
	Tobacco	Services and product focus
	Household products	Services and product focus
	Apparel, footwear, accessories, and luxury goods	Services and product focus
	Personal products	Services and product focus
Telecommunications and cable	Cable and satellite	Services and product focus
	Alternative carriers	Services and product focus
	Integrated telecommunication services	Services and product focus
	Wireless towers	Capital or asset focus
	Data center operators	Capital or asset focus
	Fiber-optic carriers	Capital or asset focus
	Wireless telecommunication services	Services and product focus

Table 27

List Of Industries, Subsectors, And Standard Competitive Position Group Profiles (cont.)

Industry	Subsector	Competitive position group profile

*See "Key Credit Factors For The Real Estate Industry." **For specialized REITs, there is no standard CPGP, as the CPGP will vary based on the underlying industry exposure (e.g., a forest and paper products REIT).

1. Analyzing subfactors for competitive advantage

193. Competitive advantage is the first component of our competitive position analysis. Companies that possess a sustainable competitive advantage are able to capitalize on key industry factors or mitigate associated risks more effectively. When a company operates in more than one business, we analyze each segment separately to form an overall view of its competitive advantage. In assessing competitive advantage, we evaluate the following subfactors:

- Strategy;
- Differentiation/uniqueness, product positioning/bundling;
- Brand reputation and marketing;
- Product/service quality;
- Barriers to entry, switching costs;
- Technological advantage and capabilities, technological displacement; and
- Asset profile.

a) Strategy

194. A company's business strategy will enhance or undermine its market entrenchment and business stability. Compelling business strategies can create a durable competitive advantage and thus a relatively stronger competitive position. We form an opinion as to the source and sustainability (if any) of the company's competitive advantage relative to its peers'. The company may have a differentiation advantage (i.e., brand, technology, regulatory) or a cost advantage (i.e., lower cost producer/servicer at the same quality level), or a combination.

195. Our assessment of a company's strategy is informed by a company's historical performance and how realistic we view its forward-looking business objectives to be. These may include targets for market shares, the percentage of revenues derived from new products, price versus the competition's, sales or profit growth, and required investment levels. We evaluate these objectives in the context of industry dynamics and the attractiveness of the markets in which the company participates.

b) Differentiation/uniqueness, product positioning/bundling

196. The attributes of product or service differentiation vary by sector, and may include product or services features, performance, durability, reliability, delivery, and comprehensiveness, among other measures. The intensity of competition may be lower where buyers perceive the product or

service to be highly differentiated or to have few substitutes. Conversely, products and services that lack differentiation, or offer little value-added in the eyes of customers, are generally commodity-type products that primarily compete on price. Competition intensity will often be highest where limited or moderate investment (R&D, capital expenditures, or advertising) or low employee skill levels (for service businesses) are required to compete. Independent market surveys, media commentaries, market share trends, and evidence of leading or lagging when it comes to raising or lowering prices can indicate varying degrees of product differentiation.

197. Product positioning influences how companies are able to extend or protect market shares by offering popular products or services. A company's abilities to replace aging products with new ones, or to launch product extensions, are important elements of product positioning. In addition, the ability to sell multiple products or services to the same customer, known as bundling or cross-selling, (for instance, offering an aftermarket servicing contract together with the sale of a new appliance) can create a competitive advantage by increasing customers' switching costs and fostering loyalty.

c) Brand reputation and marketing

198. Brand equity measures the price premium a company receives based on its brand relative to the generic equivalent. High brand equity typically translates into customer loyalty, built partially via marketing campaigns. One measure of advertising effectiveness can be revenue growth compared with the increase in advertising expenses.

199. We also analyze re-investment and advertising strategies to anticipate potential strengthening or weakening of a company's brand. A company's track record of boosting market share and delivering attractive margins could indicate its ability to build and maintain brand reputation.

d) Product/service level quality

200. The strength and consistency of a value proposition is an important factor contributing to a sustainable competitive advantage. Value proposition encompasses the key features of a product or a service that convince customers that their purchase has the right balance between price and quality. Customers generally perceive a product or a service to be good if their expectations are consistently met. Quality, both actual and perceived, can help a company attract and retain customers. Conversely, poor product and service quality may lead to product recalls, higher-than-normal product warnings, or service interruptions, which may reduce demand. Measures of customer satisfaction and retention, such as attrition rates and contract renewal rates, can help trace trends in product/service quality.

201. Maintaining the value proposition requires consistency and adaptability around product design, marketing, and quality-related operating controls. This is pertinent where product differentiation matters, as is the case in most noncommodity industries, and especially so where environmental or human health (concerns for the chemical, food, and pharmaceutical industries) adds a liability dimension to the quality and value proposition. Similarly, regulated utilities (which often do not set their own prices) typically focus on delivering uninterrupted service, often to meet the standards set by their regulator.

e) Barriers to entry, switching costs

202. Barriers to entry can reduce or eliminate the threat of new market entrants. Where they are effective, these barriers can lead to more predictable revenues and profits, by limiting pricing

pressures and customer losses, lowering marketing costs, and improving operating efficiency. While barriers to entry may enable premium pricing, a dominant player may rationally choose pricing restraint to further discourage new entrants.

203. Barriers to entry can be one or more of: a natural or regulatory monopoly; supportive regulation; high transportation costs; an embedded customer base that would incur high switching costs; a proprietary product or service; capital or technological intensiveness.

204. A natural monopoly may result from unusually high requirements for capital and operating expenditures that make it uneconomic for a market to support more than a single, dominant provider. The ultimate barrier to entry is found among regulated utilities, which provide an essential service in their 'de juris' monopolies and receive a guaranteed rate of return on their investments. A supportive regulatory regime can include rules and regulations with high hurdles that discourage competitors, or mandate so many obligations for a new entrant as to make market entry financially unviable.

205. In certain industrial sectors, proprietary access to a limited supply of key raw materials or skilled labor, or zoning laws that effectively preclude a new entrant, can provide a strong barrier to entry. Factors such as relationships, long-term contracts or maintenance agreements, or exclusive distribution agreements can result in a high degree of customer stickiness. A proprietary product or service that's protected by a copyright or patent can pose a significant hurdle to new competitors.

f) Technological advantage and capabilities, technological displacement

206. A company may benefit from a proprietary technology that enables it to offer either a superior product or a commodity-type product at a materially lower cost. Proven research and development (R&D) capabilities can deliver a differentiated, superior product or service, as in the pharmaceutical or high tech sectors. However, optimal R&D strategies or the importance or effectiveness of patent protection differ by industry, stage of product development, and product lifecycle.

207. Technological displacement can be a threat in many industries; new technologies or extensions of current ones can effectively displace a significant portion of a company's products or services.

g) Asset profile

208. A company's asset profile is a reflection of its reinvestment, which creates tangible or intangible assets, or both. Companies in similar sectors and industries usually have similar reinvestment options and, thus, their asset profiles tend to be comparable. The reinvestment in "heavy" industries, such as oil and gas, metals and mining, and automotive, tends to produce more tangible assets, whereas the reinvestment in certain "light" industries, such as services, media and entertainment, and retail, tends to produce more intangible assets.

209. We evaluate how a company's asset profile supports or undermines its competitive advantage by reviewing its manufacturing or service creation capabilities and investment requirements, its distribution capabilities, and its track record and commitment to reinvesting in its asset base. This may include a review of the company's ability to attract and retain a talented workforce; its degree of vertical integration and how that may help or hinder its ability to secure supply sources, control the value-added part of its production chain, or adjust to technological developments; or its ability develop a broad and strong distribution network.

2. Analyzing subfactors for scale, scope, and diversity

210. In assessing the relative strength of this component, we evaluate four subfactors:

- Diversity of product or service range;
- Geographic diversity;
- Volumes, size of markets and revenues, and market shares; and
- Maturity of products or services.

211. In a given industry, entities with a broader mix of business activities are typically lower risk, and entities with a narrower mix are higher risk. High concentration of business volumes by product, customer, or geography, or a concentration in the production footprint or supplier base, can lead to less stable and predictable revenues and profits. Comparatively broader diversity helps a company withstand economic, competitive, or technological threats better than its peers.

212. There is no minimum size criterion, although size often provides a measure of diversification. Size and scope of operations is important relative to those of industry peers, though not in absolute terms. While relatively smaller companies can enjoy a high degree of diversification, they will likely be, almost by definition, more concentrated in terms of product, number of customers, or geography than their larger peers in the same industry.

213. Successful and continuing diversification supports a stronger competitive position. Conversely, poor diversification weakens overall competitive position. For example, a company will weaken its overall business position if it enters new product lines and countries where it has limited expertise and lacks critical mass to be a real competitor to the incumbent market leaders. The weakness is greater when the new products or markets are riskier than the traditional core business.

214. Where applicable, we also include under scale, scope, and diversity an assessment of the potential benefits derived from unconsolidated (or partially consolidated) investments in strategic assets. The relative significance of such an investment and whether it is in an industry that exhibits high or, conversely, low correlation with the issuer's businesses would be considered in determining its potential benefits to scale, scope, and diversity. This excludes nonstrategic, financial investments, the analysis of which does not fall under the competitive position criteria but, instead, under the capital structure criteria.

a) Diversity of product or service range

215. The concentration of business volumes or revenues in a particular or comparatively small set of products or services can lead to less stable revenues and profits. Even if this concentration is in an attractive product or service, it may be a weakness. Likewise, the concentration of business volumes with a particular customer or a small group of customers, or the reliance on one or a few suppliers, can expose the company to a potentially greater risk of losing and having to replace related revenues and profits. On the other hand, successful diversification across products, customers, and/or suppliers can lead to more stable and predictable revenues and profits, which supports a stronger assessment of scale, scope, and diversity.

216. The relative contribution of different products or services to a company's revenues or profits helps us gauge its diversity. We also evaluate the correlation of demand between product or services lines. High correlation in demand between seemingly different product or service lines will accentuate volume declines during a weak part of the business cycle.

217. In most sectors, the share of revenue a company receives from its largest five to 10 customers or

counterparties reveals how diversified its customer base is. However, other considerations such as the stability and credit quality of that customer base, and the company's ability to retain significant customers, can be mitigating or accentuating factors in our overall evaluation. Likewise, supplier dependency can often be measured based on a supplier's share of a company's operating or capital costs. However, other factors, such as the degree of interdependence between the company and its supplier(s), the substitutability of key supply sources, and the company's presumed ability to secure alternative supply without incurring substantial switching costs, are important considerations. Low switching costs (i.e. limited impact on input price, quality, or delivery times as a result of having to adapt to a new supply chain partner) can mitigate a high level of concentration.

b) Geographic diversity

218. We assess geographic diversity both from the standpoint of the breadth of the company's served or addressable markets, and from the standpoint of how geographically concentrated its facilities are.

219. The concentration of business volumes and revenues within a particular region can lead to greater exposure to economic factors affecting demand for a company's goods or services in that region. Even if the company's volumes and revenues are concentrated in an attractive region, it may still be vulnerable to a significant drop in demand for its goods and services. Conversely, a company that serves multiple regions may benefit from different demand conditions in each, possibly resulting in greater revenue stability and more consistent profitability than a more focused peer's. That said, we consider geographic diversification in the context of the industry and the size of the local or regional economy. For instance, companies operating in local industries (such as food retailers) may benefit from a well-entrenched local position.

220. Generally, though, geographically concentrated production or service operations can expose a company to the risk of disruption, and damage revenues and profitability. Even when country risks don't appear significant, a company's vulnerability to exogenous factors (for example, natural disasters, an epidemic, labor or political unrest) increases with geographic concentration.

c) Volumes, size of markets and revenues, market share

221. Absolute sales or unit volumes and market share do not, by themselves, support a strong assessment of scale, scope, and diversity. Yet superior market share is a positive, since it may indicate a broad range of operations, products, or services.

222. We view volume stability (relative to peers') as a positive especially when: a company has demonstrated it during an economic downturn; if it has been achieved without relying on greater price concessions than competitors have made; and when it is likely to be sustained in the future. However, volume stability combined with shrinking market share could be evidence of a company's diminishing prospects for future profitability. We assess the predictability of business volumes and the likely degree of future volume stability by analyzing the company's performance relative to peers' on several industry factors: cyclicality; ability to adapt to technological and regulatory threats; the profile of the customer base (stickiness); and the potential life cycle of the company's products or services.

223. Depending on the industry sector, we measure a company's relative size and market share based on unit sales; the absolute amount of revenues; and the percentage of revenues captured from total industry revenues. We also adjust for industry and company specific qualitative considerations. For example, if an industry is particularly fragmented and has a number of

similarly sized participants, none may have a particular advantage or disadvantage with respect to market share.

d) Maturity of products or services

224. The degree of maturity and the relative position on the lifecycle curve of the company's product or service portfolio affect the stability and sustainability of its revenues and margins. It is important to identify the stage of development of a company's products or services in order to measure the life cycle risks that may be associated with key products or services.

225. Mature products or services (e.g. consumer products or broadcast programming) are not necessarily a negative, in our view, if they still contribute reliable profits. If demand is declining for a company's product or service, we examine its track record on introducing new products with staying power. Similarly, a company's track record with product launches is particularly relevant.

3. Analyzing subfactors for operating efficiency

226. In assessing the relative strength of this component, we consider four subfactors:

- Cost structure,
- Manufacturing processes,
- Working capital management, and
- Technology.

227. To the extent a company has high operating efficiency, it should be able to generate better profit margins than peers that compete in the same markets, whatever the prevailing market conditions. The ability to minimize manufacturing and other operational costs and thus maximize margins and cash flow--for example, through manufacturing excellence, cost control, and diligent working capital management--will provide the funds for research and development, marketing, and customer service.

a) Cost structure

228. Companies that are well positioned from a cost standpoint will typically enjoy higher capacity utilization and be more profitable over the course of the business cycle. Cost structure and cost control are keys to generating strong profits and cash flow, particularly for companies that produce commodities, operate in mature industries, or face pricing pressures. It is important to consider whether a company or any of its competitors has a sustainable cost advantage, which can be based on access to cheaper energy, favorable manufacturing locations, or lower and more flexible labor costs, for example.

229. Where information is available, we examine a company's fixed versus variable cost mix as an indication of operating leverage, a measure of how revenue growth translates into growth in operating income. A company with significant operating leverage may witness dramatic declines in operating profit if unit volumes fall, as during cyclical downturns. Conversely, in an upturn, once revenues pass the breakeven point, a substantial percentage of incremental revenues typically becomes profit.

b) Manufacturing process

230. Capital intensity characterizes many heavy manufacturing sectors that require minimum volumes to produce acceptable profits, cash flow, and return on assets. We view capacity utilization through the business cycle (combined with the cost base) as a good indication of manufacturers' ability to maintain profits in varying economic scenarios. Our capacity utilization assessment is based on a company's production capacity across its manufacturing footprint. In addition, we consider the direction of a company's capacity utilization in light of our unit sales expectations, as opposed to analyzing it plant-by-plant.

231. Labor relations remain an important focus in our analysis of operating efficiency for manufacturers. Often, a company's labor cost structure is driven by its history of contractual negotiations and the countries in which it operates. We examine the rigidity or flexibility of a company's labor costs and the extent to which it relies on labor rather than automation. We analyze labor cost structure by assessing the extent of union representation, wage and benefit costs as a share of cost of goods sold (when available), and by assessing the balance of capital equipment vs. labor input in the manufacturing process. We also incorporate trends in a company's efforts to transfer labor costs from high-cost to low-cost regions.

c) Working capital management

232. Working capital management--of current or short-term assets and liabilities--is a key factor in our evaluation of operating efficiency. In general, companies with solid working capital management skills exhibit shorter cash conversion cycles (defined as days' investment in inventory and receivables less days' investment in accounts payable) than their lower-skilled peers. Short cash-conversion cycles could, for instance, demonstrate that a company has a stronger position in the supply chain (for example, requiring suppliers or dealers to hold more of its inventory). This allows a company to direct more capital than its peers can to other areas of investment.

d) Technology

233. Technology can play an important role in achieving superior operating efficiency through effective yield management (by improving input/output ratios), supply chain automation, and cost optimization.

234. Achieving high yield management is particularly important in industries with limited inventory and high fixed costs, such as transportation, lodging, media, and retail. The most efficient airlines can achieve higher revenue per available seat mile than their peers, while the most efficient lodging companies can achieve a higher revenue per available room than their peers. Both industries rely heavily on technology to effectively allocate inventory (seats and rooms) to maximize sales and profitability.

235. Effective supply chain automation systems enable companies to reduce investments in inventory and better forecast future orders based on current trends. By enabling electronic data interchange between supplier and retailer, such systems help speed orders and reorders for goods by quickly pinpointing which merchandise is selling well and needs restocking. They also identify slow moving inventory that needs to be marked down, making space available for fresh merchandise.

236. Effective use of technology can also help hold down costs by improving productivity via

automation and workflow management. This can reduce selling, general, and administrative costs, which usually represent a substantial portion of expenditures for industries with high fixed costs, thus boosting earnings.

[Tables 28-30 have been deleted.]

C. Cash Flow/Leverage Analysis

1. The merits and drawbacks of each cash flow measure

a) EBITDA

237. EBITDA is a widely used, and therefore a highly comparable, indicator of cash flow, although it has significant limitations. Because EBITDA derives from the income statement entries, it can be distorted by the same accounting issues that limit the use of earnings as a basis of cash flow. In addition, interest can be a substantial cash outflow for speculative-grade companies and therefore EBITDA can materially overstate cash flow in some cases. Nevertheless, it serves as a useful and common starting point for cash flow analysis and is useful in ranking the financial strength of different companies.

b) Funds from operations (FFO)

238. FFO is a hybrid cash flow measure that estimates a company's inherent ability to generate recurring cash flow from its operations independent of working capital fluctuations. FFO estimates the cash flow available to the company before working capital, capital spending, and discretionary items such as dividends, acquisitions, etc.

239. Because cash flow from operations tends to be more volatile than FFO, FFO is often used to smooth period-over-period variation in working capital. We consider it a better proxy of recurring cash flow generation because management can more easily manipulate working capital depending on its liquidity or accounting needs. However, we do not generally rely on FFO as a guiding cash flow measure in situations where assessing working capital changes is important to judge a company's cash flow generating ability and general creditworthiness. For example, for working-capital-intensive industries such as retailing, operating cash flow may be a better indicator than FFO of the firm's actual cash generation.

240. FFO is a good measure of cash flow for well-established companies whose long-term viability is relatively certain (i.e., for highly rated companies). For such companies, there can be greater analytical reliance on FFO and its relation to the total debt burden. FFO remains very helpful in the relative ranking of companies. In addition, more established, healthier companies usually have a wider array of financing possibilities to cover potential short-term liquidity needs and to refinance upcoming maturities. For marginal credit situations, the focus shifts more to free operating cash flow--after deducting the various fixed uses such as working capital investment and capital expenditures--as this measure is more directly related to current debt service capability.

c) Cash flow from operations (CFO)

241. The measurement and analysis of CFO forms an important part of our ratings assessment, in particular for companies that operate in working-capital-intensive industries or industries in

which working capital flows can be volatile. CFO is distinct from FFO as it is a pure measure of cash flow calculated after accounting for the impact on earnings of changes in operating assets and liabilities. CFO is cash flow that is available to finance items such as capital expenditures, repay borrowing, and pay for dividends and share buybacks.

242. In many industries, companies shift their focus to cash flow generation in a downturn. As a result, even though they typically generate less cash from ordinary business activities because of low capacity utilization and relatively low fixed-cost absorption, they may generate cash by reducing inventories and receivables. Therefore, although FFO is likely to be lower in a downturn, the impact on CFO may not be as great. In times of strong growth the opposite will be true, and consistently lower CFO compared to FFO without a corresponding increase in revenue and profitability can indicate an untenable situation.

243. Working capital is a key element of a company's cash flow generation. While there tends to be a need to build up working capital and therefore to consume cash in a growth or expansion phase, changes in working capital can also act as a buffer in case of a downturn. Many companies will sell off inventories and invest a lower amount in raw materials because of weaker business activities, both of which reduce the amount of capital and cash that is tied up in working capital. Therefore, working capital fluctuations can occur both in periods of revenue growth and contraction and analyzing a company's near-term working capital needs is crucial for estimating future cash flow developments.

244. Often, businesses that are capital intensive are not working-capital-intensive: most of the capital commitment is upfront in equipment and machinery, while asset-light businesses may have to invest proportionally more in inventories and receivables. That also affects margins, because capital-intensive businesses tend to have proportionally lower operating expenses (and therefore higher EBITDA margins), while working-capital-intensive businesses usually report lower EBITDA margins. The resulting cash flow volatility can be significant: because all investment is made upfront in a capital-intensive business, there is usually more room to absorb subsequent EBITDA volatility because margins are higher. For example, a capital-intensive company may remain reasonably profitable even if its EBITDA margin declines from 30% to 20%. By contrast, a working-capital-intensive business with a lower EBITDA margin (due to higher operating expenses) of 8% can post a negative EBITDA margin if EBITDA volatility is large.

d) Free operating cash flow (FOCF)

245. By deducting capital expenditures from CFO, we arrive at FOCF, which can be used as a proxy for a company's cash generated from core operations. We may exclude discretionary capital expenditures for capacity growth from the FOCF calculation, but in practice it is often difficult to discriminate between spending for expansion and replacement. And, while companies have some flexibility to manage their capital budgets to weather down cycles, such flexibility is generally temporary and unsustainable in light of intrinsic requirements of the business. For example, companies can be compelled to increase their investment programs because of strong demand growth, technological changes, or to meet environmental regulatory requirements. Regulated entities (for example, telecommunications companies) might also face significant investment requirements related to their concession contracts (the understanding between a company and the host government that specifies the rules under which the company can operate locally).

246. Positive FOCF is a sign of strength and helpful in distinguishing between two companies with the same FFO. In addition, FOCF is helpful in differentiating between the cash flows generated by more and less capital-intensive companies and industries.

247. In highly capital-intensive industries (where maintenance capital expenditure requirements tend

to be high) or in other situations in which companies have little flexibility to postpone capital expenditures, measures such as FFO to debt and debt to EBITDA may provide less valuable insight into relative creditworthiness because they fail to capture potentially meaningful capital expenditures. In such cases, a ratio such as FOCF to debt provides greater analytical insight.

248. A company serving a low-growth or declining market may exhibit relatively strong FOCF because of diminishing fixed and working capital needs. Growth companies, in contrast, exhibit thin or even negative FOCF because of the investment needed to support growth. For the low-growth company, credit analysis weighs the positive, strong current cash flow against the danger that this high level of cash flow might not be sustainable. For the high-growth company, the opposite is true: weighing the negatives of a current cash deficit against prospects of enhanced cash flow once current investments begin yielding cash benefits. In the latter case, if we view the growth investment as temporary and not likely to lead to increased leverage over the long-term, we'll place greater analytical importance on FFO to debt rather than on FOCF to debt. In any event, we also consider the impact of a company's growth environment in our business risk analysis, specifically in a company's industry risk analysis (see section B).

e) Discretionary cash flow (DCF)

249. For corporate issuers primarily rated in the investment-grade universe, DCF to debt can be an important barometer of future cash flow adequacy as it more fully reflects a company's financial policy, including decisions regarding dividend payouts and share buybacks. In addition, potential M&A can represent a very significant use of cash and is an important component in cash flow analysis.

250. The level of dividends depends on a company's financial strategy. Companies with aggressive dividend payout targets might be reluctant to reduce dividends even under some liquidity pressure. In addition, investment-grade companies are less likely to reduce dividend payments following some reversals--although dividends ultimately are discretionary. DCF is the truest reflection of excess cash flow, but it is also the most affected by management decisions and, therefore, does not necessarily reflect the potential cash flow available.

D. Diversification/Portfolio Effect

1. Academic research

251. Academic research recently concluded that, during the global financial crisis of 2007-2009, conglomerates had the advantage over single sector-focused firms because they had better access to the credit markets as a result of their debt co-insurance and used the internal capital markets more efficiently (i.e., their core businesses had stronger cash flows). Debt co-insurance is the view that the joining-together of two or more firms whose earnings streams are less-than-perfectly correlated reduces the risk of default of the merged firms (i.e., the co-insurance effect) and thereby increases the "debt capacity" or "borrowing ability" of the combined enterprise. These financing alternatives became more valuable during the crisis. (Source: "Does Diversification Create Value In The Presence Of External Financing Constraints? Evidence From The 2007-2009 Financial Crisis," Venkat Kuppuswamy and Belen Villalonga, Harvard Business School, Aug. 19, 2011.)

252. In addition, fully diversified, focused companies saw more narrow credit default swap spreads from 2004-2010 vs. less diversified firms. This highlighted that lenders were differentiating for risk and providing these companies with easier and cheaper access to capital. (Source: "The Power of

Diversified Companies During Crises," The Boston Consulting Group and Leipzig Graduate School of Management, January 2012.)

253. Many rated conglomerates are either country- or region-specific; only a small percentage are truly global. The difference is important when assessing the country and macroeconomic risk factors. Historical measures for each region, based on volatility and correlation, reflect regional trends that are likely to change over time.

E. Financial Policy

1. Controlling shareholders

254. Controlling shareholder(s)--if they exist--exert significant influence over a company's financial risk profile, given their ability to use their direct or indirect control of the company's financial policies for their own benefit. Although the criteria do not associate the presence of controlling shareholder(s) to any predefined negative or positive impact, we assess the potential medium- to long-term implications for a company's credit standing of these strategies. Long-term ownership--such as exists in many family-run businesses--is often accompanied by financial discipline and reluctance to incur aggressive leverage. Conversely, short-term ownership--such as exists in private equity sponsor-owned companies--generally entails financial policies aimed at achieving rapid returns for shareholders typically through aggressive debt leverage.

255. The criteria define controlling shareholder(s) as:

- A private shareholder (an individual or a family) with majority ownership or control of the board of directors;
- A group of shareholders holding joint control over the company's board of directors through a shareholder agreement. The shareholder agreement may be comprehensive in scope or limited only to certain financial aspects; and
- A private equity firm or a group of private equity firms holding at least 40% in a company or with majority control of its board of directors.

256. A company is not considered to have a controlling shareholder if it is publicly listed with more than 50% of voting interest listed or when there is no evidence of a particular shareholder or group of shareholders exerting 'de facto' control over a company.

257. Companies that have as their controlling shareholder governments or government-related entities, infrastructure and asset-management funds, and diversified holding companies and conglomerates are assessed in separate criteria.

2. Financial discipline

a) Leverage influence from acquisitions

258. Companies may employ more or less acquisitive growth strategies based on industry dynamics, regulatory changes, market opportunities, and other factors. We consider management teams with disciplined, transparent acquisition strategies that are consistent with their financial policy framework as providing a high degree of visibility into the projected evolution of cash flow and credit measures. Our assessment takes into account management's track record in terms of

acquisition strategy and the related impact on the company's financial risk profile. Historical evidence of limited management tolerance for significant debt-funded acquisitions provides meaningful support for the view that projected credit ratios would not significantly weaken as a result of the company's acquisition policy. Conversely, management teams that pursue opportunistic acquisition strategies, without well-defined parameters, increase the risks that the company's financial risk profile may deteriorate well beyond our forecasts.

259. Acquisition funding policies and management's track record in this respect also provide meaningful insight in terms of credit ratio stability. In the criteria, we take into account management's willingness and capacity to mobilize all funding resources to restore credit quality, such as issuing equity or disposing of assets, to mitigate the impact of sizable acquisitions on credit ratios. The financial policy framework and related historical evidence are key considerations in our assessment.

b) Leverage influence from shareholder remuneration policies

260. A company's approach to rewarding shareholders demonstrates how it balances the interests of its various stakeholders over time. Companies that are consistent and transparent in their shareholder remuneration policies, and exhibit a willingness to adjust shareholder returns to mitigate adverse operating conditions, provide greater support to their long-term credit quality than other companies. Conversely, companies that prioritize cash returns to shareholders in periods of deteriorating economic, operating, or share price performance can significantly undermine long-term credit quality and exacerbate the credit impact of adverse business conditions. In assessing a company's shareholder remuneration policies, the criteria focus on the predictability of shareholder remuneration plans, including how a company builds shareholder expectations, its track record in executing shareholder return policies over time, and how shareholder returns compare with industry peers'.

261. Shareholder remuneration policies that lack transparency or deviate meaningfully from those of industry peers introduce a higher degree of event risk and volatility and will be assessed as less predictable under the criteria. Dividend and capital return policies that function primarily as a means to distribute surplus capital to shareholders based on transparent and stable payout ratios--after satisfying all capital requirements and leverage objectives of the company, and that support stable to improving leverage ratios--are considered the most supportive of long term credit quality.

c) Leverage influence from plans regarding investment decisions or organic growth strategies

262. The process by which a company identifies, funds, and executes organic growth, such as expansion into new products and/or new markets, can have a significant impact on its long-term credit quality. Companies that have a disciplined, coherent, and manageable organic growth strategy, and have a track record of successful execution are better positioned to continue to attract third-party capital and maintain long-term credit quality. By contrast, companies that allocate significant amounts of capital to numerous, unrelated, large and/or complex projects and often incur material overspending against the original budget can significantly increase their credit risk.

263. The criteria assess whether management's organic growth strategies are transparent, comprehensive, and measurable. We seek to evaluate the company's mid- to long-term growth objectives--including strategic rationales and associated execution risks--as well as the criteria it

uses to allocate capital. Effective capital allocation is likely to include guidelines for capital deployment, including minimum return hurdles, competitor activity analysis, and demand forecasting. The company's track record will provide key data for this assessment, including how well it executes large and/or complex projects against initial budgets, cost overruns, and timelines.

3. Financial policy framework

a) Comprehensiveness of financial policy framework

264. Financial policies that are clearly defined, unambiguous, and provide a tight framework around management behavior are the most reliable in determining an issuer's future financial risk profile. We assess as consistent with a supportive assessment, policies that are clear, measurable, and well understood by all key stakeholders. Accordingly, the financial policy framework must include well-defined parameters regarding how the issuer will manage its cash flow protection strategies and debt leverage profile. This includes at least one key or a combination of financial ratio constraints (such as maximum debt to EBITDA threshold) and the latter must be relevant with respect to the issuer's industry and/or capital structure characteristics.

265. By contrast, the absence of established financial policies, policies that are vague or not quantifiable, or historical evidence of significant and unexpected variation in management's long-term financial targets could contribute to an overall assessment of a non-supportive financial policy framework.

b) Transparency of financial policies

266. We assess as supportive financial policy objectives that are transparent and well understood by all key stakeholders and we view them as likely to influence an issuer's financial risk profile over time. Alternatively, financial policies, if they exist, that are not communicated to key stakeholders and/or where there is limited historical evidence to support the company's commitment to these policies, are non-supportive, in our view. We consider the variety of ways in which a company communicates its financial policy objectives, including public disclosures, investor presentation materials, and public commentary.

267. In some cases, however, a company may articulate its financial policy objectives to a limited number of key stakeholders, such as its main creditors or to credit rating agencies. In these situations, a company may still receive a supportive classification if we assess that there is a sufficient track record (more than three years) to demonstrate a commitment to its financial policy objectives.

c) Achievability and sustainability of financial policies

268. To assess the achievability and sustainability of a company's financial policies, we consider a variety of factors, including the entity's current and historical financial risk profile; the demands of its key stakeholders (including dividend and capital return expectations of equity holders); and the stability of the company's financial policies that we have observed over time. If there is evidence that the company is willing to alter its financial policy framework because of adverse business conditions or growth opportunities (including M&A), this could support an overall assessment of non-supportive.

4. Financial policy adjustments--examples

269. Example 1: A moderately leveraged company has just been sold to a new financial sponsor. The financial sponsor has not leveraged the company yet and there is no stated financial policy at the outset. We expect debt leverage to increase upon refinancing, but we are not able to factor it precisely in our forecasts yet.
Likely outcome: FS-6 financial policy assessment, implying that we expect the new owner to implement an aggressive financial policy in the absence of any other evidence.

270. Example 2: A company has two owners––a family owns 75%, a strategic owner holds the remaining 25%. Although the company has provided S&P Global Ratings with some guidance on long-term financial objectives, the overall financial policy framework is not sufficiently structured nor disclosed to a sufficient number of stakeholders to qualify for a supportive assessment. Recent history, however, does not provide any evidence of unexpected, aggressive financial transactions and we believe event risk is moderate.
Likely outcome: Neutral financial policy impact, including an assessment of neutral for financial discipline. Although the company's financial framework does not support long-term visibility, historical evidence and stability of management suggest that event risk is not significant. The unsupportive financial framework assessment, however, prevents the company from qualifying for an overall positive financial policy assessment, should the conditions for positive financial discipline be met.

271. Example 3: A company (not owned by financial sponsors) has stated leverage targets equivalent to a significant financial risk profile assessment. The company continues to make debt-financed acquisitions yet remains within its leverage targets, albeit at the weaker end of these. Our forecasts are essentially built on expectations that excess cash flow will be fully used to fund M&A or, possibly pay share repurchases, but that management will overall remain within its leverage targets.
Likely outcome: Neutral financial policy impact. Although management is fairly aggressive, the company consistently stays within its financial policy targets. We think our forecasts provide a realistic view of the evolution of the company's credit metrics over the next two years. No event risk adjustment is needed.

272. Example 4: A company (not owned by a financial sponsor) has just made a sizable acquisition (consistent with its long-term business strategy) that has brought its credit ratios out of line. Management expressed its commitment to rapidly improve credit ratios back to its long-term ratio targets––representing an acceptable range for the SACP--through asset disposals or a rights issue. We see their disposal plan (or rights issue) as realistic but precise value and timing are uncertain. At the same time, management has a supportive financial policy framework, a positive track record of five years, and assets are viewed as fairly easily tradable.
Likely outcome: Positive financial policy impact. Although forecast credit ratios will remain temporarily depressed, as we cannot fully factor in asset disposals (or rights issue) due to uncertainty on timing/value, or without leaking confidential information, the company's credit risk should benefit from management's positive track record and a supportive financial policy framework. The anchor will be better by one notch if management and governance is at least satisfactory and liquidity is at least adequate.

273. Example 5: A company (not owned by a financial sponsor) has very solid financial ratios, providing it with meaningful flexibility for M&A when compared with management's long-term stated financial policy. Also, its stock price performance is somewhat below that of its closest industry peers. Although we have no recent evidence of any aggressive financial policy steps, we fundamentally believe that, over the long-term term, the company will end up using its financial flexibility for the right M&A opportunity, or alternatively return cash to shareholders.
Likely outcome: Negative financial policy impact. Long-term event risk derived from M&A cannot

be built into forecasts nor shareholder returns (share buybacks or one-off dividends) be built into forecasts to attempt aligning projected ratios with stated long-term financial policy levels. This is because our forecasts are based on realistic and reasonably predictable assumptions for the medium term. The anchor will be adjusted down, by one notch or more, because of the negative financial policy assessment.

F. Corporate Criteria Glossary

Anchor: The combination of an issuer's business risk profile assessment and its financial risk profile assessment determine the anchor. Additional rating factors can then modify the anchor to determine the final rating or SACP.

Asset profile: A descriptive way to look at the types and quality of assets that comprise a company (examples can include tangible versus intangible assets, those assets that require large and continuing maintenance, upkeep, or reinvestment, etc.).

Business risk profile: This measure comprises the risk and return potential for a company in the market in which it participates, the country risks within those markets, the competitive climate, and the competitive advantages and disadvantages the company has. The criteria combine the assessments for Corporate Industry and Country Risk Assessment (CICRA), and competitive position to determine a company's business risk profile assessment.

Capital-intensive company: A company exhibiting large ongoing capital spending to sales, or a large amount of depreciation to sales. Examples of capital-intensive sectors include oil production and refining, telecommunications, and transportation sectors such as railways and airlines.

Cash available for debt repayment: Forecast cash available for debt repayment is defined as the net change in cash for the period before debt borrowings and debt repayments. This includes forecast discretionary cash flow adjusted for our expectations of any share issuance and M&A. Discretionary cash flow is defined in our Ratios And Adjustments criteria and guidance.

Competitive position: Our assessment of a company's: 1) competitive advantage; 2) operating efficiency; 3) scale, scope, and diversity; and 4) profitability.

- Competitive advantage--The strategic positioning and attractiveness to customers of the company's products or services, and the fragility or sustainability of its business model.
- Operating efficiency--The quality and flexibility of the company's asset base and its cost management and structure.
- Scale, scope, and diversity--The concentration or diversification of business activities.
- Profitability--Our assessment of both the company's level of profitability and volatility of profitability.

Competitive Position Group Profile (CPGP): Used to determine the weights to be assigned to the three components of competitive position other than profitability. While industries are assigned to one of the six profiles, individual companies and industry subsectors can be classified into another CPGP because of unique characteristics. Similarly, national industry risk factors can affect the weighing. The six CPGPs are:

- Services and product focus,
- Product focus/scale driven,
- Capital or asset focus,

- Commodity focus/cost driven,
- Commodity focus/scale driven, and
- National industry and utilities.

Conglomerate: Companies that have at least three distinct business segments, each contributing between 10%-50% of EBITDA or FOCF. Such companies may benefit from the diversification/portfolio effect.

Controlling shareholders: Equity owners who are able to affect decisions of varying effect on operations, leverage, and shareholder reward without necessarily being a majority of shareholders.

Corporate Industry and Country Risk Assessment (CICRA): The result of the combination of an issuer's country risk assessment and industry risk assessment.

Debt co-insurance: The view that the joining-together of two or more firms whose earnings streams are less-than-perfectly correlated reduces the risk of default of the merged firms (i.e., the co-insurance effect) and thereby increases the "debt capacity" or "borrowing ability" of the combined enterprise. These financing alternatives became more valuable during the global financial crisis of 2007-2009.

Financial headroom: Measure of deviation tolerated in financial metrics without moving outside or above a pre-designated band or limit typically found in loan covenants (as in a debt to EBITDA multiple that places a constraint on leverage). Significant headroom would allow for larger deviations.

Financial risk profile: The outcome of decisions that management makes in the context of its business risk profile and its financial risk tolerances. This includes decisions about the manner in which management seeks funding for the company and how it constructs its balance sheet. It also reflects the relationship of the cash flows the organization can achieve, given its business risk profile, to its financial obligations. The criteria use cash flow/leverage analysis to determine a corporate issuer's financial risk profile assessment.

Financial sponsor: An entity that follows an aggressive financial strategy in using debt and debt-like instruments to maximize shareholder returns. Typically, these sponsors dispose of assets within a short to intermediate time frame. Financial sponsors include private equity firms, but not infrastructure and asset-management funds, which maintain longer investment horizons.

Profitability ratio: Commonly measured using return on capital and EBITDA margins but can be measured using sector-specific ratios. Generally calculated based on a five-year average, consisting of two years of historical data, and our projections for the current year and the next two financial years.

Shareholder remuneration policies: Management's stated shareholder reward plans (such as a buyback or dividend amount, or targeted payout ratios).

Stand-alone credit profile (SACP): S&P Global Ratings' opinion of an issue's or issuer's creditworthiness, in the absence of extraordinary intervention or support from its parent, affiliate, or related government or from a third-party entity such as an insurer.

Transfer and convertibility assessment: S&P Global Ratings' view of the likelihood of a sovereign restricting nonsovereign access to foreign exchange needed to satisfy the nonsovereign's debt service obligations.

Unconsolidated equity affiliates: Companies in which an issuer has an investment, but which are

not consolidated in an issuer's financial statements. Therefore, the earnings and cash flows of the investees are not included in our primary metrics unless dividends are received from the investees.

Upstream/midstream/downstream: Referring to exploration and production, transport and storage, and refining and distributing, respectively, of natural resources and commodities (such as metals, oil, gas, etc.).

Volatility of profitability/SER: We base the volatility of profitability on the standard error of the regression (SER) for a company's historical EBITDA. The SER is a statistical measure that is an estimate of the deviation around a 'best fit' trend line. We combine it with the profitability ratio to determine the final profitability assessment. We only calculate SER when companies have at least seven years of historical annual data, to ensure that the results are meaningful.

Working-capital-intensive companies: Generally a company with large levels of working capital in relation to its sales in order to meet seasonal swings in working capital. Examples of working-capital-intensive sectors include retail, auto manufacturing, and capital goods.

G. Sector-Specific Criteria

1) Asset managers

Asset managers are companies that derive a majority of their revenues from management and performance fees for managing third-party money or assets on behalf of retail or institutional investors.

a) Capital structure

We assess asset managers' capital structure according to the same methodology we use for other corporate entities, with the exception of one additional subfactor--diversity of the capital structure, which we consider a tier one risk subfactor. A very positive assessment (1) is not used for asset managers.

In analyzing the diversity of the capital structure, we review the combination of debt and equity that forms an asset manager's capital and the degree of diversity within each of these two components. In analyzing diversity within debt, we review the number of different debt sources the company has, its access to different bank lines, and the number of banks providing those lines. In the analysis of equity, we consider whether the company is publicly traded and whether it has the ability to raise funds in public markets. We also look at the composition of equity (whether it includes common equity or any hybrid security, such as preferred equity).

We believe that diversity of capital structure is especially important for asset managers because the somewhat higher confidence sensitivity of these firms relative to nonfinancial corporate entities may rapidly reduce funding flexibility in adverse market or economic conditions. It is favorable, in our view, for an asset manager not to rely on one or a few financial institutions to raise debt and to have access to public equity markets. We view diversity of capital structure negatively if a company is reliant on a single source (for example, one bank) to raise debt and is privately owned with limited access to additional equity.

The initial capital structure assessment is based on the first four subfactors: diversity of the capital structure, currency risk associated with debt, debt maturity profile (or schedule), and interest rate risk associated with debt (see table 28). We may then adjust the initial assessment

based on the fifth subfactor--investments--as per table 22. (The investments assessment cannot exceed positive.)

Table 28

Assessing Capital Structure

Preliminary capital structure assessment	Subfactor assessment
Neutral	No tier one subfactor is negative.
Negative	One tier one subfactor is negative and the tier two subfactor is neutral.
Very negative	Two or more tier one subfactors are negative; or only one tier one subfactor is negative but the tier two subfactor is also negative.

As we analyze the investment portfolio of an asset manager, we also assess the market risk associated with those investments. Our assessment of market risk includes the manager's exposure to movements in interest rates, credit spreads, foreign exchange rates, commodity and equity prices, and any other market movements that could impair its earnings and ability to service debt. Investment portfolio market risk that produces a mismatch in cash flows, hinders profitability, or could cause a track record of losses precludes a positive assessment for investments. If the exposures are not large or hedges are in place, a positive assessment of investments is still possible despite the presence of market risk.

2) Financial market infrastructure companies

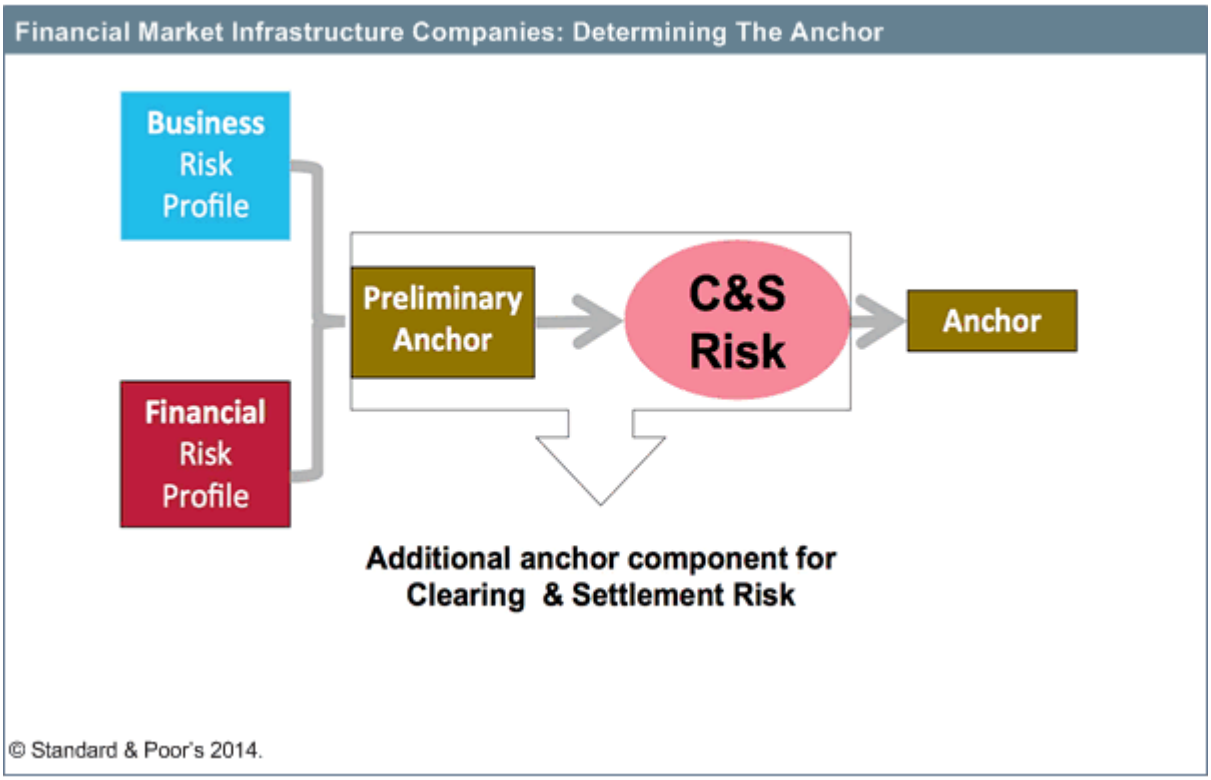
Financial market infrastructure companies (FMIs) are principally exchanges, clearinghouses, central security depositories (CSDs), and payment networks that process and clear credit or debit card transactions and cash payments.

a) Clearing and settlement risk

For FMIs, including exchanges, clearinghouses, CSDs, and payment networks, the analysis combines the FMI's business risk profile assessment and its financial risk profile assessment to determine the preliminary anchor. We then incorporate our view of clearing and settlement (C&S) risk to determine the anchor. The C&S risk assessment, as a component of the anchor, is the key difference between the FMI rating framework and the corporate methodology. This is because a clearinghouse's most important function is to reduce credit risk among its members by acting as guarantor or CCP to trades executed in its market. In our opinion, the risk of a member default is the single largest risk that a clearinghouse faces. Similarly, a CSD acts to reduce settlement risk among its members by completing trades on a delivery-versus-payment (DVP) basis and by following other well-established risk management procedures.

Our C&S risk assessment considers the diversity and creditworthiness of membership and an institution's risk management policies and procedures per international standards. The outcome of our C&S risk assessment could raise (by one notch), lower (by one to eight notches), or leave unchanged the preliminary anchor to determine the anchor.

Chart 2



b) Capital structure

For the most part, we follow the corporate methodology for assessing capital structure, which focuses on two Tier 1 risk subfactors (currency risk associated with debt and the debt maturity profile) and one Tier 2 subfactor (interest rate risk associated with debt).

In a limited number of cases, our assessment of capital structure for an FMI differs from the corporate methodology when the FMI is prudentially regulated by the national banking regulators and conducts some (limited) banking operations, such as deposit-taking and/or granting of credit facilities, linked to its core FMI business (e.g., European-based international CSDs). For these FMI companies, we calculate the risk-adjusted capital (RAC) ratio. (For details, see "Risk-Adjusted Capital Framework Methodology.")

For those few FMI companies for which we calculate a RAC ratio and assign potential modifiers, as per table 29, we apply the same five-point scale from very positive (1) to very negative (5), employing similar gradation of RAC ratios as in "Financial Institutions Rating Methodology."

There are two important exceptions. If an FMI has an anchor of 'aa-' or higher, it is not eligible to receive any notches of uplift. This is because we expect FMI companies exhibiting strong business and financial risk profiles to have strong capitalization. Likewise, if an FMI has an anchor within the 'a' category, it may receive a maximum uplift of one notch.

Table 29

Capital Structure--RAC Ratio

	Descriptor	RAC ratio %	Notches
1	Very positive	>15	2
2	Positive	10-15	1
3	Neutral	7.0-9.9	0
4	Negative	5.0-6.9	(1)
5	Very negative	<5	(2) or more

In our view, there is no optimal structure of the financial safeguard package or default waterfall. Some clearinghouses may rely more on individual member margin requirements, while others may rely more on the mutualized guarantee fund. For this reason, the overall protection afforded by the financial safeguard package (i.e., the sum of the parts) is more important than the individual components of the financial safeguard package. For example, very strong guarantee fund contributions can offset weakness in the margin calculation.

2) Financial services finance companies

Financial services finance companies (FSFCs) are finance companies for which the greatest risks relate more to their ability to generate cash flow than to the amount of capital they may need to withstand credit losses. These include consumer finance companies, originators and servicers, auto fleet services companies, real estate services, and money transaction processors, among others.

a) Competitive position

In assessing the competitive position group profile (CPGP) for FSFCs, we review the following factors:

- Competitive advantage;
- Scale, scope, and diversity;
- Operating efficiency;
- Profitability; and
- Regulatory and legislative risks.

We assess a company's exposure to regulatory or legislative risks as either (1) adequate, (2) weak, or (3) vulnerable. If the regulatory and legislative risk assessment is (3) vulnerable, a company's competitive position is capped at (6) vulnerable. If the regulatory and legislative risk is assessment is (2) weak, the competitive position assessment is capped at (5) weak. If the regulatory and legislative risk assessment is (1) adequate, there are no caps on the competitive position assessment.

Regulatory and legislative risks. Regulatory and legislative risks are prominent factors for FSFCs. When assessing regulatory and legislative risks, we consider the credit implications on the FSFC and don't opine on the larger policy issue. From this perspective, regulators may introduce new legislation or change existing policy that could have significant financial consequences

related to both the revenue and costs for individual FSFCs or FSFC subsectors. For example, regulators could impose new regulatory reporting standards, which would increase costs, or regulators could impose limits on the maximum rates at which an individual FSFC or FSFC subsector can lend, which would reduce revenue. Our assessment balances how regulation may constrain profitability while at the same time enhancing profit stability.

Depending on the operating environment, new rules could incrementally constrain the profitability of business activities--for example, by limiting the interest rates permissible to be charged to clients or by limiting the range of clients that a finance company could help finance. Regulatory or legislative changes could also result in higher compliance costs.

We do not view regulatory and legislative risks as a potential positive to competitive advantage. We recognize that regulation could help stabilize volatility for FSFCs, but that would be reflected in the financial risk profile if it were to occur. Given their typically negative impact on competitive ability, regulatory and legislative risks cannot be assessed above adequate. An FSFC with an adequate assessment is not exposed to regulatory policies--existing or prospective--that meaningfully constrain profitability. When regulation reduces competition, we do reflect these benefits directly in the specific company's competitive advantage, as opposed to the overall sector.

An FSFC with a weak regulatory and legislative risk assessment is typically characterized by two or more of the following, or one of the following that is particularly significant:

- Subject to regulatory scrutiny, sometimes in a loosely regulated industry, and profitability could be constrained if new policies were implemented
- Exposed to regulatory and legislative changes, but in some cases, diversification by product or geography partially mitigates these risks
- Has a track record of government policy and regulation that constrain profitability or alter the standards for business conduct

An FSFC with a vulnerable regulatory and legislative risk assessment typically has two or more of the following, or one of the following that is particularly significant:

- Subject to ongoing regulatory scrutiny, and profitability will likely be constrained if new policies were implemented
- Exposed to regulatory and legislative changes, with limited diversification by product or geography
- Has a track record of government policy and regulation that significantly constrain profitability or alter the standards for business conduct

b) Capital structure

We consider a company's dependence on revolving, and generally short-term, asset-specific funding as an additional Tier 1 risk subfactor in our analysis of capital structure for FSFCs.

We assess asset-specific funding as either: (1) neutral, (2) negative, or (3) very negative. We then replace table 21 ("Preliminary Capital Structure Assessment") with table 30 here to determine the preliminary capital structure assessment.

When debt, such as warehouse facilities, or other asset-specific funding is used to finance assets and we net the debt with the assets, we assess the asset-specific Tier 1 subfactor as negative.

Typically, asset-specific funding includes secured and unsecured warehouse lending facilities, repurchase agreements, asset-backed security (ABS) securitizations, and residential mortgage-backed security (RMBS) securitizations.

Table 30

Assessing Capital Structure

Preliminary capital structure assessment	Subfactor assessment
Neutral	No Tier 1 subfactor is negative.
Negative	One Tier 1 subfactor is negative, and the Tier 2 subfactor is neutral.
Very negative	Two or more Tier 1 subfactors are negative; or one Tier 1 subfactor is negative and the Tier 2 subfactor is negative; or asset-specific funding is very negative.

We consider asset-specific funding a key driver of creditworthiness when a company is dependent on this form of funding to facilitate origination volume, primarily because the company could be susceptible to disruptions in adverse economic environments. Specifically, how an FSFC funds its business and the confidence sensitivity of its assets directly affect its ability to maintain business volumes and meet obligations in the event that asset-specific funding options become unavailable at different points in the business cycle. However, finance companies with large confidence-sensitive funding exposures are more susceptible to changes in asset credit quality and tangible capital, and we rate these entities under "Financial Institutions Rating Methodology."

We assess asset-specific funding by considering stability during times of stress, the diversity of counterparties, the type of collateral being pledged, and the maturity of asset-specific funding sources.

An FSFC with a neutral asset-specific funding assessment generally has a limited amount of, or no reliance on, asset-specific funding sources for ongoing business operations.

An FSFC with a negative asset-specific funding assessment is typically characterized by one or more of the following:

- The company is reliant on asset-specific funding sources for ongoing business operations.
- A large proportion of maturities are less than one year, or there is a maturity concentration in the same quarter.
- The company is reliant on a concentrated group of financial counterparties.

An FSFC with a very negative asset-specific funding assessment is characterized by both of the following:

- A company exhibits all of the characteristics of a negative asset-specific funding assessment as per the previous paragraph.
- One or more facilities are subject to substantial margin call exposure.

FREQUENTLY ASKED QUESTIONS

A. Volatility of cash flows

If a company exhibits volatile cash flow metrics, does S&P Global Ratings capture this in the cash flow volatility adjustment or in the financial policy assessment?

We capture this in either analytic factor, as appropriate. As per paragraph 125, the volatility adjustment is the mechanism by which we factor a "cushion" of medium-term variance to current financial performance not otherwise captured in either the near-term base-case forecast or the long-term business risk assessment. We make this adjustment based on the following:

- The expectation of any potential cash flow/leverage ratio movement is both prospective and dependent on the current business or economic conditions.
- Stress scenarios include, but are not limited to, a recession, technology or competitive shifts, loss or renegotiation of major contracts or customers, and key product or input price movements, as typically defined in the company's industry risk profile and competitive position assessment.
- The volatility adjustment is not static and is company-specific. At the bottom of an economic cycle or during periods of stressed business conditions, already reflected in the general industry risk or specific competitive risk profile, the prospect of weakening ratios is far less than at the peak of an economic cycle or business conditions.
- The expectation of prospective ratio changes may be formed by observed historical performance over an economic, business, or product cycle by the company or by peers.
- The assessment of which classification to use when evaluating the prospective number of scoring category moves will be guided by how close the current ratios are to the transition point (i.e. "buffer" in the current scoring category) and the corresponding amount of EBITDA movement at each scoring transition.

As per paragraph 157, financial policy refines our view of a company's risks beyond the conclusions arising from the standard assumptions in the cash flow/leverage assessment. Those assumptions do not always reflect or entirely capture the short-to-medium term event risks or the longer-term risks stemming from a company's financial policy. To the extent movements in one of these factors cannot be confidently predicted within our forward-looking evaluation of cash flow/leverage, we capture that risk in our evaluation of financial policy.

What constitutes a period of stress when assessing whether a company has a volatile or highly volatile level of cash flow/leverage?

As guidance, our global default studies demonstrate significant correlation of defaults with weak points in business cycles and banking crises. The 1991 peak default rate occurred after a mild recession in the U.S., a severe but short recession in the U.K., and the Nordic banking crisis. Other developed-market speculative-grade default peaks were the U.S., at 10.6% in 2001 (the U.S. recession) and 11.4% in 2009 (the global banking crisis and recession); and Europe, at 12.3% in 2002 (due in part to the bursting of the technology/Internet bubble and failures of a large number of telecom start-ups). (Sources: "2012 Annual Global Corporate Default Study," published March 18, 2013, and "Understanding Standard & Poor's Rating Definitions.")

Additional guidance can be found in "Methodology: Industry Risk," Appendix 1 where we considered sensitivity to economic cycles, as measured by the historical cyclical peak-to-trough

decline in profitability and revenues for major recessions ('BBB' and 'BB' stress) mapped to specific industry sectors.

B. Profitability

If a company operates in a region or in a country where local inflation is high, and you believe that this affects the comparability of its profitability measures with industry peers', how do you incorporate this in your assessment?

When analyzing level of profitability, we use, where available, the numeric guidance developed by considering the distribution of profitability measures within an industry or subsector. These thresholds apply globally irrespective of the underlying level of inflation, although we also consider trends in the profitability ratio to determine the level of profitability assessment. However, high inflation environments are often associated with exposure to countries with a high country risk, in which case as per paragraph 87 we may adjust the volatility of profitability assessment to account for this exposure. Finally, to the extent not captured elsewhere in the analysis, we may incorporate this factor as part of the comparable ratings analysis.

REVISIONS AND UPDATES

This article was originally published on Nov. 19, 2013. These criteria became effective on the date of publication.

Changes introduced after original publication:

- Following our periodic review completed on Oct. 16, 2015, we deleted paragraphs 9 and 10, which were related to the initial publication of our criteria and no longer relevant. We also made some adjustments to language. These adjustments have no impact on our ratings or the effective date of the criteria.
- Following our periodic review completed on Oct. 14, 2016, we updated criteria references, the contact list, and the definitions of financial sponsor-owned companies and financial sponsors to be consistent with those in the article "The Treatment Of Non-Common Equity Financing In Nonfinancial Corporate Entities," published April 29, 2014.
- On Feb. 8, 2017, we republished the article to correct an error in the regional grouping for the countries of Bhutan, Grenada, and Eritrea introduced after the periodic criteria review closed on Oct. 14, 2016.
- Following our periodic review completed on Oct. 11, 2017, we updated criteria references.
- On April 23, 2018, we updated the definition of a financial sponsor-owned company in table 23. We also updated the contact information.
- On Dec. 7, 2018, we republished this criteria article to make nonmaterial changes. We updated table 26, which supplements paragraph 46, by removing the GDP weightings of each country making up each defined region. The GDP weightings were removed because they were outdated and because a static table does not reflect the fact that GDP data change dynamically. Consistent with the criteria (see paragraph 46), we calculate regional risk assessments as the average of the unadjusted country risk assessments, weighted by the GDP of each country in a

defined region. These GDP weights were published in the criteria at the time of initial publication for reference only. Since the GDP data change, we use current GDP data each time we recalculate the regional risk assessments. We also updated the contact information and a criteria reference.

- On April 1, 2019, we changed the definition of discretionary cash flow in the Corporate Criteria Glossary section because it was superseded by "Corporate Methodology: Ratios And Adjustments," published on April 1, 2019 (Ratios and Adjustments). We also aligned the FFO to cash interest coverage ratio in paragraphs 103 and 105 with Ratios and Adjustments. We also made a nonmaterial change to paragraph 81 and the Frequently Asked Questions to provide additional transparency on how we assess profitability. Finally, we updated criteria references.
- On July 1, 2019, we republished this criteria article to make nonmaterial changes. We removed tables 28, 29, and 30 that contained industry-specific SER parameters. These parameters are not key rating factors and may change over time. We will update these tables and republish them in "Guidance: Corporate Methodology." We also amended the reference to these tables in paragraph 85 and updated the related research.
- On Dec. 4, 2019, we republished this article to make nonmaterial changes. Specifically, we deleted a sentence in paragraph seven that contained an example that is not criteria text, we clarified language in paragraph 124, we updated the title of table 26, and we updated criteria references.
- On April 30, 2020, we republished this criteria article to make nonmaterial changes: 1) We clarified language in paragraphs 7, 64, 71, 83, 103, 123, and 124 to reflect the fact that some previous content from archived KCFs has subsequently been included in "Guidance: Corporate Methodology"; 2) in paragraph 123, we reformatted and clarified our language as to the use of the standard and medial volatility tables; 3) we added Appendix G, "Sector-Specific Criteria", through which we have consolidated sector-specific criteria for financial market infrastructure companies (FMIs) and financial service finance companies (FSFCs) (the criteria in Appendix G previously appeared in separate Key Credit Factors articles for FMIs and for FSFCs, both of which have since been archived); 4) in table 27 of Appendix B, we updated the list of subsectors under the media and entertainment industry--specifically, we eliminated trade show, directories, and internet search engines as subsectors, since they are not materially represented in our current rated universe, and we combined several similar subsectors within media and entertainment to simplify the sector-specific guidance; and 5) we updated the "Related Publications" section to include criteria articles referenced by Appendix G.
- On March 31, 2021, we republished this criteria article to correct a publication error in Appendix G. Specifically, we included sector-specific criteria for asset managers that were inadvertently omitted when we consolidated sector-specific criteria that previously appeared in a separate "Key Credit Factors" article for asset managers, which has since been archived.
- On May 27, 2021, we republished this article to make nonmaterial changes. Specifically, we deleted paragraph 192, and moved the list of CRA application examples to "Guidance: Corporate Methodology".
- On Oct. 11, 2021, we republished this criteria article to make nonmaterial changes. We updated paragraphs 61, 82, 89, 112, 117, 125, 185, 220, and 245 to include examples describing how we incorporate environmental, social, and governance credit factors in our criteria framework. We also updated the "Related Publications" section.
- On Dec. 15, 2021, we republished this criteria article to make nonmaterial changes to update criteria references.

Sectors that fall in the scope of these criteria since the original publication include:

- Agricultural cooperatives following publication of "Key Credit Factors For Agricultural Cooperatives" on March 17, 2015;
- Entities engaged in commodities trading activities that generate less than 70% of expected earnings from commodities trading following publication of "Commodities Trading Industry Methodology," published Jan. 19, 2017;
- Master limited partnerships and general partnerships of master limited partnerships trading following publication of "Methodology: Master Limited Partnerships And General Partnerships" on Sept. 22, 2014; and
- Transportation equipment leasing and car rental companies following publication of "Key Credit Factors For The Operating Leasing Industry," published on Dec. 14, 2016.

RELATED PUBLICATIONS

Superseded Criteria

- Companies Owned By Financial Sponsors: Rating Methodology, March 21, 2013
- Methodology: Business Risk/Financial Risk Matrix Expanded, Sept. 18, 2012
- How Stock Prices Can Affect An Issuer's Credit Rating, Sept. 26, 2008
- 2008 Corporate Criteria: Analytical Methodology, April 15, 2008
- Credit FAQ: Knowing The Investors In A Company's Debt And Equity, April 4, 2006

Related Criteria

- Financial Institutions Rating Methodology, Dec. 9, 2021
- Environmental, Social, And Governance Principles In Credit Ratings, Oct. 10, 2021
- Group Rating Methodology, July 1, 2019
- Corporate Methodology: Ratios And Adjustments, April 1, 2019
- Reflecting Subordination Risk In Corporate Issue Ratings, March 28, 2018
- Risk-Adjusted Capital Framework Methodology, July 20, 2017
- Recovery Rating Criteria For Speculative-Grade Corporate Issuers, Dec. 7, 2016
- Rating Government-Related Entities: Methodology And Assumptions, March 25, 2015
- Methodology And Assumptions: Liquidity Descriptors For Global Corporate Issuers, Dec. 16, 2014
- The Treatment Of Non-Common Equity Financing In Nonfinancial Corporate Entities, April 29, 2014
- Country Risk Assessment Methodology And Assumptions, Nov. 19, 2013
- Methodology: Industry Risk, Nov. 19, 2013

- Ratings Above The Sovereign--Corporate And Government Ratings: Methodology And Assumptions, Nov. 19, 2013
- Methodology: Management And Governance Credit Factors For Corporate Entities, Nov. 13, 2012
- Criteria For Assigning 'CCC+', 'CCC', 'CCC-', And 'CC' Ratings, Oct. 1, 2012
- Principles Of Credit Ratings, Feb. 16, 2011
- Stand-Alone Credit Profiles: One Component Of A Rating, Oct. 1, 2010

Related Guidance

- Guidance: Corporate Methodology, July 1, 2019
- Guidance: Corporate Methodology: Ratios And Adjustments, April 1, 2019

Contact List

CRITERIA CONTACTS

Peter Kernan
London
(44) 20-7176-3618
peter.kernan@spglobal.com

CRITERIA CONTACTS

Andrew D Palmer
Melbourne
(61) 3-9631-2052
andrew.palmer@spglobal.com

CRITERIA CONTACTS

Marta Castelli
Buenos Aires
(54) 114-891-2128
marta.castelli@spglobal.com

ANALYTICAL CONTACTS

Gregg Lemos-Stein, CFA
New York
(1) 212-438-1809
gregg.lemos-stein@spglobal.com

ANALYTICAL CONTACTS

Michael P Altberg
New York
(1) 212-438-3950
michael.altberg@spglobal.com

ANALYTICAL CONTACTS

Luciano D Gremone
Buenos Aires
(54) 114-891-2143
luciano.gremone@spglobal.com

ANALYTICAL CONTACTS

Barbara Castellano
Milan
+ 390272111253
barbara.castellano@spglobal.com

MOODY'S
INVESTORS SERVICE

RATING METHODOLOGY

Regulated Electric and Gas Utilities

Table of Contents:

Analyst Contacts:

NEW YORK +1.212.553.1653

Michael G. Haggarty +1.212.553.7172
Associate Managing Director
michael.haggarty@moodys.com

Jim Hempstead +1.212.553.4318
Managing Director – Utilities
james.hempstead@moodys.com

Walter Winrow +1.212.553.7943
Managing Director - Global Project and Infrastructure Finance
walter.winrow@moodys.com

Jeffrey Cassella +1.212.553.1665
Vice President - Senior Analyst
jeffrey.cassella@moodys.com

Natividad Martel +1.212.553.4561
Vice President - Senior Analyst
natividad.martel@moodys.com

» contacts continued on the last page

This rating methodology replaces "Regulated Electric and Gas Utilities" last revised on December 23, 2013. We have updated some outdated links and removed certain issuer-specific information.

Summary

This rating methodology explains our approach to assessing credit risk for regulated electric and gas utilities globally. This document does not include an exhaustive treatment of all factors that are reflected in our ratings but should enable the reader to understand the qualitative considerations and financial information and ratios that are usually most important for ratings in this sector.[1]

This report includes a detailed rating grid which is a reference tool that can be used to approximate credit profiles within the regulated electric and gas utility sector in most cases. The grid provides summarized guidance for the factors that are generally most important in assigning ratings to companies in the regulated electric and gas utility industry. However, the grid is a summary that does not include every rating consideration. The weights shown for each factor in the grid represent an approximation of their importance for rating decisions but actual importance may vary substantially. In addition, the grid in this document uses historical results while ratings are based on our forward-looking expectations. As a result, the grid-indicated rating is not expected to match the actual rating of each company.

THIS METHODOLOGY WAS UPDATED ON THE DATES LISTED AS NOTED: ON FEBRUARY 22, 2019, WE AMENDED A REFERENCE TO A METHODOLOGY IN APPENDIX E AND REMOVED OUTDATED TEXT; ON AUGUST 2, 2018, WE MADE MINOR FORMATTING ADJUSTMENTS THROUGHOUT THE METHODOLOGY; ON FEBRUARY 15, 2018, WE CORRECTED THE FORMATTING OF THE FACTOR 4: FINANCIAL STRENGTH TABLE ON PAGE 34; AND ON SEPTEMBER 27, 2017, WE REMOVED A DUPLICATE FOOTNOTE THAT WAS PLACED IN THE MIDDLE OF THE TEXT ON PAGE 7.

[1] This update may not be effective in some jurisdictions until certain requirements are met.

The grid contains four key factors that are important in our assessment for ratings in the regulated electric and gas utility sector:

1. Regulatory Framework
2. Ability to Recover Costs and Earn Returns
3. Diversification
4. Financial Strength

Some of these factors also encompass a number of sub-factors. There is also a notching factor for holding company structural subordination.

This rating methodology is not intended to be an exhaustive discussion of all factors that our analysts consider in assigning ratings in this sector. We note that our analysis for ratings in this sector covers factors that are common across all industries such as ownership, management, liquidity, corporate legal structure, governance and country related risks which are not explained in detail in this document, as well as factors that can be meaningful on a company-specific basis. Our ratings consider these and other qualitative considerations that do not lend themselves to a transparent presentation in a grid format. The grid used for this methodology reflects a decision to favor a relatively simple and transparent presentation rather than a more complex grid that might map grid-indicated ratings more closely to actual ratings.

Highlights of this report include:

» An overview of the rated universe

» A summary of the rating methodology

» A discussion of the key rating factors that drive ratings

» Comments on the rating methodology assumptions and limitations, including a discussion of rating considerations that are not included in the grid

The Appendices show the full grid (Appendix A), our approach to ratings within a utility family (Appendix B), a description of the various types of companies rated under this methodology (Appendix C), key industry issues over the intermediate term (Appendix D), regional and other considerations (Appendix E), and treatment of power purchase agreements (Appendix F).

This methodology describes the analytical framework used in determining credit ratings. In some instances our analysis is also guided by additional publications which describe our approach for analytical considerations that are not specific to any single sector. Examples of such considerations include but are not limited to: the assignment of short-term ratings, the relative ranking of different classes of debt and hybrid securities, how sovereign credit quality affects non-sovereign issuers, and the assessment of credit support from other entities. A link to documents that describe our approach to such cross-sector credit rating methodological considerations can be found in the Related Research section of this report.

About the Rated Universe

The Regulated Electric and Gas Utilities rating methodology applies to rate-regulated[2] electric and gas utilities that are not Networks[3]. Regulated Electric and Gas Utilities are companies whose predominant[4] business is the sale of electricity and/or gas or related services under a rate-regulated framework, in most cases to retail customers. Also included under this methodology are rate-regulated utilities that own generating assets as any material part of their business, utilities whose charges or bills to customers include a meaningful component related to the electric or gas commodity, utilities whose rates are regulated at a sub-sovereign level (e.g. by provinces, states or municipalities), and companies providing an independent system operator function to an electric grid. Companies rated under this methodology are primarily rate-regulated monopolies or, in certain circumstances, companies that may not be outright monopolies but where government regulation effectively sets prices and limits competition.

This rating methodology covers regulated electric and gas utilities worldwide. These companies are engaged in the production, transmission, coordination, distribution and/or sale of electricity and/or natural gas, and they are either investor owned companies, commercially oriented government owned companies or, in the case of independent system operators, not-for-profit or similar entities. As detailed in Appendix C, this methodology covers a wide variety of companies active in the sector, including vertically integrated utilities, transmission and distribution utilities with retail customers and/or sub-sovereign regulation, local gas distribution utility companies (LDCs), independent system operators, and regulated generation companies. These companies may be operating companies or holding companies.

An over-arching consideration for regulated utilities is the regulatory environment in which they operate. While regulation is also a key consideration for networks, a utility's regulatory environment is in comparison often more dynamic and more subject to political intervention. The direct relationship that a regulated utility has with the retail customer, including billing for electric or gas supply that has substantial price volatility, can lead to a more politically charged rate-setting environment. Similarly, regulation at the sub-sovereign level is often more accessible for participation by interveners, including disaffected customers and the politicians who want their votes. Our views of regulatory environments evolve over time in accordance with our observations of regulatory, political, and judicial events that affect issuers in the sector.

This methodology pertains to regulated electric and gas utilities and excludes the following types of issuers, which are covered by separate rating methodologies: Regulated Networks, Unregulated Utilities and Power Companies, Public Power Utilities, Municipal Joint Action Agencies, Electric Cooperatives, Regulated Water Companies and Natural Gas Pipelines.[5]

The Regulated Electric and Gas Utility sector is predominantly investment grade, reflecting the stability generally conferred by regulation that typically sets prices and also limits competition, such that defaults have been lower than in many other non-financial corporate sectors. However, the nature of regulation can

[2] Companies in many industries are regulated. We use the term rate-regulated to distinguish companies whose rates (by which we also mean tariffs or revenues in general) are set by regulators.

[3] Regulated Electric and Gas Networks are companies whose predominant business is purely the transmission and/or distribution of electricity and/or natural gas without involvement in the procurement or sale of electricity and/or gas; whose charges to customers thus do not include a meaningful commodity cost component; which sell mainly (or in many cases exclusively) to non-retail customers; and which are rate-regulated under a national framework.

[4] We generally consider a company to be predominantly a regulated electric and gas utility when a majority of its cash flows, prospectively and on a sustained basis, are derived from regulated electric and gas utility businesses. Since cash flows can be volatile (such that a company might have a majority of utility cash flows simply due to a cyclical downturn in its non-utility businesses), we may also consider the breakdown of assets and/or debt of a company to determine which business is predominant.

[5] A link to credit rating methodologies covering these and other sectors can be found in the Related Research section of this report.

vary significantly from jurisdiction to jurisdiction. Most issuers at the lower end of the ratings spectrum operate in challenging regulatory environments.

About this Rating Methodology

This report explains the rating methodology for regulated electric and gas utilities in six sections, which are summarized as follows:

1. Identification and Discussion of the Rating Factors in the Grid

The grid in this rating methodology focuses on four rating factors. The four factors are comprised of sub-factors that provide further detail:

Factor / Sub-Factor Weighting - Regulated Utilities

Broad Rating Factors	Broad Rating Factor Weighting	Rating Sub-Factor	Sub-Factor Weighting
Regulatory Framework	25%	Legislative and Judicial Underpinnings of the Regulatory Framework	12.5%
		Consistency and Predictability of Regulation	12.5%
Ability to Recover Costs and Earn Returns	25%	Timeliness of Recovery of Operating and Capital Costs	12.5%
		Sufficiency of Rates and Returns	12.5%
Diversification	10%	Market Position	5%*
		Generation and Fuel Diversity	5%**
Financial Strength, Key Financial Metrics	40%		
		CFO pre-WC + Interest / Interest	7.5%
		CFO pre-WC / Debt	15.0%
		CFO pre-WC – Dividends / Debt	10.0%
		Debt/Capitalization	7.5%
Total	100%		100%
Notching Adjustment			
Holding Company Structural Subordination			0 to -3

*10% weight for issuers that lack generation; **0% weight for issuers that lack generation

2. Measurement or Estimation of Factors in the Grid

We explain our general approach for scoring each grid factor and show the weights used in the grid. We also provide a rationale for why each of these grid components is meaningful as a credit indicator. The information used in assessing the sub-factors is generally found in or calculated from information in company financial statements, derived from other observations or estimated by our analysts.[6] All of the quantitative credit metrics incorporate Moody's standard adjustments to income statement, cash flow statement and balance sheet amounts for restructuring, impairment, off-balance sheet accounts, receivable securitization programs, under-funded pension obligations, and recurring operating leases.[7]

[6] For definitions of our most common ratio terms, please see "Moody's Basic Definitions for Credit Statistics, User's Guide," a link to which may be found in the Related Research section of this report.

[7] Our standard adjustments are described in "Financial Statement Adjustments in the Analysis of Non-Financial Corporations". A link to this and other sector and cross-sector credit rating methodologies can be found in the Related Research section of this report.

Our ratings are forward-looking and reflect our expectations for future financial and operating performance. However, historical results are helpful in understanding patterns and trends of a company's performance as well as for peer comparisons. We utilize historical data (in most cases, an average of the last three years of reported results) in the rating grid. However, the factors in the grid can be assessed using various time periods. For example, rating committees may find it analytically useful to examine both historic and expected future performance for periods of several years or more, or for individual twelve month periods.

3. Mapping Factors to the Rating Categories

After estimating or calculating each sub-factor, the outcomes for each of the sub-factors are mapped to a broad Moody's rating category (Aaa, Aa, A, Baa, Ba, B, or Caa).

4. Assumptions, Limitations and Rating Considerations Not Included in the Grid

This section discusses limitations in the use of the grid to map against actual ratings, some of the additional factors that are not included in the grid but can be important in determining ratings, and limitations and assumptions that pertain to the overall rating methodology.

5. Determining the Overall Grid-Indicated Rating[8]

To determine the overall grid-indicated rating, we convert each of the sub-factor ratings into a numeric value based upon the scale below.

Aaa	Aa	A	Baa	Ba	B	Caa	Ca
1	3	6	9	12	15	18	20

The numerical score for each sub-factor is multiplied by the weight for that sub-factor with the results then summed to produce a composite weighted-factor score. The composite weighted factor score is then mapped back to an alphanumeric rating based on the ranges in the table below.

Grid-Indicated Rating

Grid-Indicated Rating	Aggregate Weighted Total Factor Score
Aaa	$x < 1.5$
Aa1	$1.5 \leq x < 2.5$
Aa2	$2.5 \leq x < 3.5$
Aa3	$3.5 \leq x < 4.5$
A1	$4.5 \leq x < 5.5$
A2	$5.5 \leq x < 6.5$
A3	$6.5 \leq x < 7.5$
Baa1	$7.5 \leq x < 8.5$
Baa2	$8.5 \leq x < 9.5$
Baa3	$9.5 \leq x < 10.5$

[8] In general, the grid-indicated rating is oriented to the Corporate Family Rating (CFR) for speculative-grade issuers and the senior unsecured rating for investment-grade issuers. For issuers that benefit from ratings uplift due to parental support, government ownership or other institutional support, the grid-indicated rating is oriented to the baseline credit assessment. For an explanation of baseline credit assessment, please refer to our rating methodology on government-related issuers. Individual debt instrument ratings also factor in decisions on notching for seniority level and collateral. The documents that provide broad guidance for these notching decisions are our rating methodologies on loss given default for speculative grade non-financial companies and for aligning corporate instrument ratings based on differences in security and priority of claim. The link to these and other sector and cross-sector credit rating methodologies can be found in the Related Research section of this report.

Grid-Indicated Rating

Grid-Indicated Rating	Aggregate Weighted Total Factor Score
Ba1	10.5 ≤ x < 11.5
Ba2	11.5 ≤ x < 12.5
Ba3	12.5 ≤ x < 13.5
B1	13.5 ≤ x < 14.5
B2	14.5 ≤ x < 15.5
B3	15.5 ≤ x < 16.5
Caa1	16.5 ≤ x < 17.5
Caa2	17.5 ≤ x < 18.5
Caa3	18.5 ≤ x < 19.5
Ca	x ≥ 19.5

For example, an issuer with a composite weighted factor score of 11.7 would have a Ba2 grid-indicated rating.

6. Appendices

The Appendices present a full grid and provide additional commentary and insights on our view of credit risks in this industry.

Discussion of the Grid Factors

Our analysis of electric and gas utilities focuses on four broad factors:

» Regulatory Framework

» Ability to Recover Costs and Earn Returns

» Diversification

» Financial Strength

There is also a notching factor for holding company structural subordination.

Factor 1: Regulatory Framework (25%)

Why It Matters

For rate-regulated utilities, which typically operate as a monopoly, the regulatory environment and how the utility adapts to that environment are the most important credit considerations. The regulatory environment is comprised of two rating factors - the Regulatory Framework and its corollary factor, the Ability to Recover Costs and Earn Returns. Broadly speaking, the Regulatory Framework is the foundation for how all the decisions that affect utilities are made (including the setting of rates), as well as the predictability and consistency of decision-making provided by that foundation. The Ability to Recover Costs and Earn Returns relates more directly to the actual decisions, including their timeliness and the rate-setting outcomes.

Utility rates[9] are set in a political/regulatory process rather than a competitive or free-market process; thus, the Regulatory Framework is a key determinant of the success of utility. The Regulatory Framework has many components: the governing body and the utility legislation or decrees it enacts, the manner in which regulators are appointed or elected, the rules and procedures promulgated by those regulators, the judiciary that interprets the laws and rules and that arbitrates disagreements, and the manner in which the utility manages the political and regulatory process. In many cases, utilities have experienced credit stress or default primarily or at least secondarily because of a break-down or obstacle in the Regulatory Framework – for instance, laws that prohibited regulators from including investments in uncompleted power plants or plants not deemed "used and useful" in rates, or a disagreement about rate-making that could not be resolved until after the utility had defaulted on its debts.

How We Assess Legislative and Judicial Underpinnings of the Regulatory Framework for the Grid

For this sub-factor, we consider the scope, clarity, transparency, supportiveness and granularity of utility legislation, decrees, and rules as they apply to the issuer. We also consider the strength of the regulator's authority over rate-making and other regulatory issues affecting the utility, the effectiveness of the judiciary or other independent body in arbitrating disputes in a disinterested manner, and whether the utility's monopoly has meaningful or growing carve-outs. In addition, we look at how well developed the framework is – both how fully fleshed out the rules and regulations are and how well tested it is – the extent to which regulatory or judicial decisions have created a body of precedent that will help determine future rate-making. Since the focus of our scoring is on each issuer, we consider how effective the utility is in navigating the regulatory framework – both the utility's ability to shape the framework and adapt to it.

A utility operating in a regulatory framework that is characterized by legislation that is credit supportive of utilities and eliminates doubt by prescribing many of the procedures that the regulators will use in determining fair rates (which legislation may show evidence of being responsive to the needs of the utility in general or specific ways), a long history of transparent rate-setting, and a judiciary that has provided ample precedent by impartially adjudicating disagreements in a manner that addresses ambiguities in the laws and rules will receive higher scores in the Legislative and Judicial Underpinnings sub-factor. A utility operating in a regulatory framework that, by statute or practice, allows the regulator to arbitrarily prevent the utility from recovering its costs or earning a reasonable return on prudently incurred investments, or where regulatory decisions may be reversed by politicians seeking to enhance their populist appeal will receive a much lower score.

In general, we view national utility regulation as being less liable to political intervention than regulation by state, provincial or municipal entities, so the very highest scoring in this sub-factor is reserved for this category. However, we acknowledge that states and provinces in some countries may be larger than small nations, such that their regulators may be equally "above-the-fray" in terms of impartial and technically-oriented rate setting, and very high scoring may be appropriate.

[9] In jurisdictions where utility revenues include material government subsidy payments, we consider utility rates to be inclusive of these payments, and we thus evaluate sub-factors 1a, 1b, 2a and 2b in light of both rates and material subsidy payments. For example, we would consider the legal and judicial underpinnings and consistency and predictability of subsidies as well as rates.

The relevant judicial system can be a major factor in the regulatory framework. This is particularly true in litigious societies like the United States, where disagreements between the utility and its state or municipal regulator may eventually be adjudicated in federal district courts or even by the US Supreme Court. In addition, bankruptcy proceedings in the US take place in federal courts, which have at times been able to impose rate settlement agreements on state or municipal regulators. As a result, the range of decisions available to state regulators may be effectively circumscribed by court precedent at the state or federal level, which we generally view as favorable for the credit- supportiveness of the regulatory framework.

Electric and gas utilities are generally presumed to have a strong monopoly that will continue into the foreseeable future, and this expectation has allowed these companies to have greater leverage than companies in other sectors with similar ratings. Thus, the existence of a monopoly in itself is unlikely to be a driver of strong scoring in this sub-factor. On the other hand, a strong challenge to the monopoly could cause lower scoring, because the utility can only recover its costs and investments and service its debt if customers purchase its services. There have some instances of incursions into utilities' monopoly, including municipalization, self-generation, distributed generation with net metering, or unauthorized use (beyond the level for which the utility receives compensation in rates). Incursions that are growing significantly or having a meaningful impact on rates for customers that remain with the utility could have a negative impact on scoring of this sub-factor and on factor 2 - Ability to Recover Costs and Earn Returns.

The scoring of this sub-factor may not be the same for every utility in a particular jurisdiction. We have observed that some utilities appear to have greater sway over the relevant utility legislation and promulgation of rules than other utilities – even those in the same jurisdiction. The content and tone of publicly filed documents and regulatory decisions sometimes indicates that the management team at one utility has better responsiveness to and credibility with its regulators or legislators than the management at another utility.

While the underpinnings to the regulatory framework tend to change relatively slowly, they do evolve, and our factor scoring will seek to reflect that evolution. For instance, a new framework will typically become tested over time as regulatory decisions are issued, or perhaps litigated, thereby setting a body of precedent. Utilities may seek changes to laws in order to permit them to securitize certain costs or collect interim rates, or a jurisdiction in which rates were previously recovered primarily in base rate proceedings may institute riders and trackers. These changes would likely impact scoring of sub-factor 2b - Timeliness of Recovery of Operating and Capital Costs, but they may also be sufficiently significant to indicate a change in the regulatory underpinnings. On the negative side, a judiciary that had formerly been independent may start to issue decisions that indicate it is conforming its decisions to the expectations of an executive branch that wants to mandate lower rates.

Factor 1a: Legislative and Judicial Underpinnings of the Regulatory Framework (12.5%)

Aaa	Aa	A	Baa
Utility regulation occurs under a fully developed framework that is national in scope based on legislation that provides the utility a nearly absolute monopoly (see note 1) within its service territory, an unquestioned assurance that rates will be set in a manner that will permit the utility to make and recover all necessary investments, an extremely high degree of clarity as to the manner in which utilities will be regulated and prescriptive methods and procedures for setting rates. Existing utility law is comprehensive and supportive such that changes in legislation are not expected to be necessary; or any changes that have occurred have been strongly supportive of utilities credit quality in general and sufficiently forward-looking so as to address problems before they occurred. There is an independent judiciary that can arbitrate disagreements between the regulator and the utility should they occur, including access to national courts, very strong judicial precedent in the interpretation of utility laws, and a strong rule of law. We expect these conditions to continue.	Utility regulation occurs under a fully developed national, state or provincial framework based on legislation that provides the utility an extremely strong monopoly (see note 1) within its service territory, a strong assurance, subject to limited review, that rates will be set in a manner that will permit the utility to make and recover all necessary investments, a very high degree of clarity as to the manner in which utilities will be regulated and reasonably prescriptive methods and procedures for setting rates. If there have been changes in utility legislation, they have been timely and clearly credit supportive of the issuer in a manner that shows the utility has had a strong voice in the process. There is an independent judiciary that can arbitrate disagreements between the regulator and the utility, should they occur including access to national courts, strong judicial precedent in the interpretation of utility laws, and a strong rule of law. We expect these conditions to continue.	Utility regulation occurs under a well developed national, state or provincial framework based on legislation that provides the utility a very strong monopoly (see note 1) within its service territory, an assurance, subject to reasonable prudency requirements, that rates will be set in a manner that will permit the utility to make and recover all necessary investments, a high degree of clarity as to the manner in which utilities will be regulated, and overall guidance for methods and procedures for setting rates. If there have been changes in utility legislation, they have been mostly timely and on the whole credit supportive for the issuer, and the utility has had a clear voice in the legislative process. There is an independent judiciary that can arbitrate disagreements between the regulator and the utility, should they occur, including access to national courts, clear judicial precedent in the interpretation of utility law, and a strong rule of law. We expect these conditions to continue.	Utility regulation occurs (i) under a national, state, provincial or municipal framework based on legislation that provides the utility a strong monopoly within its service territory that may have some exceptions such as greater self-generation (see note 1), a general assurance that, subject to prudency requirements that are mostly reasonable, rates will be set will be set in a manner that will permit the utility to make and recover all necessary investments, reasonable clarity as to the manner in which utilities will be regulated and overall guidance for methods and procedures for setting rates; or (ii) under a new framework where independent and transparent regulation exists in other sectors. If there have been changes in utility legislation, they have been credit supportive or at least balanced for the issuer but potentially less timely, and the utility had a voice in the legislative process. There is either (i) an independent judiciary that can arbitrate disagreements between the regulator and the utility, including access to courts at least at the state or provincial level, reasonably clear judicial precedent in the interpretation of utility laws, and a generally strong rule of law; or (ii) regulation has been applied (under a well developed framework) in a manner such that redress to an independent arbiter has not been required. We expect these conditions to continue.

Ba	B	Caa
Utility regulation occurs (i) under a national, state, provincial or municipal framework based on legislation or government decree that provides the utility a monopoly within its service territory that is generally strong but may have a greater level of exceptions (see note 1), and that, subject to prudency requirements which may be stringent, provides a general assurance (with somewhat less certainty) that rates will be set will be set in a manner that will permit the utility to make and recover necessary investments; or (ii) under a new framework where the jurisdiction has a history of less independent and transparent regulation in other sectors. Either: (i) the judiciary that can arbitrate disagreements between the regulator and the utility may not have clear authority or may not be fully independent of the regulator or other political pressure, but there is a reasonably strong rule of law; or (ii) where there is no independent arbiter, the regulation has mostly been applied in a manner such redress has not been required. We expect these conditions to continue.	Utility regulation occurs (i) under a national, state, provincial or municipal framework based on legislation or government decree that provides the utility monopoly within its service territory that is reasonably strong but may have important exceptions, and that, subject to prudency requirements which may be stringent or at times arbitrary, provides more limited or less certain assurance that rates will be set in a manner that will permit the utility to make and recover necessary investments; or (ii) under a new framework where we would expect less independent and transparent regulation, based either on the regulator's history in other sectors or other factors. The judiciary that can arbitrate disagreements between the regulator and the utility may not have clear authority or may not be fully independent of the regulator or other political pressure, but there is a reasonably strong rule of law. Alternately, where there is no independent arbiter, the regulation has been applied in a manner that often requires some redress adding more uncertainty to the regulatory framework. There may be a periodic risk of creditor-unfriendly government intervention in utility markets or rate-setting.	Utility regulation occurs (i) under a national, state, provincial or municipal framework based on legislation or government decree that provides the utility a monopoly within its service territory, but with little assurance that rates will be set in a manner that will permit the utility to make and recover necessary investments; or (ii) under a new framework where we would expect unpredictable or adverse regulation, based either on the jurisdiction's history of in other sectors or other factors. The judiciary that can arbitrate disagreements between the regulator and the utility may not have clear authority or is viewed as not being fully independent of the regulator or other political pressure. Alternately, there may be no redress to an effective independent arbiter. The ability of the utility to enforce its monopoly or prevent uncompensated usage of its system may be limited. There may be a risk of creditor-unfriendly nationalization or other significant intervention in utility markets or rate-setting.

Note 1: The strength of the monopoly refers to the legal, regulatory and practical obstacles for customers in the utility's territory to obtain service from another provider. Examples of a weakening of the monopoly would include the ability of a city or large user to leave the utility system to set up their own system, the extent to which self-generation is permitted (e.g. cogeneration) and/or encouraged (e.g., net metering, DSM generation). At the lower end of the ratings spectrum, the utility's monopoly may be challenged by pervasive theft and unauthorized use. Since utilities are generally presumed to be monopolies, a strong monopoly position in itself is not sufficient for a strong score in this sub-factor, but a weakening of the monopoly can lower the score.

How We Assess Consistency and Predictability of Regulation for the Grid

For the Consistency and Predictability sub-factor, we consider the track record of regulatory decisions in terms of consistency, predictability and supportiveness. We evaluate the utility's interactions in the regulatory process as well as the overall stance of the regulator toward the utility.

In most jurisdictions, the laws and rules seek to make rate-setting a primarily technical process that examines costs the utility incurs and the returns on investments the utility needs to earn so it can make investments that are required to build and maintain the utility infrastructure - power plants, electric transmission and distribution systems, and/or natural gas distribution systems. When the process remains technical and transparent such that regulators can support the financial health of the utility while balancing their public duty to assure that reliable service is provided at a reasonable cost, and when the utility is able to align itself with the policy initiatives of the governing jurisdiction, the utility will receive higher scores in this sub-factor. When the process includes substantial political intervention, which could take the form of legislators or other government officials publically second- guessing regulators, dismissing regulators who have approved unpopular rate increases, or preventing the implementation of rate increases, or when regulators ignore the laws/rules to deliver an outcome that appears more politically motivated, the utility will receive lower scores in this sub-factor.

As with the prior sub-factor, we may score different utilities in the same jurisdiction differently, based on outcomes that are more or less supportive of credit quality over a period of time. We have observed that some utilities are better able to meet the expectations of their customers and regulators, whether through better service, greater reliability, more stable rates or simply more effective regulatory outreach and communication. These utilities typically receive more consistent and credit supportive outcomes, so they will score higher in this sub-factor. Conversely, if a utility has multiple rapid rate increases, chooses to submit major rate increase requests during a sensitive election cycle or a severe economic downturn, has chronic customer service issues, is viewed as frequently providing incomplete information to regulators, or is tone deaf to the priorities of regulators and politicians, it may receive less consistent and supportive outcomes and thus score lower in this sub-factor.

In scoring this sub-factor, we will primarily evaluate the actions of regulators, politicians and jurists rather than their words. Nonetheless, words matter when they are an indication of future action. We seek to differentiate between political rhetoric that is perhaps oriented toward gaining attention for the viewpoint of the speaker and rhetoric that is indicative of future actions and trends in decision- making.

Factor 1b: Consistency and Predictability of Regulation (12.5%)

Aaa	Aa	A	Baa
The issuer's interaction with the regulator has led to a strong, lengthy track record of predictable, consistent and favorable decisions. The regulator is highly credit supportive of the issuer and utilities in general. We expect these conditions to continue.	The issuer's interaction with the regulator has a led to a considerable track record of predominantly predictable and consistent decisions. The regulator is mostly credit supportive of utilities in general and in almost all instances has been highly credit supportive of the issuer. We expect these conditions to continue.	The issuer's interaction with the regulator has led to a track record of largely predictable and consistent decisions. The regulator may be somewhat less credit supportive of utilities in general, but has been quite credit supportive of the issuer in most circumstances. We expect these conditions to continue.	The issuer's interaction with the regulator has led to an adequate track record. The regulator is generally consistent and predictable, but there may some evidence of inconsistency or unpredictability from time to time, or decisions may at times be politically charged. However, instances of less credit supportive decisions are based on reasonable application of existing rules and statutes and are not overly punitive. We expect these conditions to continue.

Ba	B	Caa
We expect that regulatory decisions will demonstrate considerable inconsistency or unpredictability or that decisions will be politically charged, based either on the issuer's track record of interaction with regulators or other governing bodies, or our view that decisions will move in this direction. The regulator may have a history of less credit supportive regulatory decisions with respect to the issuer, but we expect that the issuer will be able to obtain support when it encounters financial stress, with some potentially material delays. The regulator's authority may be eroded at times by legislative or political action. The regulator may not follow the framework for some material decisions.	We expect that regulatory decisions will be largely unpredictable or even somewhat arbitrary, based either on the issuer's track record of interaction with regulators or other governing bodies, or our view that decisions will move in this direction. However, we expect that the issuer will ultimately be able to obtain support when it encounters financial stress, albeit with material or more extended delays. Alternately, the regulator is untested, lacks a consistent track record, or is undergoing substantial change. The regulator's authority may be eroded on frequent occasions by legislative or political action. The regulator may more frequently ignore the framework in a manner detrimental to the issuer.	We expect that regulatory decisions will be highly unpredictable and frequently adverse, based either on the issuer's track record of interaction with regulators or other governing bodies, or our view that decisions will move in this direction. Alternately, decisions may have credit supportive aspects, but may often be unenforceable. The regulator's authority may have been seriously eroded by legislative or political action. The regulator may consistently ignore the framework to the detriment of the issuer.

Factor 2: Ability to Recover Costs and Earn Returns (25%)

Why It Matters

This rating factor examines the ability of a utility to recover its costs and earn a return over a period of time, including during differing market and economic conditions. While the Regulatory Framework looks at the transparency and predictability of the rules that govern the decision-making process with respect to utilities, the Ability to Recover Costs and Earn Returns evaluates the regulatory elements that directly impact the ability of the utility to generate cash flow and service its debt over time. The ability to recover prudently incurred costs on a timely basis and to attract debt and equity capital are crucial credit considerations. The inability to recover costs, for instance if fuel or purchased power costs ballooned during a rate freeze period, has been one of the greatest drivers of financial stress in this sector, as well as the cause of some utility defaults. In a sector that is typically free cash flow negative (due to large capital expenditures and dividends) and that routinely needs to refinance very large maturities of long-term debt, investor concerns about a lack of timely cost recovery or the sufficiency of rates can, in an extreme scenario, strain access to capital markets and potentially lead to insolvency of the utility (as was the case when "used and useful" requirements threatened some utilities that experienced years of delay in completing nuclear power plants in the 1980s). While our scoring for the Ability to Recover Costs and Earn Returns may primarily be influenced by our assessment of the regulatory relationship, it can also be highly impacted by the management and business decisions of the utility.

How We Assess Ability to Recover Costs and Earn Returns

The timeliness and sufficiency of rates are scored as separate sub-factors; however, they are interrelated. Timeliness can have an impact on our view of what constitutes sufficient returns, because a strong assurance of timely cost recovery reduces risk. Conversely, utilities may have a strong assurance that they will earn a full return on certain deferred costs until they are able to collect them, or their generally strong returns may allow them to weather some rate lag on recovery of construction-related capital expenditures. The timeliness of cost recovery is particularly important in a period of rapidly rising costs. During the past five years, utilities have benefitted from low interest rates and generally decreasing fuel costs and purchased power costs, but these market conditions could easily reverse. For example, fuel is a large component of total costs for vertically integrated utilities and for natural gas utilities, and fuel prices are highly volatile, so the timeliness of fuel and purchased power cost recovery is especially important.

While Factors 1 and 2 are closely inter-related, scoring of these factors will not necessarily be the same. We have observed jurisdictions where the Regulatory Framework caused considerable credit concerns – perhaps it was untested or going through a transition to de-regulation, but where the track record of rate case outcomes was quite positive, leading to a higher score in the Ability to Recover Costs and Earn Returns. Conversely, there have been instances of strong Legislative and Judicial Underpinnings of the Regulatory Framework where the commission has ignored the framework (which would affect Consistency and Predictability of Regulation as well as Ability to Recover Costs and Earn Returns) or has used extraordinary measures to prevent or defer an increase that might have been justifiable from a cost perspective but would have caused rate shock.

One might surmise that Factors 2 and 4 should be strongly correlated, since a good Ability to Recover Costs and Earn Returns would normally lead to good financial metrics. However, the scoring for the Ability to Recover Costs and Earn Returns sub-factor places more emphasis on our expectation of timeliness and sufficiency of rates over time; whereas financial metrics may be impacted by one-time events, market conditions or construction cycles - trends that we believe could normalize or even reverse.

How We Assess Timeliness of Recovery of Operating and Capital Costs for the Grid

The criteria we consider include provisions and cost recovery mechanisms for operating costs, mechanisms that allow actual operating and/or capital expenditures to be trued-up periodically into rates without having to file a rate case (this may include formula rates, rider and trackers, or the ability to periodically adjust rates for construction work in progress) as well as the process and timeframe of general tariff/base rate cases – those that are fully reviewed by the regulator, generally in a public format that includes testimony of the utility and other stakeholders and interest groups. We also look at the track record of the utility and regulator for timeliness. For instance, having a formula rate plan is positive, but if the actual process has included reviews that are delayed for long periods, it may dampen the benefit to the utility. In addition, we seek to estimate the lag between the time that a utility incurs a major construction expenditures and the time that the utility will start to recover and/or earn a return on that expenditure.

How We Assess Sufficiency of Rates and Returns for the Grid

The criteria we consider include statutory protections that assure full cost recovery and a reasonable return for the utility on its investments, the regulatory mechanisms used to determine what a reasonable return should be, and the track record of the utility in actually recovering costs and earning returns. We examine outcomes of rate cases/tariff reviews and compare them to the request submitted by the utility, to prior rate cases/tariff reviews for the same utility and to recent rate/tariff decisions for a peer group of comparable utilities. In this context, comparable utilities are typically utilities in the same or similar jurisdiction. In cases where the utility is unique or nearly unique in its jurisdiction, comparison will be made to other peers with an adjustment for local differences, including prevailing rates of interest and returns on capital, as well as the timeliness of rate-setting. We look at regulatory disallowances of costs or investments, with a focus on their financial severity and also on the reasons given by the regulator, in order to assess the likelihood that such disallowances will be repeated in the future.

Factor 2a: Timeliness of Recovery of Operating and Capital Costs (12.5%)

Aaa	Aa	A	Baa
Tariff formulas and automatic cost recovery mechanisms provide full and highly timely recovery of all operating costs and essentially contemporaneous return on all incremental capital investments, with statutory provisions in place to preclude the possibility of challenges to rate increases or cost recovery mechanisms. By statute and by practice, general rate cases are efficient, focused on an impartial review, quick, and permit inclusion of fully forward-looking costs.	Tariff formulas and automatic cost recovery mechanisms provide full and highly timely recovery of all operating costs and essentially contemporaneous or near-contemporaneous return on most incremental capital investments, with minimal challenges by regulators to companies' cost assumptions. By statute and by practice, general rate cases are efficient, focused on an impartial review, of a very reasonable duration before non-appealable interim rates can be collected, and primarily permit inclusion of forward-looking costs.	Automatic cost recovery mechanisms provide full and reasonably timely recovery of fuel, purchased power and all other highly variable operating expenses. Material capital investments may be made under tariff formulas or other rate-making permitting reasonably contemporaneous returns, or may be submitted under other types of filings that provide recovery of cost of capital with minimal delays. Instances of regulatory challenges that delay rate increases or cost recovery are generally related to large, unexpected increases in sizeable construction projects. By statute or by practice, general rate cases are reasonably efficient, primarily focused on an impartial review, of a reasonable duration before rates (either permanent or non-refundable interim rates) can be collected, and permit inclusion of important forward-looking costs.	Fuel, purchased power and all other highly variable expenses are generally recovered through mechanisms incorporating delays of less than one year, although some rapid increases in costs may be delayed longer where such deferrals do not place financial stress on the utility. Incremental capital investments may be recovered primarily through general rate cases with moderate lag, with some through tariff formulas. Alternately, there may be formula rates that are untested or unclear. Potentially greater tendency for delays due to regulatory intervention, although this will generally be limited to rates related to large capital projects or rapid increases in operating costs.

Ba	B	Caa
There is an expectation that fuel, purchased power or other highly variable expenses will eventually be recovered with delays that will not place material financial stress on the utility, but there may be some evidence of an unwillingness by regulators to make timely rate changes to address volatility in fuel, or purchased power, or other market-sensitive expenses. Recovery of costs related to capital investments may be subject to delays that are somewhat lengthy, but not so pervasive as to be expected to discourage important investments.	The expectation that fuel, purchased power or other highly variable expenses will be recovered may be subject to material delays due to second-guessing of spending decisions by regulators or due to political intervention. Recovery of costs related to capital investments may be subject to delays that are material to the issuer, or may be likely to discourage some important investment.	The expectation that fuel, purchased power or other highly variable expenses will be recovered may be subject to extensive delays due to second-guessing of spending decisions by regulators or due to political intervention. Recovery of costs related to capital investments may be uncertain, subject to delays that are extensive, or that may be likely to discourage even necessary investment.

Note: Tariff formulas include formula rate plans as well as trackers and riders related to capital investment.

Factor 2b: Sufficiency of Rates and Returns (12.5%)

Aaa	Aa	A	Baa
Sufficiency of rates to cover costs and attract capital is (and will continue to be) unquestioned.	Rates are (and we expect will continue to be) set at a level that permits full cost recovery and a fair return on all investments, with minimal challenges by regulators to companies' cost assumptions. This will translate to returns (measured in relation to equity, total assets, rate base or regulatory asset value, as applicable) that are strong relative to global peers.	Rates are (and we expect will continue to be) set at a level that generally provides full cost recovery and a fair return on investments, with limited instances of regulatory challenges and disallowances. In general, this will translate to returns (measured in relation to equity, total assets, rate base or regulatory asset value, as applicable) that are generally above average relative to global peers, but may at times be average.	Rates are (and we expect will continue to be) set at a level that generally provides full operating cost recovery and a mostly fair return on investments, but there may be somewhat more instances of regulatory challenges and disallowances, although ultimate rate outcomes are sufficient to attract capital without difficulty. In general, this will translate to returns (measured in relation to equity, total assets, rate base or regulatory asset value, as applicable) that are average relative to global peers, but may at times be somewhat below average.

Ba	B	Caa
Rates are (and we expect will continue to be) set at a level that generally provides recovery of most operating costs but return on investments may be less predictable, and there may be decidedly more instances of regulatory challenges and disallowances, but ultimate rate outcomes are generally sufficient to attract capital. In general, this will translate to returns (measured in relation to equity, total assets, rate base or regulatory asset value, as applicable) that are generally below average relative to global peers, or where allowed returns are average but difficult to earn. Alternately, the tariff formula may not take into account all cost components and/or remuneration of investments may be unclear or at times unfavorable.	We expect rates will be set at a level that at times fails to provide recovery of costs other than cash costs, and regulators may engage in somewhat arbitrary second-guessing of spending decisions or deny rate increases related to funding ongoing operations based much more on politics than on prudency reviews. Return on investments may be set at levels that discourage investment. We expect that rate outcomes may be difficult or uncertain, negatively affecting continued access to capital. Alternately, the tariff formula may fail to take into account significant cost components other than cash costs, and/or remuneration of investments may be generally unfavorable.	We expect rates will be set at a level that often fails to provide recovery of material costs, and recovery of cash costs may also be at risk. Regulators may engage in more arbitrary second-guessing of spending decisions or deny rate increases related to funding ongoing operations based primarily on politics. Return on investments may be set at levels that discourage necessary maintenance investment. We expect that rate outcomes may often be punitive or highly uncertain, with a markedly negative impact on access to capital. Alternately, the tariff formula may fail to take into account significant cash cost components, and/or remuneration of investments may be primarily unfavorable.

Factor 3: Diversification (10%)

Why It Matters

Diversification of overall business operations helps to mitigate the risk that economic cycles, material changes in a single regulatory regime or commodity price movements will have a severe impact on cash flow and credit quality of a utility. While utilities' sales volumes have lower exposure to economic recessions than many non-financial corporate issuers, some sales components, including industrial sales, are directly affected by economic trends that cause lower production and/or plant closures. In addition, economic activity plays a role in the rate of customer growth in the service territory and (absent energy efficiency and conservation) can often impact usage per customer. The economic strength or weakness of the service territory can affect the political and regulatory environment for rate increase requests by the utility. For utilities in areas prone to severe storms and other natural disasters, the utility's geographic diversity or concentration can be a key determinant for creditworthiness.

Diversity among regulatory regimes can mitigate the impact of a single unfavorable decision affecting one part of the utility's footprint.

For utilities with electric generation, fuel source diversity can mitigate the impact (to the utility and to its rate-payers) of changes in commodity prices, hydrology and water flow, and environmental or other regulations affecting plant operations and economics. We have observed that utilities' regulatory environments are most likely to become unfavorable during periods of rapid rate increases (which are more important than absolute rate levels) and that fuel diversity leads to more stable rates over time.

For that reason, fuel diversity can be important even if fuel and purchased power expenses are an automatic pass-through to the utility's ratepayers. Changes in environmental, safety and other regulations have caused vulnerabilities for certain technologies and fuel sources during the past five years. These vulnerabilities have varied widely in different countries and have changed over time.

How We Assess Market Position for the Grid

Market position is comprised primarily of the economic diversity of the utility's service territory and the diversity of its regulatory regimes. We also consider the diversity of utility operations (e.g., regulated electric, gas, water, steam) when there are material operations in more than one area.

Economic diversity is a typically a function of the population, size and breadth of the territory and the businesses that drive its GDP and employment. For the size of the territory, we typically consider the number of customers and the volumes of generation and/or throughput. For breadth, we consider the number of sizeable metropolitan areas served, the economic diversity and vitality in those metropolitan areas, and any concentration in a particular area or industry. In our assessment, we may consider various information sources. For example, in the US, information sources on the diversity and vitality of economies of individual states and metropolitan areas may include Moody's Economy.com. We also look at the mix of the utility's sales volumes among customer types, as well as the track record of volume sales and any notable payment patterns during economic cycles. For diversity of regulatory regimes, we typically look at the number of regulators and the percentages of revenues and utility assets that are under the purview of each. While the highest scores in the Market Position sub-factor are reserved for issuers regulated in multiple jurisdictions, when there is only one regulator, we make a differentiation of regimes perceived as having lower or higher volatility.

Issuers with multiple supportive regulatory jurisdictions, a balanced sales mix among residential, commercial, industrial and governmental customers in a large service territory with a robust and diverse economy will generally score higher in this sub-factor. An issuer with a small service territory economy that

has a high dependence on one or two sectors, especially highly cyclical industries, will generally score lower in this sub-factor, as will issuers with meaningful exposure to economic dislocations caused by natural disasters.

For issuers that are vertically integrated utilities having a meaningful amount of generation, this sub- factor has a weighting of 5%. For electric transmission and distribution utilities without meaningful generation and for natural gas local distribution companies, this sub-factor has a weighting of 10%.

How We Assess Generation and Fuel Diversity for the Grid

Criteria include the fuel type of the issuer's generation and important power purchase agreements, the ability of the issuer economically to shift its generation and power purchases when there are changes in fuel prices, the degree to which the utility and its rate-payers are exposed to or insulated from changes in commodity prices, and exposure to Challenged Source and Threatened Sources (see the explanations for how we generally characterize these generation sources in the table below). A regulated utility's capacity mix may not in itself be an indication of fuel diversity or the ability to shift fuels, since utilities may keep old and inefficient plants (e.g., natural gas boilers) to serve peak load. For this reason, we do not incorporate set percentages reflecting an "ideal" or "sub-par" mix for capacity or even generation. In addition to looking at a utility's generation mix to evaluate fuel diversity, we consider the efficiency of the utility's plants, their placement on the regional dispatch curve, and the demonstrated ability/inability of the utility to shift its generation mix in accordance with changing commodity prices.

Issuers having a balanced mix of hydro, coal, natural gas, nuclear and renewable energy as well as low exposure to challenged and threatened sources of generation will score more highly in this sub-factor. Issuers that have concentration in one or two sources of generation, especially if they are threatened or challenged sources, will incur lower scores.

In evaluating an issuer's degree of exposure to challenged and threatened sources, we will consider not only the existence of those plants in the utility's portfolio, but also the relevant factors that will determine the impact on the utility and on its rate-payers. For instance, an issuer that has a fairly high percentage of its generation from challenged sources could be evaluated very differently if its peer utilities face the same magnitude of those issues than if its peers have no exposure to challenged or threatened sources. In evaluating threatened sources, we consider the utility's progress in its plan to replace those sources, its reserve margin, the availability of purchased power capacity in the region, and the overall impact of the replacement plan on the issuer's rates relative to its peer group. Especially if there are no peers in the same jurisdiction, we also examine the extent to which the utility's generation resources plan is aligned with the relevant government's fuel/energy policy.

Factor 3: Diversification (10%)

Weighting 10%	Sub-Factor Weighting	Aaa	Aa	A	Baa
Market Position	5.00% *	A very high degree of multinational and regional diversity in terms of regulatory regimes and/or service territory economies.	Material operations in three or more nations or substantial geographic regions providing very good diversity of regulatory regimes and/or service territory economies.	Material operations in two to three nations, states, provinces or regions that provide good diversity of regulatory regimes and service territory economies. Alternately, operates within a single regulatory regime with low volatility, and the service territory economy is robust, has a very high degree of diversity and has demonstrated resilience in economic cycles.	May operate under a single regulatory regime viewed as having low volatility, or where multiple regulatory regimes are not viewed as providing much diversity. The service territory economy may have some concentration and cyclicality, but is sufficiently resilient that it can absorb reasonably foreseeable increases in utility rates.
Generation and Fuel Diversity	5.00% **	A high degree of diversity in terms of generation and/or fuel sources such that the utility and rate-payers are well insulated from commodity price changes, no generation concentration, and very low exposures to Challenged or Threatened Sources (see definitions below).	Very good diversification in terms of generation and/or fuel sources such that the utility and rate-payers are affected only minimally by commodity price changes, little generation concentration, and low exposures to Challenged or Threatened Sources.	Good diversification in terms of generation and/or fuel sources such that the utility and rate-payers have only modest exposure to commodity price changes; however, may have some concentration in a source that is neither Challenged nor Threatened. Exposure to Threatened Sources is low. While there may be some exposure to Challenged Sources, it is not a cause for concern.	Adequate diversification in terms of generation and/or fuel sources such that the utility and rate-payers have moderate exposure to commodity price changes; however, may have some concentration in a source that is Challenged. Exposure to Threatened Sources is moderate, while exposure to Challenged Sources is manageable.

	Sub-Factor Weighting	Ba	B	Caa	Definiitons
Market Position	5.00% *	Operates in a market area with somewhat greater concentration and cyclicality in the service territory economy and/or exposure to storms and other natural disasters, and thus less resilience to absorbing reasonably foreseeable increases in utility rates. May show somewhat greater volatility in the regulatory regime(s).	Operates in a limited market area with material concentration and more severe cyclicality in service territory economy such that cycles are of materially longer duration or reasonably foreseeable increases in utility rates could present a material challenge to the economy. Service territory may have geographic concentration that limits its resilience to storms and other natural disasters, or may be an emerging market. May show decided volatility in the regulatory regime(s).	Operates in a concentrated economic service territory with pronounced concentration, macroeconomic risk factors, and/or exposure to natural disasters.	Challenged Sources are generation plants that face higher but not insurmountable economic hurdles resulting from penalties or taxes on their operation, or from environmental upgrades that are required or likely to be required. Some examples are carbon-emitting plants that incur carbon taxes, plants that must buy emissions credits to operate, and plants that must install environmental equipment to continue to operate, in each where the taxes/credits/upgrades are sufficient to have a material impact on those plants' competitiveness relative to other generation types or on the utility's rates, but where the impact is not so severe as to be likely require plant closure.

Generation and Fuel Diversity	5.00% **	Modest diversification in generation and/or fuel sources such that the utility or rate-payers have greater exposure to commodity price changes. Exposure to Challenged and Threatened Sources may be more pronounced, but the utility will be able to access alternative sources without undue financial stress.	Operates with little diversification in generation and/or fuel sources such that the utility or rate-payers have high exposure to commodity price changes. Exposure to Challenged and Threatened Sources may be high, and accessing alternate sources may be challenging and cause more financial stress, but ultimately feasible.	Operates with high concentration in generation and/or fuel sources such that the utility or rate-payers have exposure to commodity price shocks. Exposure to Challenged and Threatened Sources may be very high, and accessing alternate sources may be highly uncertain.	Threatened Sources are generation plants that are not currently able to operate due to major unplanned outages or issues with licensing or other regulatory compliance, and plants that are highly likely to be required to de-activate, whether due to the effectiveness of currently existing or expected rules and regulations or due to economic challenges. Some recent examples would include coal fired plants in the US that are not economic to retro-fit to meet mercury and air toxics standards, plants that cannot meet the effective date of those standards, nuclear plants in Japan that have not been licensed to re-start after the Fukushima Dai-ichi accident, and nuclear plants that are required to be phased out within 10 years (as is the case in some European countries).

* 10% weight for issuers that lack generation **0% weight for issuers that lack generation

Factor 4: Financial Strength (40%)

Why It Matters

Electric and gas utilities are regulated, asset-based businesses characterized by large investments in long-lived property, plant and equipment. Financial strength, including the ability to service debt and provide a return to shareholders, is necessary for a utility to attract capital at a reasonable cost in order to invest in its generation, transmission and distribution assets, so that the utility can fulfill its service obligations at a reasonable cost to rate-payers.

How We Assess It for the Grid

In comparison to companies in other non-financial corporate sectors, the financial statements of regulated electric and gas utilities have certain unique aspects that impact financial analysis, which is further complicated by disparate treatment of certain elements under US Generally Accepted Accounting Principles (GAAP) versus International Financial Reporting Standards (IFRS). Regulatory accounting may permit utilities to defer certain costs (thereby creating regulatory assets) that a non- utility corporate entity would have to expense. For instance, a regulated utility may be able to defer a substantial portion of costs related to recovery from a storm based on the general regulatory framework for those expenses, even if the utility does not have a specific order to collect the expenses from ratepayers over a set period of time. A regulated utility may be able to accrue and defer a return on equity (in addition to capitalizing interest) for construction-work-in-progress for an approved project based on the assumption that it will be able to collect that deferred equity return once the asset comes into service. For this reason, we focus more on a utility's cash flow than on its reported net income.

Conversely, utilities may collect certain costs in rates well ahead of the time they must be paid (for instance, pension costs), thereby creating regulatory liabilities. Many of our metrics focus on Cash Flow from Operations Before Changes in Working Capital (CFO Pre-WC) because, unlike Funds from Operations (FFO), it captures the changes in long-term regulatory assets and liabilities.

However, under IFRS the two measures are essentially the same. In general, we view changes in working capital as less important in utility financial analysis because they are often either seasonal (for example, power demand is generally greatest in the summer) or caused by changes in fuel prices that are typically a relatively automatic pass-through to the customer. We will nonetheless examine the impact of working capital changes in analyzing a utility's liquidity (see Other Rating Considerations – Liquidity).

Given the long-term nature of utility assets and the often lumpy nature of their capital expenditures, it is important to analyze both a utility's historical financial performance as well as its prospective future performance, which may be different from backward-looking measures. Scores under this factor may be higher or lower than what might be expected from historical results, depending on our view of expected future performance. Multi-year periods are usually more representative of credit quality because utilities can experience swings in cash flows from one-time events, including such items as rate refunds, storm cost deferrals that create a regulatory asset, or securitization proceeds that reduce a regulatory asset. Nonetheless, we also look at trends in metrics for individual periods, which may influence our view of future performance and ratings.

For this scoring grid, we have identified four key ratios that we consider the most consistently useful in the analysis of regulated electric and gas utilities. However, no single financial ratio can adequately convey the relative credit strength of these highly diverse companies. Our ratings consider the overall financial strength of a company, and in individual cases other financial indicators may also play an important role.

CFO Pre-Working Capital Plus Interest/Interest or Cash Flow Interest Coverage

The cash flow interest coverage ratio is an indicator for a utility's ability to cover the cost of its borrowed capital. The numerator in the ratio calculation is the sum of CFO Pre-WC and interest expense, and the denominator is interest expense.

CFO Pre-Working Capital / Debt

This important metric is an indicator for the cash generating ability of a utility compared to its total debt. The numerator in the ratio calculation is CFO Pre-WC, and the denominator is total debt.

CFO Pre-Working Capital Minus Dividends / Debt

This ratio is an indicator for financial leverage as well as an indicator of the strength of a utility's cash flow after dividend payments are made. Dividend obligations of utilities are often substantial, quasi- permanent outflows that can affect the ability of a utility to cover its debt obligations, and this ratio can also provide insight into the financial policies of a utility or utility holding company. The higher the level of retained cash flow relative to a utility's debt, the more cash the utility has to support its capital expenditure program. The numerator of this ratio is CFO Pre-WC minus dividends, and the denominator is total debt.

Debt/Capitalization

This ratio is a traditional measure of balance sheet leverage. The numerator is total debt and the denominator is total capitalization. All of our ratios are calculated in accordance with our standard adjustments[10], but we note that our definition of total capitalization includes deferred taxes in addition to total debt, preferred stock, other hybrid securities, and common equity. Since the presence or absence of deferred taxes is a function of national tax policy, comparing utilities using this ratio may be more meaningful among utilities in the same country or in countries with similar tax policies. High debt levels in comparison to capitalization can indicate higher interest obligations, can limit the ability of a utility to raise additional financing if needed, and can lead to leverage covenant violations in bank credit facilities or other financing agreements[11]. A high ratio may result from a regulatory framework that does not permit a robust cushion of equity in the capital structure, or from a material write-off of an asset, which may not have impacted current period cash flows but could affect future period cash flows relative to debt.

There are two sets of thresholds for three of these ratios based on the level of the issuer's business risk – the Standard Grid and the Lower Business Risk (LBR) Grid. In our view, the different types of utility entities covered under this methodology (as described in Appendix E) have different levels of business risk.

Generation utilities and vertically integrated utilities generally have a higher level of business risk because they are engaged in power generation, so we apply the Standard Grid. We view power generation as the highest-risk component of the electric utility business, as generation plants are typically the most expensive part of a utility's infrastructure (representing asset concentration risk) and are subject to the greatest risks in both construction and operation, including the risk that incurred costs will either not be recovered in rates or recovered with material delays.

Other types of utilities may have lower business risk, such that we believe that they are most appropriately assessed using the LBR Grid, due to factors that could include a generally greater transfer of risk to customers, very strong insulation from exposure to commodity price movements, good protection from volumetric risks, fairly limited capex needs and low exposure to storms, major accidents and natural

[10] In certain circumstances, analysts may also apply specific adjustments.

[11] We also examine debt/capitalization ratios as defined in applicable covenants (which typically exclude deferred taxes from capitalization) relative to the covenant threshold level.

disasters. For instance, we tend to view many US natural gas local distribution companies (LDCs) and certain US electric transmission and distribution companies (T&Ds, which lack generation but generally retain some procurement responsibilities for customers), as typically having a lower business risk profile than their vertically integrated peers. In cases of T&Ds that we do not view as having materially lower risk than their vertically integrated peers, we will apply the Standard grid. This could result from a regulatory framework that exposes them to energy supply risk, large capital expenditures for required maintenance or upgrades, a heightened degree of exposure to catastrophic storm damage, or increased regulatory scrutiny due to poor reliability, or other considerations. The Standard Grid will also apply to LDCs that in our view do not have materially lower risk; for instance, due to their ownership of high pressure pipes or older systems requiring extensive gas main replacements, where gas commodity costs are not fully recovered in a reasonably contemporaneous manner, or where the LDC is not well insulated from declining volumes.

The four key ratios, their weighting in the grid, and the Standard and LBR scoring thresholds are detailed in the following table.

Factor 4: Financial Strength

Weighting 40%	Sub-Factor Weighting		Aaa	Aa	A	Baa	Ba	B	Caa
CFO pre-WC + Interest / Interest	7.50%		≥ 8.0x	6.0x - 8.0x	4.5x - 6.0x	3.0x - 4.5x	2.0x - 3.0x	1.0x - 2.0x	< 1.0x
CFO pre-WC / Debt	15.00%	Standard Grid	≥ 40%	30% - 40%	22% - 30%	13% - 22%	5% - 13%	1% - 5%	< 1%
		Low Business Risk Grid	≥ 38%	27% - 38%	19% - 27%	11% - 19%	5% - 11%	1% - 5%	< 1%
CFO pre-WC - Dividends / Debt	10.00%	Standard Grid	≥ 35%	25% - 35%	17% - 25%	9% - 17%	0% - 9%	(5%) - 0%	< (5%)
		Low Business Risk Grid	≥ 34%	23% - 34%	15% - 23%	7% - 15%	0% - 7%	(5%) - 0%	< (5%)
Debt / Capitalization	7.50%	Standard Grid	< 25%	25% - 35%	35% - 45%	45% - 55%	55% - 65%	65% - 75%	≥ 75%
		Low Business Risk Grid	< 29%	29% - 40%	40% - 50%	50% - 59%	59% - 67%	67% - 75%	≥ 75%

Notching for Structural Subordination of Holding Companies

Why It Matters

A typical utility company structure consists of a holding company ("HoldCo") that owns one or more operating subsidiaries (each an "OpCo"). OpCos may be regulated utilities or non-utility companies. A HoldCo typically has no operations – its assets are mostly limited to its equity interests in subsidiaries, and potentially other investments in subsidiaries that are structured as advances, debt, or even hybrid securities.

Most HoldCos present their financial statements on a consolidated basis that blurs legal considerations about priority of creditors based on the legal structure of the family, and grid scoring is thus based on consolidated ratios. However, HoldCo creditors typically have a secondary claim on the group's cash flows and assets after OpCo creditors. We refer to this as structural subordination, because it is the corporate legal structure, rather than specific subordination provisions, that causes creditors at each of the utility and non-utility subsidiaries to have a more direct claim on the cash flows and assets of their respective OpCo obligors. By contrast, the debt of the HoldCo is typically serviced primarily by dividends that are up-

streamed by the OpCos[12]. Under normal circumstances, these dividends are made from net income, after payment of the OpCo's interest and preferred dividends. In most non- financial corporate sectors where cash often moves freely between the entities in a single issuer family, this distinction may have less of an impact. However, in the regulated utility sector, barriers to movement of cash among companies in the corporate family can be much more restrictive, depending on the regulatory framework. These barriers can lead to significantly different probabilities of default for HoldCos and OpCos. Structural subordination also affects loss given default. Under most default[13] scenarios, an OpCo's creditors will be satisfied from the value residing at that OpCo before any of the OpCo's assets can be used to satisfy claims of the HoldCo's creditors. The prevalence of debt issuance at the OpCo level is another reason that structural subordination is usually a more serious concern in the utility sector than for investment grade issuers in other non-financial corporate sectors.

The grids for factors 1-4 are primarily oriented to OpCos (and to some degree for HoldCos with minimal current structural subordination; for example, there is no current structural subordination to debt at the operating company if all of the utility family's debt and preferred stock is issued at the HoldCo level, although there is structural subordination to other liabilities at the OpCo level). The additional risk from structural subordination is addressed via a notching adjustment to bring grid outcomes (on average) closer to the actual ratings of HoldCos.

How We Assess It

Grid-indicated ratings of holding companies may be notched down based on structural subordination. The risk factors and mitigants that impact structural subordination are varied and can be present in different combinations, such that a formulaic approach is not practical and case-by-case analyst judgment of the interaction of all pertinent factors that may increase or decrease its importance to the credit risk of an issuer are essential.

Some of the potentially pertinent factors that could increase the degree and/or impact of structural subordination include the following:

» Regulatory or other barriers to cash movement from OpCos to HoldCo

» Specific ring-fencing provisions

» Strict financial covenants at the OpCo level

» Higher leverage at the OpCo level

» Higher leverage at the HoldCo level[14]

» Significant dividend limitations or potential limitations at an important OpCo

» HoldCo exposure to subsidiaries with high business risk or volatile cash flows

Strained liquidity at the HoldCo level

» The group's investment program is primarily in businesses that are higher risk or new to the group

Some of the potentially mitigating factors that could decrease the degree and/or impact of structural subordination include the following:

[12] The HoldCo and OpCo may also have intercompany agreements, including tax sharing agreements, that can be another source of cash to the HoldCo.

[13] Actual priority in a default scenario will be determined by many factors, including the corporate and bankruptcy laws of the jurisdiction, the asset value of each OpCo, specific financing terms, inter-relationships among members of the family, etc.

[14] While higher leverage at the HoldCo does not increase structural subordination per se, it exacerbates the impact of any structural subordination that exists

» Substantial diversity in cash flows from a variety of utility OpCos

» Meaningful dividends to HoldCo from unlevered utility OpCos

» Dependable, meaningful dividends to HoldCo from non-utility OpCos

» The group's investment program is primarily in strong utility businesses

» Inter-company guarantees - however, in many jurisdictions the value of an upstream guarantee may be limited by certain factors, including by the value that the OpCo received in exchange for granting the guarantee

Notching for structural subordination within the grid may range from 0 to negative 3 notches. Instances of extreme structural subordination are relatively rare, so the grid convention does not accommodate wider differences, although in the instances where we believe it is present, actual ratings do reflect the full impact of structural subordination.

A related issue is the relationship of ratings within a utility family with multiple operating companies, and sometimes intermediate holding companies. Some of the key issues are the same, such as the relative amounts of debt at the holding company level compared to the operating company level (or at one OpCo relative to another), and the degree to which operating companies have credit insulation due to regulation or other protective factors. Appendix B has additional insights on ratings within a utility family.

Rating Methodology Assumptions, Limitations, and Other Rating Considerations

The grid in this rating methodology represents a decision to favor simplicity that enhances transparency and to avoid greater complexity that might enable the grid to map more closely to actual ratings. Accordingly, the four rating factors and the notching factor in the grid do not constitute an exhaustive treatment of all of the considerations that are important for ratings of companies in the regulated electric and gas utility sector. In addition, our ratings incorporate expectations for future performance, while the financial information that is used in the grid in this document is mainly historical. In some cases, our expectations for future performance may be informed by confidential information that we can't disclose. In other cases, we estimate future results based upon past performance, industry trends, competitor actions or other factors. In either case, predicting the future is subject to the risk of substantial inaccuracy.

Assumptions that may cause our forward-looking expectations to be incorrect include unanticipated changes in any of the following factors: the macroeconomic environment and general financial market conditions, industry competition, disruptive technology, regulatory and legal actions.

Key rating assumptions that apply in this sector include our view that sovereign credit risk is strongly correlated with that of other domestic issuers, that legal priority of claim affects average recovery on different classes of debt, sufficiently to generally warrant differences in ratings for different debt classes of the same issuer, and the assumption that lack of access to liquidity is a strong driver of credit risk.

In choosing metrics for this rating methodology grid, we did not explicitly include certain important factors that are common to all companies in any industry such as the quality and experience of management, assessments of corporate governance and the quality of financial reporting and information disclosure. Therefore ranking these factors by rating category in a grid would in some cases suggest too much precision in the relative ranking of particular issuers against all other issuers that are rated in various industry sectors.

Ratings may include additional factors that are difficult to quantify or that have a meaningful effect in differentiating credit quality only in some cases, but not all. Such factors include financial controls, exposure to uncertain licensing regimes and possible government interference in some countries.

Regulatory, litigation, liquidity, technology and reputational risk as well as changes to consumer and business spending patterns, competitor strategies and macroeconomic trends also affect ratings. While these are important considerations, it is not possible precisely to express these in the rating methodology grid without making the grid excessively complex and significantly less transparent.

Ratings may also reflect circumstances in which the weighting of a particular factor will be substantially different from the weighting suggested by the grid.

This variation in weighting rating considerations can also apply to factors that we choose not to represent in the grid. For example, liquidity is a consideration frequently critical to ratings and which may not, in other circumstances, have a substantial impact in discriminating between two issuers with a similar credit profile. As an example of the limitations, ratings can be heavily affected by extremely weak liquidity that magnifies default risk. However, two identical companies might be rated the same if their only differentiating feature is that one has a good liquidity position while the other has an extremely good liquidity position.

Other Rating Considerations

We consider other factors in addition to those discussed in this report, but in most cases understanding the considerations discussed herein should enable a good approximation of our view on the credit quality of companies in the regulated electric and gas utilities sector. Ratings consider our assessment of the quality of management, corporate governance, financial controls, liquidity management, event risk and seasonality. The analysis of these factors remains an integral part of our rating process.

Liquidity and Access to Capital Markets

Liquidity analysis is a key element in the financial analysis of electric and gas utilities, and it encompasses a company's ability to generate cash from internal sources as well as the availability of external sources of financing to supplement these internal sources. Liquidity and access to financing are of particular importance in this sector. Utility assets can often have a very long useful life- 30, 40 or even 60 years is not uncommon, as well as high price tags. Partly as a result of construction cycles, the utility sector has experienced prolonged periods of negative free cash flow – essentially, the sum of its dividends and its capital expenditures for maintenance and growth of its infrastructure frequently exceeds cash from operations, such that a portion of capital expenditures must routinely be debt financed. Utilities are among the largest debt issuers in the corporate universe and typically require consistent access to the capital markets to assure adequate sources of funding and to maintain financial flexibility. Substantial portions of capex are non-discretionary (for example, maintenance, adding customers to the network, or meeting environmental mandates); however, utilities were swift to cut or defer discretionary spending during the 2007-2009 recession. Dividends represent a quasi-permanent outlay, since utilities typically only rarely will cut their dividend. Liquidity is also important to meet maturing obligations, which often occur in large chunks, and to meet collateral calls under any hedging agreements.

Due to the importance of liquidity, incorporating it as a factor with a fixed weighting in the grid would suggest an importance level that is often far different from the actual weight in the rating. In normal circumstances most companies in the sector have good access to liquidity. The industry generally requires, and for the most part has, large, syndicated, multi-year committed credit facilities. In addition, utilities have demonstrated strong access to capital markets, even under difficult conditions. As a result, liquidity

generally has not been an issue for most utilities and a utility with very strong liquidity may not warrant a rating distinction compared to a utility with strong liquidity. However, when there is weakness in liquidity or liquidity management, it can be the dominant consideration for ratings.

Our assessment of liquidity for regulated utilities involves an analysis of total sources and uses of cash over the next 12 months or more, as is done for all corporates. Using our financial projections of the utility and our analysis of its available sources of liquidity (including an assessment of the quality and reliability of alternate liquidity such as committed credit facilities), we evaluate how its projected sources of cash (cash from operations, cash on hand and existing committed multi-year credit facilities) compare to its projected uses (including all or most capital expenditures, dividends, maturities of short and long-term debt, our projection of potential liquidity calls on financial hedges, and important issuer-specific items such as special tax payments). We assume no access to capital markets or additional liquidity sources, no renewal of existing credit facilities, and no cut to dividends. We examine a company's liquidity profile under this scenario, its ability to make adjustments to improve its liquidity position, and any dependence on liquidity sources with lower quality and reliability.

Management Quality and Financial Policy

The quality of management is an important factor supporting the credit strength of a regulated utility or utility holding company. Assessing the execution of business plans over time can be helpful in assessing management's business strategies, policies, and philosophies and in evaluating management performance relative to performance of competitors and our projections. A record of consistency provides us with insight into management's likely future performance in stressed situations and can be an indicator of management's tendency to depart significantly from its stated plans and guidelines.

We also assess financial policy (including dividend policy and planned capital expenditures) and how management balances the potentially competing interests of shareholders, fixed income investors and other stakeholders. Dividends and discretionary capital expenditures are the two primary components over which management has the greatest control in the short term. For holding companies, we consider the extent to which management is willing to stretch its payout ratio (through aggressive increases or delays in needed decreases) in order to satisfy common shareholders. For a utility that is a subsidiary of a parent company with several utility subsidiaries, dividends to the parent may be more volatile depending on the cash generation and cash needs of that utility, because parents typically want to assure that each utility maintains the regulatory debt/equity ratio on which its rates have been set. The effect we have observed is that utility subsidiaries often pay higher dividends when they have lower capital needs and lower dividends when they have higher capital expenditures or other cash needs. Any dividend policy that cuts into the regulatory debt/equity ratio is a material credit negative.

Size – Natural Disasters, Customer Concentration and Construction Risks

The size and scale of a regulated utility has generally not been a major determinant of its credit strength in the same way that it has been for most other industrial sectors. While size brings certain economies of scale that can somewhat affect the utility's cost structure and competitiveness, rates are more heavily impacted by costs related to fuel and fixed assets. Particularly in the US, we have not observed material differences in the success of utilities' regulatory outreach based on their size. Smaller utilities have sometimes been better able to focus their attention on meeting the expectations of a single regulator than their multi-state peers.

However, size can be a very important factor in our assessment of certain risks that impact ratings, including exposure to natural disasters, customer concentration (primarily to industrial customers in a single sector) and construction risks associated with large projects. While the grid attempts to incorporate the first two of

these into Factor 3, for some issuers these considerations may be sufficiently important that the rating reflects a greater weight for these risks. While construction projects always carry the risk of cost over-runs and delays, these risks are materially heightened for projects that are very large relative to the size of the utility.

Interaction of Utility Ratings with Government Policies and Sovereign Ratings

Compared to most industrial sectors, regulated utilities are more likely to be impacted by government actions. Credit impacts can occur directly through rate regulation, and indirectly through energy, environmental and tax policies. Government actions affect fuel prices, the mix of generating plants, the certainty and timing of revenues and costs, and the likelihood that regulated utilities will experience financial stress. While our evolving view of the impact of such policies and the general economic and financial climate is reflected in ratings for each utility, some considerations do not lend themselves to incorporation in a simple ratings grid.[15]

Diversified Operations at the Utility

A small number of regulated utilities have diversified operations that are segments within the utility company, as opposed to the more common practice of housing such operations in one or more separate affiliates. In general, we will seek to evaluate the other businesses that are material in accordance with the appropriate methodology and the rating will reflect considerations from such methodologies. There may be analytical limitations in evaluating the utility and non-utility businesses when segment financial results are not fully broken out and these may be addressed through estimation based on available information. Since regulated utilities are a relatively low risk business compared to other corporate sectors, in most cases diversified non-utility operations increase the business risk profile of a utility. Reflecting this tendency, we note that assigned ratings are typically lower than grid- indicated ratings for such companies.

Event Risk

We also recognize the possibility that an unexpected event could cause a sudden and sharp decline in an issuer's fundamental creditworthiness. Typical special events include mergers and acquisitions, asset sales, spin-offs, capital restructuring programs, litigation and shareholder distributions.

Corporate Governance

Among the areas of focus in corporate governance are audit committee financial expertise, the incentives created by executive compensation packages, related party transactions, interactions with outside auditors, and ownership structure.

Investment and Acquisition Strategy

In our credit assessment we take into consideration management's investment strategy. Investment strategy is benchmarked with that of the other companies in the rated universe to further verify its consistency. Acquisitions can strengthen a company's business. Our assessment of a company's tolerance for acquisitions at a given rating level takes into consideration (1) management's risk appetite, including the likelihood of further acquisitions over the medium term; (2) share buy-back activity; (3) the company's commitment to specific leverage targets; and (4) the volatility of the underlying businesses, as well as that of the business acquired. Ratings can often hold after acquisitions even if leverage temporarily climbs above normally acceptable ranges. However, this depends on (1) the strategic fit; (2) pro-forma

[15] See also the cross-sector methodology "How Sovereign Credit Quality May Affect Other Ratings." A link to this and other sector and cross-sector credit rating methodologies can be found in the Related Research section of this report.

capitalization/leverage following an acquisition; and (3) our confidence that credit metrics will be restored in a relatively short timeframe.

Financial Controls

We rely on the accuracy of audited financial statements to assign and monitor ratings in this sector. Such accuracy is only possible when companies have sufficient internal controls, including centralized operations, the proper tone at the top and consistency in accounting policies and procedures.

Weaknesses in the overall financial reporting processes, financial statement restatements or delays in regulatory filings can be indications of a potential breakdown in internal controls.

Appendix A: Regulated Electric and Gas Utilities Methodology Factor Grid

Factor 1a: Legislative and Judicial Underpinnings of the Regulatory Framework (12.5%)

Aaa	Aa	A	Baa
Utility regulation occurs under a fully developed framework that is national in scope based on legislation that provides the utility a nearly absolute monopoly (see note 1) within its service territory, an unquestioned assurance that rates will be set in a manner that will permit the utility to make and recover all necessary investments, an extremely high degree of clarity as to the manner in which utilities will be regulated and prescriptive methods and procedures for setting rates. Existing utility law is comprehensive and supportive such that changes in legislation are not expected to be necessary; or any changes that have occurred have been strongly supportive of utilities credit quality in general and sufficiently forward- looking so as to address problems before they occurred. There is an independent judiciary that can arbitrate disagreements between the regulator and the utility should they occur, including access to national courts, very strong judicial precedent in the interpretation of utility laws, and a strong rule of law. We expect these conditions to continue.	Utility regulation occurs under a fully developed national, state or provincial framework based on legislation that provides the utility an extremely strong monopoly (see note 1) within its service territory, a strong assurance, subject to limited review, that rates will be set in a manner that will permit the utility to make and recover all necessary investments, a very high degree of clarity as to the manner in which utilities will be regulated and reasonably prescriptive methods and procedures for setting rates. If there have been changes in utility legislation, they have been timely and clearly credit supportive of the issuer in a manner that shows the utility has had a strong voice in the process. There is an independent judiciary that can arbitrate disagreements between the regulator and the utility, should they occur including access to national courts, strong judicial precedent in the interpretation of utility laws, and a strong rule of law. We expect these conditions to continue.	Utility regulation occurs under a well developed national, state or provincial framework based on legislation that provides the utility a very strong monopoly (see note 1) within its service territory, an assurance, subject to reasonable prudency requirements, that rates will be set in a manner that will permit the utility to make and recover all necessary investments, a high degree of clarity as to the manner in which utilities will be regulated, and overall guidance for methods and procedures for setting rates. If there have been changes in utility legislation, they have been mostly timely and on the whole credit supportive for the issuer, and the utility has had a clear voice in the legislative process. There is an independent judiciary that can arbitrate disagreements between the regulator and the utility, should they occur, including access to national courts, clear judicial precedent in the interpretation of utility law, and a strong rule of law. We expect these conditions to continue.	Utility regulation occurs (i) under a national, state, provincial or municipal framework based on legislation that provides the utility a strong monopoly within its service territory that may have some exceptions such as greater self-generation (see note 1), a general assurance that, subject to prudency requirements that are mostly reasonable, rates will be set will be set in a manner that will permit the utility to make and recover all necessary investments, reasonable clarity as to the manner in which utilities will be regulated and overall guidance for methods and procedures for setting rates; or (ii) under a new framework where independent and transparent regulation exists in other sectors. If there have been changes in utility legislation, they have been credit supportive or at least balanced for the issuer but potentially less timely, and the utility had a voice in the legislative process. There is either (i) an independent judiciary that can arbitrate disagreements between the regulator and the utility, including access to courts at least at the state or provincial level, reasonably clear judicial precedent in the interpretation of utility laws, and a generally strong rule of law; or (ii) regulation has been applied (under a well developed framework) in a manner such that redress to an independent arbiter has not been required. We expect these conditions to continue.

Ba	B	Caa
Utility regulation occurs (i) under a national, state, provincial or municipal framework based on legislation or government decree that provides the utility a monopoly within its service territory that is generally strong but may have a greater level of exceptions (see note 1), and that, subject to prudency requirements which may be stringent, provides a general assurance (with somewhat less certainty) that rates will be set will be set in a manner that will permit the utility to make and recover necessary investments; or (ii) under a new framework where the jurisdiction has a history of less independent and transparent regulation in other sectors. Either: (i) the judiciary that can arbitrate disagreements between the regulator and the utility may not have clear authority or may not be fully independent of the regulator or other political pressure, but there is a reasonably strong rule of law; or (ii) where there is no independent arbiter, the regulation has mostly been applied in a manner such redress has not been required. We expect these conditions to continue.	Utility regulation occurs (i) under a national, state, provincial or municipal framework based on legislation or government decree that provides the utility monopoly within its service territory that is reasonably strong but may have important exceptions, and that, subject to prudency requirements which may be stringent or at times arbitrary, provides more limited or less certain assurance that rates will be set in a manner that will permit the utility to make and recover necessary investments; or (ii) under a new framework where we would expect less independent and transparent regulation, based either on the regulator's history in other sectors or other factors. The judiciary that can arbitrate disagreements between the regulator and the utility may not have clear authority or may not be fully independent of the regulator or other political pressure, but there is a reasonably strong rule of law. Alternately, where there is no independent arbiter, the regulation has been applied in a manner that often requires some redress adding more uncertainty to the regulatory framework. There may be a periodic risk of creditor-unfriendly government intervention in utility markets or rate-setting.	Utility regulation occurs (i) under a national, state, provincial or municipal framework based on legislation or government decree that provides the utility a monopoly within its service territory, but with little assurance that rates will be set in a manner that will permit the utility to make and recover necessary investments; or (ii) under a new framework where we would expect unpredictable or adverse regulation, based either on the jurisdiction's history of in other sectors or other factors. The judiciary that can arbitrate disagreements between the regulator and the utility may not have clear authority or is viewed as not being fully independent of the regulator or other political pressure. Alternately, there may be no redress to an effective independent arbiter. The ability of the utility to enforce its monopoly or prevent uncompensated usage of its system may be limited. There may be a risk of creditor- unfriendly nationalization or other significant intervention in utility markets or rate-setting.

Note 1: The strength of the monopoly refers to the legal, regulatory and practical obstacles for customers in the utility's territory to obtain service from another provider. Examples of a weakening of the monopoly would include the ability of a city or large user to leave the utility system to set up their own system, the extent to which self-generation is permitted (e.g. cogeneration) and/or encouraged (e.g., net metering, DSM generation). At the lower end of the ratings spectrum, the utility's monopoly may be challenged by pervasive theft and unauthorized use. Since utilities are generally presumed to be monopolies, a strong monopoly position in itself is not sufficient for a strong score in this sub-factor, but a weakening of the monopoly can lower the score.

* 10% weight for issuers that lack generation **0% weight for issuers that lack generation

Factor 1b: Consistency and Predictability of Regulation (12.5%)

Aaa	Aa	A	Baa
The issuer's interaction with the regulator has led to a strong, lengthy track record of predictable, consistent and favorable decisions. The regulator is highly credit supportive of the issuer and utilities in general. We expect these conditions to continue.	The issuer's interaction with the regulator has a led to a considerable track record of predominantly predictable and consistent decisions. The regulator is mostly credit supportive of utilities in general and in almost all instances has been highly credit supportive of the issuer. We expect these conditions to continue.	The issuer's interaction with the regulator has led to a track record of largely predictable and consistent decisions. The regulator may be somewhat less credit supportive of utilities in general, but has been quite credit supportive of the issuer in most circumstances. We expect these conditions to continue.	The issuer's interaction with the regulator has led to an adequate track record. The regulator is generally consistent and predictable, but there may some evidence of inconsistency or unpredictability from time to time, or decisions may at times be politically charged. However, instances of less credit supportive decisions are based on reasonable application of existing rules and statutes and are not overly punitive. We expect these conditions to continue.

Ba	B	Caa
We expect that regulatory decisions will demonstrate considerable inconsistency or unpredictability or that decisions will be politically charged, based either on the issuer's track record of interaction with regulators or other governing bodies, or our view that decisions will move in this direction. The regulator may have a history of less credit supportive regulatory decisions with respect to the issuer, but we expect that the issuer will be able to obtain support when it encounters financial stress, with some potentially material delays. The regulator's authority may be eroded at times by legislative or political action. The regulator may not follow the framework for some material decisions.	We expect that regulatory decisions will be largely unpredictable or even somewhat arbitrary, based either on the issuer's track record of interaction with regulators or other governing bodies, or our view that decisions will move in this direction. However, we expect that the issuer will ultimately be able to obtain support when it encounters financial stress, albeit with material or more extended delays. Alternately, the regulator is untested, lacks a consistent track record, or is undergoing substantial change. The regulator's authority may be eroded on frequent occasions by legislative or political action. The regulator may more frequently ignore the framework in a manner detrimental to the issuer.	We expect that regulatory decisions will be highly unpredictable and frequently adverse, based either on the issuer's track record of interaction with regulators or other governing bodies, or our view that decisions will move in this direction. Alternately, decisions may have credit supportive aspects, but may often be unenforceable. The regulator's authority may have been seriously eroded by legislative or political action. The regulator may consistently ignore the framework to the detriment of the issuer.

Factor 2a: Timeliness of Recovery of Operating and Capital Costs (12.5%)

Aaa	Aa	A	Baa
Tariff formulas and automatic cost recovery mechanisms provide full and highly timely recovery of all operating costs and essentially contemporaneous return on all incremental capital investments, with statutory provisions in place to preclude the possibility of challenges to rate increases or cost recovery mechanisms. By statute and by practice, general rate cases are efficient, focused on an impartial review, quick, and permit inclusion of fully forward -looking costs.	Tariff formulas and automatic cost recovery mechanisms provide full and highly timely recovery of all operating costs and essentially contemporaneous or near-contemporaneous return on most incremental capital investments, with minimal challenges by regulators to companies' cost assumptions. By statute and by practice, general rate cases are efficient, focused on an impartial review, of a very reasonable duration before non-appealable interim rates can be collected, and primarily permit inclusion of forward- looking costs.	Automatic cost recovery mechanisms provide full and reasonably timely recovery of fuel, purchased power and all other highly variable operating expenses. Material capital investments may be made under tariff formulas or other rate-making permitting reasonably contemporaneous returns, or may be submitted under other types of filings that provide recovery of cost of capital with minimal delays. Instances of regulatory challenges that delay rate increases or cost recovery are generally related to large, unexpected increases in sizeable construction projects. By statute or by practice, general rate cases are reasonably efficient, primarily focused on an impartial review, of a reasonable duration before rates (either permanent or non- refundable interim rates) can be collected, and permit inclusion of important forward -looking costs.	Fuel, purchased power and all other highly variable expenses are generally recovered through mechanisms incorporating delays of less than one year, although some rapid increases in costs may be delayed longer where such deferrals do not place financial stress on the utility. Incremental capital investments may be recovered primarily through general rate cases with moderate lag, with some through tariff formulas. Alternately, there may be formula rates that are untested or unclear. Potentially greater tendency for delays due to regulatory intervention, although this will generally be limited to rates related to large capital projects or rapid increases in operating costs.

Ba	B	Caa
There is an expectation that fuel, purchased power or other highly variable expenses will eventually be recovered with delays that will not place material financial stress on the utility, but there may be some evidence of an unwillingness by regulators to make timely rate changes to address volatility in fuel, or purchased power, or other market-sensitive expenses. Recovery of costs related to capital investments may be subject to delays that are somewhat lengthy, but not so pervasive as to be expected to discourage important investments.	The expectation that fuel, purchased power or other highly variable expenses will be recovered may be subject to material delays due to second-guessing of spending decisions by regulators or due to political intervention. Recovery of costs related to capital investments may be subject to delays that are material to the issuer, or may be likely to discourage some important investment.	The expectation that fuel, purchased power or other highly variable expenses will be recovered may be subject to extensive delays due to second-guessing of spending decisions by regulators or due to political intervention. Recovery of costs related to capital investments may be uncertain, subject to delays that are extensive, or that may be likely to discourage even necessary investment.

Note: Tariff formulas include formula rate plans as well as trackers and riders related to capital investment.

Factor 2b: Sufficiency of Rates and Returns (12.5%)

Aaa	Aa	A	Baa
Sufficiency of rates to cover costs and attract capital is (and will continue to be) unquestioned.	Rates are (and we expect will continue to be) set at a level that permits full cost recovery and a fair return on all investments, with minimal challenges by regulators to companies' cost assumptions. This will translate to returns (measured in relation to equity, total assets, rate base or regulatory asset value, as applicable) that are strong relative to global peers.	Rates are (and we expect will continue to be) set at a level that generally provides full cost recovery and a fair return on investments, with limited instances of regulatory challenges and disallowances. In general, this will translate to returns (measured in relation to equity, total assets, rate base or regulatory asset value, as applicable) that are generally above average relative to global peers, but may at times be average.	Rates are (and we expect will continue to be) set at a level that generally provides full operating cost recovery and a mostly fair return on investments, but there may be somewhat more instances of regulatory challenges and disallowances, although ultimate rate outcomes are sufficient to attract capital without difficulty. In general, this will translate to returns (measured in relation to equity, total assets, rate base or regulatory asset value, as applicable) that are average relative to global peers, but may at times be somewhat below average.

Ba	B	Caa
Rates are (and we expect will continue to be) set at a level that generally provides recovery of most operating costs but return on investments may be less predictable, and there may be decidedly more instances of regulatory challenges and disallowances, but ultimate rate outcomes are generally sufficient to attract capital. In general, this will translate to returns (measured in relation to equity, total assets, rate base or regulatory asset value, as applicable) that are generally below average relative to global peers, or where allowed returns are average but difficult to earn. Alternately, the tariff formula may not take into account all cost components and/or remuneration of investments may be unclear or at times unfavorable.	We expect rates will be set at a level that at times fails to provide recovery of costs other than cash costs, and regulators may engage in somewhat arbitrary second-guessing of spending decisions or deny rate increases related to funding ongoing operations based much more on politics than on prudency reviews. Return on investments may be set at levels that discourage investment. We expect that rate outcomes may be difficult or uncertain, negatively affecting continued access to capital. Alternately, the tariff formula may fail to take into account significant cost components other than cash costs, and/or remuneration of investments may be generally unfavorable.	We expect rates will be set at a level that often fails to provide recovery of material costs, and recovery of cash costs may also be at risk. Regulators may engage in more arbitrary second-guessing of spending decisions or deny rate increases related to funding ongoing operations based primarily on politics. Return on investments may be set at levels that discourage necessary maintenance investment. We expect that rate outcomes may often be punitive or highly uncertain, with a markedly negative impact on access to capital. Alternately, the tariff formula may fail to take into account significant cash cost components, and/or remuneration of investments may be primarily unfavorable.

Factor 3: Diversification (10%)

Weighting 10%	Sub-Factor Weighting	Aaa	Aa	A	Baa
Market Position	5% *	A very high degree of multinational and regional diversity in terms of regulatory regimes and/or service territory economies.	Material operations in three or more nations or substantial geographic regions providing very good diversity of regulatory regimes and/or service territory economies.	Material operations in two to three nations, states, provinces or regions that provide good diversity of regulatory regimes and service territory economies. Alternately, operates within a single regulatory regime with low volatility, and the service territory economy is robust, has a very high degree of diversity and has demonstrated resilience in economic cycles.	May operate under a single regulatory regime viewed as having low volatility, or where multiple regulatory regimes are not viewed as providing much diversity. The service territory economy may have some concentration and cyclicality, but is sufficiently resilient that it can absorb reasonably foreseeable increases in utility rates.
Generation and Fuel Diversity	5% **	A high degree of diversity in terms of generation and/or fuel sources such that the utility and rate-payers are well insulated from commodity price changes, no generation concentration, and very low exposures to Challenged or Threatened Sources (see definitions below).	Very good diversification in terms of generation and/or fuel sources such that the utility and rate-payers are affected only minimally by commodity price changes, little generation concentration, and low exposures to Challenged or Threatened Sources.	Good diversification in terms of generation and/or fuel sources such that the utility and rate-payers have only modest exposure to commodity price changes; however, may have some concentration in a source that is neither Challenged nor Threatened. Exposure to Threatened Sources is low. While there may be some exposure to Challenged Sources, it is not a cause for concern.	Adequate diversification in terms of generation and/or fuel sources such that the utility and rate-payers have moderate exposure to commodity price changes; however, may have some concentration in a source that is Challenged. Exposure to Threatened Sources is moderate, while exposure to Challenged Sources is manageable.

	Sub-Factor Weighting	Ba	B	Caa	Definitions
Market Position	5% *	Operates in a market area with somewhat greater concentration and cyclicality in the service territory economy and/or exposure to storms and other natural disasters, and thus less resilience to absorbing reasonably foreseeable increases in utility rates. May show somewhat greater volatility in the regulatory regime(s).	Operates in a limited market area with material concentration and more severe cyclicality in service territory economy such that cycles are of materially longer duration or reasonably foreseeable increases in utility rates could present a material challenge to the economy. Service territory may have geographic concentration that limits its resilience to storms and other natural disasters, or may be an emerging market. May show decided volatility in the regulatory regime(s).	Operates in a concentrated economic service territory with pronounced concentration, macroeconomic risk factors, and/or exposure to natural disasters.	Challenged Sources are generation plants that face higher but not insurmountable economic hurdles resulting from penalties or taxes on their operation, or from environmental upgrades that are required or likely to be required. Some examples are carbon-emitting plants that incur carbon taxes, plants that must buy emissions credits to operate, and plants that must install environmental equipment to continue to operate, in each where the taxes/credits/upgrades are sufficient to have a material impact on those plants' competitiveness relative to other generation types or on the utility's rates, but where the impact is not so severe as to be likely require plant closure.
Generation and Fuel Diversity	5% **	Modest diversification in generation and/or fuel sources such that the utility or rate- payers have greater exposure to commodity price changes. Exposure to Challenged and Threatened Sources may be more pronounced, but the utility will be able to access alternative sources without undue financial stress.	Operates with little diversification in generation and/or fuel sources such that the utility or rate-payers have high exposure to commodity price changes. Exposure to Challenged and Threatened Sources may be high, and accessing alternate sources may be challenging and cause more financial stress, but ultimately feasible.	Operates with high concentration in generation and/or fuel sources such that the utility or rate-payers have exposure to commodity price shocks. Exposure to Challenged and Threatened Sources may be very high, and accessing alternate sources may be highly uncertain.	Threatened Sources are generation plants that are not currently able to operate due to major unplanned outages or issues with licensing or other regulatory compliance, and plants that are highly likely to be required to de- activate, whether due to the effectiveness of currently existing or expected rules and regulations or due to economic challenges. Some recent examples would include coal fired plants in the US that are not economic to retro-fit to meet mercury and air toxics standards, plants that cannot meet the effective date of those standards, nuclear plants in Japan that have not been licensed to re-start after the Fukushima Dai-ichi accident, and nuclear plants that are required to be phased out within 10 years (as is the case in some European countries).

* 10% weight for issuers that lack generation **0% weight for issuers that lack generation

Factor 4: Financial Strength

Weighting 40%	Sub-Factor Weighting		Aaa	Aa	A	Baa	Ba	B	Caa
CFO pre-WC + Interest / Interest	7.5%		≥ 8x	6x - 8x	4.5x - 6x	3x - 4.5x	2x - 3x	1x - 2x	< 1x
CFO pre-WC / Debt	15%	Standard Grid	≥ 40%	30% - 40%	22% - 30%	13% - 22%	5% - 13%	1% - 5%	< 1%
		Low Business Risk Grid	≥ 38%	27% - 38%	19% - 27%	11% - 19%	5% - 11%	1% - 5%	< 1%
CFO pre-WC - Dividends / Debt	10%	Standard Grid	≥ 35%	25% - 35%	17% - 25%	9% - 17%	0% - 9%	(5%) - 0%	< (5%)
		Low Business Risk Grid	≥ 34%	23% - 34%	15% - 23%	7% - 15%	0% - 7%	(5%) - 0%	< (5%)
Debt / Capitalization	7.5%	Standard Grid	< 25%	25% - 35%	35% - 45%	45% - 55%	55% - 65%	65% - 75%	≥ 75%
		Low Business Risk Grid	< 29%	29% - 40%	40% - 50%	50% - 59%	59% - 67%	67% - 75%	≥ 75%

Appendix B: Approach to Ratings within a Utility Family

Typical Composition of a Utility Family

A typical utility company structure consists of a holding company ("HoldCo") that owns one or more operating subsidiaries (each an "OpCo"). OpCos may be regulated utilities or non-utility companies. Financing of these entities varies by region, in part due to the regulatory framework. A HoldCo typically has no operations – its assets are mostly limited to its equity interests in subsidiaries, and potentially other investments in subsidiaries or minority interests in other companies. However, in certain cases there may be material operations at the HoldCo level. Financing can occur primarily at the OpCo level, primarily at the HoldCo level, or at both HoldCo and OpCos in varying proportions. When a HoldCo has multiple utility OpCos, they will often be located in different regulatory jurisdictions. A HoldCo may have both levered and unlevered OpCos.

General Approach to a Utility Family

In our analysis, we generally consider the stand-alone credit profile of an OpCo and the credit profile of its ultimate parent HoldCo (and any intermediate HoldCos), as well as the profile of the family as a whole, while acknowledging that these elements can have cross-family credit implications in varying degrees, principally based on the regulatory framework of the OpCos and the financing model (which has often developed in response to the regulatory framework).

In addition to considering individual OpCos under this (or another applicable) methodology, we typically[16] approach a HoldCo rating by assessing the qualitative and quantitative factors in this methodology for the consolidated entity and each of its utility subsidiaries. Ratings of individual entities in the issuer family may be pulled up or down based on the interrelationships among the companies in the family and their relative credit strength.

In considering how closely aligned or how differentiated ratings should be among members of a utility family, we assess a variety of factors, including:

» Regulatory or other barriers to cash movement among OpCos and from OpCos to HoldCo

» Differentiation of the regulatory frameworks of the various OpCos

» Specific ring-fencing provisions at particular OpCos

» Financing arrangements – for instance, each OpCo may have its own financing arrangements, or the sole liquidity facility may be at the parent; there may be a liquidity pool among certain but not all members of the family; certain members of the family may better be able to withstand a temporary hiatus of external liquidity or access to capital markets

» Financial covenants and the extent to which an Event of Default by one OpCo limits availability of liquidity to another member of the family

» The extent to which higher leverage at one entity increases default risk for other members of the family

» An entity's exposure to or insulation from an affiliate with high business risk

» Structural features or other limitations in financing agreements that restrict movements of funds, investments, provision of guarantees or collateral, etc.

» The relative size and financial significance of any particular OpCo to the HoldCo and the family

[16] See paragraph at the end of this section for approaches to Hybrid HoldCos.

See also those factors noted in Notching for Structural Subordination of Holding Companies.

Our approach to a Hybrid HoldCo (see definition in Appendix C) depends in part on the importance of its non-utility operations and the availability of information on individual businesses. If the businesses are material and their individual results are fully broken out in financial disclosures, we may be able to assess each material business individually by reference to the relevant Moody's methodologies to arrive at a composite assessment for the combined businesses. If non-utility operations are material but are not broken out in financial disclosures, we may look at the consolidated entity under more than one methodology. When non-utility operations are less material but could still impact the overall credit profile, the difference in business risks and our estimation of their impact on financial performance will be qualitatively incorporated in the rating.

Higher Barriers to Cash Movement with Financing Predominantly at the OpCos

Where higher barriers to cash movement exist on an OpCo or OpCos due the regulatory framework or debt structural features, ratings among family members are likely to be more differentiated. For instance, for utility families with OpCos in the US, where regulatory barriers to free cash movement are relatively high, greater importance is generally placed on the stand-alone credit profile of the OpCo.

Our observation of major defaults and bankruptcies in the US sector generally corroborates a view that regulation creates a degree of separateness of default probability. For instance, Portland General Electric (Baa1 RUR-up) did not default on its securities, even though its then-parent Enron Corp. entered bankruptcy proceedings. When Entergy New Orleans (Ba2 stable) entered into bankruptcy, the ratings of its affiliates and parent Entergy Corporation (Baa3 stable) were unaffected. PG&E Corporation (Baa1 stable) did not enter bankruptcy proceedings despite bankruptcies of two major subsidiaries - Pacific Gas & Electric Company (A3 stable) in 2001 and National Energy Group in 2003.

The degree of separateness may be greater or smaller and is assessed on a case by case basis, because situational considerations are important. One area we consider is financing arrangements. For instance, there will tend to be greater differentiation if each member of a family has its own bank credit facilities and difficulties experienced by one entity would not trigger events of default for other entities. While the existence of a money pool might appear to reduce separateness between the participants, there may be regulatory barriers within money pools that preserve separateness. For instance, non-utility entities may have access to the pool only as a borrower, only as a lender, and even the utility entities may have regulatory limits on their borrowings from the pool or their credit exposures to other pool members. If the only source of external liquidity for a money pool is borrowings by the HoldCo under its bank credit facilities, there would be less separateness, especially if the utilities were expected to depend on that liquidity source. However, the ability of an OpCo to finance itself by accessing capital markets must also be considered. Inter-company tax agreements can also have an impact on our view of how separate the risks of default are.

For a HoldCo, the greater the regulatory, economic, and geographic diversity of its OpCos, the greater its potential separation from the default probability of any individual subsidiary. Conversely, if a HoldCo's actions have made it clear that the HoldCo will provide support for an OpCo encountering some financial stress (for instance, due to delays and/or cost over-runs on a major construction project), we would be likely to perceive less separateness.

Even where high barriers to cash movement exist, onerous leverage at a parent company may not only give rise to greater notching for structural subordination at the parent, it may also pressure an OpCo's rating, especially when there is a clear dependence on an OpCo's cash flow to service parent debt.

While most of the regulatory barriers to cash movement are very real, they are not absolute. Furthermore, while it is not usually in the interest of an insolvent parent or its creditors to bring an operating utility into a bankruptcy proceeding, such an occurrence is not impossible.

The greatest separateness occurs where strong regulatory insulation is supplemented by effective ring-fencing provisions that fully separate the management and operations of the OpCo from the rest of the family and limit the parent's ability to cause the OpCo to commence bankruptcy proceedings as well as limiting dividends and cash transfers. Typically, most entities in US utility families (including HoldCos and OpCos) are rated within 3 notches of each other. However, it is possible for the HoldCo and OpCos in a family to have much wider notching due to the combination of regulatory imperatives and strong ring-fencing that includes a significant minority shareholder who must agree to important corporate decisions, including a voluntary bankruptcy filing.

Lower Barriers to Cash Movement with Financing Predominantly at the OpCos

Our approach to rating issuers within a family where there are lower regulatory barriers to movement of cash from OpCos to HoldCos (e.g., many parts of Asia and Europe) places greater emphasis on the credit profile of the consolidated group. Individual OpCos are considered based on their individual characteristics and their importance to the family, and their assigned ratings are typically banded closely around the consolidated credit profile of the group due to the expectation that cash will transit relatively freely among family entities.

Some utilities may have OpCos in jurisdictions where cash movement among certain family members is more restricted by the regulatory framework, while cash movement from and/or among OpCos in other jurisdictions is less restricted. In these situations, OpCos with more restrictions may vary more widely from the consolidated credit profile while those with fewer restrictions may be more tightly banded around the other entities in the corporate family group.

Appendix C: Brief Descriptions of the Types of Companies Rated Under This Methodology

The following describes the principal categories of companies rated under this methodology:

Vertically Integrated Utility: Vertically integrated utilities are regulated electric or combination utilities (see below) that own generation, distribution and (in most cases) electric transmission assets. Vertically integrated utilities are generally engaged in all aspects of the electricity business. They build power plants, procure fuel, generate power, build and maintain the electric grid that delivers power from a group of power plants to end-users (including high and low voltage lines, transformers and substations), and generally meet all of the electric needs of the customers in a specific geographic area (also called a service territory). The rates or tariffs for all of these monopolistic activities are set by the relevant regulatory authority.

Transmission & Distribution Utility: Transmission & Distribution utilities (T&Ds) typically operate in deregulated markets where generation is provided under a competitive framework. T&Ds own and operate the electric grid that transmits and/or distributes electricity within a specific state or region.

T&Ds provide electrical transportation and distribution services to carry electricity from power plants and transmission lines to retail, commercial, and industrial customers. T&Ds are typically responsible for billing customers for electric delivery and/or supply, and most have an obligation to provide a standard supply or provider-of-last-resort (POLR) service to customers that have not switched to a competitive supplier. These factors distinguish T&Ds from Networks, whose customers are retail electric suppliers and/or other electricity companies. In a smaller number of cases, T&Ds rated under this methodology may not have an obligation to provide POLR services, but are regulated in sub- sovereign jurisdictions. The rates or tariffs for these monopolistic T&D activities are set by the relevant regulatory authority.

Local Gas Distribution Company: Distribution is the final step in delivering natural gas to customers. While some large industrial, commercial, and electric generation customers receive natural gas directly from high capacity pipelines that carry gas from gas producing basins to areas where gas is consumed, most other users receive natural gas from their local gas utility, also called a local distribution company (LDC). LDCs are regulated utilities involved in the delivery of natural gas to consumers within a specific geographic area. Specifically, LDCs typically transport natural gas from delivery points located on large-diameter pipelines (that usually operate at fairly high pressure) to households and businesses through thousands of miles of small-diameter distribution pipe (that usually operate at fairly low pressure). LDCs are typically responsible for billing customers for gas delivery and/or supply, and most also have the responsibility to procure gas for at least some of their customers, although in some markets gas supply to all customers is on a competitive basis. These factors distinguish LDCs from gas networks, whose customers are retail gas suppliers and/or other natural gas companies. The rates or tariffs for these monopolistic activities are set by the relevant regulatory authority.

Integrated Gas Utility: Integrated gas regulated utilities are regulated utilities that deliver gas to all end users in a particular service territory by sourcing the commodity; operating transport infrastructure that often combines high pressure pipelines with low pressure distribution systems and, in some cases, gas storage, re-gasification or other related facilities; and performing other supply-related activities, such as customer billing and metering. The rates or tariffs for the totality of these activities are set by the relevant regulatory authority. Many integrated gas utilities are national in scope.

Combination Utility: Combination utilities are those that combine an LDC or Integrated Gas Utility with either a vertically integrated utility or a T&D utility. The rates or tariffs for these monopolistic activities are set by the relevant regulatory authority.

Regulated Generation Utility: Regulated generation utilities (Regulated Gencos) are utilities that almost exclusively have generation assets, but their activities are generally regulated like those of vertically integrated utilities. In the US, this means that the purchasers of their output (typically other investor-owned, municipal or cooperative utilities) pay a regulated rate based on the total allowed costs of the Regulated Genco, including a return on equity based on a capital structure designated by the regulator (primarily FERC). Companies that have been included in this group include certain generation companies (including in Korea and China) that are not rate regulated in the usual sense of recovering costs plus a regulated rate of return on either equity or asset value. Instead, we have looked at a combination of governmental action with respect to setting feed-in tariffs and directives on how much generation will be built (or not built) in combination with a generally high degree of government ownership, and we have concluded that these companies are currently best rated under this methodology. Future evolution in our view of the operating and/or regulatory environment of these companies could lead us to conclude that they may be more appropriately rated under a related methodology (for example, Unregulated Utilities and Power Companies).

Independent System Operator: An Independent System Operator (ISO) is an organization formed in certain regional electricity markets to act as the sole chief coordinator of an electric grid. In the areas where an ISO is established, it coordinates, controls and monitors the operation of the electrical power system to assure that electric supply and demand are balanced at all times, and, to the extent possible, that electric demand is met with the lowest-cost sources. ISOs seek to assure adequate transmission and generation resources, usually by identifying new transmission needs and planning for a generation reserve margin above expected peak demand. In regions where generation is competitive, they also seek to establish rules that foster a fair and open marketplace, and they may conduct price-setting auctions for energy and/or capacity. The generation resources that an ISO coordinates may belong to vertically integrated utilities or to independent power producers. ISOs may not be rate-regulated in the traditional sense, but fall under governmental oversight. All participants in the regional grid are required to pay a fee or tariff (often volumetric) to the ISO that is designed to recover its costs, including costs of investment in systems and equipment needed to fulfill their function. ISOs may be for profit or not-for-profit entities.

In the US, most ISOs were formed at the direction or recommendation of the Federal Energy Regulatory Commission (FERC), but the ISO that operates solely in Texas falls under state jurisdiction. Some US ISOs also perform certain additional functions such that they are designated as Regional Transmission Organizations (or RTOs).

Transmission-Only Utility: Transmission-only utilities are solely focused on owning and operating transmission assets. The transmission lines these utilities own are typically high-voltage and allow energy producers to transport electric power over long distances from where it is generated (or received) to the transmission or distribution system of a T&D or vertically integrated utility. Unlike most of the other utilities rated under this methodology, transmission-only utilities primarily provide services to other utilities and ISOs. Transmission-only utilities in most parts of the world other than the US have been rated under the Regulated Networks methodology.

Utility Holding Company (Utility HoldCo): As detailed in Appendix B, regulated electric and gas utilities are often part of corporate families under a parent holding company. The operating subsidiaries of Utility HoldCos are overwhelmingly regulated electric and gas utilities.

Hybrid Holding Company (Hybrid HoldCo): Some utility families contain a mix of regulated electric and gas utilities and other types of companies, but the regulated electric and gas utilities represent the majority of the consolidated cash flows, assets and debt. The parent company is thus a Hybrid HoldCo.

Appendix D: Key Industry Issues Over the Intermediate Term

Political and Regulatory Issues

As highly regulated monopolistic entities, regulated utilities continually face political and regulatory risk, and managing these risks through effective outreach to key customers as well as key political and regulatory decision-makers is, or at least should be, a core competency of companies in this sector. However, larger waves of change in the political, regulatory or economic environment have the potential to cause substantial changes in the level of risk experienced by utilities and their investors in somewhat unpredictable ways.

One of the more universal risks faced by utilities currently is the compression of allowed returns. A long period of globally low interest rates, held down by monetary stimulus policies, has generally benefitted utilities, since reductions in allowed returns have been slower than reductions in incurred capital costs. Essentially all regulated utilities face a ratcheting down of allowed and/or earned returns. More difficult to predict is how regulators will respond when monetary stimulus reverses, and how well utilities will fare when fixed income investors require higher interest rates and equity investors require higher total returns and growth prospects.

The following global snapshot highlights that regulatory frameworks evolve over time. On an overall basis in the US over the past several years, we have noted some incremental positive regulatory trends, including greater use of formula rates, trackers and riders, and (primarily for natural gas utilities) de-coupling of returns from volumetric sales. In Canada, the framework has historically been viewed as predictable and stable, which has helped offset somewhat lower levels of equity in the capital structure, but the compression of returns has been relatively steep in recent years. In Japan, the regulatory authorities are working through the challenges presented by the decision to shut down virtually all of the country's nuclear generation capacity, leading to uncertainty regarding the extent to which increased costs will be reflected in rate increases sufficient to permit returns on capital to return to prior levels. China's regulatory framework has continued to evolve, with fairly low transparency and some time-to-time shifts in favored versus less-favored generation sources balanced by an overall state policy of assuring sustainability of the sector, adequate supply of electricity and affordability to the general public. Singapore and Hong Kong have fairly well developed and supportive regulatory frameworks despite a trend towards lower returns, whereas Malaysia, Korea and Thailand have been moving towards a more transparent regulatory framework. The Philippines is in the process of deregulating its power market, while Indian power utilities continue to grapple with structural challenges. In Latin America, there is a wide dispersion among frameworks, ranging from the more stable, long established and predictable framework in Chile to the decidedly unpredictable framework in Argentina. Generally, as Latin American economies have evolved to more stable economic policies, regulatory frameworks for utilities have also shown greater stability and predictability.

All of the other issues discussed in this section have a regulatory/political component, either as the driver of change or in reaction to changes in economic environments and market factors.

Economic and Financial Market Conditions

As regulated monopolies, electric and gas utilities have generally been quite resistant to unsettled economic and financial market conditions for several reasons. Unlike many companies that face direct market-based competition, their rates do not decrease when demand decreases. The elasticity of demand for electricity and gas is much lower than for most products in the consumer economy.

When financial markets are volatile, utilities often have greater capital market access than industrial companies in competitive sectors, as was the case in the 2007-2009 recession. However, regulated electric and gas utilities are by no means immune to a protracted or severe recession.

Severe economic malaise can negatively affect utility credit profiles in several ways. Falling demand for electricity or natural gas may negatively impact margins and debt service protection measures, especially when rates are designed such that a substantial portion of fixed costs is in theory recovered through volumetric charges. The decrease in demand in the 2007-2009 recession was notable in comparison to prior recessions, especially in the residential sector. Poor economic conditions can make it more difficult for regulators to approve needed rate increases or provide timely cost recovery for utilities, resulting in higher cost deferrals and longer regulatory lag. Finally, recessions can coincide with a lack of confidence in the utility sector that impacts access to capital markets for a period of time. For instance, in the Great Depression and (to a lesser extent) in the 2001 recession, access for some issuers was curtailed due to the sector's generally higher leverage than other corporate sectors, combined with a concerns over a lack of transparency in financial reporting.

Fuel Price Volatility and the Global Impact of Shale Gas

The ability of most utilities to pass through their fuel costs to end users may insulate a utility from exposure to price volatility of these fuels, but it does not insulate consumers. Consumers and regulators complained vociferously about utility rates during the run-up in hydro-carbon prices in 2005-2008 (oil, natural gas and, to a lesser extent, coal). The steep decline in US natural gas prices since 2009, caused in large part by the development of shale gas and shale oil resources, has been a material benefit to US utilities, because many have been able to pass through substantial base rate increases during a period when all-in rates were declining. Shale hydro-carbons have also had a positive impact, albeit one that is less immediate and direct, on non-US utilities. In much of the eastern hemisphere, natural gas prices under long-term contracts have generally been tied to oil prices, but utilities and other industrial users have started to have some success in negotiating to de-link natural gas from oil. In addition, increasing US production of oil has had a noticeable impact on world oil prices, generally benefitting oil and gas users.

Not all utilities will benefit equally. Utilities that have locked in natural gas under high-priced long- term contracts that they cannot re-negotiate are negatively impacted if they cannot pass through their full contracted cost of gas, or if the high costs cause customer dissatisfaction and regulatory backlash. Utilities with large coal fleets or utilities constructing nuclear power plants may also face negative impacts on their regulatory environment, since their customers will benefit less from lower natural gas prices.

Distributed Generation Versus the Central Station Paradigm

The regulation and the financing of electric utilities are based on the premise that the current model under which electricity is generated and distributed to customers will continue essentially unchanged for many decades to come. This model, called the central station paradigm (because electricity is generated in large, centrally located plants and distributed to a large number of customers, who may in fact be hundreds of miles away), has been in place since the early part of the 20th century. The model has worked because the economies of scale inherent to very large power plants has more than offset the cost and inefficiency (through power losses) inherent to maintaining a grid for transmitting and distributing electricity to end users.

Despite rate structures that only allow recovery of invested capital over many decades (up to 60 years), utilities can attract capital because investors assume that rates will continue to be collected for at least that long a period. Regulators and politicians assume that taxes and regulatory charges levied on electricity usage will be paid by a broad swath of residences and businesses and will not materially discourage usage of

electricity in a way that would decrease the amount of taxes collected. A corollary assumption is that the number of customers taking electricity from the system during that period will continue to be high enough such that rates will be reasonable and generally more attractive than other alternatives. In the event that consumers were to switch en masse to alternate sources of generating or receiving power (for instance distributed generation), rates for remaining customers would either not cover the utility's costs, or rates would need to be increased so much that more customers may be incentivized to leave the system. This scenario has been experienced in the regulated US copper wire telephone business, where rates have increased quite dramatically for users who have not switched to digital or wireless telephone service. While this scenario continues to be unlikely for the electricity sector, distributed generation, especially from solar panels, has made inroads in certain regions.

Distributed generation is any retail-scale generation, differentiated from self-generation, which generally describes a large industrial plant that builds its own reasonably large conventional power plant to meet its own needs. While some residential property owners that install distributed generation may choose to sever their connection to the local utility, most choose to remain connected, generating power into the grid when it is both feasible and economic to do so, and taking power from the grid at other times. Distributed generation is currently concentrated in roof-top photovoltaic solar panels, which have benefitted from varying levels of tax incentives in different jurisdictions.

Regulatory treatment has also varied, but some rate structures that seek to incentivize distributed renewable energy are decidedly credit negative for utilities, in particular net metering.

Under net metering, a customer receives a credit from the utility for all of its generation at the full (or nearly full) retail rate and pays only for power taken, also at the retail rate, resulting in a materially reduced monthly bill relative to a customer with no distributed generation. The distributed generation customer has no obligation to generate any particular amount of power, so the utility must stand ready to generate and deliver that customer's full power needs at all times. Since most utility costs, including the fixed costs of financing and maintaining generation and delivery systems, are currently collected through volumetric rates, a customer owning distributed generation effectively transfers a portion of the utility's costs of serving that customer to other customers with higher net usage, notably to customers that do not own distributed generation. The higher costs may incentivize more customers to install solar panels, thereby shifting the utility's fixed costs to an even smaller group of rate-payers. To date, solar generation and net metering have not had a material credit impact on any utilities, but ratings could be negatively impacted if the programs were to grow and if rate structures were not amended so that each customer's monthly bill more closely approximated the cost of serving that customer.

In our current view, the possibility that there will be a widespread movement of electric utility customers to sever themselves from the grid is remote. However, we acknowledge that new technologies, such as the development of commercially viable fuel cells and/or distributed electric storage, could disrupt materially the central station paradigm and the credit quality of the utility sector.

Nuclear Issues

Utilities with nuclear generation face unique safety, regulatory, and operational issues. The nuclear disaster at Fukushima Daiichi had a severely negative credit impact on its owner, Tokyo Electric Power Company, Incorporated, as well as all the nuclear utilities in the country. Japan previously generated about 30% of its power from 50 reactors, but all are currently either idled or shut down, and utilities in the country face materially higher costs of replacement power, a credit negative.

Fukushima Daiichi also had global consequences. Germany's response was to require that all nuclear power plants in the country be shut by 2022. Switzerland opted for a phase-out by 2031. (Most European nuclear plants are owned by companies rated under other the Unregulated Utilities and Power Companies methodology.) Even in countries where the regulatory response was more moderate, increased regulatory scrutiny has raised operating costs, a credit negative, especially in the US, where low natural gas prices have rendered certain primarily smaller nuclear plants uneconomic. Nonetheless, we view robust and independent nuclear safety regulation as a credit-positive for the industry.

Other general issues for nuclear operators include higher costs and lower reliability related to the increasing age of the fleet. In 2013, Duke Energy Florida, Inc. decided to shut permanently Crystal River Unit 3 after it determined that a de-lamination (or separation) in the concrete of the outer wall of the containment building was uneconomic to repair. San Onofre Nuclear Generating Station was closed permanently in 2013 after its owners decided not to pursue a re-start in light of operating defects in two steam generators that had been replaced in 2010 and 2011.

Appendix E: Regional and Other Considerations

Notching Considerations for US First Mortgage Bonds

In most regions, our approach to notching between different debt classes of the same regulated utility issuer follows the guidance on notching corporate instrument ratings based on differences in security and priority of claim, including a one notch differential between senior secured and senior unsecured debt.[17] However, in most cases we have two notches between the first mortgage bonds and senior unsecured debt of regulated electric and gas utilities in the US.

Wider notching differentials between debt classes may also be appropriate in speculative grade. Additional insights for speculative grade issuers are provided in the publication "Loss Given Default for Speculative-Grade Companies."[18]

First mortgage bond holders in the US generally benefit from a first lien on most of the fixed assets used to provide utility service, including such assets as generating stations, transmission lines, distribution lines, switching stations and substations, and gas distribution facilities, as well as a lien on franchise agreements. In our view, the critical nature of these assets to the issuers and to the communities they serve has been a major factor that has led to very high recovery rates for this class of debt in situations of default, thereby justifying a two notch uplift. The combination of the breadth of assets pledged and the bankruptcy-tested recovery experience has been unique to the US.

In some cases, there is only a one notch differential between US first mortgage bonds and the senior unsecured rating. For instance, this is likely when the pledged property is not considered critical infrastructure for the region, or if the mortgage is materially weakened by carve-outs, lien releases or similar creditor-unfriendly terms.

Securitization

The use of securitization, a financing technique utilizing a discrete revenue stream (typically related to recovery of specifically defined expenses) that is dedicated to servicing specific securitization debt, has primarily been used in the US, where it has been quite pervasive in the past two decades. The first generation of securitization bonds were primarily related to recovery of the negative difference between the market value of utilities' generation assets and their book value when certain states switched to competitive electric supply markets and utilities sold their generation (so-called stranded costs). This technique was then used for significant storm costs (especially hurricanes) and was eventually broadened to include environmental related expenditures, deferred fuel costs, or even deferred miscellaneous expenses. States that have implemented securitization frameworks include Arkansas, California, Connecticut, Illinois, Louisiana, Maryland, Massachusetts, Mississippi, New Hampshire, New Jersey, Ohio, Pennsylvania, Texas and West Virginia. In its simplest form, a securitization isolates and dedicates a stream of cash flow into a separate special purpose entity (SPE). The SPE uses that stream of revenue and cash flow to provide annual debt service for the securitized debt instrument. Securitization is typically underpinned by specific legislation to segregate the securitization revenues from the utility's revenues to assure their continued collection, and the details of the enabling legislation may vary from state to state. The utility benefits from the securitization because it receives an immediate source of cash (although it gives up the opportunity to earn a return on the corresponding asset), and ratepayers benefit because the cost of the securitized debt is

[17] A link to this and other sector and cross-sector credit rating methodologies can be found in the Related Research section of this report.
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lower than the utility's cost of debt and much lower than its all-in cost of capital, which reduces the revenue requirement associated with the cost recovery.

In the presentation of US securitization debt in published financial ratios, we make our own assessment of the appropriate credit representation but in most cases follows the accounting in audited statements under US Generally Accepted Accounting Principles (GAAP), which in turn considers the terms of enabling legislation. As a result, accounting treatment may vary. In most states utilities have been required to consolidate securitization debt under GAAP, even though it is technically non- recourse.

In general, we view securitization debt of utilities as being on-credit debt, in part because the rates associated with it reduce the utility's headroom to increase rates for other purposes while keeping all-in rates affordable to customers. Thus, where accounting treatment is off balance sheet, we seek to adjust the company's ratios by including the securitization debt and related revenues for our analysis. Where the securitized debt is on balance sheet, our credit analysis also considers the significance of ratios that exclude securitization debt and related revenues. Since securitization debt amortizes mortgage-style, including it makes ratios look worse in early years (when most of the revenue collected goes to pay interest) and better in later years (when most of the revenue collected goes to pay principal).

Strong levels of government ownership in Asia Pacific (ex-Japan) provide rating uplift

Strong levels of government ownership have dominated the credit profiles of utilities in Asia Pacific (excluding Japan), generally leading to ratings that are a number of notches above the Baseline Credit Assessment. Regulated electric and gas utilities with significant government ownership are rated using this methodology in conjunction with the Joint Default Analysis approach in our methodology for Government-Related Issuers.[19]

Support system for large corporate entities in Japan can provide ratings uplift, with limits

Our ratings for large corporate entities in Japan reflect the unique nature of the country's support system, and they are higher than they would otherwise be if such support were disregarded. This is reflected in the tendency for ratings of Japanese utilities to be higher than their grid implied ratings. However, even for large prominent companies, our ratings consider that support will not be endless and is less likely to be provided when a company has questionable viability rather than being in need of temporary liquidity assistance.

[19] A link to this and other sector and cross-sector credit rating methodologies can be found in the Related Research section of this report.

Appendix F: Treatment of Power Purchase Agreements ("PPAs")

Although many utilities own and operate power stations, some have entered into PPAs to source electricity from third parties to satisfy retail demand. The motivation for these PPAs may be one or more of the following: to outsource operating risks to parties more skilled in power station operation, to provide certainty of supply, to reduce balance sheet debt, to fix the cost of power, or to comply with regulatory mandates regarding power sourcing, including renewable portfolio standards. While we regard PPAs that reduce operating or financial risk as a credit positive, some aspects of PPAs may negatively affect the credit of utilities. The most conservative treatment would be to treat a PPA as a debt obligation of the utility as, by paying the capacity charge, the utility is effectively providing the funds to service the debt associated with the power station. At the other end of the continuum, the financial obligations of the utility could also be regarded as an ongoing operating cost, with no long-term capital component recognized.

Under most PPAs, a utility is obliged to pay a capacity charge to the power station owner (which may be another utility or an Independent Power Producer – IPP); this charge typically covers a portion of the IPP's fixed costs in relation to the power available to the utility. These fixed payments usually help to cover the IPP's debt service and are made irrespective of whether the utility calls on the IPP to generate and deliver power. When the utility requires generation, a further energy charge, to cover the variable costs of the IPP, will also typically be paid by the utility. Some other similar arrangements are characterized as tolling agreements, or long-term supply contracts, but most have similar features to PPAs and are thus we analyze them as PPAs.

PPAs are recognized qualitatively to be a future use of cash whether or not they are treated as debt-like obligations in financial ratios

The starting point of our analysis is the issuer's audited financial statements – we consider whether the utility's accountants determine that the PPA should be treated as a debt equivalent, a capitalized lease, an operating lease, or in some other manner. PPAs have a wide variety of operational and financial terms, and it is our understanding that accountants are required to have a very granular view into the particular contractual arrangements in order to account for these PPAs in compliance with applicable accounting rules and standards. However, accounting treatment for PPAs may not be entirely consistent across US GAAP, IFRS or other accounting frameworks. In addition, we may consider that factors not incorporated into the accounting treatment may be relevant (which may include the scale of PPA payments, their regulatory treatment including cost recovery mechanisms, or other factors that create financial or operational risk for the utility that is greater, in our estimation, than the benefits received). When the accounting treatment of a PPA is a debt or lease equivalent (such that it is reported on the balance sheet, or disclosed as an operating lease and thus included in our adjusted debt calculation), we generally do not make adjustments to remove the PPA from the balance sheet.

However, in relevant circumstances we consider making adjustments that impute a debt equivalent to PPAs that are off-balance sheet for accounting purposes.

Regardless of whether we consider that a PPA warrants or does not warrant treatment as a debt obligation, we assess the totality of the impact of the PPA on the issuer's probability of default. Costs of a PPA that cannot be recovered in retail rates creates material risk, especially if they also cannot be recovered through market sales of power.

Additional considerations for PPAs

PPAs have a wide variety of financial and regulatory characteristics, and each particular circumstance may be treated differently by Moody's. Factors which determine where on the continuum we treat a particular PPA include the following:

» Risk management: An overarching principle is that PPAs have normally been used by utilities as a risk management tool and we recognize that this is the fundamental reason for their existence. Thus, we will not automatically penalize utilities for entering into contracts for the purpose of reducing risk associated with power price and availability. Rather, we will look at the aggregate commercial position, evaluating the risk to a utility's purchase and supply obligations. In addition, PPAs are similar to other long-term supply contracts used by other industries and their treatment should not therefore be fundamentally different from that of other contracts of a similar nature.

» Pass-through capability: Some utilities have the ability to pass through the cost of purchasing power under PPAs to their customers. As a result, the utility takes no risk that the cost of power is greater than the retail price it will receive. Accordingly we regard these PPA obligations as operating costs with no long-term debt-like attributes. PPAs with no pass-through ability have a greater risk profile for utilities. In some markets, the ability to pass through costs of a PPA is enshrined in the regulatory framework, and in others can be dictated by market dynamics. As a market becomes more competitive or if regulatory support for cost recovery deteriorates, the ability to pass through costs may decrease and, as circumstances change, our treatment of PPA obligations will alter accordingly.

» Price considerations: The price of power paid by a utility under a PPA can be substantially above or below the market price of electricity. A below-market price will motivate the utility to purchase power from the IPP in excess of its retail requirements, and to sell excess electricity in the spot market. This can be a significant source of cash flow for some utilities. On the other hand, utilities that are compelled to pay capacity payments to IPPs when they have no demand for the power or at an above-market price may suffer a financial burden if they do not get full recovery in retail rates. We will focus particularly on PPAs that have mark-to-market losses, which typically indicates that they have a material impact on the utility's cash flow.

» Excess Reserve Capacity: In some jurisdictions there is substantial reserve capacity and thus a significant probability that the electricity available to a utility under PPAs will not be required by the market. This increases the risk to the utility that capacity payments will need to be made when there is no demand for the power. We may determine that all of a utility's PPAs represent excess capacity, or that a portion of PPAs are needed for the utility's supply obligations plus a normal reserve margin, while the remaining portion represents excess capacity. In the latter case, we may impute debt to specific PPAs that are excess or take a proportional approach to all of the utility's PPAs.

» Risk-sharing: Utilities that own power plants bear the associated operational, fuel procurement and other risks. These must be balanced against the financial and liquidity risk of contracting for the purchase of power under a PPA. We will examine on a case-by case basis the relative credit risk associated with PPAs in comparison to plant ownership.

» Purchase requirements: Some PPAs are structured with either options or requirements to purchase the asset at the end of the PPA term. If the utility has an economically meaningful requirement to purchase, we would most likely consider it to be a debt obligation. In most such cases, the obligation would already receive on-balance sheet treatment under relevant accounting standards.

» Default provisions: In most cases, the remedies for default under a PPA do not include acceleration of amounts due, and in many cases PPAs would not be considered as debt in a bankruptcy scenario and could potentially be cancelled. Thus, PPAs may not materially increase Loss Given Default for the

utility. In addition, PPAs are not typically considered debt for cross- default provisions under a utility's debt and liquidity arrangements. However, the existence of non-standard default provisions that are debt-like would have a large impact on our treatment of a PPA. In addition, payments due under PPAs are senior unsecured obligations, and any inability of the utility to make them materially increases default risk.

Each of these factors will be considered by our analysts and a decision will be made as to the importance of the PPA to the risk analysis of the utility.

Methods for estimating a liability amount for PPAs

According to the weighting and importance of the PPA to each utility and the level of disclosure, we may approximate a debt obligation equivalent for PPAs using one or more of the methods discussed below. In each case we look holistically at the PPA's credit impact on the utility, including the ability to pass through costs and curtail payments, the materiality of the PPA obligation to the overall business risk and cash flows of the utility, operational constraints that the PPA imposes, the maturity of the PPA obligation, the impact of purchased power on market-based power sales (if any) that the utility will engage in, and our view of future market conditions and volatility.

» Operating Cost: If a utility enters into a PPA for the purpose of providing an assured supply and there is reasonable assurance that regulators will allow the costs to be recovered in regulated rates, we may view the PPA as being most akin to an operating cost. Provided that the accounting treatment for the PPA is, in this circumstance, off-balance sheet, we will most likely make no adjustment to bring the obligation onto the utility's balance sheet.

» Annual Obligation x 6: In some situations, the PPA obligation may be estimated by multiplying the annual payments by a factor of six (in most cases). This method is sometimes used in the capitalization of operating leases. This method may be used as an approximation where the analyst determines that the obligation is significant but cannot otherwise be quantified otherwise due to limited information.

» Net Present Value: Where the analyst has sufficient information, we may add the NPV of the stream of PPA payments to the debt obligations of the utility. The discount rate used will be our estimate of the cost of capital of the utility.

» Debt Look-Through: In some circumstances, where the debt incurred by the IPP is directly related to the off-taking utility, there may be reason to allocate the entire debt (or a proportional part related to share of power dedicated to the utility) of the IPP to that of the utility.

» Mark-to-Market: In situations in which we believe that the PPA prices exceed the market price and thus will create an ongoing liability for the utility, we may use a net mark-to-market method, in which the NPV of the utility's future out-of-the-money net payments will be added to its total debt obligations.

» Consolidation: In some instances where the IPP is wholly dedicated to the utility, it may be appropriate to consolidate the debt and cash flows of the IPP with that of the utility. If the utility purchases only a portion of the power from the IPP, then that proportion of debt might be consolidated with the utility.

If we have determined to impute debt to a PPA for which the accounting treatment is not on-balance sheet, we will in some circumstances use more than one method to estimate the debt equivalent obligations imposed by the PPA, and compare results. If circumstances (including regulatory treatment or market conditions) change over time, the approach that is used may also vary.

Moody's Related Research

The credit ratings assigned in this sector are primarily determined by this credit rating methodology. Certain broad methodological considerations (described in one or more credit rating methodologies) may also be relevant to the determination of credit ratings of issuers and instruments in this sector. Potentially related sector and cross-sector credit rating methodologies can be found here.

For data summarizing the historical robustness and predictive power of credit ratings assigned using this credit rating methodology, see link.

Please refer to Moody's Rating Symbols & Definitions, which is available here, for further information. Definitions of Moody's most common ratio terms can be found in "Moody's Basic Definitions for Credit Statistics, User's Guide", accessible via this link.

» contacts continued from page 1

Analyst Contacts:

BUENOS AIRES +54.11.5129.260

Daniela Cuan +54.11.5129.261
Vice President - Senior Analyst
daniela.cuan@moodys.com

TORONTO +1.416.214.163

Gavin MacFarlane +1.416.214.386
Vice President - Senior Credit Officer
gavin.macfarlane@moodys.com

LONDON +44.20.7772.545

Douglas Segars +44.20.7772.158
Managing Director - Infrastructure Finance
douglas.segars@moodys.com

Helen Francis +44.20.7772.542
Vice President - Senior Credit Officer
helen.francis@moodys.com

HONG KONG +852.3551.307

Vivian Tsang +852.375.815.3
Associate Managing Director
vivian.tsang@moodys.com

SINGAPORE +65.6398.830

Ray Tay +65.6398.830
Vice President - Senior Credit Officer
ray.tay@moodys.com

TOKYO +81.3.5408.410

Mihoko Manabe +81.354.084.033
Associate Managing Director
mihoko.manabe@moodys.com

Mariko Semetko +81.354.084.20
Vice President - Senior Credit Officer
mariko.semetko@moodys.com

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Author
Michael G. Haggarty

Production Associate
Masaki Shiomi

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