



Central Hudson Gas & Electric Corporation

**GAS TRANSPORTATION OPERATING  
PROCEDURES**

**Submitted: August 31, 2022**

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## **I. INTRODUCTION**

The purpose of Central Hudson Gas & Electric Corporation's ("CHG&E" or "the Company") Gas Transportation Operating Procedures Manual ("the Manual") is to provide a set of procedures and guidelines for Retail Suppliers and Direct Customers doing business within CHG&E's service territory. These procedures and guidelines have been established to help provide a safe, reliable operating environment where participating Customers may choose an alternate energy supplier (Retail Supplier) by evaluating all available options, where Retail Suppliers may conduct business with CHG&E and Customers in a smooth, efficient manner, and where all Customers are adequately represented and afforded reasonable consumer protections.

The Manual includes procedures and guidelines for the Company's firm retail access transportation program (Service Classification Nos. 6, 12 and 13), interruptible transportation program (Service Classification No. 9) and firm transportation program for large customers (Service Classification No. 11).

Retail Suppliers and Direct Customers are subject to the terms of CHG&E's tariff, P.S.C. No. 12 - Gas and the terms of the Supplier Operating Agreement, as each of the same may be amended, modified, superseded or supplemented. Unless otherwise specifically stated herein, the provisions of CHG&E's tariff, P.S.C. No. 12 continue to apply. CHG&E's tariff leaves are subject to approval by the PSC, and are subject to change in accordance with applicable laws, rules and regulations.

Renewable Natural Gas (RNG) interconnect guidelines have been included in section B at the end of this document to encourage and facilitate the addition of these installations within the Company's natural gas service territory.

## **II. OVERVIEW OF CENTRAL HUDSON**

### **A. Corporate Structure**

#### **Table of Organization - Executives Central Hudson Gas & Electric Corporation**

<b>Charles A. Freni</b>	President and Chief Executive Officer
<b>Christopher Capone</b>	Executive Vice President
<b>Lora Gescheidle</b>	Chief Financial Officer and Treasurer
<b>Ryan Hawthorne</b>	Vice President Engineering and Operations
<b>Anthony S. Campagiorni</b>	Senior Vice President Customer Services & Gas Operations
<b>Sharon A. McGinnis</b>	Senior Vice President Human Resources & Safety
<b>Donna Kladis</b>	Chief Technology Officer
<b>Joe B. Koczko</b>	General Counsel
<b>Paul Colbert</b>	Associate General Counsel Regulatory Affairs
<b>Stacey A. Renner</b>	Vice President of Innovation and Sustainability

### **B. Gas Operations Organization**

<b>Jeff Doane</b>	Manager Customer Account Services
<b>Jeff May</b>	Manager Energy Resources
<b>Stacy Powers</b>	Director Costs, Rates & Forecasts
<b>Marvyn James</b>	Manager System Operations and Emergency Management
<b>Eric Kiszkiel</b>	Manager Gas Engineering and Operations
<b>Crystal Oakes</b>	Financial Controller
<b>Jerry Nappi</b>	Manager Public Relations

**Transportation and Retail Supplier Support**

Direct questions on the Company's Retail Access Program and billing to:

**Mr. Michael Bachan** (Associate Cost & Rate Analyst)

Telephone: 845-790-4898

Email: MBachan@cenhud.com

Direct questions on gas deliveries, nominations, and pipeline capacity to:

**Gassupplygroup@cenhud.com**

Direct questions on interruptible services and Service Class No. 11 to:

**Cost@cenhud.com**

**Customer Service:** 845-452-2700

**Emergency Gas Control:** 845-486-5600 or 5601 - 24-hour service

### **C. Territory**

Central Hudson provides gas service on both sides of the Hudson River starting 25 miles north of New York City and extending to 10 miles south of Albany. Central Hudson serves parts of Albany, Columbia, Dutchess, Greene, Orange, Putnam, Sullivan, and Ulster Counties.

- Territorial Map - available on the Company's web site
- Pipelines Serving Franchise Area :

Iroquois Gas Transmission System - Pleasant Valley Citygate

Columbia Gas Transmission Corp - Tuxedo Citygate

Algonquin Gas Transmission - Somers Citygate

Tennessee Gas Pipeline - Cedar Hill Citygate

Millennium Pipeline Company - Tuxedo Citygate

### **D. Service Classifications**

#### **Sales Services**

##### **Service Classification No. 1- Firm Residential Customers**

General Service for all residential customers.

Rates and charges are set forth in P.S.C. No. 12 – Gas, Service Classification No. 1.

##### **Service Classification No. 2 - Firm Commercial and Industrial Customers**

General Service for all customers except use exclusively in individual residences.

Rates and charges are set forth in P.S.C. No. 12 – Gas, Service Classification No. 2.

##### **Service Classification No. 8 - Interruptible Rate**

General Service for all customers with annual consumption less than 750,000 Ccf.

Transmission and Distribution Service for all customers with annual requirements greater than 750,000 Ccf and are located on a part of our system that does not have constraints.

Rates are set monthly.

### **Transportation Services**

#### **Service Classification No. 6 - Firm Transport Service - Commercial and Industrial Customers**

Annual requirements greater than 35,000 Ccf.

Available for firm transportation service by the Company of customer-owned gas, which the customer has arranged to have transported to a delivery point at the boundary of the Company's service area.

Rates and charges are set forth in P.S.C. No. 12 – Gas, Service Classification No. 6.

#### **Service Classification No. 12 - Firm Transport Service - Residential Customers**

Available to customers who would otherwise qualify for service under Service Classification No. 1, and who are party to a customer buying group which has the capability of consuming 50,000 Ccf or greater per year. This rate schedule allows for firm transportation service by the Company of customer-owned gas, which the customer buying group has arranged to have transported to a delivery point at the boundary of the Company's service area.

Rates and charges are set forth in P.S.C. No. 12 – Gas, Service Classification No. 12.

#### **Service Classification No. 13 - Firm Transport Service - Commercial and Industrial Customers**

This rate schedule is available to customers who would otherwise qualify for service under Service Classification No. 2, and are party to a customer buying group which has the capability of consuming 50,000 Ccf or greater per year. This rate schedule allows for firm transportation service by the Company of customer-owned gas, which the customer buying group has arranged to have transported to a delivery point at the boundary of the Company's service area.

Rates and charges are set forth in P.S.C. No. 12 – Gas, Service Classification No. 13.

#### **Service Classification No. 11 - Firm Transport Service Large Commercial and Industrial Customers**

Annual Requirements greater than 750,000 Ccf.

Firm transportation service of customer-owned gas which the customer has arranged to have transported to a delivery point at the boundary of the Company's service area.

**Distribution Large Mains (DLM) Service**

Annual requirements greater than 400,000 Mcf and service from Company facilities below transmission pressures and from mains at least 6 inches in diameter.

**Distribution Service**

All other service from Company facilities below transmission pressures.

**Transmission Service**

Service provided off the transmission system.

Rates and charges are set forth in P.S.C. No. 12 – Gas, Service Classification No. 11.

Service Classification No. 9 - Interruptible Transportation Service

Annual requirements greater than 35,000 Ccf or be party to an aggregated group.

General Service for all customers with annual consumption less than 750,000 Ccf.

Transmission and Distribution Service for all customers with annual requirements greater than 750,000 Ccf and are located on a part of CHG&E's system that does not have constraints.

Central Hudson's gas tariffs are available on the Company's website [www.CentralHudson.com](http://www.CentralHudson.com) and on the New York State Public Service Commission's website [www.dps.ny.gov](http://www.dps.ny.gov).

**E. Customer Breakdown**

December 31, 2020	Number of Customers	Annual Sales- Mcf
<b><u>Sales</u></b>		
Residential	63,602	4,877,269
Commercial	8,405	2,963,354
Industrial	204	201,596
West Point	1	588,878
Interruptible	7	21,680
<b><u>Transportation</u></b>		
Residential	8,673	431,936
Commercial	3,432	3,577,582
Industrial	83	335,885
WBS Sales to Marketers	Gas to serve transport customers	1,598,763
Interruptible	same sales customers	3,313,643

**III. BUSINESS RULES GENERIC TO AGGREGATION AND FIRM TRANSPORTATION  
CUSTOMERS**

New York State Retail Access Business Rules

Uniform Business Practices

PSC Case No. 98-M-1343

On January 22, 1999 the PSC issued the Order Adopting Uniform Business Practices (UBP) and Requiring Tariff Amendments in Case 98-M-1343 wherein the PSC approved the first set of uniform practices and procedures addressing retail access to be incorporated into each utility's tariff. Subsequently, in compliance with the PSC's December 19, 2003 Order in the same proceeding, the UBP was incorporated into each utility's electric and/or gas tariff in its entirety as an addendum. The UBP contains the detailed rules and practices governing credit requirements, customer relationships, invoicing and other significant program aspects relating to the relationship between distribution utilities and retail suppliers. The UBP, as it may be modified or superseded by the PSC, is incorporated in its entirety by reference in this Manual.

#### **IV. NOMINATING PROCEDURES**

##### **A. Nomination Procedures**

To nominate gas, the Retail Supplier notifies Central Hudson of the quantity of gas they are transporting to the Central Hudson system via CHG&E's web-based Gas Tracking System. Separate nominations are required for daily and monthly balanced customer pools. Nomination due dates are posted on the Company's Gas Transportation Calendar. The Calendar is available on the Company's website.

Mid-day nominations must be received by Central Hudson by 11:00 am. EST the day on which the nomination is to become effective.

All nominations and changes at Central Hudson's city gates are confirmed by Central Hudson with the upstream pipeline prior to gas flowing. Central Hudson may refuse the nomination if the Retail Supplier's nomination does not match the pipeline nomination, or if the nomination is in excess of the customers' maximum daily quantity (MDQ).

##### **B. NAESB Standards**

Transaction schedules and procedures upstream of the Company's Citygate are controlled by the FERC Regulations and NAESB Standards. The following table shows the current NAESB Daily Nomination Cycle.

**NAESB Nomination and Confirmation Timeline**

*All times are Central*

Nomination Cycle	Nomination Effective Time	Process	Deadlines
Timely	Next day at 9:00 AM (09:00)	Nominations Due: Confirmations Due: Scheduled Quantity:	1:00 PM 4:30 PM 5:00 PM
Evening	Next day at 9:00 AM (09:00)	Nominations Due: Confirmations Due: Scheduled Quantity:	6:00 PM 8:30 PM 9:00 PM
IntraDay1	2:00 PM (14:00)	Nominations Due: Confirmations Due: Scheduled Quantity:	10:00 AM 12:30 PM 1:00 PM
IntraDay2	6:00 PM (18:00)	Nominations Due: Confirmations Due: Scheduled Quantity:	2:30 PM 5:00 PM 5:30 PM
IntraDay3	10:00 PM (22:00)	Nominations Due: Confirmations Due: Scheduled Quantity:	7:00 PM 9:30 PM 10:00 PM

**C. Daily Delivery Quantity Procedures - Service Class 6, 12 or 13**

1. Prior to the beginning of the month Central Hudson will provide to the Retail Supplier (1) the Daily Contract Quantity Forecast (DCQ<sub>forecast</sub>), expressed in Ccf, for each customer taking service from the Retail Supplier, (2) the Aggregated Daily Contract Quantity Forecast (ADCQ<sub>forecast</sub>) expressed in dekatherms, equal to the sum of the DCQ<sub>forecast</sub> for all aggregation customers being served by the Retail Supplier multiplied by the factor of adjustment and converted from Ccf to Dth using the twelve month system average BTU conversion factor, (3) the Incremental Daily Contract Quantity (IDCQ) expressed in dekatherms, (4) the Total Contract Quantity (TCQ) expressed in dekatherms, representing the amount of pipeline capacity required to serve the peak day requirements of the Retail Supplier’s aggregated pool of customers. This information will be available by the date specified on Central Hudson’s Calendar of Natural Gas Transportation Scheduling. The Retail Supplier will notify Central Hudson within three (3) business days as to any corrections or changes to their list of

customers or the expected daily requirements of those customers. The Retail Supplier will provide a natural gas nomination to Central Hudson by the date specified on Central Hudson's Calendar of Natural Gas Transportation Scheduling. A copy of the calendar is available on the Company's website.

2. The Retail Supplier must deliver to Central Hudson on each day of the month, at predetermined interconnection points, the  $ADCQ_{\text{forecast}}$ . In the event of a period of peak weather conditions, or other system emergencies, Central Hudson may increase the volume of natural gas to be delivered, by the IDCQ, up to the TCQ. Alternatively, Central Hudson may also decrease the volume of natural gas to be delivered via a percentage decrement applied to the forecasted daily nomination requirement ( $ADCQ_{\text{forecast}} - \text{Daily WBS}$ ). Retail Suppliers will be given twenty-four (24) hour notice of the need to increase or decrease deliveries.
3. If a Retail Supplier declines to take assignment of the capacity held by the Company, the Company shall provide firm sales service to Retail Supplier's customers commencing on November 1 and the Retail Supplier shall be prohibited from serving such customers for a period of one year. In addition to any and all remedies the Company may have in law and/or equity, if a Retail Supplier fails to maintain firm, non-recallable, primary delivery point capacity, the Retail Supplier shall be liable to the Company for an amount equal to \$50 times the daily volume in dekatherms of the difference between the capacity released by the Company to the Retail Supplier and the actual firm, non-recallable, primary delivery point capacity maintained by the Retail Supplier under the Company's Retail Access Program.
4. Where upstream capacity is available for assignment, the Company will determine the specific upstream capacity to be released to the Retail Supplier and will release that capacity, in minimum increments of 1 dekatherm, at the Company's Weighted Average Cost of Capacity ("WACOC") in accordance with the Company's Gas Transportation Operating Procedures, and in accordance with the terms and conditions of the interstate pipeline's FERC gas tariff and the rules and regulations of the FERC. The Company will calculate a capacity release rate to be effective each April 1st for the 12 month period ending March 31<sup>st</sup> equal to the weighted average cost of capacity that the Company has contracted for under each pipeline's gas tariff filed with FERC and/or as negotiated with the pipeline, excluding capacity to deliver gas withdrawn from storage. However, the initial WACOC rate shall be calculated to become effective November 1, 2012. If in any month the actual WACOC should differ from the calculated WACOC by more than five percent (5%), the Company will recalculate the capacity

release rate applied to Retail Supplier capacity releases for the remainder of the 12-month period ending March 31, effective with the first day of the following month. The WACOC will be made available on the Company's Statement of Firm Gas Transportation Rates. The Retail Supplier shall be directly billed by the pipeline(s) for such capacity and will be responsible for paying the pipeline(s) for such charges. Once the capacity is released, Central Hudson is not responsible for any actions by the Retail Supplier. The capacity is resalable by the Retail Supplier subject to the provisions contained in the upstream pipeline rules and regulations, and is subject to recall by Central Hudson under the following conditions: (1) when required to preserve the integrity of the system, (2) the customer returns to Central Hudson as a core sales service customer, (3) the customer leaves the system or the meter is locked, or (4) the Retail Supplier serving the customer defaults on delivery obligations. A Retail Supplier will be considered to be in default when the predetermined delivery requirements have ceased for a forty-eight (48) hour period.

5. The capacity intended for release under the Company's Retail Access Program is set forth in the table below. The releases are made on a monthly basis beginning November 1 and continue for 12 months until October 31 and reflect adjustments for incremental customer migration. Any Retail Supplier beginning service prior to November 1 will be released capacity on a monthly basis until October 31.

**CENTRAL HUDSON GAS & ELECTRIC CORPORATION**  
**Capacity Available for Retail Program 04/1/2021**

Pipeline Path	Zone	Leg	DTH Volume	% of Total Available for Release
Tennessee Gas	0-5	100	5,644	24.1%
Tennessee Gas	1-5	800	3,386	14.5%
Tennessee Gas	1-5	500	7,096	30.3%
			<b>16,126</b>	
Tennessee Gas	0-4	100	34	
Tennessee Gas	1-4	800	394	

Tennessee Gas	1-4	500	311	
Tennessee Gas	1-4	500	1,479	
Columbia Gas			<u>2,175</u>	
			<b>2,175</b>	9.3%
Columbia Gulf			5,113	
Columbia Gas			<u>5,105</u>	
			<b>5,105</b>	21.8%
<b>Total Available for Retail Program</b>			<b>23,406</b>	100.0%

6. Central Hudson shall in no way be liable for any errors in the calculation of the customer’s delivery requirements, nor be responsible for any additional gas costs incurred by the Retail Supplier due to an error in the calculation of the delivery requirements.

**D. Company Holidays**

- New Year’s Day
- President’s Day
- Good Friday
- Memorial Day
- Independence Day
- Labor Day
- Thanksgiving Day and the day after
- Christmas Eve and Christmas Day

Note: For any holiday that falls on a weekend the weekday that falls closest to the holiday will be considered to be the holiday.

**V. TRANSPORTATION SERVICES**

**A. Firm and Aggregated Transportation (Service Class Nos. 6, 12 and 13)**

**Eligibility**

To be eligible for service under the Company’s Retail Access Program for firm “core” gas transportation service,:

- 1. customers who would otherwise qualify for service under Service Classification No. 1 - Residence, must be party to a customer buying group that has the capability of consuming

50,000 Ccf or greater per year. These customers will operate under the terms of Service Classification No. 12; or,

2. customers who would otherwise qualify for service under Service Classification No. 2 - Commercial and Industrial and have annual requirements less than 35,000 Ccf, must be a party to a customer buying group that has the capability of consuming 50,000 Ccf or greater per year. These customers will operate under the terms of Service Classification No. 13. Customers who qualify for service under Service Classification No. 2 and whose annual consumption is greater than 35,000 Ccf will operate under the terms of Service Classification No. 6; and,
3. customers must assist and allow the collection of data and information necessary to evaluate the program; and,
4. customers must agree to subscribe to the services of only one Retail Supplier at a time per meter.

### **Customer Enrollment**

1. Customers interested in the program may contact Central Hudson and request a listing of the eligible Retail Suppliers published by the Company;  
  
Customers may call 845-452-2700 or 1-800-527-2714. This information is also available on the Company's website **[www.CentralHudson.com](http://www.CentralHudson.com)**
2. The customer may contact any eligible Retail Supplier directly and request a statement of the Retail Supplier's terms and conditions that detail the customer's rights, responsibilities, and expected costs;
3. The customer may contract with the Retail Supplier by telephone or in writing, by providing the Supplier with the customer's Central Hudson account number(s) as well as the Point of Delivery ID and other information required by the Supplier;
4. Customers may be served by only one Retail Supplier per meter;

5. A customer whose annual consumption is greater than 35,000 Ccf may act as his own Retail Supplier (Direct Customer) to obtain natural gas supplies from third party suppliers and to have those supplies delivered to the appropriate interconnection points on Central Hudson’s system subject to the applicable terms and conditions of Central Hudson’s Retail Access Program.
  
6. Retail Suppliers must transact all enrollments, drops, changes and reinstatements (switches) using the prescribed electronic data interchange (EDI) transactions. Retail Suppliers must have a customer group with annual usage in excess of 50,000 Ccf to participate in the program.

**B. Winter Bundled Sales (WBS) Service**

Retail Suppliers will be provided with storage space demand determinants for each customer in their pool. The aggregated total of the storage space for all customers in a Retail Supplier’s pool, measured in dekatherms, will be called the Winter Bundled Sales Volume (WBSV). The Retail Supplier is required to purchase the WBSV from the Company during the period November – March (winter period) in accordance with the provisions set forth below.

During the winter period, the ADCQ for each Retail Supplier will be reduced by a monthly allocation of WBSV based on the schedule set forth below:

<u>Month</u>	<u>Amount Delivered</u> <u>As a % of WBSV</u>
November	10%
December	20
January	25
February	25
March	20

The WBS gas delivered by the Company to a Retail Supplier’s customers shall be defined as WBSV divided by the factor of adjustment, and will be considered the first gas through the meter each day of the winter period.

The Retail Supplier shall purchase the WBSV at a price, to be published on the Company’s website during the period November – March of each year and in the Statement of Firm Gas

Transportation Rates on a one month lag during the period –December - April of each year, using the methodology described below:

- (a) The commodity component of the WBS price, which will be revised each month, shall reflect the Company’s actual weighted average cost of storage (“WACOS”) for the preceding month.
- (b) The above commodity cost will be adjusted to include storage charges, firm transportation charges, including fuel, from Canadian and US Index points (50% “Dawn Ontario” and 50% “Dominion Transmission Inc. – Appalachia”) to the Company’s market area storage, and from the market area storage to the Company’s city gates, and carrying charges on the cost of gas in storage.

### **C. Weather Normalization Adjustment**

A Weather Normalization Adjustment, as defined in the Tariff General Information, Section 27, shall be effective for all Service Classification Nos. 1, 2, 6, 12 and 13 heating customers and shall be applied to total gas usage during the period October 1 through May 31 of each year.

The Weather Normalization Adjustment shall be included in the Statement of Firm Gas Transportation Rates during the period October – May of each year.

### **D. Supply Balancing and Settlement**

#### **1. Daily**

The Retail Supplier must deliver to Central Hudson on each day of the month, at predetermined interconnection points, the  $ADCQ_{forecast}$ , plus any applicable IDCQ and minus any applicable decremental volumes. Deliveries in excess of one hundred two (102) percent of the  $ADCQ_{forecast}$ , plus any applicable IDCQ and minus any applicable decremental volumes, will be purchased by Central Hudson at the weighted average of the Midpoint rate of Tennessee Zone 4 300 Leg, Millennium East, Iroquois Zone 2, and Algonquin City gates as published in Platt’s Gas Daily in the table “Daily Price Survey” under the Citygate heading, plus the Company’s weighted average cost of transportation and fuel losses. The summer and winter weightings of the Midpoint rates effective 10/1/22 are listed below:

	<u>Tennessee Zone 4 300 leg pricing</u>	<u>Algonquin Citygate pricing</u>	<u>Millennium East pricing</u>	<u>Iroquois Zone 2 pricing</u>	<b>Total</b>
<b>Winter (November through March):</b>					
Weighting based on '21-'22 Winter	10%	20%	30%	40%	100%
<b>Summer (April through October):</b>					
Weighting based on 2021 Summer	5%	0%	95%	0%	100%

In the event that the daily deliveries are less than ninety eight (98) percent of the ADCQ<sub>forecast</sub>, plus any applicable IDCQ and minus any applicable decremental volumes, the Retail Supplier will purchase from Central Hudson the incremental gas required to increase the deliveries to 98 percent of the ADCQ<sub>forecast</sub>, plus any applicable IDCQ and minus any applicable decremental volumes, at a weighted average of the Midpoint rate of Tennessee Zone 4 300 Leg, Millennium East, Iroquois Zone 2, and Algonquin City gates as published in Platt's Gas Daily in the table "Daily Price Survey" under the Citygate heading plus the Company's weighted average cost of transportation and fuel losses plus a charge of ten (\$10) dollars per dekatherm. The summer and winter weightings of the Midpoint rates effective 10/1/22 are listed below:

	<u>Tennessee Zone 4 300 leg pricing</u>	<u>Algonquin Citygate pricing</u>	<u>Millennium East pricing</u>	<u>Iroquois Zone 2 pricing</u>	<b>Total</b>
<b>Winter (November through March):</b>					
Weighting based on '21-'22 Winter	10%	20%	30%	40%	100%
<b>Summer (April through October):</b>					
Weighting based on 2021 Summer	5%	0%	95%	0%	100%

In the event that the under-delivery occurs during a period in which Central Hudson has issued an operational flow order, the Retail Supplier will purchase from Central Hudson the incremental gas required to increase the deliveries to 98 percent of the daily  $ADCQ_{forecast}$ , plus any applicable IDCQ, at a weighted average of the Midpoint rate of Tennessee Zone 4 300 Leg, Millennium East, Iroquois Zone 2, and Algonquin City gates as posted in Platt’s Gas Daily, for the applicable day, plus the Company’s weighted average cost of transportation and fuel losses, plus a charge of twenty-five (\$25) dollars per dekatherm.

2. Monthly Cash Out

Within 15 days after the end of the month, the Company will estimate customer consumption using actual degree days as measured at the Dutchess County Airport and the same heat and non-heat factors that were used to provide the  $ADCQ_{forecast}$  to arrive at an estimate of the amount of gas consumed by the aggregated group of customers each month. This calculated value will be multiplied by the factor of adjustment and converted from Ccf to Dth using the 12 month system average BTU conversion factor and will be called the Aggregated Monthly Contract Quantity ( $AMCQ_{actual}$ ). The monthly cash out quantity for each Retail Supplier’s pool will then be equal to the difference between the  $AMCQ_{forecast}$ , plus any applicable IDCQ, minus the  $AMCQ_{actual}$ . Any resulting difference will be cashed out at the following index prices:

The monthly cash out prices will be as follows:

For both over and under deliveries the Index Price used to determine the applicable rate shall be equal to the monthly average of a weighted average of the Midpoint rate of Tennessee Zone 4 300 Leg, Millennium East, Iroquois Zone 2, and Algonquin City gates as published in Platt’s Gas Daily in the table “Daily Price Survey” under the Citygate heading, plus the Company’s weighted average cost of transportation and fuel losses. The summer and winter weightings of the Midpoint rates effective 10/1/22 are listed below:

<u>Tennessee Zone 4 300 leg pricing</u>	<u>Algonquin Citygate pricing</u>	<u>Millennium East pricing</u>	<u>Iroquois Zone 2 pricing</u>	<b>Total</b>
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**Winter (November through March):**

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Weighting based on '21-'22 Winter	10%	20%	30%	40%	100%
<b>Summer (April through October):</b>					
Weighting based on 2021 Summer	5%	0%	95%	0%	100%

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3. Single Cash Out Process

A revised cash-out process for the Retail Access program has been implemented effective April 2017, to cash-out, in any given month, those accounts with valid meter readings during the month.

At the end of the period, the Company will determine the over- or under-delivery, or net imbalance, for each Retail Supplier based on the Retail Supplier's customers' actual billed usage for the period. The sum of each Retail Supplier's customers' consumption will be multiplied by the factor of adjustment, converted from Ccf to Dth and compared to the Retail Supplier's total pool deliveries, inclusive of confirmed nominations, any daily and monthly imbalances, if applicable, and any WBSV. The Company will release this imbalance determination, and supporting detail, twenty-one (21) days after the end of each period.

Any resulting difference will be cashed out at the index prices shown above.

**E. Interruptible Transportation Service - Service Classification No. 9**

**Eligibility**

To be eligible for service under the Company's Service Class No. 9 interruptible transportation service the customer must have the capability of transporting and consuming at one service point 35,000 Ccf or greater per year or be party to a customer buying group having the capability of transporting and consuming 50,000 Ccf or greater per year;

1. The customer agrees to take service on a fully interruptible basis;

2. The customer provides and maintains necessary standby facilities together with a sufficient supply of fuel to operate continuously during periods when gas supply is interrupted;
3. Human needs customers and customers relying on distillate fuel as their alternate fuel must maintain standby facilities and a fuel reserve that will support ten (10) days of the customer's energy requirements and have arranged for fuel deliveries during curtailments that are longer than ten (10) days. The customer's alternate fuel reserve inventory must be in place on or before November 1. Customers with storage facilities that cannot maintain the required fuel reserves must provide documentation confirming that they have arranged to have fuel deliveries during curtailment periods. Alternatively, customers excluding schools and human needs customers may elect to attest to their intent to curtail their operation during periods of interruption rather than be subject to these alternate fuel requirements by providing an affidavit in writing at least thirty (30) days prior to November 1 of each year. Curtailment of a customer's operation shall be defined to mean that zero gas consumption is recorded on the customer's meter for the applicable interruption period. The customer must accomplish this zero-gas consumption for the duration of the interruption period by curtailing the operation of its facility rather than switching to its alternative fuel source. Customers failing to comply completely with an interruption request will be subject to the charges described in Special Provision 9.9 of this service classification as well as the Company's actual cost to manually shut off gas to the customer in the event the customer does not cease operations;
4. The service hereunder is not used in any equipment which is supplied with gas service under any other Service Classification except for S.C. No. 8;
5. The customer's premises are (a) located adjacent to the Company's existing gas mains having adequate capacity to supply customer's prospective requirements in addition to the simultaneous requirements of present or prospective customers taking firm or interruptible service from such mains, or (b) at other points under arrangements made in accordance with General Information, Section 25 of the Company's tariff;
6. The customer has entered into a transportation agreement with Central Hudson. Copies of the agreement are included in the Forms Section of this manual and are also included in General Information Section 35 of the Company's tariff;

7. The customer agrees to discontinue or curtail the use of gas service, at any time, at the Company's option on not less than two hours' notice to the customer;
8. The customer agrees to notify the Company, within 24 hours, in the event the customer discontinues service provided under this Service Classification;
9. All customers opting to commence service under this service classification on and after September 1, 2004 are required to have automated meter recording equipment furnished and installed by the Company at the customer's expense. The customer agrees to prepay to the Company the cost of the automated meter recording equipment. In addition, the customer shall furnish an electrical supply and a phone line necessary for the operation of the equipment, in an area which is acceptable to the Company.
10. Effective March 1, 2006, all customers taking service under this service classification prior to September 1, 2004 are required to have automated meter recording equipment furnished and installed by the Company at the Company's expense. In addition, the customer shall furnish an electrical supply and a phone line necessary for the operation of the equipment, in an area which is acceptable to the Company, and;
11. Customers found to be operating under this tariff without meeting the requirements of this tariff will be required to take service under Service Classification No. 2 for a period of not less than one year. If after the one-year period, the Customer is able to meet the requirements of this tariff they will be given the option of returning to interruptible service.

### **Character of Service**

Transportation service of interruptible customer-owned gas for which the customer has arranged to have transported to a delivery point at the boundary of the Company's service area. The Company shall control the dispatch of such gas, and dispatch shall be provided as requested by the customer, conditioned on the availability of the Company's system capacity.

### **Monthly Rate**

The monthly rate billed to customers under this Service Classification will be comprised of two components: (1) a Transportation Rate and (2) a Balancing Service Charge, all as defined below.

Rates and charges are set forth in P.S.C. No. 12 – Gas, Service Classification No. 9 – Interruptible Transportation.

1. Transportation Rate

Customer's transportation rates will be determined on the following basis:

Category 1- No. 6 Oil, 1.5% Sulfur Content or Higher

Category 2- No. 6 Oil, Less than 1.5% Sulfur Content and No. 4 Oil

Category 3- All others

A. Monthly Rate Option

The rate per 100 cu. ft. shall be established for each interruptible customer category, at the Company's discretion, and shall be applied to all gas transported under each interruptible category.

The rate shall not be less than \$.010 per 100 cu. ft. or more than the firm transportation rate applicable to customers under Service Classification No. 6. This rate will be determined on the date described in Special Provision Section 9.1 on the Company's tariff.

For customers eligible for S.C. No. 11, the rate shall not be greater than the transportation rate capped at the applicable S.C. No. 11 rate, as established in Opinion 96-28 in Case 95-G-1034. The annual S.C. No. 11 transportation rate cap shall be determined each January based on customer load data from the previous calendar year. The rate cap will become effective in February and shall remain in effect for the following twelve (12) months.

B. Seasonal Rate Option

Seasonal transportation rates will be determined in April and October of each year. The rate per 100 cu. ft. established in April for each interruptible customer category will remain in effect from May 1 through October 31. The rate per 100 cu. ft. established in October for each

interruptible customer category will remain in effect from November 1 through April 30. Customers operating under the interruptible transportation seasonal rate option will not be eligible for service under Service Classification No. 8 during the term of their interruptible transportation service agreement. Service agreement terms will correspond to the seasonal rate periods.

2. Balancing Service Charge

The Balancing Service Charge, as described in General Information Section 43 of the Company's tariff, shall apply to all gas consumed by a customer under this Service Classification and shall be billed to the customer.

Customers taking service under this Service Classification will be required to make a semi-annual election to have their gas deliveries and usage balanced on a daily or monthly basis according to the terms of this Service Classification for the following balancing periods:

November 1 - April 30, inclusive

May 1 - October 31, inclusive

Existing customers will be required to notify the Company in writing, of their selected balancing option for an applicable balancing period on or before the date indicated on the Company's Calendar of Gas Transportation Schedule utilizing Attachment A to the service agreement included in General Information Section 35 or 36 of the Company's tariff, as appropriate.

Absent timely receipt by the Company of notification of a customer's selected balancing option, the customer will be placed on monthly balancing by default.

A customer taking service under this Service Classification will maintain its balancing option for the full duration of the balancing period regardless of whether the customer switches Retail Suppliers, or switches to service under another service classification or its alternate fuel and subsequently returns to service under this Service Classification.

### **BALANCING: Charges for Over- and Under-Deliveries**

All charges resulting from over- or under- deliveries will be billed to a customer's Retail Supplier pursuant to the rates and terms contained herein. If for any reason a Retail Supplier does not pay the charges resulting from over-or under-deliveries however, the Company retains the right to bill the customer for such charges.

Retail Suppliers must have the authority to act as the customer's agent and attorney-in-fact for the purpose of scheduling, balancing and settlement. Retail Suppliers must have signed and delivered a Supplier Operating Agreement Applicable to Interruptible and/or Firm Transport, as included in the Forms Section of this manual.

Retail Suppliers shall undertake all reasonable efforts to provide the Company with accurate nominations of the customer-owned gas and to balance nominations and deliveries. Any penalty amount paid by the Retail Supplier shall not be construed as giving the Retail Supplier the right to continue to under or over deliver gas.

#### A. Daily Balancing

If the amount of gas delivered to the Company for a customer, less any adjustment determined in accordance with Special Provision 9.4 of the Company's tariff, varies from the amount of gas used by the customer on a daily basis, the customer will have an over-delivery or an under-delivery.

##### 1. Over-deliveries - Daily

If on any day a customer's over-delivery is greater than 10% of a customer's actual usage, and the combined over- or under-delivery for all Service Classification Nos. 9 and 11 daily balanced customers is greater than 10%, the over-delivered volumes in excess of 10% will be purchased by the Company at the rates set forth below. The Index Price used to determine the applicable rate shall be equal to a weighted average of the Midpoint rate of Tennessee Zone 4 300 Leg, Millennium East, Iroquois Zone 2, and Algonquin City gates as published in Platt's Gas Daily in the table "Daily Price Survey" under the Citygate heading, plus the Company's weighted average cost of transportation and fuel losses. The summer and winter weightings of the Midpoint rates effective 10/1/22 are listed below:

	<u>Tennessee Zone 4 300 leg pricing</u>	<u>Algonquin Citygate pricing</u>	<u>Millennium East pricing</u>	<u>Iroquois Zone 2 pricing</u>	<b>Total</b>
<b>Winter (November through March):</b>					
Weighting based on '21-'22 Winter	10%	20%	30%	40%	100%
<b>Summer (April through October):</b>					
Weighting based on 2021 Summer	5%	0%	95%	0%	100%

For Over-Deliveries	Rate
> 10% up to and including 15%	90% of Index Price
> 15% up to and including 20%	85% of Index Price
> 20% - Winter	60% of Index Price
> 20% - Summer	70% of Index Price

2. Under-deliveries - Daily

If on any day a customer's under-delivery is greater than 10% of a customer's actual usage, and the combined over- or under-delivery for all Service Classification Nos. 9 and 11 daily balanced customers is greater than 10%, the under-delivered volumes in excess of 10% will be sold to the customer by the Company at the rates set forth below. The Index Price used to determine the applicable rate shall be equal to a weighted average of the Midpoint rate of Tennessee Zone 4 300 Leg, Millennium East, Iroquois Zone 2, and Algonquin City gates as published in Platt's Gas Daily in the table "Daily Price Survey" under the Citygate heading, plus the Company's weighted average cost of transportation and fuel losses. The summer and winter weightings of the Midpoint rates effective 10/1/22 are listed below:

	<u>Tennessee Zone 4 300 leg pricing</u>	<u>Algonquin Citygate pricing</u>	<u>Millennium East pricing</u>	<u>Iroquois Zone 2 pricing</u>	<b>Total</b>
<b>Winter (November through March):</b>					
Weighting based on '21-'22 Winter	10%	20%	30%	40%	100%
<b>Summer (April through October):</b>					
Weighting based on 2021 Summer	5%	0%	95%	0%	100%

For Under-deliveries	Rate
> 10% up to and including 15%	110% of Index Price
> 15% up to and including 20%	115% of Index Price
> 20% - Winter	140% of Index Price
> 20% - Summer	130% of Index Price

3. Month End Cash Out

At the end of the month, a customer’s cumulative over- or under-deliveries, net of any activity resulting from the daily balancing provisions described above, will be summed into a net imbalance.

(a) Exchange of Net Imbalances

A customer or its Retail Supplier may exchange a month-end imbalance with another Service Classification No. 9 or 11 customer or its Retail Supplier. Imbalance position and contact information for each Retail Supplier will be available after the end of the month on the Company’s Gas Tracking System. Such exchanges of imbalances shall be accomplished upon notification to the Company of the exchange by the applicable customer, or its designated Retail Supplier, prior to the imbalance resolution due date as shown on the Company’s Calendar of Gas Transportation Scheduling. The net effect of all imbalance exchanges must improve a customer’s or its designated Retail Supplier’s, relative imbalance position. In no

event will the company process exchanges that result in a larger negative position for the customer, or its designated supplier.

(b) Cash Out

Any net imbalances which are not resolved through exchange will be cashed out according to the following terms and pricing:

November - March	Over-Deliveries	Under-Deliveries
0% to 5%	Index	Index
5% to 10%	90% of Index	110% of Index
>10%	80% of Index	120% of Index

All Other Months	Over-Deliveries	Under-Deliveries
0% to 10%	Index	Index
>10%	80% of Index	120% of Index

The over-delivery Index Price used to determine the applicable rate shall be equal to a weighted average of the Midpoint rate of Tennessee Zone 4 300 Leg, Millennium East, Iroquois Zone 2, and Algonquin City gates as published in Platt’s Gas Daily in the table “Daily Price Survey” under the Citygate heading, plus the Company’s weighted average cost of transportation and fuel losses. The summer and winter weightings of the Midpoint rates effective 10/1/22 are listed below:

	<u>Tennessee</u> <u>Zone 4 300</u> <u>leg pricing</u>	<u>Algonquin</u> <u>Citygate</u> <u>pricing</u>	<u>Millennium</u> <u>East pricing</u>	<u>Iroquois</u> <u>Zone 2</u> <u>pricing</u>	Total
<b>Winter (November through March):</b>					
Weighting based on '21-'22 Winter	10%	20%	30%	40%	100%
<b>Summer (April through October):</b>					
Weighting based on 2021 Summer	5%	0%	95%	0%	100%

The under-delivery Index Price used to determine the applicable rate shall be equal to a weighted average of the Midpoint rate of Tennessee Zone 4 300 Leg, Millennium East, Iroquois Zone 2, and Algonquin City gates as published in Platt’s Gas Daily in the table “Daily Price Survey” under the Citygate heading, plus the Company’s weighted average cost of transportation and fuel losses. The summer and winter weightings of the Midpoint rates effective 10/1/22 are listed below:

	<u>Tennessee Zone 4 300 leg pricing</u>	<u>Algonquin Citygate pricing</u>	<u>Millennium East pricing</u>	<u>Iroquois Zone 2 pricing</u>	<b>Total</b>
<b>Winter (November through March):</b>					
Weighting based on '21-'22 Winter	10%	20%	30%	40%	100%
<b>Summer (April through October):</b>					
Weighting based on 2021 Summer	5%	0%	95%	0%	100%

B. Monthly Balancing

Both the over and under-delivery index price used to determine the applicable rates shall be equal to the monthly average of the daily “Midpoint” rate of the lower of “a weighted average of the Midpoint rate of Tennessee Zone 4 300 Leg, Millennium East, Iroquois Zone 2, and Algonquin City gates as published in Platt’s Gas Daily in the table “Daily Price Survey” under the Citygate heading, plus the Company’s weighted average cost of transportation and fuel losses. The summer and winter weightings of the Midpoint rates effective 10/1/22 are listed below:

	<u>Tennessee Zone 4 300 leg pricing</u>	<u>Algonquin Citygate pricing</u>	<u>Millennium East pricing</u>	<u>Iroquois Zone 2 pricing</u>	<b>Total</b>
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**Winter (November through March):**

Weighting based on '21-'22 Winter	10%	20%	30%	40%	100%
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**Summer (April through October):**

Weighting based on 2021 Summer	5%	0%	95%	0%	100%
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If the amount of gas delivered to the Company for a customer, less any adjustment determined in accordance with Special Provision 9.4 of the Company’s tariff, varies from the amount of gas used by the customer for a given month, the customer will have an over-delivery or an under-delivery. Any such over- or under-delivery will be cashed out according to the terms and pricing contained in A. 3., Month End Cash Out, of this section.

**Minimum Charge**

The Customer Charge – As set forth in P.S.C. No. 12 – Gas, Service Classification No. 9.

**Increase in Rates and Charges**

The rates and charges under this Service Classification are increased to reflect the tax rates applicable within the municipality where the customer takes service. Current tax tables are available on the PSC website.

**Operating Procedures**

1. The Company shall determine the rate per 100 cu. ft. to be charged for the next calendar month under this Service Classification on or before the date shown on the Company's Calendar of Gas Transportation Scheduling. The rates will be available on the Company’s website.
  
2. The customer shall reimburse the Company within ten days of receipt of a statement, for any additional fees, taxes or other charges billed directly to the Company for services

regarding transportation of customer-owned gas to the boundary of the Company's service territory.

3. Customers switching to or from their alternate fuel shall provide the Company with written notification (email notification shall be acceptable) at least one business day prior to such switch.
4. The customer shall provide the Company gas supplies to compensate the Company for system line losses. The volume of gas associated with system line losses shall be calculated by applying the Company's Factor of Adjustment to the volume of gas delivered to the Company on behalf of the customer.
5. Customers can be served by only one Retail Supplier during the month. Customers will not be allowed to change Retail Suppliers after the initial monthly nomination form is received by the Company. For customers operating within a buying group the customer must comply with the Company's switching requirements.
6. The Company is under no obligation to accept deliveries on behalf of a customer in excess of the maximum daily quantities included in the customer's service agreement.
7. In the event that the Company must interrupt deliveries of customer-owned gas supplies which have been delivered to the Company on behalf of the customer, the Company will not impose any imbalance penalties associated with that gas supply.
8. Landlords of industrial and commercial properties, which do not have residential tenants, may file a petition and application to the New York State Public Service Commission requesting permission to submeter gas usage to their tenants. Such petitions and application must address the following four areas of major concern regarding the request to submeter: (1) safety (2) rate impact for the ultimate consumer (3) non-rate consumer protection issues, and (4) service provider and utility matters. The petition and application must also provide that the conditions proffered will be reiterated in leases with the sub metered tenants. Copies of such petitions and application must be served on the Company and the petitioner's tenants.

9. If the Company curtails service and the Customer is not able to meet requirements of the curtailment, the Company will charge the Customer a curtailment charge for all gas consumed by the Customer until the Customer is able to meet the requirements of a curtailment. The curtailment penalty charge for gas consumed will be \$2.50 per Ccf plus the highest price of the natural gas purchased by Central Hudson during the curtailment. A Customer that is not able to meet the requirements of a curtailment will also be subject to the following:
  - a) One unannounced curtailment test at the end of January, provided however that such test shall be waived if scheduled to occur within five days of an actual curtailment wherein the Customers was able to meet the requirements of such curtailment;
  - b) Provision of an affidavit in writing attesting to compliance with the Company's tariff; Customers electing to cease using natural gas when directing to by the Company in lieu of maintaining an alternate fuel inventory are excluded from the provision; and,
  - c) Provision of the Customer's alternate fuel supplier contact information in the aforementioned affidavit.
  
10. If a customer fails to meet the alternate fuel reserve requirement, the Company will charge the customer the greater of 130% of the market price of the customer's alternate fuel or 110% of the applicable tariff rate for natural gas service for all gas consumed until the customer is able to meet the alternate fuel reserve requirement. The daily alternate fuel market price will be the New York spot \$/MMBtu price of the customer's alternate fuel as published in Platt's Gas Daily in the table "Platt's oil prices" for the day prior to the noncompliance. If the customer's alternate fuel is No. 4 or No. 6 oil, the applicable alternate fuel price will be "1% Resid HP". The curtailment charge is effective for the billing period during which the noncompliance becomes known and for any subsequent periods during which noncompliance continues.
  
11. Prior to November 15 of each year, the Company will institute an annual system curtailment. Customers will be notified by registered mail that the Company will be conducting a system curtailment. The notification letter will also request information concerning the Customer's alternate fuel supply and arrangements for deliveries during actual curtailment periods and will request verification and/or update of customer

contact information. Customers must reply to the request for information within thirty (30) days of receipt. Failure to reply will subject the Customer to the Company's curtailment charge. In addition, if for any reason the Customer is not able to curtail usage during the annual system curtailment, the Customer will be subject to the Company's curtailment charge, as described above, for all gas consumed by the Customer until the Customer is able to meet the requirements of a curtailment.

12. If the Customer experiences unanticipated problems when attempting to curtail usage during either an actual curtailment, the annual announced system curtailment or an unannounced curtailment test, the Company, at its sole discretion, may waive the curtailment charge for a period up to four (4) hours as a result of equipment failure as long as the Customer provides the Company with supporting documentation. Penalties will not be waived for Customers that fail to meet the minimum fuel requirements.
13. In the event the Company issues an Operational Flow Order (OFO), the following requirements will remain in effect for the duration of the OFO:
  - a) Gas delivered to Central Hudson's system, less any adjustment determined in accordance with Special Provision 9.4 of the Company's tariff, for a daily balanced customer will be required to be within two percent (2%) of the customer's daily usage, and
  - b) The daily cashout tiering provisions will be revised such that the first tier will apply to daily over- and under-deliveries greater than 2% up to and including 15%, and
  - c) The Company will not issue an OFO simultaneously for under deliveries and over deliveries.
14. Effective January 1, 2017, the Company will implement daily communication with each specific customer facility locations agreed upon by the customer and the Company, as soon as weather forecasts project outside temperatures to be 15 degrees or below for the upcoming three consecutive days or during times when three days of consecutive customer curtailments occur. Additionally, the Company will contact each specific customer facility location at the end of every curtailment to remind Customers to replenish alternate fuel inventories as needed to maintain minimum levels.

15. The Company may negotiate, with customers that exhibit the ability to consume at least 400,000 Mcf on an annual basis at one service point, terms and prices that differ from the foregoing base tariff provisions to reflect operational flexibilities. The terms and conditions of such agreements shall be filed with the New York State Public Service Commission as tariff addenda. The Company may not negotiate terms and prices with any of its affiliates.
16. Bills are due when personally served or three days after mailing. Bills shall be subject to a late payment charge if payment is not made by the date specified on the bill which date shall be not less than 20 days from the due date.
17. The term of service will be as defined within the written transportation service agreement.

### **Nomination Procedures**

To nominate gas, the Retail Supplier notifies Central Hudson of the quantity of gas they are transporting to the Central Hudson system via CHG&E's web-based Gas Tracking System. Separate nominations are required for daily and monthly balanced customer pools. Nomination due dates are posted on the Company's Gas Transportation Calendar. The Calendar is available on the Company's website.

Mid-day nominations must be received by Central Hudson by 11:00 am. EST the day on which the nomination is to become effective.

All nominations and changes at Central Hudson's city gates are confirmed by Central Hudson with the upstream pipeline prior to gas flowing. Central Hudson may refuse the nomination if the Retail Supplier's nomination does not match the pipeline nomination, or if the nomination is in excess of the customer's maximum daily quantity (MDQ).

### **Curtailment Procedures**

The Company shall only implement a curtailment as a last resort. Economic considerations shall not be the basis for a curtailment. Mutual aid, contractual and other non-curtailment supply management tools, Operational Flow Orders, interruption of contractually-interruptible load,

and supply acquisition shall be utilized before the Company declares a curtailment. As circumstances permit, the Company shall initially seek voluntary curtailments to alleviate an emergency situation. In the event of a force majeure, loss of capacity on the Company's system or a loss of upstream gas supply(s) and/or loss of upstream interstate pipeline capacity, the Company shall initiate the following curtailment procedures. Curtailments shall be limited in scope and duration as necessary to alleviate an emergency and shall be localized to the extent possible. Customers who are unable to secure customer-owned gas supplies and are unable to switch to their alternate fuel will be switched to the Company's Service Classification No. 2 service.

A. Order of Curtailment

1. ELECTRIC GENERATION. NOTE: If in the sole judgment of the Company a need for the electric generation exists, the Company would endeavor to maintain adequate gas supply to the electric generation facilities.
2. Interruptible transport (S.C. No. 9) and firm transport (S.C. No. 11) without customer-owned supplies.
3. Interruptible service requirements (S.C. No. 8).  
  
Category 1 - No. 6 Oil, 1.5% Sulfur Content or Higher  
Category 2 - No. 6 Oil, Less than 1.5% Sulfur Content and No. 4 Oil  
Category 3 - All Others
4. Requirements of the Company's general office and of customers with installed dual-fuel capability.
5. Firm industrial and commercial requirements for boiler fuel for space heating, air conditioning, electric generation and other non-process purposes where the total annual requirements are 100,000 Ccf. or greater.
6. Firm industrial and commercial requirements for boiler fuel for space heating, air conditioning, electric generation and other non-process purposes where the total annual requirements are between 12,000 Ccf. and 99,999 Ccf., inclusive.

7. Firm industrial and commercial requirements for processes for which there are technically feasible alternate fuels and for space heating (other than boiler fuel) where the total annual requirements are 100,000 Ccf. or greater.
8. Firm industrial and commercial requirements for processes for which there are technically feasible alternate fuels and for space heating (other than boiler fuel) where the total annual requirements are between 12,000 Ccf. and 99,999 Ccf., inclusive.
9. Process and feedstock requirements for which there are no technically feasible alternate fuels where the total annual requirements are 12,000 Ccf. or greater.
10. Plant protection requirements for customers curtailed in Priorities 5 through 9 above.
11. Firm industrial and commercial requirements where the total annual requirements are less than 12,000 Ccf.
12. Interruptible transport (S.C. No. 9) and firm transport (S.C. No. 11) with customer-owned supplies.
13. Firm residential requirements including the requirements of apartment houses, prisons, dormitories, nursing homes, hospitals and residential hotels.

B. Method of Curtailment

1. Curtailment will proceed through the priorities starting with Priority 1, and will require curtailment of consumption by the affected customer after not less than two hours notice by telephone or otherwise. The Company will notify customers when curtailment of consumption is no longer required.
2. Curtailment within each priority shall be made on a pro rata basis except that curtailment of firm residential requirements will be by individual customers in descending order based on volume of gas used.

3. When necessary to meet high-priority customer demand, Central Hudson will acquire gas intended for lower priority customers at the citygate. Retail suppliers/direct customers whose gas is diverted by Central Hudson will be required to continue making nominations of gas throughout the curtailment period up to their maximum delivery obligation as directed by Central Hudson, unless qualified upstream force majeure interruptions or curtailments prevent retail suppliers/direct customers from securing or delivery of such supplies. During a curtailment period, Central Hudson shall make all reasonable efforts to inform non-responding retail suppliers/direct customers that required actions are not being taken. Lack of such notice shall not relieve any retail supplier/direct customer of its obligations.
4. The Company reserves the right to curtail services outside the order listed in order to protect the efficient operation of the system.
5. Failure of the Company to adhere to one or more of the curtailment criteria is not a basis for Retail Suppliers or Direct Customers not to comply with requirements of the curtailment, but may provide the basis for a complaint to the Commission regarding the Company's behavior.

C. Notification of Curtailment

1. The Company will notify the Director of the Office of Electric, Gas and Water of the New York State Department of Public Service and representatives of the New York State Energy Research and Development Authority and Empire State Petroleum Association when a curtailment is declared and when the situation returns to normal.
2. Notification will be provided to the Retail Supplier and curtailed customers periodically during the curtailment period.

D. Compensation

1. If a non-core customer (S.C. No. 8 or 9) has been directed to curtail consumption, by telephone or otherwise, and refuses to comply with the directed reductions, the

customer may be subject to an additional charge of \$2.50 per Ccf of unauthorized usage.

2. In the event it is necessary to divert gas from non-core customers (S.C. No. 8 or 9) to supply the needs of core customers (S.C. Nos. 1, 2, 6, 11, 12, 13, 15 and 16), compensation to non-core customers, or their designated retail supplier, will be at the market value of the diverted gas on the day(s) the gas was diverted. The market value of the diverted gas shall be equal to the “Midpoint” rate of the higher of “Algonquin, city-gates” and “Iroquois, zone 2” receipt points as published in Platt’s Gas Daily in the table “Daily Price Survey” under the Citygates heading. When gas is diverted to serve firm sales customers, the payments made by the Company will be recovered through the Gas Supply Charge as described in General Information Section 27 of the Company’s tariff. When gas is diverted to serve a customer operating under a firm transportation service, that firm transportation customer will reimburse the Company for its payments to the non-core customer.
2. 3. In the event it is necessary to divert gas from lower priority core customers to supply the needs of higher priority core customers, Central Hudson will compensate the direct customer(s) or the customers’ retail supplier(s) at the market value of the diverted gas on the day(s) the gas was diverted. The market value of the diverted gas shall be equal to the “Midpoint” rate of the higher of “Algonquin, city-gates” and “Iroquois, zone 2” receipt points as published in Platt’s Gas Daily in the table “Daily Price Survey” under the Citygates heading.

If it can be demonstrated by the retail supplier/direct customer that a contract calls for a higher price, Central Hudson will reimburse the retail supplier/direct customer at the contract price. Any such payments made by Central Hudson will be recovered through the Gas Supply Charge as described in General Information Section 27 of the Company’s tariff.

Effective January 1, 2017, the Company will implement daily communication with each specific customer facility locations agreed upon by the customer and the Company, as soon as weather forecasts project outside temperatures to be 15 degrees or below for the upcoming three consecutive days or during times when three days of consecutive customer curtailments occur. Additionally, the Company will contact each specific customer facility location at the end of every

curtailment to remind Customers to replenish alternate fuel inventories as needed to maintain minimum levels.

## **E. Service Classification No. 11 - Large Customer Transportation**

### **Eligibility**

1. This service is available to those customers that have the capability of transporting and receiving at one service point 750,000 Ccf. or greater per year, and;
2. the customer's premises are (a) located adjacent to the Company's existing gas mains having adequate capacity to supply customer's prospective requirements in addition to the simultaneous requirements of present or prospective customers taking firm or interruptible service from such mains, or at other points under arrangements made in accordance with General Information, Section 25; and
3. service is to be provided under a transportation agreement as included the Forms Section of the manual and as shown in General Information, Section 40 of the Company's tariff.

### **Character of Service**

Firm transportation service of customer-owned gas which the customer has arranged to have transported to a delivery point at the boundary of the Company's service area. The Company shall control the dispatch of such gas, and dispatch shall be provided as requested by the customer.

Service will be provided off the distribution or transmission system. Service off the distribution system will be provided at one of two levels: (1) "Distribution Large Mains," which will be applicable to customers using over 400,000 Mcf/year and taking service from Company facilities below transmission pressures and from mains at least 6" in diameter, or (2) all other service from Company facilities below transmission pressures.

Pursuant to the Order in Case 14-G-0319, a new subclass, Electric Generation ("SC11EG"), will be established as of July 1, 2015 and will be applicable to electric generation facilities with a minimum generation capacity of 5 megawatts taking service off the transmission system.

## **Monthly Rate**

The monthly rate billed to customers under this Service Classification will be comprised of five components: (1) a Transportation Rate and (2) a Balancing Service Charge and (3) a System Benefits Charge (4) a Gas Bill Credit all as defined below (5) and a Miscellaneous Charge (excluding SC11 EG).

### (1) **Transportation Rate**

Rates and charges are set forth in P.S.C. No. 12 – Gas, Service Classification No. 11.

For each Mcf. of gas metered on any day in excess of the customer's MDQ there will be a delivery charge of \$1.00 per Mcf.

The rates and charges under this Service Classification are increased pursuant to General Information Section 28 of the Company's tariff, to reflect the tax rates applicable within the municipality where the customer takes service. Current tax tables are available on the PSC's website.

### (2) **Balancing Service Charge**

The Balancing Service Charge, as described in General Information Section 43 of the Company's tariff, shall apply to all gas consumed by a customer under this Service Classification and shall be billed to the customer.

Gas deliveries and usage for customers taking service under SC11EG will be daily balanced. All other customers taking service under this Service Classification will be required to make a semi-annual election to have their gas deliveries and usage balanced on a daily or monthly basis according to the terms of this Service Classification for the following balancing periods:

November 1 - April 30, inclusive

May 1 - October 31, inclusive

Existing customers will be required to notify the Company in writing, of their selected balancing option for an applicable balancing period on or before the date indicated on the

Company's Calendar of Gas Transportation Schedule utilizing Attachment A to the service agreement included in General Information Section 40 of the Company's tariff.

Absent timely receipt by the Company of notification of a customer's selected balancing option, the customer will be placed on monthly balancing by default. Effective July 1, 2015, the default position for all new customers will be daily balanced, requiring an affirmative response for the monthly balancing option. Effective July 1, 2015, the Company reserves the right to apply daily balancing on a new SC 11 customer if monthly balancing will negatively impact its ability to maintain gas distribution system reliability.

A customer taking service under this Service Classification will maintain its balancing option for the full duration of the balancing period.

(3) System Benefit Charge

The charges set forth herein shall be subject to the Systems Benefit Charge as explained in General Information Section 42 of the Company's tariff.

(4) Gas Bill Credit

The Gas Bill Credit, as described in General Information Section 42.F, shall apply to each Ccf and shall be billed to the customer. The Gas Bill Credit is not applicable to the SC 11 Electric Generation Subclass.

(5) Gas Miscellaneous Charge

The Gas Miscellaneous Charge, as described in the General Information Section 42.F of the Company's tariff, shall apply to each Ccf and shall be billed to the customer. The Gas Miscellaneous Charge is not applicable to the SC11 Electric Generation Subclass.

**BALANCING: Charges for Over- and Under- Deliveries**

All charges resulting from over- or under- deliveries will be billed to a customer's Retail Supplier pursuant to the rates and terms contained herein. If for any reason a Retail Supplier does not pay the charges resulting from over-or under-deliveries however, the Company retains the right to bill the customer for such charges.

Retail Suppliers must have the authority to act as the customer's agent and attorney-in-fact for the purpose of scheduling, balancing and settlement. Retail Suppliers must have signed and delivered a Supplier Operating Agreement Applicable to Interruptible and/or Firm Transport, as included in the Forms Section of this manual.

Retail Suppliers shall undertake all reasonable efforts to provide the Company with accurate nominations of the customer-owned gas and to balance nominations and deliveries. Any penalty amount paid by the Retail Supplier shall not be construed as giving the Retail Supplier the right to continue to under or over deliver gas.

A. Daily Balancing

If the amount of gas delivered to the Company for a customer, less any adjustment determined in accordance with Special Provision 11.2 of the Company's tariff, varies from the amount of gas used by the customer on a daily basis, the customer will have an over-delivery or an under-delivery.

1. Over-deliveries – Daily

3. If on any day a customer's over-delivery is greater than 10% of a customer's actual usage, and the combined over- or under-delivery for all Service Classification Nos. 9 and 11 daily balanced customers is greater than 10%, the over-delivered volumes in excess of 10% will be purchased by the Company at the rates set forth below. The Index Price used to determine the applicable rate shall be equal to a weighted average of the Midpoint rate of Tennessee Zone 4 300 Leg, Millennium East, Iroquois Zone 2, and Algonquin City gates as published in Platt's Gas Daily in the table "Daily Price Survey" under the Citygate heading, plus the Company's weighted average cost of transportation and fuel losses. The summer and winter weightings of the Midpoint rates effective 10/1/22 are listed below:

	<u>Tennessee Zone 4 300 leg pricing</u>	<u>Algonquin Citygate pricing</u>	<u>Millennium East pricing</u>	<u>Iroquois Zone 2 pricing</u>	<b>Total</b>
<b>Winter (November through March):</b>					
Weighting based on '21-'22 Winter	10%	20%	30%	40%	100%
<b>Summer (April through October):</b>					
Weighting based on 2021 Summer	5%	0%	95%	0%	100%

For Over-Deliveries	Rate
> 10% up to and including 15%	90% of Index Price
> 15% up to and including 20%	85% of Index Price
> 20% - Winter	60% of Index Price
> 20% - Summer	70% of Index Price

2. Under-deliveries - Daily

1. If on any day a customer's under-delivery is greater than 10% of a customer's actual usage, and the combined over- or under-delivery for all Service Classification Nos. 9 and 11 daily balanced customers is greater than 10%, the under-delivered volumes in excess of 10% will be sold to the customer by the Company at the rates set forth below. The Index Price used to determine the applicable rate shall be equal to a weighted average of the Midpoint rate of Tennessee Zone 4 300 Leg, Millennium East, Iroquois Zone 2, and Algonquin City gates as published in Platt's Gas Daily in the table "Daily Price Survey" under the Citygates heading, plus the Company's weighted average cost of transportation and fuel losses. The summer and winter weightings of the Midpoint rates effective 10/1/22 are listed below:

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	<u>Tennessee</u> <u>Zone 4 300</u> <u>leg pricing</u>	<u>Algonquin</u> <u>Citygate</u> <u>pricing</u>	<u>Millennium</u> <u>East pricing</u>	<u>Iroquois</u> <u>Zone 2</u> <u>pricing</u>	<u>Total</u>
<b>Winter (November through March):</b>					
Weighting based on '21-'22 Winter	10%	20%	30%	40%	100%
<b>Summer (April through October):</b>					
Weighting based on 2021 Summer	5%	0%	95%	0%	100%

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For Under-deliveries	Rate
> 10% up to and including 15%	110% of Index Price
> 15% up to and including 20%	115% of Index Price
> 20% - Winter	140% of Index Price
> 20% - Summer	130% of Index Price

3. Month End Cash Out

At the end of the month, a customer’s cumulative over- or under-deliveries, net of any activity resulting from the daily balancing provisions described above, will be summed into a net imbalance.

(a) Exchange of Net Imbalances

A customer or its Retail Supplier may exchange a month-end imbalance with another Service Classification No. 9 or 11 customer or its Retail Supplier. Imbalance position and contact information for each Retail Supplier will be available after the end of the month on the Company’s Gas Tracking System. Such exchanges of imbalances shall be accomplished upon notification to the Company of the exchange by the applicable customer, or its designated Retail Supplier, prior to the imbalance resolution due date as

shown on the Company’s Calendar of Gas Transportation Scheduling. The net effect of all imbalance exchanges must improve a customer’s or its designated Retail Supplier’s, relative imbalance position. In no event will the company process exchanges that result in a larger negative position for the customer, or its designated supplier.

(b) Cash Out

Any net imbalances, which are not resolved through exchange, will be cashed out according to the following terms and pricing:

November - March	Over-Deliveries	Under-Deliveries
0% to 5%	Index	Index
5% to 10%	90% of Index	110% of Index
>10%	80% of Index	120% of Index

All Other Months	Over-Deliveries	Under-Deliveries
0% to 10%	Index	Index
>10%	80% of Index	120% of Index

- Both the over and under delivery Index Price used to determine the applicable rates shall be equal to the monthly average of a weighted average of the Midpoint rate of Tennessee Zone 4 300 Leg, Millennium East, Iroquois Zone 2, and Algonquin City gates as published in Platt’s Gas Daily in the table “Daily Price Survey” under the Citygate heading, plus the Company’s weighted average cost of transportation and fuel losses. The summer and winter weightings of the Midpoint rates effective 10/1/22 are listed below:

	<u>Tennessee Zone 4 300 leg pricing</u>	<u>Algonquin Citygate pricing</u>	<u>Millennium East pricing</u>	<u>Iroquois Zone 2 pricing</u>	<b>Total</b>
<b>Winter (November through March):</b>					
Weighting based on '21-'22 Winter	10%	20%	30%	40%	100%

**Summer (April through October):**

Weighting based on 2021 Summer	5%	0%	95%	0%	100%
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**B. Monthly Balancing**

If the amount of gas delivered to the Company for a customer, less any adjustment determined in accordance with Special Provision 11.2 of the Company’s tariff, varies from the amount of gas used by the customer for a given month, the customer will have an over-delivery or an under-delivery. Any such over- or under-delivery will be cashed out according to the terms and pricing contained in A. 3, Month End Cash Out, of this section.

**Operating Procedures**

1. The customer shall reimburse the Company within ten days of receipt of a statement, for any additional fees, taxes or other charges billed directly to the Company for services regarding transportation of customer-owned gas to the boundary of the Company's service territory.
2. The customer shall provide to the Company gas supplies to compensate the Company for system line losses. The volume of gas associated with system line losses shall be calculated by applying the Company's Factor of Adjustment to the volume of gas delivered to the Company on behalf of the customer.
3. Customer deliveries, less any adjustment determined in accordance with Special Provision 11.2 of the Company’s tariff, and usage for those customers taking service under special contracts will be balanced on a monthly basis in accordance with the provisions contained in the Monthly Balancing section above until the conclusion of an existing contract or contract renegotiations, at which time the customer will be required

to select either daily or monthly balancing provisions as contained in this Service Classification.

4. To maintain system reliability, the Company may require the installation of a remote operated valve on the service lateral that supplies the Customer at the Customer's cost. Any Customer that fails to comply with a Company issued interruption will be required to have a remote operated valve installed and to pay for all associated charges. Customers applying for transportation service to serve new electric generation facilities will be responsible for paying all charges associated with the installation of this equipment.
5. For system reliability and deliverability an MDQ will be established and maintained for each customer:

**SC11EG:**

Customers taking service under SC11EG will be required to make an annual MDQ election pursuant to the provisions of the TERM section of this service classification. During an annual term customers will be allowed to exceed the MDQ four times, but not by more than ten percent on each occasion, without an increase to the customer's MDQ. If the MDQ is exceeded five times in an annual term the MDQ will be reset based on the average of the five exceedances and will remain in place for the remainder of the annual term, with the new MDQ subject to the same reset provisions. The Company shall not be obligated to receive during any single hour more than 1/24 of the MDQ. In the event that a customer would like to exceed its MDQ by more than ten percent on a given day, but in no event by more than thirty-three percent, the customer shall make such request to the Company not less than seventy-two hours prior to such day with such request subject to approval by the Company in its sole discretion. The Company may revoke any such approval provided at any time when the Company believes, in its sole judgment, that such revocation is required to protect the operational integrity of the gas system. All deliveries in excess of the MDQ will be subject to the rates of this Service Classification.

**All other Customers:**

During the period November 1 through March 31, the MDQ, as set forth on a customer's service agreement, will be reset each time a customer's usage exceeds the MDQ on five separate days. The average of the five highest demands will establish the new MDQ

which will be effective on the first day of the next calendar month. If a customer's usage exceeds the MDQ in effect on November 1 on five or more separate days during the period November 1 through March 31, the average of the five highest demands will establish the new MDQ which will be effective April 1.

The MDQ for a customer taking service under Service Classification No. 11 may be revised downward for a permanent reduction to the gas load on the customer's premises caused by installation of, or modifications to, gas equipment, including the possible installation of a propane-air facility. The amount of such downward adjustment to the MDQ will be reasonably determined based on engineering studies prepared by the customer and furnished to the Company and the Public Service Commission. Any such downward adjustment to the MDQ shall be effective during the first month for which the changes in gas equipment are placed in service. Any Service Classification No. 11 customer proposing to reduce its MDQ based on a propane-air facility will provide the Public Service Commission and the Company written notice at least six months in advance of the date on which the proposed changes in gas equipment will be placed in service.

6. All customers taking service under this service classification are required to agree to have automated meter recording equipment furnished and installed by the Company at the customer's expense. The provisions included in this service classification require daily monitoring; therefore, all customers operating under this service are required to have installed automated meter recording equipment. The Customer agrees to prepay, to the Company, the cost of the automated meter recording equipment. In addition, the Customer shall furnish an electrical supply and a phone line necessary for the operation of the equipment, in an area which is acceptable to the Company.
7. Customers can be served by only one Retail Supplier during the month. Customers will not be allowed to change Retail Suppliers after the initial monthly nomination form is received by the Company.
8. Landlords of industrial and commercial properties, which do not have residential tenants, may file a petition and application to the New York State Public Service Commission requesting permission to submeter gas usage to their tenants. Such petitions and application must address the following four areas of major concern regarding the request to submeter: (1) safety (2) rate impact for the ultimate consumer

(3) non-rate consumer protection issues, and (4) service provider and utility matters. The petition and application must also provide that the conditions proffered will be reiterated in leases with the submetered tenants. Copies of such petitions and application must be served on the Company and the petitioner's tenants.

9. In the event the Company issues an Operational Flow Order (OFO), the following requirements will remain in effect for the duration of the OFO:
  - a) Gas delivered to Central Hudson's system, less any adjustment determined in accordance with Special Provision 11.2 of the Company's tariff, for a daily balanced customer will be required to be within two percent (2%) of the customer's daily usage, and
  - b) The daily cashout tiering provisions will be revised such that the first tier will apply to daily over- and under-deliveries greater than 2% up to and including 15%, and
  - c) The Company will not issue an OFO simultaneously for under deliveries and over deliveries.
  
10. Bills are due when personally served or three days after mailing. Bills shall be subject to a late payment charge if payment is not made by the date specified on the bill which date shall be not less than 20 days from the due date.
  
11. The term of service will be one year. All terms will be renewed annually unless three months prior written notification of termination or change has been provided by Company or Customer.

### **Nomination Procedures**

To nominate gas, the Retail Supplier notifies Central Hudson of the quantity of gas they are transporting to the Central Hudson system via CHG&E's web-based Gas Tracking System. Separate nominations are required for daily and monthly balanced customer pools. Nomination due dates are posted on the Company's Gas Transportation Calendar. The Calendar is available on the Company's website.

Mid-day nominations must be received by Central Hudson by 11:00 am. EST the day on which the nomination is to become effective.

Central Hudson does not accept weekend or holiday nomination changes from Retail Suppliers serving customers who are required to balance monthly. All nominations should be made by 12:30 p.m. EST on the last working day prior to the weekend or holiday. Retail Suppliers who serve customers operating under the Company's Daily Balancing service will be permitted to make nomination changes during weekends and holidays.

All nominations and changes at Central Hudson's city gates are confirmed by Central Hudson with the upstream pipeline prior to gas flowing. Central Hudson may refuse the nomination if the Retail Supplier's nomination does not match the pipeline nomination, or if the nomination is in excess of the customers maximum daily quantity (MDQ).

## **VI. REQUIREMENTS OF POOL OPERATIONS**

### **Operating Procedures**

The following information defines Company policies related to the Retail Access Program that are not specifically addressed by the Uniform Business Practices.

1. Retail Suppliers must have signed and delivered a Supplier Operating Agreement with the Company.
2. Retail Suppliers must plan to meet the full natural gas supply requirements of the customer. In the event there is a material change or an anticipated substantial increase in the natural gas supply requirement of a customer or customers, Retail Suppliers will notify the Company of such change prior to such change or increase and will cooperate with the Company, as reasonably required by the Company, to accommodate such change or increase.
3. Retail suppliers must provide a list of contact personnel to the Company and information on after hours contact.

## **VII. COMMUNICATION PROTOCOLS**

## **A. Internet Access**

The coordinated effort of Central Hudson, Retail Suppliers, Pipelines and the Customers is needed to make the open market system work efficiently. A key component of this effort is information exchange. To make as much information as possible available to all parties Central Hudson has made extensive information available on the Company's website. Central Hudson's web address is **www.CenHud.com**. Parties interested in retail access information should go into the section entitled "**My Energy**" then "**My Energy Options**". The following is a summary of the information available in the "Energy Choice" section.

Under the "Energy Suppliers" section:

Gas – A list of Natural Gas retail suppliers operating in Central Hudson's territory accepting new customers.

Under the "Info for Energy Suppliers" section: <https://www.cenhud.com/esco/>

### General Information:

- Central Hudson's Service Territory Map
- Facts at a Glance – which includes information about Central Hudson Gas & Electric Corporation.
- Contracts and Operating Agreements - which includes the current copy of the Gas Transportation Manual.
- Usage History – (Legacy Usage History page) The Central Hudson customer account number is required to access usage history. Up to 24 months of data is available along with customer specific information.
- Links to Other Useful Documents - which contains the Gas Transportation Calendar and the current Meter Reading Template.

New ESCO Portal: - Contains enrollment information, reports and rates.

New Usage History Page: Input the Contract Account number or legacy account number to access customer specific information.

Approved Suppliers Only – (Only for reports prior to September 1, 2021) A Retail Supplier Account number and password are required to enter this area. The account number and password is available from the Retail Access Coordinator.

Gas Tracking System – Used to manage the daily natural gas nomination and balancing process.

The following is a summary of the information available in the Account Resources “Rates” section, found here: <https://www.cenhud.com/account-resources/rates/>

Gas & Electric Supply Rates - Supply rates applicable to customers using Central Hudson to purchase their energy.

Delivery Rates Summary - A summary of Central Hudson's current rates for energy delivery.

PSC Tariff Site - A link to the section of the New York State Public Service Commission website where tariff agreements are stored, including Central Hudson's gas and electric tariffs.

Current Rate Order - Document declaring Central Hudson's current regulated delivery rates.

Cost Adjustments - Modifying rates used to help ensure correct collection in accordance with regulations.

Typical Bill Comparisons - Historic average bill information for residential, commercial and industrial customers.

## **B. Electronic Bulletin Boards**

Interstate pipelines have developed Electronic Bulletin Boards which are interactive links between the gas supply and distribution parties. Each interstate pipeline delivering gas into Central Hudson’s system has their own Electronic Bulletin Board. Retail Suppliers who wish to provide service to customers in our territory are responsible for monitoring the appropriate Bulletin Boards. The following table shows the name of the pipeline delivering into Central Hudson’s territory and the name of their bulletin board. Questions about the Electronic Bulletin Boards should be directed to the Company’s Fuels Buyer.

**Pipelines Serving Franchise Area**

Pipeline System	Electronic Bulletin Board
Iroquois Gas Transmission System	Iroquois On Line
Columbia Gas Transmission Corp.	Navigates
Algonquin Gas Transmission	Link
Tennessee Gas Pipeline	DART

## **C. Company Contacts**

Direct questions on the Company's Retail Access Program to:

**Mr. Michael Bachan** -(Associate Cost & Rate Analyst)

Telephone: 845-790-4898

E-Mail: MBachan@cenhud.com

Direct questions on gas deliveries, nominations, and pipeline capacity to:

**Mr. Scott McDowell**

- OR -

**Ms. Kathleen Kilkenny**

(Energy Buyer)

(Senior Energy Control Analyst)

Telephone: 845-486-5569

Telephone: 845-486-5786

E-Mail: smcdowell@cenhud.com

E-Mail: kkilkenny@cenhud.com

Direct questions on interruptible services and Service Class No. 11 to:

**Cost@Cen Hud.com**

**Customer Service:** 845-452-2700

**Emergency Gas Control:** 845-486-5600 or 5601 - 24-hour service

#### **D. Operational Flow Orders (OFO)**

Central Hudson, at its sole discretion, shall have the right to issue Operational Flow Orders (OFOs) to transportation customers and third party suppliers of gas to either minimize or alleviate conditions which threaten the physical integrity of its system or to prevent a short term curtailment.

Before issuing an OFO, Central Hudson shall first attempt to correct the problem through the use of other options available to the Company. In the event Central Hudson's options cannot correct the problem, the Company shall issue an OFO (1) as localized as possible (2) to the recipients causing the problem and (3) to those recipients transporting gas in the problem area.

Actions required by an OFO may include but shall not be limited to the following:

- Limit Retail Suppliers to deliveries at specific points.
- Direct Retail Suppliers to balance daily or deliver a specified quantity of gas.
  - Nomination changes daily for aggregated groups being served with a flat nomination. Retail Suppliers may be required to increase their deliveries to

include their incremental supplies or to reduce their deliveries if a decremental volume is issued.

Except for circumstances where immediate action is necessary, Central Hudson shall attempt to provide 24-hour notice for an OFO. When an OFO is declared, all direct customers and Retail Suppliers will be notified by phone and/or email via Central Hudson's Gas Tracking System (GTS) notifying them of the effective date and time, the situation making the OFO necessary, the actions expected of all parties, and the consequences for not complying. The NYISO will also be notified due to the generators on Central Hudson's system via the following email: [GasNotifications@nyiso.com](mailto:GasNotifications@nyiso.com). Retail Suppliers must communicate with their customers to ensure compliance with the conditions of Central Hudson's OFO. Retail Suppliers who are aware of the noncompliance of one or more of its customers must notify Central Hudson of the name, address and account number of the end-user(s).

When Central Hudson receives advance notice of a potential for a curtailment on our system, a System Alert (SA) will be issued to advise Retail Suppliers and Direct Customers of the situation and request voluntary action to possibly avert the necessity for the issuance of an OFO. Central Hudson is not obligated to issue a SA before an OFO but will endeavor to do so when adequate advance notice is available.

## Section A: Forms

End - User Transportation Nomination

Form of Service Agreement- Service Class No.9

Form of Service Agreement- Service Class No. 11

Retail Supplier Operating Agreement

Supplier Operating Agreement Applicable to SC Nos. 9 and/or 11

Affidavit for Curtailment of Operations-Service Class No. 9-Interruptible Transportation

**Central Hudson Gas & Electric Corporation**

**End - User Transportation Nomination**

Attention : Fuels Resources

Fax Number : 845-486-5626

Email: gassupplygroup@cenhud.com

Phone #'s : 845-486-5562 or 5422 or 5443

Retail Supplier \_\_\_\_\_

Date(s) of natural gas deliveries \_\_\_\_\_

Volume Mmbtu	Upstream Pipeline	Gate Station	Upstream Contract #	Meter#	Upstream Contract Holder

<b>Central Hudson City Gate Information</b>		
Upstream Pipeline	City Gate	Meter #
Tennessee Gas	Cedar Hill	20275
Millennium	Tuxedo	600314
Algonquin	Mahopac	45
Columbia	Tuxedo	11
Iroquois	Pleasant Valley	PV



**Central Hudson Gas & Electric Corporation**  
**Form of Service Agreement- Service Classification No.9**  
**Interruptible Transportation**

AGREEMENT made and entered into for interruptible gas transportation by and between Central Hudson Gas & Electric Corporation, (herein called the Company) and Customer Buying Group (herein called the Customer).

WITNESSETH: That in consideration of the mutual covenants herein contained, the parties hereto agree that the Company will transport gas up to the Customer's MDQ, for qualified customers, and the Customer will deliver to the Company natural gas for such transportation during the term hereof.

The Customer agrees that service supplied under this Agreement will be taken and paid for by the undersigned in accordance with the rules and regulations, and at the rates contained in the Company's tariffs and schedules as filed from time to time with the Public Service Commission of the State of New York. The name, account number, pre-determined monthly and daily contract quantities, name of Retail Supplier and authorization for each party to this agreement will also be included as an attachment to this service agreement.

If extension or reinforcement of distribution main facilities is required for transportation service, Customer agrees to prepay to the Company the total costs of such additional facilities. All customers opting for service under this service classification on and after September 1, 2004 are required to agree to have automated meter recording equipment furnished and installed by the Company at the Customer's expense. The Customer agrees to prepay to the Company the costs of the automated meter recording equipment. The Customer shall furnish an electrical supply and phone line necessary for the operation of the equipment, in an area which is acceptable to the Company.

Effective March 1, 2006, all customers taking service under this service classification prior to September 1, 2004 are required to have automated meter recording equipment furnished and installed by the Company at the Company's expense. In addition, the Customer shall furnish an electrical supply and phone line necessary for the operation of the equipment, in an area which is acceptable to the Company.

DELIVERIES: Beginning on the date on which deliveries of gas are commenced hereunder and thereafter for the remaining term of this Agreement, the Company agrees to receive from the Customer for transportation and the Customer agrees to tender for transportation up to the following quantities of natural gas per month:

		(MCF)
Maximum Daily Quantity (MDQ)	January	_____
	February	_____
	March	_____
	April	_____
	May	_____
	June	_____
	July	_____
	August	_____
	September	_____
	October	_____
	November	_____
	December	_____

The Customer agrees to notify the Company, in writing, of the Customer's daily and monthly transport quantity for a given month on or before the date indicated on the Company's Calendar of Gas Transportation Scheduling as defined in General Information, Section 2 of the Company's tariff. The Customer will also indicate the Retail Supplier which will be supplying the natural gas.

The Company agrees to redeliver to Customer and Customer agrees to accept delivery of above quantities less volumes allocated to compensate the Company for system line losses as defined in General Information, Section 27 of the Company's tariff.

RATES: The Customer agrees to pay the Company the rates and charges provided by Service Classification No. 9, contained in the Company's effective gas tariffs or any effective superseding rate schedule.

TERM OF AGREEMENT: For customers operating under the monthly rate option, service shall be requested each month for the next calendar month. Service shall be rendered until the Company's facilities are not adequate to provide the service. For customers operating under the seasonal rate option, the term of service shall commence either May 1 or November 1 and will continue until the end of the corresponding seasonal rate period and thereafter until canceled by written notice by either the Company or the Customer thirty days prior to the beginning of the subsequent seasonal rate period. Customers must elect to take service under the seasonal rate option prior to the start of the seasonal period.

Seasonal Rate Citygate Delivery Location \_\_\_\_\_

Balancing Option (Daily/Monthly) \_\_\_\_\_

Accepted: \_\_\_\_\_

Customer

\_\_\_\_\_  
\_\_\_\_\_

Address

By: \_\_\_\_\_

Dated: \_\_\_\_\_

Accepted: Central Hudson Gas & Electric Corp.

By: \_\_\_\_\_

Dated: \_\_\_\_\_

**FORM OF SERVICE AGREEMENT APPLICABLE TO AGGREGATED AND  
INTERRUPTIBLE GAS TRANSPORTATION (SERVICE CLASSIFICATION NO. 9)**

ATTACHMENT A

Customer \_\_\_\_\_

Retail Supplier \_\_\_\_\_

Balancing Option (Daily/Monthly) \_\_\_\_\_

Balancing Option Term: November 1, \_\_\_\_\_ April 30, \_\_\_\_\_, inclusive

or

May 1, \_\_\_\_\_ October 31, \_\_\_\_\_, inclusive

ACCEPTED: \_\_\_\_\_  
CUSTOMER

\_\_\_\_\_  
ADDRESS

BY \_\_\_\_\_

DATED \_\_\_\_\_

ACCEPTED:

CENTRAL HUDSON GAS & ELECTRIC CORPORATION

BY \_\_\_\_\_

DATED \_\_\_\_\_

**Central Hudson Gas & Electric Corporation**  
**Form of Service Agreement- Service Classification No. 11**  
**Large Customer Firm Transportation**

AGREEMENT made and entered into for firm gas transportation service by and between Central Hudson Gas & Electric Corporation, (herein called the Company) and \_\_\_\_\_ (herein called the Customer).

WITNESSETH: That in consideration of the mutual covenants herein contained, the parties hereto agree that Company will transport for Customer and Customer will furnish to Company natural gas (not less than 75,000 Mcf. annually) for such transportation during the term hereof.

The Customer agrees that service supplied under this Agreement will be taken and paid for by the undersigned in accordance with the rules and regulations, and at the rates contained in the Company's tariffs and schedules as filed from time to time with the Public Service Commission of the State of New York.

If extension or reinforcement of distribution main facilities is required for transportation service, Customer agrees to prepay to the Company the total costs of such additional facilities. All customers taking service under this service classification are required to have automated meter recording equipment furnished and installed by the Company at the Customer's expense. The Customer agrees to prepay to the Company the cost of the automated meter recording equipment. The Customer shall furnish an electrical supply and a phone line necessary for the operation of the equipment, in an area which is acceptable to the Company.

DELIVERIES: Beginning on the date on which deliveries of gas are commenced hereunder and thereafter for the remaining term of this Agreement, Company agrees to receive from Customer for transportation and Customer agrees to tender for transportation up to the following quantities of natural gas:

Maximum Daily Quantity (MDQ) \_\_\_\_\_ Mcf.

The Customer agrees to notify the Company, in writing, of Customer's daily and monthly transport quantity for each month and the delivering pipeline, on or before the date indicated on the Company's Calendar of Gas Transportation Scheduling as defined in General Information, Section 2 of the Company's tariff.

SC 11 EG:

Customers taking service under SC11EG will be required to make an annual MDQ election pursuant to the provisions of the TERM section of this service classification. During an annual term customers will be allowed to exceed the MDQ four times, but not by more than ten percent on each occasion, without an increase to the customer's MDQ. If the MDQ is exceeded five times in an annual term the MDQ will be reset based on the average of the five exceedances and will remain in place for the remainder of the annual term, with the new MDQ subject to the same reset provisions. The Company shall not be obligated to receive during any single hour more than 1/24 of the MDQ. In the event that a customer would like to exceed its MDQ by more than ten percent on a given day, but in no event by more than thirty-three percent, the customer shall make such request to the Company not less than seventy-two hours prior to such day with such request subject to approval by the Company in its sole discretion. The Company may revoke any such approval provided at any time when the Company believes, in its sole judgment, that such revocation is required to protect the operational integrity of the gas system. All deliveries in excess of the MDQ will be subject to the rates of this Service Classification.

All other Customers:

During the period November 1 through March 31, the MDQ, as set forth on a customer's service agreement, will be reset each time a customer's usage exceeds the MDQ on five separate days. The average of the five highest demands will establish the new MDQ which will be effective on the first day of the next calendar month. If a customer's usage exceeds the MDQ in effect on November 1 on five or more separate days during the period November 1 through March 31, the average of the five highest demands will establish the new MDQ which will be effective April 1.

The Customer agrees to provide natural gas supplies to the Company to compensate for system line losses as defined in General Information, Section 27 of the Company's tariff.

RATES: Customer agrees to pay Company the rates and charges provided by Service Classification No. 11, contained in the Company's effective gas tariffs or any effective superseding rate schedule.

TERM OF AGREEMENT: Transportation service shall commence \_\_\_\_\_, and continue for a period of one year. All terms will be renewed annually unless three months prior written notification of termination or change has been provided by Company or Customer.

Accepted: \_\_\_\_\_  
Customer

\_\_\_\_\_  
\_\_\_\_\_  
Address

By: \_\_\_\_\_

Dated: \_\_\_\_\_

Accepted: Central Hudson Gas & Electric Corp.

By: \_\_\_\_\_

Dated: \_\_\_\_\_

**FORM OF TRANSPORTATION SERVICE AGREEMENT**  
**(SERVICE CLASSIFICATION NO. 11)**

ATTACHMENT A

Customer \_\_\_\_\_

Retail Supplier \_\_\_\_\_

Balancing Option (Daily/Monthly) \_\_\_\_\_

Balancing Option Term: November 1, \_\_\_\_\_ April 30, \_\_\_\_\_, inclusive

or

May 1, \_\_\_\_\_ October 31, \_\_\_\_\_, inclusive

ACCEPTED: \_\_\_\_\_

CUSTOMER

\_\_\_\_\_

\_\_\_\_\_

ADDRESS

\_\_\_\_\_

DATED \_\_\_\_\_

RECEIVED:

CENTRAL HUDSON GAS & ELECTRIC CORPORATION

BY \_\_\_\_\_

DATED \_\_\_\_\_

**Central Hudson Gas & Electric Corporation  
Retail Supplier Operating Agreement**

This **AGREEMENT** (“Agreement”), is made and entered into this \_\_\_\_\_ day of \_\_\_\_\_, 20 \_\_, by and between Central Hudson Gas & Electric Corp. a New York corporation having its principal office at 284 South Ave., Poughkeepsie, New York 12601 (“Central Hudson”) and \_\_\_\_\_, a \_\_\_\_\_ corporation, having an office at \_\_\_\_\_ (“Retail Supplier”), both Central Hudson and the Retail Supplier hereinafter sometimes referred to collectively as the “Parties”, or individually as a “Party”.

**WITNESSES**

**WHEREAS**, Central Hudson has established a retail access program (the “Retail Access Program”), as described in its Schedule for Gas Service, P.S.C. No. 12 - Gas (“Tariff”), on file with the New York State Public Service Commission (“NYPSC”);

**WHEREAS**, Retail Supplier is an eligible supplier under the Retail Access Program and desires to supply natural gas to its retail access customers (“Customers”);

**WHEREAS**, Central Hudson agrees to receive from the Retail Supplier and deliver such Customers’ natural gas quantities supplied by the Retail Supplier (“Natural Gas Supply”) through Central Hudson’s transmission and distribution system, subject to the terms and conditions of this Agreement.

**NOW THEREFORE**, in consideration of the premises and mutual promises set forth hereunder and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Central Hudson and Retail Supplier, intending to be legally bound, hereby covenant, promise and agree as follows:

**ARTICLE 1**

**COMMON TERMS AND CONDITIONS**

**1.1 Incorporation By Reference**

The rights and obligations of the Parties under this Agreement shall be governed by the provisions of Central Hudson’s Schedule for Gas Service, P.S.C. No. 12 - Gas, as the same may be amended, modified, or superseded from time to time and are incorporated within the original

agreement. In the event of any conflict, the Schedule for Gas Service, P.S.C. No 12 - Gas, shall govern with respect to the services provided hereunder.

**1.2 Term**

This Agreement shall commence on the date set forth above (“Effective Date”), and will remain in effect until terminated in accordance with its terms, the Tariff, or an order of the FERC or the NYPSC.

**ARTICLE 2**

**BALANCING AND AGENCY ARRANGEMENTS**

**2.1 Retail Supplier Obligations**

The Retail Supplier must follow all supply requirements as outlined in the Gas Transportation Operating Procedures Manual and as further defined in Central Hudson’s Schedule for Gas Service, P.S.C. No. 12 - Gas, as the same may be amended, modified or superseded from time to time.

**2.2 Representations and Warranties**

Retail Supplier makes the following representations and warranties to Central Hudson:

- A.** The information in Appendix No. 1 (Retail Supplier Information Form) is correct as of the Effective Date, and Retail Supplier will promptly inform Central Hudson in writing of any changes in such information.
- B.** Retail Supplier is in compliance with all of the requirements set forth in the Uniform Business Practices (“UBP”) Section 2, and will continue to be in compliance with such requirements and all subsequently adopted regulatory requirements throughout the term of this Agreement.
- C.** No material changes in the data contained in Retail Supplier’s initial eligibility application filing with the NYPSC have occurred or will occur, except such changes as have been or will be reported to the NYPSC.
- D.** Throughout the term of this Agreement, Retail Supplier will continually adhere to its own policies and procedures as set forth in its disclosure statement filed with the NYPSC, as updated from time to time.
- E.** Retail Supplier will not, either directly or indirectly, engage in, participate in or encourage or assist others to engage or participate in the practice of transferring customers without authorization, commonly referred to as “slamming.”

- F.** Retail Supplier will have sufficient natural gas supply resources available to it, either by contract or through ownership to provide Customers with their natural gas requirements.
- G.** Retail Supplier will have in place, and must bear the costs of putting in place and successfully testing prior to the start of Customer enrollment, all required information technology systems that will enable it to send and receive data to and from Central Hudson to satisfy its obligations under this Agreement and all other relevant agreements.

### **2.3 Central Hudson Service**

Central Hudson will follow all requirements as outlined in the Gas Transportation Operating Procedures Manual and as further defined in Central Hudson's Schedule for Gas Service, P.S.C. No. 12 - Gas, Section 41, as the same may be amended, modified or superseded from time to time.

### **2.4 Financial Security**

Prior to the commencement of service to the Retail Access Customer, Retail Supplier will provide financial security in an amount determined in accordance with the UBP. If a cash security deposit is provided, Central Hudson will pay interest thereon at the "Other Customer Contributed Capital" rate established by the NYPSC.

### **2.5 Resolution of Disputes**

If a dispute arises between Parties, including those issues requiring NYPSC action, the dispute resolution process described in the UBP will be followed.

### **2.6 Suspension**

#### **A. NYPSC Suspension of Retail Supplier**

In accordance with the provisions of the UBP, Central Hudson will be notified by the NYPSC if Retail Supplier's eligibility is temporarily suspended or permanently revoked. Central Hudson then will notify Customers. Upon the effective date of the termination of Retail Supplier's eligibility, the Company will cease to provide service under this Agreement and notify Customers of such action.

**B. Central Hudson Suspension of Retail Supplier**

Conditions under which Central Hudson will initiate a suspension of Retail Supplier are included in provisions of the UBP.

Central Hudson will notify in writing (by mail) Retail Supplier and the NYPSC of Central Hudson's intention to suspend Retail Supplier as of a date certain (the "Suspension Date"). Central Hudson will provide such written notice to Retail Supplier so that it is received at least 10 business days before the Suspension Date unless the suspension is related to an immediate safety or reliability issue, in which case notice will be provided on the Suspension Date. Unless informed otherwise by the NYPSC, Central Hudson will cease to provide service to Retail Supplier on the Suspension Date and will notify Customers of the suspension.

**2.7 Retail Access Customer Record**

Retail Supplier will obtain and retain authorization from each Customer and make the authorization available for audit by Central Hudson or its agent.

**2.8 Billing and Payment**

- A.** Central Hudson will bill Retail Supplier and Retail Supplier will pay fees and charges for reconciling imbalances as provided herein. Retail Supplier also shall pay all charges billed in accordance with the Tariff including charges for miscellaneous services and billing determinant items.
- B.** Retail Supplier will pay the full amount stated in any invoice from Central Hudson to Retail Supplier, without deduction, set-off or counterclaim, within 20 days from the date of such invoice. Claims that any invoice is not correct will be made no more than three months after the invoice date.
- C.** Upon failure of Retail Supplier to make any payment when due under this Agreement, Central Hudson will assess a late payment charge at the rate stated in the Tariff on all overdue billed amounts, including arrears and unpaid late payment charges.

**2.9 Notices**

Any notice to be provided pursuant to the terms of this Agreement will be deemed given, and any other document to be delivered hereunder will be deemed delivered, if in writing

and (i) delivered by hand, (ii) deposited for next-business day delivery (fee prepaid) with a reputable overnight delivery service such as Federal Express, or (iii) mailed by certified mail (return receipt requested) postage prepaid, addressed to the recipient at the address set forth below for that party (or at such other address as that party may from time to time designate by giving notice thereof).

Notice to:

Central Hudson Gas & Electric Corp.  
Michael Bachan - Associate Cost & Rate Analyst  
284 South Ave.  
Poughkeepsie, NY 12601  
Telephone #: 845-790-4898  
E-Mail: retailaccess@cenhud.com

and to:

Retail Supplier

\_\_\_\_\_  
\_\_\_\_\_  
Attn: \_\_\_\_\_  
Telephone #: \_\_\_\_\_  
E-Mail: \_\_\_\_\_

### 2.10 Customer Accounts

Central Hudson will provide Retail Supplier with the applicable billing determinants of Retail Supplier's Customers and such other information as detailed in the Tariff. Such information will be provided in accordance with the procedures set forth in the Tariff and may not be used by Retail Supplier for unrelated purposes.

## ARTICLE 3

### MISCELLANEOUS

#### 3.1 Amendments

Notwithstanding any provision of this Agreement, Central Hudson may at any time propose and file with the FERC and/or NYPSC changes to the rates, terms, and conditions of the tariff. Such amendment or modification will become effective with respect to service pursuant to this Agreement on the date specified by the FERC or NYPSC.

#### 3.2 Prior Agreements Superseded

This Agreement constitutes the entire understanding between the Parties with respect to the subject matter hereof, supersedes any and all previous understandings between the parties with respect to the subject matter hereof, and binds and inures to the benefit of the Parties, their successors and permitted assigns.

#### 3.3 Waiver and Modification

No modification or waiver of all or any part of this Agreement will be valid unless in writing and signed by the Parties or their agents. Any waiver will be effective only for the particular event for which it is issued and will not be deemed a waiver with respect to any subsequent performance, default or matter.

**3.4 Applicable Law and Forum**

This Agreement shall be interpreted and enforced in accordance with the laws of the State of New York (regardless of the laws that might otherwise govern under applicable principles of conflicts of law). Each Party agrees that any legal action or proceeding arising under or relating to this Agreement shall be brought in a court of the State of New York. Each Party hereby agrees to consent to the personal jurisdiction of the courts of the State of New York in any legal action or proceeding concerning this Agreement or the transactions contemplated hereby. Each Party agrees to accept service of process by mail in any such action or proceeding in accordance with applicable New York State law. The method of serving process, however, shall not be limited by this Agreement to service by mail.

**3.5 Severability**

If one or more provisions herein are held to be invalid, illegal or unenforceable for any reason, the remaining portion of the Agreement shall remain in such full force and effect and shall be carried out in a manner consistent with the intentions of the parties hereto.

**3.6 Agency**

This Agreement is not intended, and will not be construed, to create any association, joint venture, agency relationship or partnership between Central Hudson and the Retail Supplier or any other parties or to impose any such obligation or liability upon Central Hudson.

**3.7 Not for the Benefit of Third Parties**

This Agreement is for the benefit of the Parties hereto and not for the benefit of any third parties.

**3.8 Assignment of Contracts**

A Retail Supplier may assign customer contracts to other eligible Retail Supplier, and transfer the rights to serve those customers under the terms defined in the UBP.

**3.9** This Agreement may be executed in counterparts each of which shall be deemed an original and all of which shall be deemed one and the same Agreement.

**IN WITNESS WHEREOF**, the Parties hereto have caused this Agreement to be signed by their respective agents thereunto duly authorized, as of the date first above written.

CENTRAL HUDSON GAS & ELECTRIC CORP.

By \_\_\_\_\_  
Name \_\_\_\_\_  
Title \_\_\_\_\_  
Date \_\_\_\_\_

(Retail Supplier)

By \_\_\_\_\_  
Name \_\_\_\_\_  
Title \_\_\_\_\_  
Date \_\_\_\_\_



**BALANCING AND SETTLEMENT**

A. Contact person responsible for Balancing and Settlement \_\_\_\_\_

Address: \_\_\_\_\_

Phone Number \_\_\_\_\_ E-Mail Address: \_\_\_\_\_

B. Send Check (If a Credit is Due)To: \_\_\_\_\_

Address: \_\_\_\_\_

Phone Number \_\_\_\_\_ E-Mail Address: \_\_\_\_\_

**SUPPLIER CREDIT**

Contact person responsible for financial information \_\_\_\_\_

Address: \_\_\_\_\_

Phone Number \_\_\_\_\_ E-Mail Address: \_\_\_\_\_

**NEW YORK STATE TAX INFORMATION**

A. Contact Person Responsible for Tax Information \_\_\_\_\_

Phone Number \_\_\_\_\_ E-Mail Address: \_\_\_\_\_

**Important:** Please attach a copy of Form ST-120 New York State Resale Certificate

B. New York State Certificate of Authority #: \_\_\_\_\_

**Signature** \_\_\_\_\_ **Date** \_\_\_\_\_

**WHEN THIS FORM IS COMPLETED PLEASE MAIL IT TO:**

Mr. Michael Bachan  
Central Hudson Gas & Electric Corporation  
284 South Avenue  
Poughkeepsie, New York 12601

**CENTRAL HUDSON GAS & ELECTRIC CORP.**  
**SUPPLIER OPERATING AGREEMENT APPLICABLE TO INTERRUPTIBLE AND/OR FIRM**  
**TRANSPORTATION (SERVICE CLASSIFICATION NOS. 9 AND/OR 11)**

This **AGREEMENT** (“Agreement”), is made and entered into this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_, by and between Central Hudson Gas & Electric Corp. a New York corporation having its principal office at 284 South Ave., Poughkeepsie, New York 12601 (“Central Hudson”) and \_\_\_\_\_, a corporation, having an office at \_\_\_\_\_ (“Retail Supplier”), both Central Hudson and the Retail Supplier hereinafter sometimes referred to collectively as the “Parties”, or individually as a “Party”.

**WITNESSES**

**WHEREAS**, Retail Supplier desires to supply natural gas to interruptible and/or firm transportation customers (“Customers”); taking service under Service Classification Nos. 9 and/or 11.

**WHEREAS**, Central Hudson agrees to receive from the Retail Supplier and deliver such Customers’ natural gas quantities supplied by the Retail Supplier (“Natural Gas Supply”) through Central Hudson’s transmission and distribution system, subject to the terms and conditions of this Agreement.

**NOW THEREFORE**, in consideration of the premises and mutual promises set forth hereunder and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Central Hudson and Retail Supplier, intending to be legally bound, hereby covenant, promise and agree as follows:

**ARTICLE 1**  
**COMMON TERMS AND CONDITIONS**

**1.1 Incorporation by Reference**

The rights and obligations of the Parties under this Agreement shall be governed by the provisions of Central Hudson’s Schedule for Gas Service, P.S.C. No. 12 - Gas, as the same may be amended, modified, or superseded from time to time and are incorporated within the original agreement. In the event of any conflict, the Schedule for Gas Service, P.S.C. No. 12 - Gas, shall govern with respect to the services provided hereunder.

**1.2 Term**

This Agreement shall commence on the date set forth above (“Effective Date”), and will remain in effect until terminated in accordance with its terms, the Tariff, or an order of the FERC or the NYPSC.

**ARTICLE 2**  
**BALANCING AND AGENCY ARRANGEMENTS**

**2.1 Retail Supplier Obligations**

The Retail Supplier must follow all supply requirements as outlined in the Gas Transportation Operating Procedures Manual and as further defined in Central Hudson’s Schedule for Gas Service, P.S.C. No. 12 - Gas, Service Classification Nos. 9 and/or 11, as the same may be amended, modified or superseded from time to time.

**2.2 Representations and Warranties**

Retail Supplier makes the following representations and warranties to Central Hudson:

- A. The information in Appendix No. 1 (Retail Supplier Information Form) is correct as of the Effective Date, and Retail Supplier will promptly inform Central Hudson in writing of any changes in such information.
- B. Retail Supplier will have sufficient natural gas supply resources available to it, either by contract or through ownership to provide Customers with their natural gas requirements.

**2.3 Central Hudson Service**

Central Hudson will follow all requirements as outlined in the Gas Transportation Operating Procedures Manual and as further defined in Central Hudson’s Schedule for Gas Service, P.S.C. No. 12 - Gas, Service Classification Nos. 9 and/or 11, as the same may be amended, modified or superseded from time to time.

**2.4 Billing and Payment**

- A. Central Hudson will bill Retail Supplier and Retail Supplier will pay fees and charges for reconciling imbalances as provided herein. Retail Supplier also shall pay all charges billed in accordance with the Tariff including charges for miscellaneous services.
- B. Retail Supplier will pay the full amount stated in any invoice from Central Hudson to Retail Supplier, without deduction, set-off or counterclaim, within 20 days from the date of such invoice. Claims that any invoice is not correct will be made no more than three months after the invoice date.
- C. Upon failure to make any payment when due under this Agreement, Central Hudson will assess a late payment charge at the rate stated in the Tariff on all overdue billed amounts, including arrears and unpaid late payment charges.

**2.5 Notices**

Any notice to be provided pursuant to the terms of this Agreement will be deemed given, and any other document to be delivered hereunder will be deemed delivered, if in writing and (i) delivered by hand, (ii) deposited for next-business day delivery (fee prepaid) with a reputable overnight delivery service such as Federal Express, or (iii) mailed by certified mail (return receipt requested) postage prepaid, addressed to the recipient at the address set forth below for that party (or at such other address as that party may from time to time designate by giving notice thereof).

Notice to: Central Hudson Gas & Electric Corp.  
 Cost and Rate Division  
 284 South Ave.  
 Poughkeepsie, NY 12601  
 Telephone #: 845-486-5420  
 E-Mail: retailaccess@cenhud.com

and to: Retail Supplier  
 \_\_\_\_\_  
 \_\_\_\_\_  
 Attn: \_\_\_\_\_  
 Telephone #: \_\_\_\_\_  
 E-Mail: \_\_\_\_\_

**2.6 Customer Accounts**

Central Hudson will provide Retail Supplier access to each of its customer's MDQ data. Such information may not be used by Retail Supplier for unrelated purposes.

**ARTICLE 3  
MISCELLANEOUS**

**3.1 Amendments**

Notwithstanding any provision of this Agreement, Central Hudson may at any time propose and file with the FERC and/or NYPSA changes to the rates, terms, and conditions of the tariff. Such amendment or modification will become effective with respect to service pursuant to this Agreement on the date specified by the FERC or NYPSA.

**3.2 Prior Agreements Superseded**

This Agreement constitutes the entire understanding between the Parties with respect to the subject matter hereof, supersedes any and all previous understandings between the parties with respect to the subject matter hereof, and binds and inures to the benefit of the Parties, their successors and permitted assigns.

**3.3 Waiver and Modification**

No modification or waiver of all or any part of this Agreement will be valid unless in writing and signed by the Parties or their agents. Any waiver will be effective only for the particular event for which it is issued and will not be deemed a waiver with respect to any subsequent performance, default or matter.

**3.4 Applicable Law and Forum**

This Agreement shall be interpreted and enforced in accordance with the laws of the State of New York (regardless of the laws that might otherwise govern under applicable principles of conflicts of law). Each Party agrees that any legal action or proceeding arising under or relating to this Agreement shall be brought in a court of the State of New York. Each Party hereby agrees to consent to the personal jurisdiction of the courts of the State of New York in any legal action or proceeding concerning this Agreement or the transaction contemplated hereby. Each Party agrees to accept service of process by mail in any such action or proceeding in accordance with the applicable New York State law. The method of serving process, however, shall not be limited by this Agreement to service by mail.

**3.5 Severability**

If one or more provisions herein are held to be invalid, illegal or unenforceable for any reason, the remaining portion of the Agreement shall remain in such full force and effect and shall be carried out in a manner consistent with the intentions of the parties hereto.

**3.6 Agency**

This Agreement is not intended, and will not be construed, to create any association, joint venture, agency relationship or partnership between Central Hudson and the Retail Supplier or any other parties or to impose any such obligation or liability upon Central Hudson.

**3.7 Not for the Benefit of Third Parties**

This Agreement is for the benefit of the Parties hereto and not for the benefit of any third parties.

**3.8** This Agreement may be executed in counterparts each of which shall be deemed an original and all of which shall be deemed one and the same Agreement.

**IN WITNESS WHEREOF**, the Parties hereto have caused this Agreement to be signed by their respective agents thereunto duly authorized, as of the date first above written.

CENTRAL HUDSON GAS & ELECTRIC CORP

(Retail Supplier)

By \_\_\_\_\_  
Name \_\_\_\_\_  
Title \_\_\_\_\_  
Date \_\_\_\_\_

By \_\_\_\_\_  
Name \_\_\_\_\_  
Title \_\_\_\_\_  
Date \_\_\_\_\_

**BUSINESS INFORMATION**

Supplier Federal Tax ID: \_\_\_\_\_  
Company Name: \_\_\_\_\_  
Business Address: \_\_\_\_\_  
Mailing Address: \_\_\_\_\_  
Business Contact Name (Title): \_\_\_\_\_  
Telephone Number: \_\_\_\_\_  
E-Mail Address: \_\_\_\_\_  
Internet Site: \_\_\_\_\_

**BALANCING AND SETTLEMENT**

A. Contact person responsible for Balancing and Settlement \_\_\_\_\_  
Address: \_\_\_\_\_  
Phone Number \_\_\_\_\_  
E-Mail Address \_\_\_\_\_

B. Send Check (If a Credit is Due) To: \_\_\_\_\_  
Address: \_\_\_\_\_  
Phone Number \_\_\_\_\_  
E-Mail Address \_\_\_\_\_

**NEW YORK STATE TAX INFORMATION**

A. Contact Person Responsible for Tax Information \_\_\_\_\_  
Phone Number \_\_\_\_\_  
E-Mail Address \_\_\_\_\_

**Important:** Please attach a copy of Form ST-120 New York State Resale Certificate

B. New York State Certificate of Authority #: \_\_\_\_\_

**Signature** \_\_\_\_\_ **Date** \_\_\_\_\_

**WHEN THIS FORM IS COMPLETED PLEASE MAIL IT TO:**

Central Hudson Gas & Electric Corporation

Cost and Rate Division

284 South Avenue

Poughkeepsie, NY 12601

AFFIDAVIT FOR CURTAILMENT OF OPERATIONS

FOR THE DURATION OF ANY AND ALL CALLED INTERRUPTIONS  
By CENTRAL HUDSON GAS & ELECTRIC CORPORATION, P.S.C. NO. 12 – GAS,  
SERVICE CLASSIFICATION NO. 9 – INTERRUPTIBLE TRANSPORTATION SERVICE

STATE OF \_\_\_\_\_

COUNTY OF \_\_\_\_\_

\_\_\_\_\_, being duly sworn, says: I am \_\_\_\_\_ of  
Name Title of Officer

\_\_\_\_\_ (hereafter "Customer"), and intend to  
Company Name

shut down its operations for the duration of any and all called interruptions and continue to comply with all other interruptible provisions described in Central Hudson's Schedule for Service, P.S.C. No. 12 – GAS and Service Classification No. 9 – Interruptible Transportation Service.

This Affidavit covers the period November 1, \_\_\_\_\_ through October 31, \_\_\_\_\_.  
Year Year

Sworn to before me this \_\_\_\_\_ day  
of \_\_\_\_\_ 20\_\_

\_\_\_\_\_  
Notary Public

## Glossary of Terms

**AGGREGATED DAILY CONTRACT QUANTITY FORECAST (Citygate) - (ADCQ<sub>forecast</sub>):** The volume of gas, expressed in dekatherms (Dth), to be delivered to the Company on a daily basis on behalf of a Customer Buying Group, or Pool: sum of each Pool's DCQ<sub>forecast</sub> multiplied by the factor of adjustment and converted from Ccf to Dth using the twelve month system average BTU conversion factor.

**AGGREGATED DAILY CONTRACT QUANTITY ACTUAL (Citygate) - (ADCQ<sub>actual</sub>):** Sum of each Pool's DCQ<sub>actual</sub> multiplied by the factor of adjustment and converted from Ccf to Dth using the twelve-month system average conversion factor.

**AGGREGATED GROUP:** A group of customers who have contracted with a specific Retail Supplier who combines customers' load for the purposes of nominations, scheduling reconciliation of monthly imbalances and supplemental supply billing.

**AGGREGATOR:** Any party (such as a Retail Supplier) that is approved by the Company to deliver gas supplies to an Aggregated Group.

**ANNUAL PERIOD:** The 12 months beginning with the month in which the customer first receives service under the applicable Service Classification and each succeeding 12-month period.

**ALTERNATE ENERGY SUPPLIER or ENERGY SERVICE COMPANY (ESCO):** An energy company that offers to supply the actual commodity of natural gas. This entity is sometimes referred to as a "retail supplier" or "Retail Supplier".

**ANNUAL CONSUMPTION QUANTITY - (ACQ):** The customer's annual natural gas requirement at design weather conditions.

**BALANCING:** A process that reconciles actual customer use with the amount of natural gas delivered to the Company on behalf of the customer. Any difference between the two is an imbalance.

**BUNDLED SERVICE:** Providing full-service natural gas including the supply from the pipeline, delivery through gas mains and service pipes, reading meters, and providing customer service. This is the way you've been accustomed to receiving your natural gas service.

**CALENDAR OF GAS TRANSPORTATION SCHEDULING:** A schedule, which indicates when information pertaining to transportation gas is to be made available. The Calendar is available on the Company's website.

**CAPACITY RELEASE:** The release of a Utility entitlement to interstate pipeline transportation capacity to a customer or a third party.

**CAPACITY RELEASE SURCHARGE:** A charge to a customer who chooses to take assignment of the upstream pipeline capacity under contract to the Company. The capacity release surcharge rate per 100 cu. ft. is equal to the weighted average cost of pipeline capacity included in the Company's calculation of the Monthly Gas Supply Charge.

**CITY GATE:** The point of interconnection between a pipeline and a local distribution company where the gas is delivered to the LDC.

**CORE MARKET CUSTOMER:** A customer who lacks alternatives to natural gas or chooses not to utilize alternatives to natural gas. If a customer chooses to be a core customer for a specific application or end-use, such application must be separately metered.

**CRITICAL DAY:** A critical day exists when the LDC declares an OFO.

**CURTAILMENT:** A mandatory reduction of gas deliveries and usage.

**CUSTOMER BUYING GROUP:** A group of customers formed for the sole purpose of transporting gas under the Company's aggregated transportation tariff.

**DECREMENTAL:** A volume reduction in the Retail Access Marketer's forecasted daily nomination requirement.

**RETAIL ACCESS:** The ability of individual customers to select an alternate supplier to provide their natural gas; sometimes called "retail access".

**DAILY CONTRACT QUANTITY FORECAST (Burnertip) - (DCQ<sub>forecast</sub>):** The volume of gas, expressed in Ccf, to be delivered to the Company on a daily basis on behalf of a transportation customer as specified by the Company: (Number of days in month times non-heat factor plus the normal monthly degree days times the heat factor) divided by the number of days in the month.

**DAILY CONTRACT QUANTITY ACTUAL (Burnertip) - (DCQ<sub>actual</sub>):** An estimate of the volume of gas, expressed in Ccf, delivered to the Company on a daily basis based on the actual number of degree days: (Number of days in month times non-heat factor plus the actual monthly degree days times the heat factor) divided by the number of days in the month.

**DELIVERY SERVICE CUSTOMER:** A customer who elects to participate in Central Hudson's Retail Access Plan and receives their supply of natural gas from an alternate supplier. Central Hudson will continue to deliver the gas.

**DIRECT CUSTOMER:** A customer with an annual natural gas consumption in excess of 35,000 Ccf that acts on their own behalf in arranging to bring natural gas to Central Hudson's citygate for their own consumption and not for resale. A Direct Customer does not have to file an application with the New York State Department of Public Service to become eligible as a Retail Supplier but must comply with certain operating requirements established by the Company. A Direct Customer may aggregate and schedule load for itself and other Direct Customers, each of which would continue to be responsible individually for meeting requirements placed on Direct Customers.

**DISTRIBUTION:** The delivery of natural gas through pipes along roadways into your home or business. The cost to provide this service is included in the delivery-service portion of the customer's bill.

**FULL-SERVICE CUSTOMER:** A customer who elects not to participate in Retail Access and continues to receive both the supply and delivery of natural gas from Central Hudson.

**GAS DAY:** The twenty-four hour period beginning at 10:00 a.m. EST.

**GAS CONFIRMATION:** The process by which a gas supplier's nomination to the LDC is verified by the pipelines and the LDC.

**GAS INDUSTRY STANDARDS BOARD (GISB):** A not for profit North American industry association whose mission is "to develop and promote standards to simplify and expand electronic communications, and to simplify and streamline business practices that will lead to a seamless marketplace for natural gas".

**INCREMENTAL DAILY CONTRACT QUANTITY (Citygate) - (IDCQ):** The incremental volume of gas, expressed in Ccf, to be delivered to the Company on a daily basis, on behalf of a transport customer to meet the customer's incremental natural gas requirements during periods of peak weather conditions.

**INTERCONNECTION POINTS:** The point of delivery between the Company's facilities and the upstream pipeline's facilities.

**INTERRUPTIBLE SERVICE:** Transportation and sales service which can be interrupted by the LDC.

**LINE LOSS:** The amount of gas lost in the gas distribution system.

**LOAD FACTOR:** The ratio of the average consumption to the maximum consumption for the same time period.

**LOST AND UNACCOUNTED FOR GAS (LAUF):** The difference between the quantity of gas available from all sources and the quantity accounted for.

**MAIN:** A pipeline located on a public or private right-of-way, which is generally available or used to transport gas to more than one service line.

**MARKETER / RETAIL SUPPLIER:** Any non-utility entity that is determined eligible by the New York State Department of Public Service to provide or arrange to provide gas supply and other services on behalf of end use customers in New York State using Central Hudson's distribution system.

**MAXIMUM DAILY QUANTITY - (MDQ):** The maximum volume of gas the Company is obligated to accept on behalf of a transportation customer during the twenty-four hour period beginning at 10:00 a.m. each day.

**NON-CORE MARKET CUSTOMER:** A customer who has and chooses to utilize alternatives to natural gas. If a customer chooses to be a non-core customer for a specific application or end-use, such application must be separately metered.

**NOMINATION:** A shipper's request to move a certain amount of gas on a pipeline during a given period.

**NORMAL DEGREE DAYS:** Estimated (normalized) degree days for a given period based on historic averages.

**NORMALIZED:** Adjusted for weather based on the degree day factors.

**OPERATIONAL FLOW ORDER:** Orders issued by a pipeline or an LDC in difficult operational circumstances to protect the integrity of its gas system, either by restricting service or requiring affirmative action by shipper.

**PEAK DAY:** The day in which the greatest volume of gas is delivered to meet the demand of the customers.

**PEAKING SERVICE SURCHARGE:** The peaking service surcharge rate per 100 cu. ft. is equal to the weighted average cost of the peaking service demand components included in the Company's calculation of the Monthly Gas Supply Charge.

**PUBLIC RIGHT-OF-WAY:** The territorial limits of any street, avenue, road or way (other than a limited access thoroughfare) that is for any highway purpose under the jurisdiction of the State of New York or the legislative body of any county, city, town or village and is open to public use.

**QUALIFIED SELLER OR AGENT:** A non-utility supplier that arranges to bring gas to the utility citygate on behalf of a customer or aggregated customer buying group.

**RETAIL SUPPLIER / MARKETER:** Any non-utility entity that is determined eligible by the New York State Department of Public Service to provide or arrange to provide gas supply and other services on behalf of end use customers in New York State using Central Hudson's distribution system.

**SERVICE LINE:** The piping, including associated metering and pressure reducing appurtenances, that transports gas below grade from a main to the first accessible fitting inside the wall of a customer's building when a meter is located within the building; if a meter is located outside the building, the service line will be deemed to terminate at the outside of the building foundation wall.

**SLAMMING:** Where a customer is switched from one provider to another without the customers authorization.

**STREAMING TRANSACTION:** The arrangement by the Company for specific gas supplies dedicated to an individual customer, customer buying group or market.

**STORAGE SERVICE SURCHARGE:** The storage service surcharge rate per 100 cu. ft. is equal to the weighted average cost of the storage services included in the Company's calculation of the Monthly Gas Supply Charge.

**STORAGE SPACE SURCHARGE:** The storage space surcharge rate per 100 cu. ft. is equal to the weighted average cost of the storage space included in the Company's calculation of the Monthly Gas Supply Charge.

**SUMMER PERIOD:** April 1 through October 31.

**SYSTEM ALERT:** An announcement of actual or pending events that if unchecked may result in an OFO.

**TRANSMISSION:** The delivery of natural gas (often over long distances) from pipelines through Central Hudson's gas transmission system. The cost to provide this service is included in the delivery-service portion of the customer's bill.

**TOTAL CONTRACT QUANTITY (TCQ):** The amount of pipeline capacity required to be obtained by a Retail Supplier serving customers on Service Classification Nos. 6, 12 and 13, excluding any applicable Alternate Capacity Requirements as more fully described in General Information Section 41.

**UNBUNDLED SERVICE:** Separates the generating or commodity of natural gas from all the other services required to provide delivery of gas to a home or business.

**UPSTREAM CAPACITY ASSIGNMENT:** The assignment of transportation capacity on upstream pipeline(s) which is available to the Company for other parties.

**WINTER PERIOD:** November 1 through March 31.

## Section B: Interconnect Guide for Renewable Natural Gas (RNG)

### Central Hudson Gas & Electric Corporation Natural Gas System

Central Hudson Gas & Electric Corporation, a subsidiary of Fortis Inc., is an energy delivery company headquartered in Poughkeepsie, New York. The utility serves approximately 300,000 electric and 80,000 natural gas customers in eight counties of New York State's Mid-Hudson River Valley, delivering natural gas and electricity in a 2,600-square-mile service territory that extends north from the suburbs of metropolitan New York City to the Capital District around Albany. The Company's natural gas system is comprised of both transmission and distribution facilities. Central Hudson's gas transmission system consists of four gate stations and approximately 165 miles of pipeline operating at 350 psig to 750 psig. The Company's gas distribution facilities consist of approximately 150 regulator stations and 1,300 miles of distribution pipeline operating at pressures from utilization up to 120 psig. Central Hudson, working in collaboration with other state gas utilities, the Northeast Gas Association and the Gas Technology Institute, has developed a process guideline for the interconnection of renewable natural gas (RNG) facilities into its natural gas system. The objective of the collaborative was to provide a framework of uniform standards for these types of installations that applied statewide.

### Interconnect Guide for Renewable Natural Gas Scope & Applicability

The objective of this document is to provide the technical framework and guidance necessary for introduction of renewable fuels, such as renewable natural gas (RNG), into the pipeline network. RNG is a product of anaerobic digestion or gasification of a wide variety of waste products. These include dairy/animal residuals (e.g., manure, etc.), landfill biomass material, wastewater treatment produced gases; digestion of agricultural wastes and, in advanced systems, co-digestion of mixed biomass substrates. Digestion or gasification of biomass material results in "raw" biogas production (a gas which contains up to 68% methane); the product suitable for introduction to the natural gas pipeline network is, for the most part, processed biogas (termed "RNG"), where constituents potentially problematic to pipeline integrity and end-use applications are treated to acceptable levels. Over the past decade, significant research has been conducted to better understand the similarities and differences in biogas composition relative to traditional pipeline quality natural gas delivered into the northeast region. In parallel, significant technology advancements have been achieved in processing and treatment of raw biogas to address trace constituent concerns of end-users making processed biogas, or RNG, compatible with local gas distribution system and end-use requirements. This document is intended to encourage maximizing acceptance of RNG into the pipeline grid by using a "good science & common sense" approach to bridge both policy and technical concerns of project developers and Central Hudson Gas & Electric Corporation ("Central Hudson", "the Company").

Although fundamental interchangeability criteria have been established for alternative gases including biogas, lack of a consistent approach to evaluating acceptance criteria has proven to be barrier to wide-scale acceptance of RNG directly into distribution networks. This Guidance Document provides an evaluation process including a list of potential constituents of concern based on biomass feedstock. The approach helps eliminate a “one size fits all” solution to acceptance by focusing on specific, reasonably expected raw gas constituents relative to pipeline natural gas. The process then looks at the proposed clean-up technology to help optimize clean-up solutions relative to reasonably expected constituent levels presently found in flowing pipeline supplies. A user-friendly technical framework is provided to help minimize overall operational risk for both the developer and the Company thereby minimizing potential impacts to end-use consumers.

This framework includes the following elements:

- ✓ Interconnect Agreement Evaluation Process Flow Diagram
- ✓ Producer/Developer & Company Assessment Checklists
- ✓ Gas Quality & Interchangeability Management Program Matrix
- ✓ Raw Biogas & Upgraded RNG Trace Constitutes Measurement Matrix & Sampling Plans

Finally, the document provides a comprehensive list of technical references that support the overall suggested process approach to accepting renewable natural gas supplies into the distribution network. The appendix contains a sample Engineering Service Agreement and Gas Sales Agreement (Interconnect Agreement). These sample agreements serve as a starting place in the evaluation and gas acceptance process and provide essential elements for project/company specific agreements. The ultimate goal of this document is to minimize technical uncertainty and perceived risk by both developers and Central Hudson to the extent the industry can maximize acceptance of this valuable energy resource.

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## Renewable Natural Gas Interconnect Agreements A Guideline for RNG Producers

In his 2016 State of the State speech New York Governor Andrew Cuomo announced an aggressive drive towards incorporating renewable energy into the state's energy portfolio. Cuomo said clean energy is a business opportunity for the state, as well as an important step to address increasing climate change challenges. He already announced in 2015 that he supports New York getting half of its power from renewable energy within 15 years. New York City already has a goal of powering 100 percent of City government operations from renewable sources of energy.

Renewable natural gas (RNG), or biomethane (another term for RNG), derived from landfills, waste water treatment plants (WWTPs), dairy farms, food waste processors, gasifiers, and other sources can be positioned to become an important part of meeting renewable energy challenges in New York State. This type of gas is already being accepted and used in many parts of the state. Introduction of RNG directly into a gas distribution system has been successfully practiced for over 30 years from the Staten Island landfill and is being proposed at the Newtown Creek waste water treatment plant (WWTP) in the New York metro area. Many other facilities are using RNG for electricity generation on site. Today, other companies are considering RNG as a fuel of choice and part of the overall equation in meeting renewable energy needs. This is an opportunity to shape the energy future of New York, recovering a valuable fuel resource while eliminating release of greenhouse gases to the environment.

Throughout the state, RNG project developers are in discussion with gas distributors (pipeline operators). But the processes, requirements, and agreements are not uniform, resulting in commercial and technical uncertainty for both parties that inhibits maximum recovery of this valuable resource. A consistent approach is needed to assess the commercial and technical viability of each project that encourages and maximizes introduction of all types of RNG into the pipeline system without compromising pipeline safety or reliability of the pipeline grid. This approach will bring certainty for all parties involved in negotiations with regard to safety, reliability, continuity, and interchangeability. It will define the requirements to keep gas flowing and avoid service interruption. It will help project developers and RNG producers by providing a standardized framework throughout the state that can be used to reduce uncertainty around what is needed from a technical perspective to optimize biogas processing facility design.

This document is intended to outline a structured approach that all parties can use to begin the critical process of technical collaboration necessary to understand each other's requirements and ultimately, to make each biogas development project a success story for all involved parties. It lays out what the roles and responsibilities of the Company and the project developer/ producer should be, and offers a common technical framework describing what each party needs to accomplish. Successful and sustainable introduction of RNG into the natural gas network often depends on multiple variables beyond specific gas quality objectives. Defining these variables and their impact on a project will lead to productive dialog between all parties.

## Introduction – RNG Gas to Grid

RNG is pipeline quality gas that is fully interchangeable with natural gas. It comes from raw biogas after the biogas is cleaned of impurities. Raw biogas contains varying amounts of methane with other gases, along with small amounts of trace constituents.

There are two basic types of raw biogas. The first is the more traditional type that comes from anaerobic digestion. The second derives from biomass gasification.

Anaerobic (oxygen-free) digestion based biogas is produced from a basic two step mechanism independent of the source waste material. Aerobic microorganisms contained in all decaying matter initially react with oxygen from entrapped air. Once the oxygen is depleted, an anaerobic environment is created that allows for the remaining organic material to decompose and be converted into biogas. Potential waste-derived biogas sources are solid waste (landfill/municipal facilities and food waste), WWTPs, and animal manure. The raw biogas from anaerobic digesters is often flared off, or used to generate electricity on-site.

The second source of biogas is from gasification of biomass feedstocks such as wood waste, coal, coke, bagasse, and other biologically-derived sources. Gasification is the process of high temperature conversion of organic material into a biogas that can be further methanized and cleaned into RNG.

In contrast to Europe, biogas utilization remains limited in the United States. Lately, there is heightened interest in fully upgrading biogas to RNG and more fully utilizing this valuable renewable source. The three most common biogas upgrading technologies are: pressure swing adsorption (PSA), physical solvent scrubbing (with organic glycols or amines), and gas separation membranes.

Biogas is recognized as a valuable, relatively untapped resource which, when appropriately upgraded to acceptable pipeline quality levels, becomes an interchangeable carbon-neutral product.

## Commercial and Contractual Relationships

The two main parties involved in an RNG interconnection project are the project developer/ producer (who recovers, processes, and sells the RNG) and the pipeline operator (who receives RNG for purchase, and/or transportation for purchase, by another party for end use).

The developer/producer is responsible for project development, producing and upgrading the gas. The producer may be the digester owner, or it may be the upgrade process developer, or even a third party who has contracted with one of the above. In some cases it may be a gas utility.

The pipeline operator owns and operates the pipeline system that would receive the RNG. For purposes of this document, the pipeline operator is Central Hudson Gas & Electric Corporation.

It is not the intention of Central Hudson to own or operate the biogas conditioning and/or upgrading facility. The developer/producer is typically the owner of any gas treatment system (prior to gas entering the Company gas distribution system). While regulatory compliance with New York State Code Title 16, Chapter III 16 NYCRR Part 229 standards for pipeline injection of any gas source for distribution to consumers is the utility or pipeline operators responsibility, the developer/producer is solely responsible for ensuring that upgraded RNG intended for pipeline injection meet these statutory requirements as well as any other requirements of the Company.

## Social and Economic Benefits of RNG Recovery

The social benefits of using RNG are numerous. RNG is considered a ‘carbon neutral’ energy source because the carbon released by its combustion comes from carbon already fixed from the natural carbon cycle (i.e. contained in recently living biomass).

Using the methane generated from natural decomposition to make RNG prevents it from degrading in an open environment and leaking into the atmosphere. There is a definite environmental benefit from capturing this gas instead of flaring or venting it. Greenhouse gas (GHG) emissions are reduced and the final waste stream is cleaner and less polluting. The amount of organic waste disposed in landfills will be reduced because the waste is being diverted into RNG gas projects. Overall air quality is improved.

When the recovered methane is burned to produce heat and energy, the by-products are carbon dioxide (CO<sub>2</sub>) and water. While CO<sub>2</sub> is also a greenhouse gas, its impact is considerably less than methane. Combustion of RNG reduces the GHG impact by over 20 times (based on global warming impact calculations for the next 100 years).

Recovering RNG also makes economic sense. Construction, operation, and maintenance of RNG gas production plants create new jobs and stimulate the local economy. Financial payments stay within New York State, to the benefit of municipalities and businesses. Producing, recovering, and using RNG increases the security and diversity of energy supplies in the United States.

## Essential Elements of Getting Connected

There are a few essential steps in the process for getting an RNG project connected to the pipeline grid. It is recommended that the project developer/producer engage with Central Hudson 18-24 months in advance of the desired in-service date. Figure 1 shows the basic process. A more detailed flow diagram is found in Appendix A.

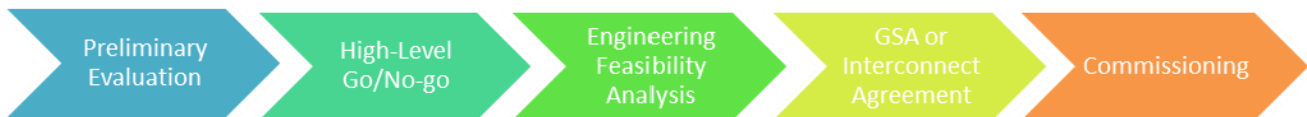


Figure 1: Sequence of Events in Getting Connected

The first step is the Preliminary Evaluation. This is a high-level concept feasibility assessment focused on the ability of Central Hudson to receive gas into its distribution or transmission system based on the interconnection location and associated system flow capacity. The developer/producer will contact the District Director- New Business Services and describe the project. The more information that can be provided at this point will make the process go as quickly and smoothly as possible. At a minimum, the preliminary project scope description should include:

- Proposed facility Location,
- Anticipated interconnect pressure,
- Temperature,
- Pipe size,
- Heating value and specific gravity,
- Production flow rates (net anticipated hourly/daily flow rates),
- Deliverability of gas to Central Hudson (including daily/seasonal variations if any), and
- Any other key process variables.

The Company will make a high-level go/no-go appraisal based on the preliminary information provided. If Central Hudson determines that the project has potential at the desired interconnect location, the process will move to the next step which is execution of an Engineering Services Agreement (ESA) to perform a deeper evaluation of the technical aspects of the project including assessment of biogas feedstock to determine reasonable trace constituents of concern that may impact safety and reliability of the gas pipeline distribution system.

Once engineering feasibility is established, a Gas Sales Agreement or Interconnect Agreement is negotiated which highlights mutually agreeable commercial aspects of the project (commodity price, facility maintenance cost sharing agreements, initial and on-going gas quality monitoring and sampling requirements, gas odorization and custody transfer measurement, etc.) Following execution of the GSA, the facility is constructed and its product is vetted as acceptable to the Company through periodic gas analysis and testing protocols identified in the GSA.

## Engineering Services Agreement

The initial go/no-go decision includes a broad overview of the developer/producer's project to provide RNG to the Company. The initial overview evaluation allows Central Hudson sufficient information to move forward with a more detailed engineering evaluation. There are many regulatory, technical and economic details that the Company must consider before accepting a new source of gas.

As part of the ESA Central Hudson will need more detailed information about the project. The developer/producer will provide a detailed Technical Proposal to the Company, typically conducted under a Non-Disclosure Agreement (NDA).

Included in the technical proposal is:

- A description of the chosen gas clean-up technology.
- Supporting data to validate that the clean-up technology is compatible with the upgraded gas feedstock.
- A detailed analysis of the raw biogas for the presence of contaminants detrimental to the proposed clean-up technology solution, pipeline safety, integrity, end users, and consumers.

The gas analysis information is needed to determine what associated process safety mitigation measures should be incorporated into the proposed system. The concern here is what would happen if a gas processing system abnormal operating condition occurred resulting in break-through of constituents that ultimately impact gas quality specifications.

The raw gas analysis must include all reasonably expected trace constituents based on the specific feedstock. Each constituent must be addressed by the chosen cleanup technology such that the chemical "fingerprint" of the gas delivered to the Company is comparable to pipeline quality gas flowing within the pipeline in proximity to the proposed interconnect location.

The ESA should be executed as early as possible so that this detailed examination of potential impact on the existing pipeline system and its end-use customers can be quickly determined. Potential impact issues include:

- Examination of pipeline capacity during varying load periods,
- The zone of influence of trace constituent impact as determined through system modelling. This will evaluate trace constituent impact and resulting potential impact on end-use customers),
- Safety and reliability of the pipeline systems, and
- Impact on therm billing monitoring.

The project developer/producer should be aware that having a pipeline nearby does not guarantee that it can be used for RNG injection. The specific pipeline's capacity and network configuration must be

taken into account. Not all pipelines can handle gas receipt on a routine basis. Making contact with the Company and agreeing to move forward with an ESA does not guarantee acceptance of the project.

The ESA may provide reimbursement to the Company for their engineering services expenses incurred while fully evaluating the Technical Proposal to make an interconnect. Whether or not reimbursement is included will be negotiated by the involved parties. This is a legal contract between Central Hudson and the project developer/producer.

The Company commits to a full technical and economic feasibility evaluation of the Technical Proposal. The producer/developer commits to providing complete information and transparency of their RNG upgrade process. The ESA will provide a schedule of communication between the two parties and will designate the technical contacts for the review process.

The next step, after essential elements of the ESA are satisfied and the resulting gas quality proven acceptable, would be establishment of a mutually agreeable Gas Sales Agreement between the producer/developer and the Company. This should be executed prior to commencing facility construction.

NOTE: While successful completion of the ESA is key for project success, completion does not guarantee project acceptance and is non-binding pending successful execution of the Gas Sales Agreement (GSA).

Appendices B, C, and D offer guidance for the assessment process. Appendix E contains an sample ESA.

## [Interconnect Contract or Gas Sales Agreement](#)

Once the technical evaluation is complete and the interconnect is found acceptable, commercial aspects of accepting gas from the proposed facility are negotiated and an Interconnect Contract or Gas Sales Agreement (GSA) is executed. The ESA provides a common platform of technical certainty which facilitates optimization of a commercial agreement.

Essential elements of a GSA include

- Commodity and receipt point O&M (Operations and Maintenance) compensation,
- Delivery obligations (volume, energy content, pressure, temperature, flow rate etc.),
- Gas pairing agreements (contractual blending if applicable),
- Gas measurement requirements (schedule and periodicity, equipment, sharing of monitoring information and electronic signals etc.),
- Operation and maintenance requirements (monitoring and measurement equipment maintenance, odorization and metering equipment maintenance etc.),
- Facility access,
- Gas quality monitoring requirements,
- Conditions that impact acceptance of upgraded gas and facility isolation,
- Billing and payment terms, and
- Tariff or a special contract for transporting the gas, this will enable the pipeline operator to facilitate the desired transaction for the producer/developer if the RNG will be sold to a third party.

Appendix F contains an sample GSA.

## [Project Evaluation and Connection Assessment Process](#)

Several steps are necessary for a proper project evaluation and connection assessment, and are described in the following sections.

## Producer Preliminary Technical Assessment and Connection Evaluation Request

The first step in the project assessment process is for the developer/producer to directly contact Central Hudson. A brief description of the proposed project is needed including:

- Source of biogas (WWTP, landfill, agriculture, food, gasification, etc.),
- Precise site location and who owns the land,
- How much gas will be produced,
- What flow rates are anticipated,
- What pressure will be available,
- Any seasonality changes to the gas stream, both in composition and availability,
- What cleanup technology will be used and how efficient it will be, and
- Prior experience with the proposed cleanup technology relative to the biogas feedstock.

For the purposes of this process the Company contact will be the District Director of New Business Services or his/her assignee. The Company contact person will engage with Gas & Mechanical Engineering to perform a high-level technical review of the preliminary proposal. This process may take several weeks. The Company contact person will then contact the developer/producer to discuss results of the preliminary assessment, typically a “go / no-go” response to proceed to the next phase of evaluation. If the proposal is selected for further assessment, the Company contact will set up a preliminary review meeting with the developer/producer. The developer/producer may withdraw the proposal at any time.

During this preliminary review meeting, Central Hudson will go over the next steps including a review of the ESA, the GSA requirements, pipeline operator specific needs, and any local, state and/or federal regulatory requirements including New York State Code 16 NYCRR Part 229 gas quality standards for pipeline injection. Relevant gas quality information and rationale will be included based on the anticipated biomass feedstock material (see Appendix G for Feedstock/Upgraded Gas Constituent Guidance Matrix).

If the developer/producer decides to continue the process, the ESA will be executed and Central Hudson will begin the comprehensive system engineering feasibility study. A schedule for further meetings will be determined along with a timeline for ESA completion and discussion of the financial commitment needed from the developer/producer.

## System Engineering Feasibility Study

The Company has many variables to assess to ensure a reliable and safe interconnect agreement including:

1. Will the RNG be aggregated (contractual blending/pairing or in-situ system aggregation) with pipeline gas or will the gas be introduced from a sole source with limited pipeline blending capability?
2. What is the zone of influence? A zone of influence is the geographical area that could be significantly affected by changes in the gas supply, properties, and constituents. It is determined through engineering modeling of the gas flows and pressures. It includes an evaluation of pipeline integrity issues as well as end-use considerations. This approach is similar to how a utility would look at any change in gas quality such as Wobbe or Heating Value.
3. Who would receive the RNG? How will the gas be utilized by potentially sensitive receptors of the gas? An end-user such as a bakery or food processor may not be able to tolerate even a slight change in heat content of the gas or the presence of trace constituents. A customer impact survey may be needed.

4. Can the end-user handle it better if the RNG is blended with pipeline gas? Depending on the interconnect location, this may or may not be feasible.
5. Will accepting the RNG have any impact on other local pipeline interconnects? The project cannot compromise any existing interconnect agreements.
6. Does the proposed connection have sufficient capacity (is the pipeline main large enough)? It is very costly to install new pipelines in the public right of way.
7. Can the Company accept the proposed quantity of gas? Varying load periods must be considered to ensure sustainable acceptance into the pipeline grid and avoid injection interruptions.
8. Evaluation of the raw gas analysis. If any Constituents of Concern (COC) are found in the raw gas, what levels should specific actions take place if it breaks through to the RNG?

## Feedstock, Pipeline Gas Quality and Safety Assessment

Understanding the RNG feedstock is critical. RNG gas quality concerns will vary depending on the source. Gas from a landfill operation can be different than gas from a biomass gasifier or a dairy. There will be significantly different COCs (see Appendix G for Feedstock/Upgraded Gas Constituent Guidance Matrix).

As part of the ESA evaluation, the developer/producer will need to provide a comprehensive gas analysis of the raw biogas. This analysis will go beyond the routine determination of major and minor constituents as found in typical natural gas tariffs. The purpose of the thorough analysis is to reasonably define what the COCs are so that impact on the zone of influence can be made and to assess if the proposed treatment is adequate to ensure effective removal of these constituents to reasonable levels, typically defined as comparable to flowing pipeline supplies at the interconnect point. These levels will be up to the developer/producer to maintain.

NOTE: It is the developer/producer's responsibility to affirm and demonstrate through comparative analysis that reasonably expected COC concentrations (based on feedstock analysis and/or prior processing experience) are removed and/or limited to concentrations typically found in flowing pipeline supplies in the vicinity of the interconnect location.

The comprehensive raw gas analysis needs to include the following constituent classes. It is also important to test the natural gas supply at or near the proposed interconnect point to provide an equal basis for comparison. Testing should be done by a mutually agreed upon third party analytical laboratory service provider and paid for by the developer.

- Major/minor constituents, including hydrogen, with properties calculation (heating value, Wobbe Number, relative density, hydrocarbon dewpoint temperature),
- Sulfur, both major/minor and trace constituents, especially dimethyl sulfide, hydrogen sulfide and naturally occurring mercaptans including methyl and ethyl mercaptan,
- Ammonia (possible carry-over from gas treatment or breakthrough from raw biogas),
- Reasonably suspected volatile and semi-volatile organics,
- Siloxanes (typically found in raw biogas from landfills and WWTPs)
- Halogenated compounds (for example vinyl chloride and Freon compounds may be found in landfill-derived raw biogas)
- PCBs and pesticides (if necessary, depending on type of biogas)
- Corrosion-causing bacteria and spores (Sulfate-reducing Bacteria (SRB), Acid-producing Bacteria (APB), and Iron-oxidizing bacteria (IOB) are widely considered the most aggressive corrosion-causing bacteria)
- Aldehydes and ketones (commonly associated with biogas odor)
- Volatile metals and mercury
- Temperature
- Moisture content

Each of these COCs has a differing impact on gas quality, interchangeability, public safety, and pipeline integrity. In some cases, the individual constituent may not appear to present a problem however the synergistic effect of that constituent in the presence of others could result in an unacceptable condition. Full transparency and disclosure by the developer/producer of the potential for these COCs to be present and the demonstrated compatibility of the proposed treatment system to adequately treat these constituents to levels commonly found in pipeline quality natural gas<sup>1</sup> is essential for any project. Central Hudson must have a consistent and predictable RNG supply. One example of a gas quality specification table is shown in Table 1. The specific details of the gas quality specification will be defined by Central Hudson. Not Detectable, for purposes of this table, is defined as a value less than a mutually agreeable specification concentration, or the lowest detectable level for a standard industry analytical test method.

**Table 1: Gas Quality Specification Example**

Gas Quality Specification	Low	High
BTU Content (Heat Content) [BTU/scf]		
Wobbe Number		
Relative Density		
Water Vapor Content [lb/MMscf]		
Mercaptans (as Odorant) [lb/MMscf]		
Hydrocarbon Dew Point, [°F] CHDP		
Hydrogen Sulfide (H <sub>2</sub> S)		
Total Sulfur		
Total Diluent Gases Carbon Dioxide (CO <sub>2</sub> ) Nitrogen (N <sub>2</sub> ) Oxygen (O <sub>2</sub> )		
Hydrogen		
Total Bacteria	Not Detectable	
Mercury	Not Detectable	
Other Volatile Metals	Not Detectable	
Siloxanes	Not Detectable	
Ammonia	Not Detectable	
Non-Halogenated Semi-Volatile and Volatile Compounds	Not Detectable	
Halocarbons	Not Detectable	
Aldehyde/Ketones	Not Detectable	

### Clean-up Technology Evaluation Summary

The engineering feasibility study will also include an evaluation of the clean-up technology. It is in both party’s best interest to use effective, efficient, and state of the art methods to produce acceptable RNG from the raw biogas.

The developer/producer will need to provide information about the cleanup technology and plant operations to the Company, along with the raw biogas analysis, to ensure the proposed cleanup technology is compatible with processing requirements of the raw biogas to the extent that COC’s are

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<sup>1</sup> For purposes of this document, treated biogas that results in a biomethane product that is interchangeable from an end-use perspective and similar in constituents (both qualitative and quantitative) to pipeline natural gas shall be considered commercially free of objectionable materials per AGA Report 4A.

sufficiently removed. The proposed technology review should include specifications on the efficiency of the clean-up technology. As soon as possible, results of a gas quality analysis on the cleaned RNG should be provided to the Company. This analysis may be from similar completed projects so long as the raw biogas analysis and feedstock are comparable and the cleanup technology is the same.

## Pre-Construction, Construction and Facility Start-up

Central Hudson must be kept informed on the progress of the biogas clean-up plant construction and specifications. All proper regulatory requirements, construction codes, and standards for design and installation of safety systems (including gas and fire detection systems), electrical, and instrumentation facilities must be followed. The Company should be granted access for periodic progress inspection and compliance with any applicable company engineering standards and practices, and apprised of any changes in the project timeline. Standards and practices may include personnel and process safety procedures and assessments, detection, and security policies, etc. It is suggested that interim meetings be held to discuss the project's progress at the 50% and 90% completion points, and possibly at other mutually agreed upon points.

Prior to construction, several pre-construction questions need to be addressed and should be included in the GSA. These questions include:

- Facility start-up procedures and plans,
- O&M and safety plans and procedures,
- Discussion of odorization needs and responsibility,
- Final gas quality tariff specifications,
- On-line instrumentation needs,
- Determination of schedule for monitoring of gas quality,
- Identification of necessary sampling points,
- Identification of target COCs for periodic monitoring,
- Initial sampling requirements,
- Follow-up sampling requirements,
- Steady state sampling requirements,
- Trigger levels for specific COCs, and
- Response actions for out-of-compliance supply

## Facility Operation and Maintenance

Once the project is underway, the developer/producer should be aware of some items that would contribute to successful injection of RNG. These are described in the following sections.

### Monitoring, Communication and Notification Requirements

As with all pipeline interconnects, the gas quality and flow rates must be monitored to ensure the gas is meeting the agreed-upon specifications. In cases where the quality has a potential to vary, monitoring is usually performed by on-line instrumentation for essential parameters such as hydrocarbon composition, Wobbe Number, specific gravity and heat content, non-hydrocarbons (inerts and diluents), sulfur compounds (total and speciated), temperature, pressure, and moisture.

This information must be made available to the Company and is usually connected to a Supervisory Control and Data Acquisition system (SCADA). A SCADA process control system gathers data in real time from remote locations in order to control equipment and conditions. A central gas system operations facility continuously monitors gas quality and pipeline conditions through computerized data input and visual inspection.

The Company must also be notified as soon as possible or within 24 hours of any change in the biogas upgrade process, feedstock change or disruptions, expected system shut-downs, and scheduled servicing.

## Facility O&M Procedures

A comprehensive, well documented Operations and Maintenance Plan (O&M) of the biogas processing facility is key to ensure sustainable uninterrupted operations. In addition to increasing operating revenue, an effective O&M Plan also extends the productive lifetime of the assets, resulting in a reduction in the overall capital expenditure as well as environmental risks.

The interface between the upgrading plant and the pipeline interconnect is known as the gas metering station or custody transfer point. It is the “roles and responsibility demarcation point” between Central Hudson and cleanup facility owner/operator.

O&M plans should include:

- Operating specifications, plans and procedures,
- Point of ownership/demarcation at the metering facility, with a process schematic that denotes major process equipment, critical isolation valves, pressure and flow monitoring equipment, measurement equipment and sample points, odorization equipment,
- Location and control of overpressure protection, critical isolation valves and check valves to prevent backflow,
- Isolation procedures,
- Organization charts, key contact information, phone numbers, and
- Daily facility check-in protocols and communication requirements.

## Emergency Plan and Facility Isolation

Should the RNG gas quality fall out of specification, based on established trigger levels that both parties have agreed upon in the GSA, Central Hudson will have authority to isolate the interconnect to protect their system. Communications with the facility operator will determine the extent of the expected anomaly and how long the plant requires isolation until the internal facility issue related to the anomaly is resolved

NOTE: All reasonable efforts will be made to keep the facility operational. For short duration low impact anomalies that have limited impact on gas system operations, the Company may be able to accommodate these types of events occasionally through rerouting of gas supplies and/or pipeline blending. Applying this mitigation measure is at the sole discretion of Central Hudson and is considered an exception, not the “rule”.

If facility isolation from the pipeline system is necessary, the Company will notify the facility operator as soon as reasonably possible. The facility operator will need to provide assurance that all gas quality requirements of the GSA are satisfied before gas flow is resumed through the interconnect system.

## Gas Measurement Protocols and Instrumentation

The GSA (or Tap and Supply Agreements) will specify which party is responsible for operating and maintaining the measurement facilities. In most cases this will be the facility operator or producer, with SCADA connections to Gas System Operations. The GSA will also specify the gas measurement basis, i.e. the pressure and temperature that all data will be corrected to and reported as and whether the gas is to be considered dry or saturated with water vapor. Typical temperature is 60°F and either 14.696 or 14.73 psia.

The required instrumentation for gas analysis consists of basic equipment that is found at all custody transfer points.

- 10-component gas chromatograph
- Odorant/sulfur chromatograph
- Moisture analyzer
- Temperature thermocouple
- Pressure transducer
- Flow rate measurement

Good practice for analytical instrumentation involves writing a Standard Operating Procedure (SOP), training of operators, determination of specific accuracy limits, calibration frequency, performance verification, periodicity of measurements, calculation methods, equipment maintenance procedures, and reporting protocols.

## Gas Quality Analysis and Management

The GSA will also specify additional monitoring requirements for specific COCs that will verify the consistent operation of the upgrading facility. The particular COCs selected for periodic analysis will be based upon their presence in the raw biogas, likelihood for breakthrough from the upgrading technology used, potential pipeline integrity impact, potential human health concerns, interchangeability impact, and any regulatory requirements.

Trigger levels for out of compliance testing will result in two possible scenarios:

- Additional monitoring requirements if the concentration level of a COC rises above the first action limit. Gas will be accepted, but additional monitoring will be required until periodic testing proves the issue is resolved.
- The gas will be shut-in and the facility isolated if the concentration level rises above a second, higher action level, until periodic testing proves the out of compliance issue is resolved.

Monitoring is aimed at confirming that RNG from a discrete system, given a discrete biomass input and gas cleanup technology, can consistently achieve required value ranges for specific compounds in the treated gas.

Usually there will be an accelerated phase of compliance monitoring (3-6 months) for COCs at the beginning of an RNG interconnect project. This is designed to look at potential variation in the gas cleanup system. Maintenance sampling and analysis will be less frequent as the upgrading process and biogas source are shown to be in control. The maintenance schedule may be modified due to expected seasonal variation of gas quality.

This compliance monitoring achieves three goals:

1. The Company is able to monitor and assure the quality of the new fuel product within the pipeline system based on routine production of the product over a trial period of time,
2. The producer is able to verify that the product is consistent and safe for pipeline interchange, and,
3. Both parties may better understand the nature of specific gas quality parameters and constituents necessary to optimize the cleanup process prior to introduction to the pipeline network.

Samples shall be taken in accordance with mutually agreeable industry accepted practices. Inerted sample containers and specific sorbent materials will be used as necessary for particular constituents as specified in the GSA. Guidance documents for sampling and testing on the exact required COCs can be found in the Technical References section of this document.

It is recommended that all on-line measurements be available for independent viewing by qualified personnel for verification of quality during the test period. This period of testing and system analysis is for the protection of the receiving pipeline system and will provide data which assures routine and rigorous gas quality.

## Odorization

It is a federal code requirement (49 CFR 192.625) that all gas that is transported through specified populated areas be odorized as a warning agent so that the gas can be readily detected by a person with a normal sense of smell at a minimum of one-fifth of the Lower Explosive Limit. New York State code (16 CRR-NY 255.625) is even more stringent, requiring odorization at one-tenth of the Lower Explosive Limit for distribution pipeline systems.

The RNG gas being considered for pipeline injection must also be odorized. Central Hudson will specify the type of odorizer, which odorant to use, and what the odorant level should be. In most cases, the Company will design, specify, construct and operate the odorization facility as part of the gas metering and monitoring station with cost recovery as noted in the GSA, however alternative arrangements may be agreed upon and specified in the GSA.

According to 16 CRR-NY 255.625, odorization equipment must be designed and maintained so as to ensure the required odorant level in the gas under varying conditions. The equipment must be installed so that it does not cause a release of fumes to nearby residents. These can be eliminated through engineering controls. Central Hudson will be responsible for odorizer operation and maintenance. It is recommended that the developer/producer have a high-level familiarity with odorant safety practices in case of an odorant issue onsite.

It is important to keep the biogas upgrading process in control as trace constituents such as lower molecular weight mercaptans, aldehydes, ketones, and semi-volatile organic species can interfere with or mask the odorant smell. Treatment chemicals and solvents from the upgrading process can also be carried over and interfere with odorization.

## Technical References

1. Natural Gas Quality Management Manual. Prepared by the AGA Transmission Measurement Committee. August 2013. Catalog # XQ1303.
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3. White Paper on Natural Gas Interchangeability and Non-Combustion End Use. NGC+ Interchangeability Work Group. February 28, 2005.
4. White Paper on Liquid Hydrocarbon Drop Out in Natural Gas Infrastructure. NGC+ Liquid Hydrocarbon Drop Out Task Group. February 28, 2005.
5. Pipeline Quality Biogas – Guidance Document for Dairy Waste, Waste Water Treatment and Landfill Conversion. USDOT/PHMSA Agreement: DTPH56-08-T-000018, Project 250. GTI Project 20736. 2009.
6. Pipeline Quality Biomethane: North American Guidance Document for Introduction of Dairy Waste Derived Biomethane into Existing Natural Gas Networks. GTI Collaborative Project 20614. GTI Report # 09/0011. September, 2009.
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8. Guidance on Biogas Quality and RIN Generation when Biogas is Injected into a Commercial Pipeline for use in Producing Renewable CNG or LNG under the Renewable Fuel Standard Program. EPA-420-B-16-075. September 2016.
9. Renewable Gas — Vision for a Sustainable Gas Network. National Grid position paper. [https://www9.nationalgridus.com/non\\_html/NG\\_renewable\\_WP.pdf](https://www9.nationalgridus.com/non_html/NG_renewable_WP.pdf) Accessed Oct. 14, 2010.

## Definitions

The definitions provided here are intentionally limited in scope and are offered only for general information applicable to the Interconnect Guide for Renewable Natural Gas (RNG).

**Aerobic Digestion** – Decay of organic matter in the presence of oxygen. It is the first step in microbiological conversion of organic materials to biogas. Aerobic microorganisms contained in all decaying matter initially react with oxygen from entrapped air.

**Aggregation** – Another term for gas blending.

**Aldehyde** – An organic compound which incorporates a carbonyl functional group, C=O, bonded on one side to a hydrogen atom and on the other side to a hydrocarbon group. Aldehydes and ketones are chemically similar. They can be found in waste streams containing building materials such as OSB (oriented strand board), MDF (medium-density fiberboard), carpet and linoleum/vinyl flooring, other pressed wood products, hardwood and plywood paneling, upholstery fabrics, latex-backed fabrics, fiberglass, and urea formaldehyde foam insulation.

**Ammonia** – Ammonia is a colorless inorganic compound of nitrogen and hydrogen with the formula  $\text{NH}_3$ , usually in gaseous form with a characteristic pungent odor. Ammonia is potentially encountered in anaerobic digestion of organic waste.

**Anaerobic Digestion** – Decay of organic matter in the absence of oxygen. It is the second step in microbiological conversion of organic materials to biogas. Once the oxygen is depleted, an anaerobic environment is created that allows for the remaining organic material to decompose and be converted into biogas.

**ASTM** – American Society for Testing and Materials

**Biogas** – The gas resulting from the anaerobic digestion or gasification of biomass. Depending upon the process used and possible conditions of digestion, biogas consists of 40 – 65% methane. The remaining 35 – 60% of the biogas consists of “other” gases, with carbon dioxide being the major other gas along with trace gases including nitrogen compounds (ammonia, etc.), water vapor, sulfur compounds (hydrogen sulfide, etc.) and other constituents, depending upon the biomass used. Biogas is considered “raw” unless cleaned or “conditioned” to meet the requirements of end use or inclusion within natural pipeline systems. “Raw” biogas is not considered suitable for interchange within natural gas pipeline networks.

**Biomass** – Organic materials that may be converted to gaseous fuel through digestion (breakdown) or high temperature conversion (gasification). These materials may include all organic substances, but some biomass materials possess more caloric value than others, thereby producing more energy. Biomass sources vary widely and include domestic wastes, animal wastes, livestock operation residues, forest and mill residues, agricultural crops and wastes, wood and wood wastes, aquatic plants, fast-growing trees and plants, and municipal and industrial wastes.

**Biomethane** – Another term for RNG. The portion of biogas which consists primarily of methane. Biomethane is generally extracted from raw biogas through cleanup or conditioning, to remove those constituents which impact gas quality. Using effective biogas cleanup (removal of gases which effect overall gas quality), biomethane can be up to 99% methane. Biomethane is considered suitable for many end-use applications and may be considered suitable for inclusion in general pipeline systems, depending upon other characteristics of the gas and specific tariff requirements.

**Chromatograph** – An analytical instrument that separates a gas sample into its components for measuring and is used to determine gas quality data such as heating value, relative density (specific gravity), and compressibility.

**Commercially Free** – As defined in AGA 4A, commercially free is a contract term used to qualify objectionable material to the extent the gas is reasonably free of contaminants or constituents that otherwise would interfere or cause harm to the pipeline or would preclude utilization of a gas supply in the ordinary course of business.

**Constituents of Concern (COC)** – Chemicals that could reasonably be expected to be associated with specific waste streams and be volatilized into the raw biogas, with potential for breakthrough into RNG.

**Corrosion-causing Bacteria** – See Microbial Induced Corrosion (MIC).

**Detection Limit** – If a concentration is reported as “below detection limit” (BDL), the analyte was not detected at a concentration greater than the specified detection limit concentration.

**Digester (Anaerobic)** – A tank, covered lagoon or other covered vessel designed to convert biomass to biogas. Digesters are common to the wastewater treatment industry as well as in farming operations for manure management. Conversion of the biomass in the digester depends upon bacterial degradation or transformation of compounds, both carbon-based and other, to gaseous products, which are then present in the resulting biogas. Digesters vary in complexity and design. The maximum quantity of biogas generated from digestion of biomass is dependent upon the design of the digester (temperature and hydraulic retention time), biologically degradable fraction of the raw material and other factors. Biogas generated through anaerobic digestion of biomass in digesters requires further cleanup prior to use (interchange) within natural gas pipeline systems.

**Distributor** – The distributor owns and operates the pipeline system. The distributor may be a Local Distribution Company (LDC) or utility, or it may be a pipeline transmission company who sells gas to the LDC.

**Engineering Services Agreement (ESA)** – An agreement where Central Hudson who performs a detailed evaluation of the technical aspects of an RNG pipeline introduction project. During this step the producer will provide a detailed Technical Proposal.

EPA – Environmental Protection Agency

**Gas Cleanup** – Used in reference to cleaning raw biogas resulting from biomass conversion. The goal of the gas cleanup unit is to remove constituents within the raw biogas in order to produce a clean RNG product, suitable for further end use or potential inclusion within gas pipeline networks. Cleanup efficiencies for particular constituents of concern vary between cleanup or “conditioning” units.

**Gas Sales Agreement (GSA)** – An agreement between the producer and Central Hudson for gas purchase. Also known as an interconnect agreement. The GSA will establish the conditions in which supplies will be accepted into the Company’s pipeline. It will contain the details of the purchasing process including delivery obligations, pricing, gas measurement requirements (schedule and periodicity), operation and maintenance requirements, access, and billing and payment terms.

**Gas Separation Membranes** – Gas separation membranes use selective permeation, driven by partial pressure differences across the membrane, to separate gas components. Other species are removed by pre- and post- treatment as necessary.

**Gasification** – An alternate way to produce RNG. Gasification is the process of high temperature conversion of organic material into a biogas that can be further methanized and cleaned into a clean product ready for pipeline injection.

**Grab sample** – A single sample taken at a specific time or over a short period of time.

**Grain** – A measurement of weight. 7,000 grains = 1 lb.

**GPA** – Gas Processors Association

**Halocarbons** – Organic compounds containing the elements fluorine (F), chlorine (Cl), bromine (Br), and iodine (I), which make up the seventh period in the periodic table of the elements. Compounds which consist of these elements are often used in disinfectant solutions, or as refrigerant gases in air conditioning and other cooling equipment. Upon degradation, the elements may be released as gases.

**Heating Value** – Gross heating value, also known as Higher Heating Value (HHV), is defined as the amount of energy transferred as heat from the complete, ideal combustion of the gas with air, at a standard temperature, in which all the water formed by the reaction condenses to liquid. Another commonly seen heating value parameter is net heating value, or Lower Heating Value (LHV). The difference between HHV and LHV is that the water produced by combustion remains in the vapor state when determining the LHV. The energy gained by the condensation of the water vapor is not realized so the heating value is lower. Heating values are also often reported as wet or dry. Wet gas refers to gas that is completely saturated with water vapor. A wet gas has a lower heating value per volume than a dry gas because some of the gas volume is occupied by the water vapor, so the absolute amount of combustible gas is less. The North American Energy Standards Board recommends utilizing the HHV expressed on a dry basis.

**Hydrocarbon Dewpoint Temperature** – The hydrocarbon dew point temperature (HDP) is the temperature of the corresponding state condition at which the non-methane hydrocarbon components of natural gas begin to condense into the liquid phase.

**Inerted Gas Sample Collection Cylinder** – Sample collection cylinders containing an inert coating or otherwise passivated so that the cylinder exhibits very low reactivity to compounds such as sulfur odorants or H<sub>2</sub>S.

**Interchangeability** – The ability to substitute one gas for another, in the context of natural gas replacement, without materially changing or influencing environmental health and safety, end use performance, or pipeline integrity.

**Interconnection Agreement** – Another term for the GSA. A business contract between the gas supplier (producer) and utility, pipeline operator, or gas distributor.

**Ketone** – An organic compound which incorporates a carbonyl functional group, C=O, bonded on both sides to a hydrocarbon group. Aldehydes and ketones are chemically similar. They can be found in waste streams containing building materials such as OSB (oriented strand board), MDF (medium-density fiberboard), carpet and linoleum/vinyl flooring, other pressed wood products, hardwood and plywood paneling, upholstery fabrics, latex-backed fabrics, fiberglass, and urea formaldehyde foam insulation.

**Landfill Gas** – Gas which is emitted from the breakdown of materials in a landfill. This gas is considered “raw” and requires upgrade for introduction to the pipeline network.

**Local Distribution Company (LDC)** – A pipeline operator of a distribution system or utility company that typically transports natural gas from delivery points located on interstate and intrastate pipelines to residential households and commercial businesses through smaller diameter and lower pressure distribution pipe. For the purposes of this document Central Hudson Gas & Electric will be considered the local distribution company.

**Microbial Induced Corrosion (MIC)** – Corrosion caused by bacteria present in a pipeline network. Specific groups of bacteria can produce acids that deteriorate pipes through pitting and oxidation. MIC bacteria groupings include, but are not limited to: sulfate-reducing bacteria (SRB), acid-producing bacteria (APB), including acetic-acid producing bacteria (total group) and butyric-acid producing bacteria (total group), iron-oxidizing bacteria (IOB), denitrifying bacteria (DNB), and methanogens – microbes which produce methane (in the Archaea domain). MIC can be very deleterious to pipeline integrity and has been associated with pipeline failure.

**O&M** – Operations and Maintenance

**Pipeline Operator** – For purposes of this document, the pipeline operator owns and operates the pipeline system. The pipeline operator is Central Hudson Gas & Electric Corporation (“Central Hudson”, “the Company”)

**PCBs** – Polychlorinated Biphenyls are synthetic chlorinated chemicals that were produced for approximately 50 years between the 1920s and the 1970s. The mixtures were sold under the registered trade mark of “Aroclor” followed by a 4 digit code. PCB oils used to be used as compressor lubricants for natural gas pipeline transmission lines. In 1976 Congress passed the Toxic Substances Control Act (TSCA) which banned their use.

**Physical Solvent Scrubbing** – Physical solvents preferentially absorb acid gases (over methane), unlike chemical solvents that react with acid gases. One popular solvent is based on a mixture of the dimethyl ethers of polyethylene glycol (DEPG). Amine solvents can also be used, such as monoethanolamine (MEA), diethanolamine (DEA) and methyldiethanolamine (MDEA).

**Pressure Swing Adsorption (PSA)** – A process that separates mixtures of gases according to the species' molecular characteristics, affinity for, and attraction to the surface of an adsorbent material. These materials can be molecular sieves (zeolites), activated carbon, silica gel, and/or alumina. In gas cleanup applications the physical adsorption of CO<sub>2</sub> occurs at high pressure. The process then swings to a lower pressure to desorb the adsorbed gas. In most applications pre- or post-treatment is required to reduce other contaminants such as non-methane organics (NMOCs) and hydrogen sulfide.

**Producer** – The producer is responsible for producing and upgrading biogas to RNG. The producer may be the digester owner, or it may be the upgrade process developer, or even a third party who has contracted with one of the above.

**Relative Density** – The relative density of a gas is defined as the ratio of the mass density of the gas to the mass density of air (where the molecular weight of air is defined as 28.9625 grams per mole), both at a defined pressure and temperature. This property, along with the higher heating value, is used to determine the Wobbe Number, an interchangeability parameter that takes both HHV and the relative density of the gas into consideration and accounts for both heat content and gas flow through a fixed orifice.

**RNG or Renewable Natural Gas** – Another term for biomethane. The portion of biogas which consists primarily of methane. RNG is generally extracted from raw biogas through cleanup or conditioning, to remove those constituents which impact gas quality. Using effective biogas cleanup (removal of gases which effect overall gas quality), RNG can be up to 99% methane. RNG is considered suitable for many end-use applications and may be considered suitable for inclusion in general pipeline systems, depending upon other characteristics of the gas and specific tariff requirements.

**RNG Verification Testing Program** – A period of time in which the gas resulting from an RNG production process is subject to analytical testing and review, to confirm RNG quality. Such a program is advised, as the quality of biogas and RNG varies with process design, biomass input, choice of

cleanup unit and other parameters. The verification program should be executed prior to introduction of the RNG product to the natural gas system, so that analytical compliance may be demonstrated over a period of time.

**Supervisory Control And Data Acquisition (SCADA)** – A SCADA process control system gathers data in real time from remote locations in order to control equipment and conditions. A central Gas S facility continuously monitors gas quality and pipeline conditions through computerized data input and visual inspection.

**Siloxane** - Any chemical compound composed of units of the form  $R_2SiO_2$ , where R is a hydrogen atom or a hydrocarbon group. A siloxane has a branched or unbranched backbone of alternating silicon and oxygen atoms,  $-Si-O-Si-O-Si-$ , with side chain R groups attached to the silicon atoms. The word siloxane is derived from the words silicon, oxygen and alkane. Siloxanes can be found in products such as cosmetics, deodorants, water repelling windshield coatings, food additives and soaps. When combusted, the siloxane molecules are reduced to silica dust; this is extremely abrasive and damaging to internal engine components. The combustion process can cause a build up around burner tips and on the tubes of heat exchangers. Silica dust may also pose health risks to humans and other receptors.

**Transmission Company** – The company that owns the interstate and/or intrastate natural gas pipeline network which transports processed natural gas from processing plants in producing regions to areas with high natural gas requirements. A transmission company can also own an LDC or utility.

**Volatile and Semi-volatile Compounds** – Biogas produced from landfill biomass sources typically consists of methane and other major components but can also contain hundreds of other chemicals - most of which are known as "non-methane organic compounds" or volatile or semi-volatile organic compounds (VOCs and SVOCs). These are typically compounds containing carbon, hydrogen, and sometimes oxygen. Many non-halogenated VOCs and SVOCs are present in natural gas as well, originating from the geological basin from which the gas was extracted.

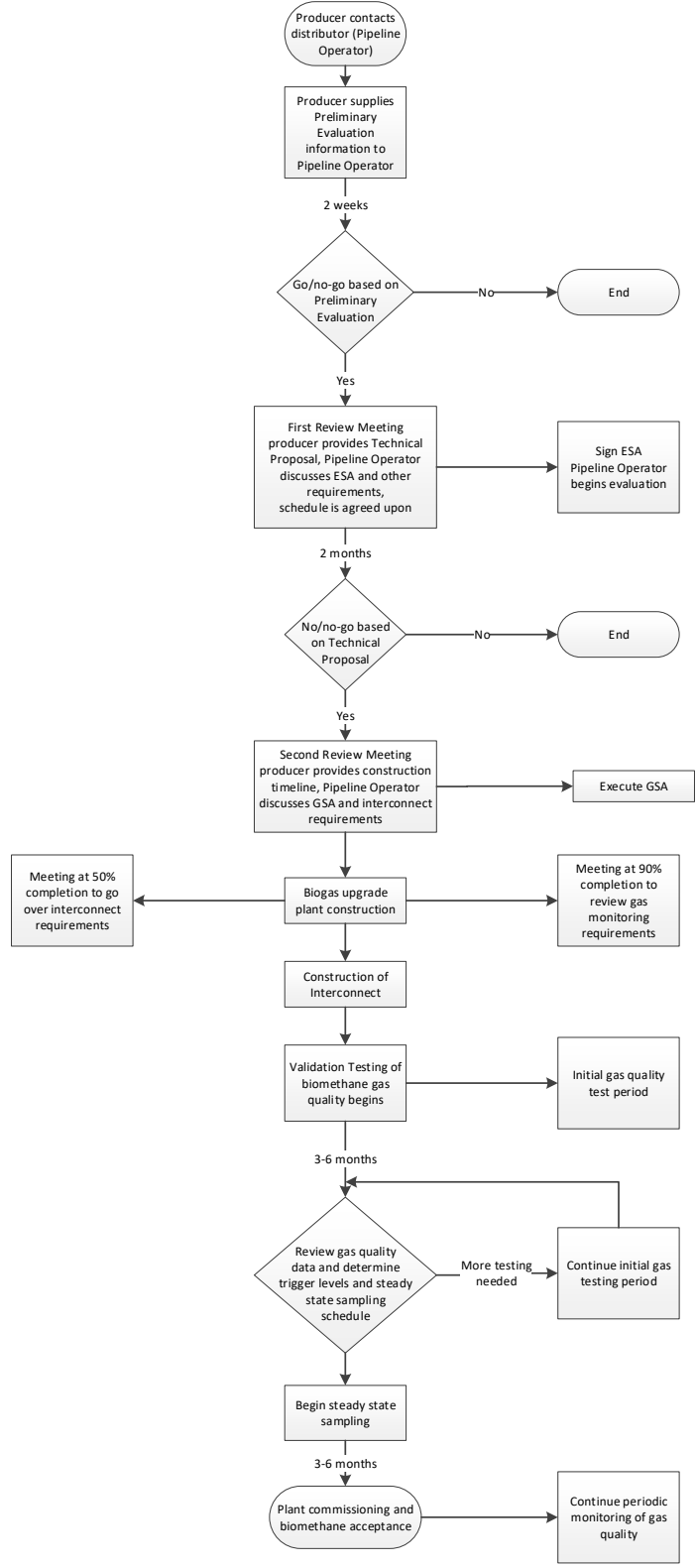
**Volatile Metals** – Volatile metals refers to a group of mostly toxic metals that have high atomic weights. Some are always toxic (e.g. lead, mercury, cadmium, arsenic, chromium) and others are toxic at high concentrations (e.g. zinc, copper). They are found everywhere in the environment because they are naturally part of the earth's crust or are concentrated in waste streams due to the use of a compound that incorporates a heavy metal element. When a compound that contains a heavy metal is degraded, the element can be released as a toxic gas.

**Wobbe Number** – An interchangeability parameter that takes both the higher heating value and the relative density of the gas into consideration and accounts for both heat content and gas flow through a fixed orifice. The Wobbe Number is calculated by dividing the HHV by the square root of the relative density. Differences in the relative density, and by extrapolation the Wobbe Number, generally come from the presence of other hydrocarbons or diluent and inert gases such as carbon dioxide or air (nitrogen plus oxygen).

**WWTP** – Wastewater Treatment Plant. A WWTP facility treats household water waste (sewage) and can be an effective biogas source through an anaerobic digester. This gas is considered "raw" and requires upgrade for introduction to the pipeline network.

**Zone of Influence** – The geographical area that could be significantly affected by changes in the gas supply. It is determined through engineering modeling of the gas flows and pressures. It is an evaluation of pipeline integrity issues as well as potential gas storage and End Users.

# Appendix A – Interconnect Agreement Evaluation Process Flow Diagram & Timeline



## Appendix B – Producer and Central Hudson Assessment Process Checklists

The purpose of this checklist is to provide a worksheet of items to consider when assessing the producer's technical proposal.

- A. Who are the parties who are entering into the contract
- B. Assignment of a project manager (technical contact) from the producer
- C. Assignment of project manager (technical contact) from the Company
- D. Physical location of the receipt/delivery point
- E. Agreement of producer to allow access to site where applicable
- F. Description of the process
  - i. Anaerobic digester gas type (dairy, WWTP, food waste, landfill) or gasification feedstock
- G. Definition of any technical terms
- H. Regulatory requirements, as necessary
- I. Discussion of New York State Code NYCRR Chapter 03 Gas Standards Part 229 standards for pipeline injection
- J. Liabilities
- K. Agreement to forward any new information regarding the project and amend the ESA when appropriate
- L. Periodic meeting schedule
- M. Description of requirements that the Company needs to provide to the producer
  - i. Company standards for the developer to follow (electrical, instrumentation)
  - ii. Company specifications for metering
  - iii. Technical assistance as needed for analytical instrumentation
  - iv. Odorant design and specifications (utility will operate odorizer but developer is responsible for installation and costs)
  - v. Any other engineering and technical assistance
- N. Description of requirements for the producer (equipment and facilities required for the project that is provided by producer and specified by the Company)
  - i. Gas service and associated metering equipment
  - ii. System tie-in equipment
  - iii. System to remotely transmit gas quality and flow data to utility
  - iv. On-line gas analysis equipment and associated necessities
  - v. Commitment as to reading, cleaning, repairing, inspecting, testing, calibrating, adjusting the equipment
  - vi. Remote shut-in capability
  - vii. Odorizer and associated necessities
- O. Estimation of the cost to be paid by the producer to Central Hudson
- P. IP agreement
- Q. Agreement to follow "Good Utility Practice"
- R. Insurance agreement
- S. Expiration date and termination terms

## Appendix C – Gas Quality and Interchangeability Management Program Matrix

The purpose of this matrix is to provide a checklist of items to consider when developing the gas quality and interchangeability management program. The goal is to optimize gas quality, maximize gas supply, and to avoid problems with the pipeline infrastructure, end-use applications, and consumer health and safety. Information was extracted from AGA's Natural Gas Quality Management Manual. It is recommended to consult this manual for more detailed information.

The management plan will look at the raw biogas composition and make science-based decisions on potential breakthrough of COCs from the gas cleanup process, and any detrimental impact that such breakthrough may incur. Constituent and parameter limits are established that will strike a balance between all of the stakeholders involved.

A gas quality management plan should

- Identify requirements
- Determine procedures to ensure compliance
- Identify response actions and/or corrective actions for anomalies/noncompliance
- Establish data retention schedules to support compliance

It is advised to conduct an overall interchangeability assessment for each project to determine what the range of acceptability should be. This assessment should include at a minimum an assessment of:

- Historically delivered supplies into the market area with respect to gas quality constituents and parameters that define interchangeability,
- Historical effects of anomalies or upsets in gas processing and system aggregation of the market area,
- Records of pipeline infrastructure, end user complaints, and storage operation problems potentially linked to gas quality issues into the market area,
- The proposed biogas cleanup technology and maximum constituent concentrations that may be present in the proposed substitute gas,
- The cleanup system and balancing of concerns of potentially sensitive end users
- The history of end users requirements, equipment upgrades, and appliance re-adjustment in the market area,
- A comprehensive review of federal, state, and local regulatory requirements; internal operating procedures; and tariff requirements,
- A model of the zone of influence of the proposed substitute gas and determination if the aggregated supply profile meets tariff and/or contract requirements, and
- Any sensitive receptors within the zone of influence.

Prior to introduction to the natural gas pipeline network, it is suggested that the RNG be monitored for quality for a discrete test period. Depending upon the specific tariff requirements pertaining to any individual company receiving the gas, this test period may vary in length. It is recommended that the test period be executed prior to introduction to the natural gas pipeline network. Any product flaring should be done in compliance with federal, state and local codes.

This Verification Program achieves three goals:

- Central Hudson is able to monitor and assure the quality of the new fuel product and the routine production of the product over a trial period of time,
- The producer is able to verify that the product is consistent and safe for pipeline interchange, and,
- Both parties may better understand the nature of specific gas quality parameters and constituents necessary to optimize the cleanup process prior to introduction to the pipeline network.

Modern on-line instruments provide continuous real-time or near-real time monitoring, and readings should be performed as frequently as possible. The natural gas industry measures BTU content at custody transfer points because gas is sold on an energy basis, not a volume basis. Since the on-line BTU analyzer is commonly a gas chromatograph, its use will also provide data on methane and other hydrocarbons present, as well as nitrogen, oxygen, and carbon dioxide.

An on-line temperature probe, pressure transducer, and moisture analyzer must be installed, as well as a sulfur analyzer with capability to measure both H<sub>2</sub>S and total sulfur at a minimum. Testing for MIC bacteria, and total bacteria and spores is also advised on a monthly basis throughout the test/verification period for anaerobic digester-derived RNG.

Other COCs listed in Appendix D should be tested on a spot sample retrieved when the verification period begins. Samples should be collected monthly during the verification period for at least three months.

Once verification of minimum gas quality has been determined, a “maintenance” testing schedule can be established. The maintenance schedule should cover seasonal variation of the gas quality and should be a minimum of three months. Trigger levels for COCs will be established during the maintenance period.

Trigger levels for out of compliance testing will result in two possible scenarios:

- Extra monitoring will be required if the concentration level of a COC rises above the first action limit. Gas will be accepted, but additional monitoring will be required until periodic testing proves the issue is resolved
- The gas will be shut out if the concentration level rises above a second, higher action level, until periodic testing proves the out of compliance issue is resolved.

Once the maintenance testing schedule is complete, on-line verification of BTU content, moisture, temperature, and sulfur content should be maintained to provide continuous confirmation of gas quality to the receiving pipeline system.

## Appendix D – Raw Biogas and Upgraded RNG Trace Constituents Measurement Matrix

The table below lists some recommended parameters and their testing frequency for the initial RNG Verification Program. The following table details some on-line and off-line analysis methods.

Parameter	Frequency
Heating Value	Continuous real-time or near-real time monitoring and periodic field samples for independent confirmation.
Temperature	Continuously measured on-line
Pressure	Continuously measured on-line
Water Content	Continuously measured on-line
Sulfur, including Hydrogen Sulfide	Continuous real-time or near-real time monitoring and periodic field samples for independent confirmation
Hydrogen	Continuous real-time or near-real time monitoring and periodic field samples for independent confirmation
Carbon dioxide	Continuous real-time or near-real time monitoring and periodic field samples for independent confirmation
Nitrogen	Continuous real-time or near-real time monitoring and periodic field samples for independent confirmation
Oxygen	Continuous real-time or near-real time monitoring and periodic field samples for independent confirmation
Biologicals	Monthly testing for MIC bacteria, and live and dead bacteria and spores is advised through the test period for anaerobic digester-derived RNG
Mercury	Minimum of three samples over a three month period, with increased frequency, depending upon concentration at first sample point
Siloxanes	Minimum of three samples over a three month period, with increased frequency, depending upon concentration at first sample point
Semi-volatile and Volatile Compounds	Minimum of three samples over a three month period, with increased frequency, depending upon concentration at first sample point
Halocarbons	Minimum of three samples over a three month period, with increased frequency, depending upon concentration at first sample point
Aldehydes and Ketones	Minimum of three samples over a three month period, with increased frequency, depending upon concentration at first sample point

Parameter	Method
Heating Value	ASTM D3588 (on-line , or off-line canister collection*)
Water Content	ASTM D5454 (on-line only)

Parameter	Method
Sulfur, including Hydrogen Sulfide	ASTM D6228, D5504 (off-line canister collection) ASTM D4084 (H <sub>2</sub> S on-line) and D4468 (total S on-line) ASTM D7493 (on-line sulfur speciation)
Hydrogen	ASTM D1945, D1946 (usually only off-line gas chromatographs can measure hydrogen, canister collection)
Carbon dioxide	ASTM D1945, D1946 (on-line, or off-line canister collection)
Nitrogen	ASTM D1945, D1946 (on-line, or off-line canister collection)
Oxygen	ASTM D1945, D1946 (on-line, or off-line canister collection)
Biologicals	NACE qPCR (off-line with gas filter collection) NASA NHB 5340.1D (off-line with gas filter collection)
Mercury	ASTM D5954, D6350 (gold sorbent, on-line and off-line)
Siloxanes	Gas chromatography (off-line canister collection) with atomic emission detection (GC-AED), mass spectral detection (GC-MS), or vacuum ultraviolet absorption detection (GC-VUV)**
Semi-volatile and Volatile Compounds	EPA TO-14, TO-15 (off-line) Canister collection (volatiles) XAD sorbent media (semi-volatiles)
Halocarbons	EPA TO-14, TO-15 (off-line canister collection)
Aldehydes and Ketones	EPA TO-11 (off-line DNPH sorbent)

\* Canister collection refers to a sample collected in a sample cylinder, Summa canister, or other device.

\*\* ASTM standard expected to be balloted for these three techniques in late 2017 or early 2018.

## Appendix E – Sample Engineering Services Agreement (ESA)

This Engineering Services Reimbursement Agreement (“*Agreement*”), effective as of this \_\_\_\_ day of \_\_\_\_\_ (“*Effective Date*”), is by and between \_\_\_\_\_ (“*Customer*”), a \_\_\_\_\_ organized and existing under the laws of \_\_\_\_\_ and Central Hudson Gas & Electric Corporation (“*Company*”), a corporation organized and existing under the laws of the State of New York.

**WHEREAS**, Customer is proposing to build an anaerobic digester within a \_\_\_\_\_ located in \_\_\_\_\_, New York that will recover digester methane gas from \_\_\_\_\_, with excess gas to be sent to Company’s natural gas distribution system (the “*Project*”); and

**WHEREAS**, Customer desires to have Company perform certain engineering services (as specified below) in connection with the Project, and Company has agreed to perform such services upon the terms and conditions set forth below;

**NOW, THEREFORE**, in consideration of the mutual promises and covenants contained herein, and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties entering into this Agreement (each a “*Party*”, and collectively, the “*Parties*”), with the intent to be bound, agree as follows:

### **ARTICLE I – SERVICES**

#### **Section 1 - Scope of Services**

Company will perform those services specified in Exhibit A attached hereto and hereby incorporated herein (“*Services*”). No goods, equipment, or materials will be provided under this Agreement.

This Agreement does not provide for generation interconnection service, procurement of equipment, installation or construction, or transmission service.

#### **Section 2 - Customer's Responsibilities**

Customer shall provide:

1. Complete and accurate information regarding requirements for Services, including, without limitation, constraints, space requirements and relationships, special equipment, systems, site requirements, underground or hidden facilities and structures, and all applicable drawings and specifications;
2. If and to the extent applicable, Company access to the site where Services will be performed;
3. A project manager who will be given the authority to coordinate all aspects of the Project between Customer and Company;
4. If and to the extent applicable, adequate parking for the vehicles of Company personnel performing the Services; and
5. Other responsibilities and access deemed necessary by, and in the sole discretion of, Company to facilitate performance of the Services.

Customer shall reasonably cooperate with Company as required to facilitate Company's performance of the Services. Other express Customer responsibilities, if any, shall be as specified in Exhibit A attached hereto.

Anything in this Agreement to the contrary notwithstanding, Company shall have no responsibility or liability under this Agreement for any defective performance or nonperformance to the extent such defective performance or nonperformance is caused by the inability or failure of (i) Customer to cooperate or to perform any of the tasks or responsibilities contemplated to be performed or undertaken by Customer in Exhibit A or elsewhere in this Agreement, or (ii) Customer and Company to reach agreement on any matter requiring their mutual agreement as contemplated in Exhibit A or elsewhere in this Agreement.

### **Section 3 - Unknown Conditions**

Customer represents, warrants and covenants that all information provided by Customer is accurate and complete and acknowledges and agrees that Company may and will rely on this representation, warranty and covenant in performing under this Agreement. If, as a result of additional, different, or previously unknown information, any changes in Services are required that will result in an increase or decrease in the cost or time of performance under the Agreement, the Price, schedule and other affected provisions of this Agreement shall be equitably adjusted and this Agreement shall be amended in writing to memorialize such changes.

### **Section 4 - Changes and Extras**

Customer may request changes in Services in writing. If any such changes will result in an increase or decrease in the cost or time of performance under this Agreement, the Price, schedule and other affected provisions of the Agreement shall be equitably adjusted and this Agreement shall be amended in writing to memorialize such changes. Company may make changes in Services with the prior written approval of Customer (which approval shall not be unreasonably withheld, conditioned, or delayed).

### **Section 5 - Governmental Requirements**

Changes in Services may be necessary in order to meet the requirements of governmental authorities, laws, regulations, ordinances, Good Utility Practice (as such term is defined in Article V, Section 1, below) and/or codes. After Customer's approval (which shall not be unreasonably withheld, conditioned, or delayed), Company will make changes in Services as it deems necessary, in its sole discretion, to conform to such requirements. If any such changes will result in an increase or decrease in the cost or time of performance under this Agreement, the Price, schedule and other affected provisions of this Agreement shall be equitably adjusted and this Agreement shall be amended in writing to memorialize such changes. If Customer withholds its approval, and in Company's sole and exclusive judgment the withholding of approval by Customer is not reasonable, then, at Company's election, this Agreement may be immediately terminated upon written notice to Customer. Nothing in this Agreement shall relieve Customer of the responsibility to comply with requirements of ISO-NE or other utilities with regard to the Project and the Services.

## **ARTICLE II – PRICE, TAXES, AND PAYMENT**

### **Section 1 - Price**

The price for the Services to be paid by Customer shall be the actual costs and expenses incurred by the Company and its affiliates in connection with performance of the Services or otherwise incurred by Company in connection with this Agreement, and shall include, without limitation, any such costs that may have been incurred by Company prior to the Effective Date (the "*Price*").

The Price shall include, without limitation, the actual costs and expenses for the following to the extent incurred in connection with performance of the Services: labor (including, without limitation, internal labor); materials; subcontracts; equipment; travel, lodging, and per diem paid in accordance with Company policy; copying and reproduction of materials, overnight delivery charges, certified mailing charges, first class mailing charges and similar types of incidental charges; transportation; carrying charges and surcharges; all applicable overheads including an Administrative and General (A&G) expense charge at Company's current rate at the time of invoicing; all federal, state and local taxes incurred; all costs and fees of outside experts, consultants, counsel and contractors; all other third-party fees and costs; and all costs of obtaining any required consents, releases, approvals, or authorizations. All invoiced sums will include applicable expenses, surcharges, and federal, state and local taxes.

If Customer claims exemption from sales tax, Customer agrees to provide Company with an appropriate, current and valid tax exemption certificate, in form and substance satisfactory to Company, relieving Company from any obligation to collect sales taxes from Customer ("*Sales Tax Exemption Certificate*"). During the term of this Agreement, Customer shall promptly provide Company with any modifications, revisions or updates to the Sales Tax Exemption Certificate or to Customer's exemption status. If Customer fails to provide an acceptable Sales Tax Exemption Certificate for a particular transaction, Company shall add the sales tax to the applicable invoice to be paid by Customer.

## **Section 2 – Payment**

Customer shall provide Company with an initial prepayment in the amount of \_\_\_\_\_ US dollars (\$\_\_\_\_\_.00) ("*Initial Prepayment*"). Company shall not be obligated to commence performance of Services until it has received the Initial Prepayment. If, during the performance of the Services, Company determines that one or more additional prepayments are required before completing the Services, Company may, but is not required to, request additional prepayment from Customer; any such requests will be in writing. If an additional prepayment is requested and is not received from Customer on or before the date specified in each such request, or if no date is specified, within 30 days of receipt of the written request, Company may cease work upon the depletion of the Initial Prepayment and any other prepayments made by Customer to date, as applicable. Upon Company's receipt of the additional requested prepayment from Customer (such prepayment to be additional to the Initial Prepayment and any other prepayments made by Customer to date), Company will continue to perform the Services. The Initial Prepayment and the additional prepayments (if any) represent estimates only.

Company is not required to request additional prepayments from Customer and may elect, in its sole discretion, to continue performing Services hereunder after the depletion of the Initial Prepayment, or any other prepayments made by Customer to date, as applicable, without additional prepayments and invoice Customer for such Services at a later date. Customer shall be responsible to pay Company the total Price for completing the Services actually performed by Company whether or not any additional prepayments were made at Company's request. Any election by Company to seek or defer additional prepayments in one instance shall not obligate the Company to seek or defer additional prepayments in any other instance.

Company will invoice Customer for all sums owed under this Agreement. With the exception of additional prepayments required under the first paragraph of this Section 2 of Article II, in which case the due date provided in such paragraph shall apply, payment shall be due in full within thirty (30) days of Company's submittal of an invoice, without regard to claims or off-sets. Payment shall be made in immediately available funds transmitted by the method specified in the invoice. A continuing late payment charge of 1.5% per month will be applied on any late payments.

If Company's Price for completing the Services is less than the Initial Prepayment plus any such additional prepayments paid by Customer under this Article ("*Total Prepayment*"), Company will refund the remaining unused portion of the Total Prepayment to Customer.

### **ARTICLE III - SCHEDULE, DELAYS, AND FORCE MAJEURE**

Company will use reasonable efforts to commence the Services promptly following its receipt of all of the following: a fully executed Agreement, the Initial Prepayment, and all information required by this Agreement to be supplied by Customer prior to commencement of the Services.

If Company's performance of the Agreement is delayed by Customer, an equitable adjustment shall be made for any increase in the cost and/or time of performance caused by the delay.

Any delays in, or failure of, performance by Customer or Company, other than payment of monies, shall not constitute default and shall be excused hereunder, if and to the extent such delays or failures of performance are caused by occurrences beyond the reasonable control of Customer or Company, as applicable, including, but not limited to, acts of God, Federal and/or state law or regulation, sabotage, explosions, acts of terrorism, unavailability of personnel, equipment, supplies, or other resources for utility-related duties, delays by governmental authorities in granting licenses, permits or other approvals necessary in connection with Services, compliance with any order or request of any governmental or judicial authority, compliance with Company's public service obligations, storms, fires, inclement or adverse weather, floods, riots or strikes or other concerted acts of workers, and accidents.

### **ARTICLE IV – INTELLECTUAL PROPERTY**

Any drawings, specifications or other documents (i) prepared or used by Company, or (ii) prepared by Customer for Company in connection with this Agreement, shall be the proprietary, confidential information and sole property of Company at no cost to Company (collectively "*Materials*").

Excluding third-party owned documents and software, Customer is granted an irrevocable, nontransferable, and non-assignable license to use such Materials solely in connection with the Project. No commercialization of such Materials by Customer is authorized. Customer shall not disclose any of the Materials to any third party, in whole or in part, without the prior written consent of Company.

The obligations imposed by this Article IV shall survive the completion, cancellation, or termination of this Agreement.

### **ARTICLE V – PERFORMANCE**

#### **Section 1 -- Performance.**

Company shall perform the Services in a manner consistent with "Good Utility Practice" (as such term is defined below); provided, however, that Company shall have no responsibility or liability in connection with (i) any items or services provided by Customer or its third party contractors or representatives whether or not such items or services are incorporated in the Services, (ii) any items or services provided, manufactured or licensed by third parties whether or not such items or services are incorporated in the Services, or (iii) any defects in Services that result from the acts or omissions of persons other than Company or accidents not caused by Company.

"Good Utility Practice" shall mean the practices, methods and acts engaged in or approved by a significant portion of the electric utility industry during the relevant time period, or any practices, methods and acts which, in the exercise of good judgment in light of the facts known at the time the decision was made, would have been reasonably expected to accomplish the desired result consistent



respect to payment of all amounts due and payable hereunder), and (b) such terms and provisions that expressly or by their operation survive the termination or expiration of this Agreement.

Either Party may terminate this Agreement for convenience by delivery of written notice to the other Party, such termination to be effective on the tenth (10th) day following delivery of such written notice, or upon payment in full of all amounts due and payable hereunder, whichever is later. On or before the effective termination date of this Agreement, Customer shall pay Company all amounts due and payable as the Price for that portion of the Services performed to the effective date of termination (“Amount Outstanding”), including, without limitation, all costs and expenses incurred, less the Total Prepayment. In the event that the Total Prepayment exceeds the Amount Outstanding, Company shall remit the balance to Customer.

**ARTICLE VIII – MISCELLANEOUS PROVISIONS**

**Section 1 - Assignment and Subcontracting**

Customer agrees that Company has the right, but not the obligation, to (i) use the services of its affiliated companies in connection with the performance of Services, and (ii) issue contracts to third parties for, or in connection with, the performance of Services hereunder, without the prior consent of Customer, and that the costs and expenses of such affiliated companies or third parties charged or chargeable to Company shall be paid by Customer as part of the Price.

**Section 2 – No Third-Party Beneficiary**

Nothing in this Agreement is intended to confer on any person, other than the Parties, any rights or remedies under or by reason of this Agreement.

**Section 3 – Amendment; Equitable Adjustments**

This Agreement shall not be amended, superseded or modified, except in a writing signed by both Parties. In any circumstance in which this Agreement contemplates an equitable adjustment to Price, schedule or any other term of this Agreement, Company shall have no obligation to continue performance hereunder until and unless such equitable adjustment has been mutually agreed to by both Parties in writing.

**Section 4 – Notices**

Any notice given under this Agreement shall be in writing and shall be hand delivered, sent by registered or certified mail, delivered by a reputable overnight courier, or sent by facsimile (fax) with electronic confirmation of receipt, to the party's representatives as follows:

Customer:

[ \_\_\_\_\_ ]  
ATTN: [ \_\_\_\_\_ ]  
[ \_\_\_\_\_ ]  
[ \_\_\_\_\_ ]  
Phone: [ \_\_\_\_\_ ]  
Fax: [ \_\_\_\_\_ ]  
Email: [ \_\_\_\_\_ ]

Company:

[ \_\_\_\_\_ ]  
ATTN: [ \_\_\_\_\_ ]  
[ \_\_\_\_\_ ]  
[ \_\_\_\_\_ ]  
Phone: [ \_\_\_\_\_ ]  
Fax: [ \_\_\_\_\_ ]

Email: [\_\_\_\_\_]

#### **Section 5 - Waiver**

No term of this Agreement may be waived except in a writing signed by an authorized representative of the Party against whom the amendment, modification, or waiver is sought to be enforced. Waiver of any provision herein shall not be deemed a waiver of any other provision herein, nor shall waiver of any breach of this Agreement be construed as a continuing waiver of other breaches of the same or other provisions of this Agreement.

#### **Section 6 - Approvals**

It is understood that Company may be required to obtain, regulatory, and other third-party approvals and releases in connection with the provision of the Services. If so, this Agreement shall be effective subject to the receipt of any such approvals and releases, in form and substance satisfactory to Company in its sole discretion, and to the terms thereof.

#### **Section 7 - Laws**

This Agreement shall be interpreted and enforced according to the laws of the State of New York and not those laws determined by application of the State of New York's conflicts of law principles. Venue in any action with respect to this Agreement shall be in the State of New York; each Party agrees to submit to the personal jurisdiction of courts in the State of New York with respect to any such actions.

#### **Section 8 - Severability**

To the extent that any provision of this Agreement shall be held to be invalid, illegal or unenforceable, it shall be modified so as to give as much effect to the original intent of such provision as is consistent with applicable law and without affecting the validity, legality or enforceability of the remaining provisions of the Agreement.

#### **Section 9 - Integration and Merger: Entire Agreement**

Customer and Company each agree that there are no understandings, agreements, or representations, expressed or implied, with respect to the subject matter hereof other than those expressed herein. This Agreement supersedes and merges all prior discussions and understandings with respect to the subject matter hereof, and constitutes the entire agreement between the Parties with respect to such subject matter.

#### **Section 10 – Authority**

Each Party represents to the other that the signatory identified beneath its name below has full authority to execute this Agreement on its behalf.

#### **Section 11 – Information and Coordination Contact**

[\_\_\_\_ Name, contact information \_\_\_\_\_] or such other representative as Company may designate, will be the point of contact for Customer to submit the information required for Company to perform the Services stated in this Agreement.

[\_\_\_\_ Name, contact information \_\_\_\_\_] or such other representative as Customer may designate, will be the point of contact for Company to request additional information from Customer, if required.

**Section 12 – Counterparts**

This Agreement may be executed in multiple counterparts, each of which shall be considered an original, and all of which together shall constitute one and the same agreement. The exchange of copies of this Agreement and of signature pages by facsimile or other electronic transmission (including, without limitation, by e-mailed PDF) shall constitute effective execution and delivery of this Agreement as to the Parties and may be used in lieu of the original Agreement for all purposes. Signatures of the Parties transmitted by facsimile or other electronic means (including, without limitation, by e-mailed PDF) shall be deemed to be their original signatures for all purposes.

**IN WITNESS WHEREOF**, the Parties hereto have caused this Agreement to be executed by their duly authorized representatives as of the Effective Date.

[ \_\_\_\_\_ Customer Name \_\_\_\_\_ ]

By: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

[ \_\_\_\_\_ Company Name \_\_\_\_\_ ]

By: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

**EXHIBIT A - Scope of Services**

**Company’s scope of Services shall be:**

- Assign a Project Engineer and Project Manager to provide technical support for the Project;
- Arrange and schedule periodic Project meetings;
- Provide standards for Customer to follow in order to design metering equipment in accordance with Company specifications;
- Provide the specifications for the meters to be installed and determine the size and quantity of meters required;
- Provide technical assistance as needed by Customer in reviewing the design and layout for analytical equipment to be installed by Customer in accordance with manufacturer’s recommendations;
- Provide technical assistance as needed by Customer in reviewing the design and layout for odorant equipment to be installed by Customer in accordance with applicable health and safety codes for the storage of odorant, including DEC, DEP, and Suffolk County Department of Health;
- Review drawings and specifications created by Customer for the equipment set forth below. Company reserves the right to make changes to the design in order to meet National Grid standards; and
- Provide engineering services to assist Customer in design and development of specifications for the work to purchase and install the equipment and facilities set forth below.

**Equipment and Facilities Required for Project (to be provided by Customer):**

- Gas service and associated metering equipment for back up supply from Company
- Gas outlet system tie-in and associated metering equipment for gas produced on site
- Remote Terminal Unit (RTU) to transmit gas quality and flow data to Company’s Gas System Operations
- Gas Chromatograph (10 component) to measure BTU, inerts (CO2, N2), Oxygen of digester gas
- Odorant Chromatograph to measure mercaptans, total sulfur, and H2S in the digester gas
- Moisture Meter to measure amount of H2O in the digester gas

- Remote control valve to enable remote shut-in of Customer's outlet in cases where gas from the plant is out of specification as listed in Table below.
- Odorant injection system with sight glass diffusion probe, storage tank(s) with dike
- Gas filters with differential gages on plant outlet line
- Analyzer Building – prefab concrete building to house RTU and all analytical equipment with electric service and Power Conditioning, and Battery Back Up system, gas detector(s)
- Odorant Building – negative pressure concreted building to house odorant equipment with electric service and gas detector(s), charcoal filter, blower, fire suppression and monitoring equipment (as required by \_\_\_\_\_ Fire Marshall).

**Assumptions and Conditions:**

Any dates, schedules or cost estimates resulting from the Services are preliminary projections/estimates only and shall not become or give rise to any binding commitment.

The Services contemplated by this Exhibit and this Agreement do not include any construction, relocations, alterations, modifications, or upgrades with respect to any facilities ("Construction"), nor does Company make any commitment to undertake such Construction. If the Parties elect, in their respective sole discretion, to proceed with any Construction: (i) such Construction would be performed pursuant to a separate, detailed, written, and mutually acceptable Cost Reimbursement Agreement to be entered into by the Parties prior to the commencement of any such Construction, and (ii) payment of all actual costs incurred by Company or its Affiliates in connection with or related to such Construction shall be the responsibility of Customer and Customer shall reimburse Company for all such costs.

For the avoidance of doubt: This Agreement does not provide for generation interconnection service, procurement of equipment, installation or construction. The Company shall not have any responsibility for seeking or acquiring any real property rights in connection with the Services or the Project including, without limitation, licenses, consents, permissions, certificates, approvals, or authorizations, or fee, easement or right of way interests. Neither this Agreement nor the Services include securing or arranging for Customer or any third party to have access rights in, through, over or under any real property owned or controlled by the Company.

## Appendix F – Sample Gas Sales Agreement (aka Interconnect Agreement)

This Gas Sales Agreement (“*Agreement*”), effective as of this \_\_\_\_\_ day of \_\_\_\_\_ (“*Effective Date*”), is by and between Central Hudson Gas & Electric Corporation (“*Buyer*”), a corporation organized and existing under the laws of the State of New York, and \_\_\_\_\_ (“*Seller*”), a \_\_\_\_\_ organized and existing under the laws of \_\_\_\_\_.

**WHEREAS**, Seller owns a \_\_\_\_\_ within a \_\_\_\_\_ located in \_\_\_\_\_, New York that recovers methane gas from \_\_\_\_\_; and

**WHEREAS**, Buyer is a regulated natural gas distribution company which owns and operates a natural gas distribution system in \_\_\_\_\_ counties; and

**WHEREAS**, Seller desires to sell and deliver Renewable Natural Gas (“*RNG*” or Biomethane) to Buyer, and Buyer desires to purchase and accept such *RNG* from Seller; and

**WHEREAS**, Buyer has agreed to operate and maintain certain of the facilities required in connection with the delivery of *RNG*, and Seller has agreed to reimburse Buyer for performing such operation and maintenance services; and

**NOW, THEREFORE**, in consideration of the mutual promises and covenants contained herein, and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties entering into this Agreement (each a “*Party*”, and collectively, the “*Parties*”), with the intent to be bound, agree as follows:

### **ARTICLE 1: DEFINITIONS**

- 1.1 The term “*Btu*” means British Thermal Unit, and shall be the quantity of heat required to raise the temperature of one (1) pound of water one (1) degree Fahrenheit at sixty (60) degrees Fahrenheit at a pressure of 14.73 psia.
- 1.2 The term “*dekatherm*” means a unit of heat energy equal to 1,000,000 BTUs.
- 1.3 The term “*Day*” means a period of twenty-four (24) consecutive hours beginning and ending at 9:00 AM Central Standard Time.
- 1.4 The term “*Delivery Point*” shall mean the point of interconnection between the facilities of Seller and Buyer at or near the facility where *RNG* will be sold and delivered by Seller to Buyer under this Agreement, as shown on Exhibit “*A*” hereto.

[Insert Schematic drawing]

- 1.5 “*Facilities*” means those facilities that will be maintained by the Buyer pursuant to this Agreement and other facilities utilized in connection with the delivery of *RNG*.
- 1.6 The term “*Maximum Daily Quantity*” (or “*MDQ*”) is the maximum amount of *RNG* that Buyer is obligated to purchase on any *Day* during the term of this Agreement.
- 1.7 The term “*MMbtu*” means one million *Btu*.
- 1.8 The term “*mdth*” means one thousand dekatherms.
- 1.9 The term “*Month*” means a period beginning at 9:00 AM Central Standard Time on the first *Day*

of any calendar month and ending at 9:00 AM Central Time on the first Day of the next succeeding calendar month (per NAESB and FERC).

- 1.10 The term "Plant" means the digester and processing facilities operated by Seller.
- 1.11 The term "RNG" means the gas produced by Seller at the Plant.
- 1.12 "Services" has the meaning set forth in Article 8 of this Agreement.
- 1.13 "Pipeline Quality" has the meaning defined in latest version of AGA Report 4A.

#### **ARTICLE 2: EFFECTIVE DATE AND TERM**

- 2.1 The term of the Agreement shall commence as of the date first written above and shall remain in effect through \_\_\_\_\_, and from month to month thereafter unless terminated by either Party on no less than thirty (30) days prior written notice to the other.
- 2.2 Upon the termination of this Agreement for any reason, any monies due and owing Seller or Buyer shall be paid pursuant to the terms hereof, and any corrections or adjustments to payments previously made shall be determined and made at the earliest possible time. The provisions of this Agreement shall remain in effect until the obligations under this paragraph have been fulfilled.

#### **ARTICLE 3: SALE AND PURCHASE OBLIGATIONS**

- 3.1 Subject to the terms and conditions of this Agreement, Seller agrees to sell and deliver, and Buyer agrees to purchase and receive, each Day during the term of this Agreement, at the Delivery Point, a quantity of RNG equal to the lesser of (a) the quantity of RNG produced by the Plant on such Day or (b) the MDQ for such Day.
- 3.2 As of the effective date of this Agreement, the MDQ shall be MMBtu.
- 3.3 Seller shall tender RNG for delivery at a substantially uniform rate of flow throughout each Day, at a minimum of 0 mdth/day and a maximum of \_\_\_\_\_ mdth/day. If Seller becomes aware that the rate of delivery or the total quantity of RNG that Seller will deliver for any Day will differ by more than twenty-five percent (25%) (positive or negative) from that achieved the previous Day, Seller shall so notify Buyer's Gas System Operations at the contact set forth in Section 13.10 below. Seller also shall notify Buyer's Gas System Operations at least twenty-four (24) hours in advance of any suspension of RNG deliveries under this Agreement necessitated by Seller's maintenance of its Plant.

#### **ARTICLE 4: PRICE OF GAS**

- 4.1 The price paid for each MMBtu of RNG sold and purchased under this Agreement in any Month shall be equal to the New York Mercantile Exchange (NYMEX) natural gas futures contract last day settle price for such Month.

#### **ARTICLE 5: TITLE TO GAS**

- 5.1 Seller hereby warrants good and merchantable title to all RNG delivered hereunder, free and clear of all liens, encumbrances and claims whatsoever. Seller will indemnify Buyer and hold it harmless from any and all suits, actions, debts, accounts, damages, costs, losses, and expenses arising from or out of adverse title claims of any and all persons to said RNG.

5.2 Title to all RNG received by Buyer shall pass to Buyer at the Delivery Point. As between the Parties hereto, Seller shall be deemed to be in exclusive control and possession of the RNG deliverable hereunder and responsible for any damage or injury caused thereby until the same shall have been delivered to Buyer at the Delivery Point; thereafter Buyer shall be deemed to be in exclusive control and possession of such gas and responsible for any damage or injury caused thereby.

**ARTICLE 6: GAS PRESSURE, TEMPERATURE AND QUALITY**

6.1 Seller shall tender RNG for delivery to Buyer under this Agreement at the Delivery Point at pressures sufficient for such RNG to enter Buyer's facilities at such point, but in no event in excess of the maximum allowable operating pressure on Buyer's system which, at the time of execution of this Agreement, is \_\_\_\_\_ psig. Buyer shall promptly notify Seller of any changes in the maximum operating pressure of the Buyer's system.

6.2 Seller shall tender RNG for delivery to Buyer under this Agreement at the Delivery Point at a temperature no less than \_\_\_\_\_ degrees Fahrenheit and no greater than \_\_\_\_\_ degrees Fahrenheit. Should Seller tender RNG to Buyer at the Delivery Point at a temperature colder or warmer than such range and Buyer's meter is damaged as a result, then in addition to and without limitation of any other remedy Buyer may have, Buyer shall be entitled to receive from Seller an amount equal to Buyer's cost to repair or replace such meter and any other related equipment affected.

6.3 Seller agrees that it will exercise reasonable care and diligence in tendering RNG for delivery to Buyer under this Agreement, and warrants that all RNG when tendered for delivery to Buyer hereunder at the Delivery Point shall:

- a. be compatible and interchangeable with pipeline gas as defined in 16 NYCRR 229;
- b. be within the limits set forth in Table 1
- c. be monitored as to conformity with all of the foregoing criteria by manual test or by mutually acceptable continuous monitoring equipment; and Buyer will require quarterly random grab sampling to ensure gas is free of objectionable materials with analytical costs to be reimbursed by the Seller.

Table 1: Gas Quality Specifications

Gas Quality Specification	Low	High
BTU Content (Heat Content) [BTU/scf]		
Wobbe Number		
Relative Density		
Water Vapor Content [lb/MMscf]		
Mercaptans (as Odorant) [lb/MMscf]		
Hydrocarbon Dew Point, [°F] CHDP		
Hydrogen Sulfide (H <sub>2</sub> S)		
Total Sulfur		
Total Diluent Gases		
Carbon Dioxide (CO <sub>2</sub> )		
Nitrogen (N <sub>2</sub> )		
Oxygen (O <sub>2</sub> )		

Hydrogen	-	
Total Bacteria	-	Not Detectable
Mercury	-	Not Detectable
Other Volatile Metals (including arsenic)	-	Not Detectable
Siloxanes	-	Not Detectable
Ammonia	-	Not Detectable
Non-Halogenated Semi-Volatile and Volatile Compounds	-	Not Detectable
Halocarbons	-	Not Detectable
Aldehyde/Ketones	-	Not Detectable

**NOTES:**

1. *Not-detectable for purposes of this specification is defined as a value less than the lowest detectable level for a mutually agreeable standard industry analytical test method*
2. *BTU = commonly referred to as Higher Heating Value (HHV)*
3. *Wobbe = Interchangeability parameter; ratio of BTU content to specific gravity*
4. *In addition to the specified limits above, gas received into Buyer's pipeline system shall be pipeline quality and as such remain commercially free of objectionable materials and merchantable as defined in latest edition of AGA Report 4A "Natural Gas Contract Measurement and Quality Clauses"*

- 6.4 Seller shall maintain in good working order its facilities at the Plant that enable it to ensure that the pressure, temperature and quality of the RNG it tenders for delivery under this Agreement fully conform with the criteria set forth in this Agreement.
- 6.5 In addition to any and all other remedies that it may have, Buyer shall have the right to reject as non-conforming any RNG Seller tenders for delivery under this Agreement that fails to comply with the pressure, temperature or quality specifications set forth in this Agreement, and will maintain suitable equipment at Seller's premise in order to remotely monitor and shut off Seller's supply should it not meet such specifications.
- 6.6 The Parties shall develop a facility start-up gas quality sampling and testing plan (the "Plan") to ensure all equipment is functioning as and intended in order to provide RNG conforming to the quality specifications set forth in Table 1 above. The Plan shall include provisions regarding frequency of initial testing.

**ARTICLE 7: GAS MEASUREMENT**

- 7.1 The quantity of RNG delivered hereunder shall be measured according, to Boyle's and Charles' Laws for the measurement of gas under varying temperatures and pressures and shall be determined as follows:
- a. the sales unit of the RNG delivered shall be one (1) MMBtu of gas measured as HHV on a real, dry, basis at standard temperature and pressure;
  - b. the unit of weight for the purpose of measurement shall be one (1) pound mass of gas;
  - c. the average absolute atmospheric pressure shall be assumed to be 14.73 pounds per square inch; and
  - d. the temperature of gas passing through the meter shall be determined by the continuous use of a temperature measuring device; the arithmetic averages of the temperature recorded each

twenty-four (24) hour Day shall be used in computing gas volumes or continuous instantaneous temperature measurements may be applied to metering instruments to provide the volume computation.

- 7.2 The metering equipment shall be sealed and the seals shall be broken only upon occasions when the meters are to be inspected, tested or adjusted, and representatives of Seller shall be afforded at least twenty-four (24) hour notice and reasonable opportunity to be present upon such occasions. Buyer shall use reasonable efforts to give Seller more than twenty-four (24) hour notice of such inspections, tests or adjustments.
- 7.3 Periodic tests of such metering equipment, at intervals not to exceed two times per year, will be made at any reasonable time upon request there for by Seller. If, as a result of any such additional test, the metering equipment is found to be defective or inaccurate, it will be restored to a condition of accuracy or replaced. If an additional test of the metering equipment is made at the request of Seller with the result that said metering equipment is found to be registering correctly or within two percent (2%) plus or minus of one hundred percent (100%) accuracy, Seller shall bear the expense of such additional test. If such additional test shows an error greater than two percent (2%) plus or minus of one hundred percent (100%) accuracy, then Buyer shall bear the expense of such additional test and any necessary repair or replacement.
- 7.4 All meters shall be adjusted as close as practical to one hundred percent (100%) accuracy at time of installation and testing. If any of the metering equipment tests provided for herein disclose that the error for such equipment exceeds two percent (2%) plus or minus of one hundred percent (100%) accuracy, and the period of inaccuracy cannot be reasonably ascertained, then the period of inaccuracy will be assumed to have begun at the midpoint in time between the discovery of the inaccuracy and the previous meter test.
- 7.5 Any correction in billing resulting from such correction in meter records shall be made in the next monthly invoice rendered by Buyer after the inaccuracy is discovered. Should any metering equipment fail to register the gas delivered or received during any period of time, the amount of RNG delivered or received during such period will be estimated by the Parties according to the amounts previously delivered or received during similar periods under substantially similar conditions, and upon mutual agreement of the Parties shall be used as the basis for billing for that period.

#### **ARTICLE 8: OPERATION and MAINTENANCE SERVICES, EQUIPMENT REPLACEMENT COSTS**

- 8.1 **SCOPE** – During the term of this Agreement the Buyer will perform, or cause to be performed, in a prudent and workman like manner the Services set forth in Section 8.2 below. Upon the mutual agreement of the Parties, the Buyer may perform additional Services (the "Unscheduled Services") in connection with the Facilities. In the case of emergencies that render the Facilities unsafe, the Buyer may perform emergency services that it deems necessary to make the Facilities safe (the "Emergency Services"), including shutting off gas supply and the gas delivery. The Buyer shall attempt to notify Seller prior to commencing any such Emergency Services, however if prior notification is impractical, the Buyer shall have the right to commence the Emergency Services immediately and to notify Seller within 24 hours thereafter.
- 8.2 **SERVICES** – During the term of this Agreement, the Buyer shall provide the labor and materials necessary to operate and maintain the gas meters, gas regulators, odorant system, gas chromatographs, telephone lines and other ancillary equipment required by the Company in connection with the delivery of RNG pursuant to this Agreement (the "Services"). The Services do not include repairs for damages, malfunctions or failures caused by or occurring as the result of: (a) repairs, adjustments or any other actions performed by persons other than the Buyer's authorized representatives; (b) failure of components not serviced by the Buyer's authorized

representatives; (c) abuse, misuse or negligent acts of Seller or others; or (d) an event of force majeure as defined in Article 11 hereof. Installation of the equipment described above is the Seller's responsibility.

- 8.3 **COST OF SERVICES** – Seller shall reimburse the Company for the fully loaded cost incurred by the Company in performing the Services, Unscheduled Services and/or Emergency Services.
- 8.4 **EQUIPMENT REPLACEMENT AT END OF LIFE** – Seller shall reimburse the Company for the fully loaded cost to replace gas meters, gas regulators, odorant system, gas chromatographs, telephone lines and other ancillary equipment when such equipment reaches the end of its service life.

#### **ARTICLE 9: BILLING AND PAYMENT**

- 9.1 On or before the fifth (5th) day of each Month, Buyer shall notify Seller of the quantity of RNG delivered by Seller to Buyer during the preceding Month. Seller shall render a written statement to Buyer on or before the fifteenth (15th) day of such succeeding Month which, upon verification by Buyer, shall be paid by Buyer by the twenty-fifth (25th) day of such Month. If the twenty-fifth (25th) day of any Month falls on a weekend or bank holiday, payment by Buyer shall be due on the next succeeding business day.
- 9.2 The fully loaded costs incurred by the Buyer in performing any Services, Unscheduled Services, and/or Emergency Services will be applied as an offset to the amount invoiced by Seller pursuant to Section 9.1 above.
- 9.3 **AUDITS** – Each Party shall have the right at its own expense to examine and audit at a reasonable time and upon reasonable prior notice the books, records and charts of the other Party relevant to this Agreement. Each Party shall use reasonable efforts to make available such records as may be necessary to verify the accuracy of any statements or charges made under or pursuant to any of the provisions of this Agreement. A formal audit of accounts shall not be made more than once each calendar year.

#### **ARTICLE 10: ACCESS TO PREMISES**

- 10.1 Seller agrees during the term of this Agreement that it will provide access as may be required by the Buyer's authorized representatives for the performance of its obligations hereunder. Upon 24 hours' notice, Seller shall grant access to, or obtain access for, the Buyer's authorized representatives for performance of the Services and the Unscheduled Services. Furthermore, Seller shall grant or obtain immediate access for the Buyer's authorized representatives for the performance of Emergency Services.

#### **ARTICLE 11: FORCE MAJEURE**

- 11.1 The term force majeure as employed herein shall mean acts of God, strikes, lockouts or other industrial disturbances, acts of the public enemy, wars, blockades, insurrections, riots, epidemics, landslides, lightning earthquakes, fires, storms, floods, washouts, arrests, the order of any court of governmental authority having jurisdiction while the same is in force and effect, civil disturbances, explosions, breakage, accidents to machinery or lines or pipe, freezing of or damage to facilities, inability to obtain or unavoidable delay in obtaining material, equipment, and any other cause whether of the kind herein enumerated or otherwise, not reasonably within the control of the Party claiming suspension and which by the exercise of due diligence such Party is unable to prevent or overcome.
- 11.2 In the event of either Party being rendered unable, wholly or in part, by force majeure to carry

out its obligations (other than the continuing obligation set forth herein below), it is agreed that on such Party's giving notice and full particulars of such force majeure in writing or by telegraph or teletype to the other Party within a reasonable time (not to exceed five (5) days) after occurrence of the cause relied on, the obligations of both Parties, so far as they are affected by such force majeure, shall be suspended during such period of force majeure, but for no longer period, and such cause shall so far as possible be remedied with all reasonable dispatch.

- 11.3 Neither Party shall be liable in damages to the other for any act, omission or circumstance occasioned by, or in consequence of, force majeure, as herein defined. Such causes or contingencies affecting the performance by either Party, however, shall not relieve it of liability unless such Party shall give notice and full particulars of such cause or contingency in writing, to the other Party at the address set forth in Section 13.10 within a reasonable time after the occurrence relied upon, nor shall such causes or contingencies affecting the performance by either Party relieve it of liability in the event of its failure to use due diligence to remedy the situation and remove the cause with all reasonable dispatch, nor shall such causes or contingencies affecting the performance relieve Buyer from its obligation to make payments of amounts in respect of RNG delivered.
- 11.4 To the extent that, in Buyer's sole judgment. Buyer's ability to receive, measure monitor and/or odorize RNG is impaired by conditions on its system including, but not limited to, the performance of routine maintenance or repairs, then Buyer's obligation to purchase and receive such RNG shall be suspended for the duration of such condition.

## **ARTICLE 12: EVENTS OF DEFAULT**

- 12.1 **EVENTS OF DEFAULT** – The occurrence of anyone or more of the following shall be an "Event of Default" under this Agreement:
- a. Failure by a party to pay/reimburse any amount when due and payable that is required to be paid by the terms of this Agreement.
  - b. Failure by a party to perform any covenant, condition or agreement required to be performed by it by the terms of this Agreement that continues for a period of ten (10) days after the required date of performance.

## **12.2 REMEDIES ON DEFAULT**

- a. The non-defaulting party shall have the right, upon written notice to the defaulting party, to terminate this Agreement upon any Event of Default.
- b. Upon any Event of Default by the Buyer, Seller, or a designee of Seller, may cure any breach or default of the Company under this Agreement that resulted in an Event of Default (including the failure to perform Services), in which case the full cost thereof shall be reimbursed to Seller by the Buyer.

## **ARTICLE 13: MISCELLANEOUS**

- 13.1 Except as provided hereinafter, neither this Agreement nor any rights or obligations hereunder may be assigned or transferred, by operation of law or otherwise by either Party without the prior written consent of the other Party, which consent shall not be unreasonably withheld. Notwithstanding the foregoing, Buyer may assign this Agreement and all of its rights and obligations to an affiliate of Buyer at any time upon 30 days prior written notice to Seller.
- 13.2 Seller shall provide, at no cost to Buyer, all of the electricity and compressed air required for Buyer to operate the facilities that will measure, regulate and odorize the RNG gas delivered by Buyer to Seller under this Agreement at Buyer's facilities for such purposes located at or near

the Delivery Point.

- 13.3 The sale and delivery of RNG by Seller and the purchase and receipt thereof by Buyer are subject to all valid legislation with respect to the subject matter hereof and to all valid present and future orders, rules and regulations of duly constituted authorities having jurisdiction. Neither Buyer nor Seller shall be liable to the other for failure to perform any obligation hereunder where such failure is due to compliance with such valid laws, orders, rules or regulations. If any statute, order, rule, or regulation of a duly constituted authority having jurisdiction over a Party or the performance of this Agreement prevents Seller from charging or collecting the price or prices payable hereunder or prevents Buyer from recovering costs representing the price or prices payable hereunder, the following shall apply notwithstanding any other provision of this Agreement:
- a. If Buyer is prevented from recovering any costs representing all or a portion of the price or prices payable hereunder, or Buyer's recovery of such costs is made subject to refund, Buyer may, at its option, terminate this Agreement by written notice to Seller, effective not less than sixty (60) days after delivery thereof;
  - b. If Seller is prevented from charging or collecting all or any part of the price or prices payable hereunder, or Seller's collection of such prices is made subject to refund, Seller may, at its option, terminate this Agreement by written notice to Buyer, effective not less than sixty (60) days after delivery thereof.
- 13.4 This Agreement sets forth all understandings between the Parties respecting the terms and conditions of this transaction. All other agreements, understandings and representations by and between the Parties hereto prior to this Agreement, whether consistent or inconsistent, oral or written, concerning this transaction are merged into and superseded by this written Agreement.
- 13.5 All headings appearing herein are for convenience only and shall not be considered a part of this Agreement for any purpose.
- 13.6 The Parties may, by mutual agreement, waive any provision herein; however, a waiver shall not be construed to constitute a continuing waiver hereunder and furthermore, a waiver by either Party of any one or more defaults by the other Party in performance of any provision of this Agreement shall not operate or be construed as a waiver of future default or defaults, whether of a like or different character.
- 13.7 Seller hereby agrees to indemnify and hold harmless Buyer from damage to Buyer's or third parties' property or injury to persons (including death) to the extent resulting from the negligence of Seller, its servants, agents or employees, while engaged in activities under this Agreement. Buyer shall indemnify and hold harmless Seller from damage to Seller's or third parties' property or injury to persons (including death) to the extent resulting from the negligence of Buyer, its servants, agents or employees while engaged in activities under this Agreement except to the extent Buyer's Schedule for Gas Service (as filed with and approved by the Public Service Commission of the State of New York), limits Buyer's liability. The obligations under this Section shall survive termination of this Agreement.
- 13.8 This agreement shall be governed by and construed in accordance with the laws of the state of New York, without regard to any rules governing conflicts of laws that would require application of the laws of another jurisdiction.
- 13.9 This Agreement may be executed in several counterparts, each of which is an original and all of which constitute one and the same instrument.
- 13.10 Unless otherwise specified, any notice, request, demand, statement, bill or other payment

provided for in this Agreement, or any notice which a Party may desire to give to the other, shall be considered duly delivered as of the earlier of the date of the receipt by the addressee or three (3) business days after the postmark date when mailed by ordinary mail or given to the addressee at the addresses listed below:

**CONTACT INFORMATION**

Buyer Notices:

[ \_\_\_\_\_ ]  
ATTN: [ \_\_\_\_\_ ]  
[ \_\_\_\_\_ ]  
[ \_\_\_\_\_ ]  
Phone: [ \_\_\_\_\_ ]  
Fax: [ \_\_\_\_\_ ]  
Email: [ \_\_\_\_\_ ]

Buyer Billings:

[ \_\_\_\_\_ ]  
ATTN: [ \_\_\_\_\_ ]  
[ \_\_\_\_\_ ]  
[ \_\_\_\_\_ ]  
Phone: [ \_\_\_\_\_ ]  
Fax: [ \_\_\_\_\_ ]  
Email: [ \_\_\_\_\_ ]

Buyer Gas System Operations:

[ \_\_\_\_\_ ]  
ATTN: [ \_\_\_\_\_ ]  
[ \_\_\_\_\_ ]  
[ \_\_\_\_\_ ]  
Phone: [ \_\_\_\_\_ ]  
Fax: [ \_\_\_\_\_ ]  
Email: [ \_\_\_\_\_ ]

Seller: Notices and Billings

[ \_\_\_\_\_ ]  
ATTN: [ \_\_\_\_\_ ]  
[ \_\_\_\_\_ ]  
[ \_\_\_\_\_ ]  
Phone: [ \_\_\_\_\_ ]  
Fax: [ \_\_\_\_\_ ]  
Email: [ \_\_\_\_\_ ]

**IN WITNESS WHEREOF**, the Parties hereto have caused this Agreement to be executed by their duly authorized representatives as of the Effective Date.

[ Buyer ]  
By: \_\_\_\_\_  
Name: \_\_\_\_\_  
Title: \_\_\_\_\_

[ Seller ]  
By: \_\_\_\_\_  
Name: \_\_\_\_\_  
Title: \_\_\_\_\_

## Appendix G – Feedstock/Upgraded Gas Constituent Guidance Matrix

The following table lists some potential COCs that may be found in raw gas from specific feedstocks for RNG production. Each biogas to RNG project will be different, and the final list of constituents of concern will depend on many unique criteria. The tables that follow list typical ranges found in fully upgraded RNG from several of these feedstocks.

Parameter	Landfill	Dairy, Swine	WWTP	Food Waste	Gasifier, Syngas
Water Content					
Sulfur, including Hydrogen Sulfide					
Hydrogen					
Carbon dioxide					
Nitrogen					
Oxygen					
Ammonia					
Biologicals					
Mercury					
Volatile metals					
Siloxanes					
Volatile Organic Compounds					
Semi-volatile Organic Compounds					
Halocarbons					
Aldehydes and Ketones					
Polychlorinated biphenyls (PCBs)					
Pesticides					

### Observed Ranges Found in Fully Upgraded RNG from Landfills

The following data on upgraded RNG from landfills is from GTI lab analyses from 2006-2016.

Parameter	AGA 4A Reported Range	Range Found in Upgraded Landfill-Derived RNG	Range Found in Natural Gas Samples
Total Sulfur	maximum 0.5 to 20 grains per 100 SCF	BDL (0.003) to 0.32 grains per 100 SCF	BDL (0.003) to 1.1 grains per 100 SCF
Hydrogen Sulfide	maximum 0.25 to 1.0 grains per 100 SCF	BDL (0.003) to 0.03 grains per 100 SCF	BDL (0.003) to 0.36 grains per 100 SCF
Hydrogen	max. 0.04 to 0.1 vol%	BDL (0.1) to 1.0 vol%	BDL (0.1) to 0.3 vol%
Carbon dioxide	maximum 1 to 3 vol%	BDL (0.03) to 2.2 vol%	BDL (0.03) to 2.6 vol%

Parameter	AGA 4A Reported Range	Range Found in Upgraded Landfill-Derived RNG	Range Found in Natural Gas Samples
Nitrogen	maximum 1 to 4 vol%	0.5 to 9.5 vol%	BDL (0.03) to 12.7 vol%
Oxygen	max. 0.001 to 1 vol% majority: 0.1 to 0.2 vol%	BDL (0.03) to 1.3 vol%	BDL (0.03) to 1.2 vol%
Diluents + Inerts	maximum 3 to 6 vol%	0.6 to 10.0 vol%	0.3 to 12.7 vol %
Ammonia	none	BDL (10 ppmv)	BDL (10 ppmv)
Total Bacteria	none	2.46x10 <sup>4</sup> to 3.29x10 <sup>8</sup> # per 100 SCF	3.47x10 <sup>4</sup> to 6.39x10 <sup>7</sup> # per 100 SCF
Mercury	none	BDL (0.01) to 0.3 µg/m <sup>3</sup>	BDL (0.01) to 0.06 µg/m <sup>3</sup>
Other Volatile Metals <sup>3</sup>	none	BDL (30) to 250 µg/m <sup>3</sup> (Cr, Cu, Mn, Pb, Sb, Zn)	BDL (30) to 213 µg/m <sup>3</sup> (As, Cu, Pb, Zn)
Siloxanes (D4)	none	BDL <sup>1</sup> to 6.0 mg Si/m <sup>3</sup>	BDL <sup>1</sup>
Non-Halogenated Semi-Volatile and Volatile Compounds	none	BDL <sup>2</sup> to 1.4 ppmv (BTEX, phthalates)	BDL <sup>2</sup> to 471 ppmv (1,3-butadiene, acrylonitrile, BTEX)
Halocarbons	none	BDL (0.1) to 3.6 ppmv (Freons, chloroethane, vinyl chloride)	BDL (0.1 ppmv)
Aldehyde/Ketones <sup>3</sup>	none	BDL (10) to 522 ppbv	BDL (10) to 103 ppbv
Polychlorinated biphenyls (PCBs)	none	BDL (0.01 ppbv)	BDL (0.01 ppbv)
Pesticides	none	BDL (0.0006) to 0.003 ppbv (4,4'-DDT)	BDL (0.0006 ppbv)

<sup>1</sup> Detection limits for siloxane ranged from 0.5 mg Si/m<sup>3</sup> to 0.1 as analysis methods improved.

<sup>2</sup> Detection limits vary from 1 ppmv (volatiles) to 5 ppbv (semi-volatiles).

<sup>3</sup> Field blanks contained copper, zinc and acetone.

## Observed Ranges Found in Fully Upgraded RNG from Dairies

The following data on upgraded RNG from dairies is from GTI lab analyses from 2006-2016.

Parameter	AGA 4A Reported Range	Range Found in Upgraded Dairy-Derived RNG	Range Found in Natural Gas Samples
Total Sulfur	maximum 0.5 to 20 grains per 100 SCF	BDL (0.003) to 0.31 grains per 100 SCF	BDL (0.003) to 1.1 grains per 100 SCF
Hydrogen Sulfide	maximum 0.25 to 1.0 grains per 100 SCF	BDL (0.003 ppmv)	BDL (0.003) to 0.36 grains per 100 SCF
Hydrogen	max. 0.04 to 0.1 vol%	BDL (0.1 vol%)	BDL (0.1) to 0.3 vol%
Carbon dioxide	maximum 1 to 3 vol%	0.06 to 0.95 vol%	BDL (0.03) to 2.6 vol%
Nitrogen	maximum 1 to 4 vol%	0.20 to 7.81 vol%	BDL (0.03) to 12.7 vol%
Oxygen	max. 0.001 to 1 vol% majority: 0.1 to 0.2 vol%	BDL (0.03) to 1.99 vol%	BDL (0.03) to 1.2 vol%
Diluents + Inerts	maximum 3 to 6 vol%	0.37 to 10.65 vol%	0.3 to 12.7 vol %
Ammonia	none	BDL (10 ppmv)	BDL (10 ppmv)
Total Bacteria	none	3.28x10 <sup>3</sup> to 1.02x10 <sup>7</sup> # per 100 SCF	3.47x10 <sup>4</sup> to 6.39x10 <sup>7</sup> # per 100 SCF
Mercury	none	BDL (0.01 µg/m <sup>3</sup> )	BDL (0.01) to 0.06 µg/m <sup>3</sup>
Other Volatile Metals <sup>3</sup>	none	BDL (20 µg/m <sup>3</sup> )	BDL (30) to 213 µg/m <sup>3</sup> (As, Cu, Pb, Zn)
Siloxanes (D4)	none	BDL <sup>1</sup>	BDL <sup>1</sup>
Non-Halogenated Semi-Volatile and Volatile Compounds	none	BDL <sup>2</sup> to 0.1 ppmv (BTEX, N-nitroso-di-n-propylamine, benzyl alcohol)	BDL <sup>2</sup> to 471 ppmv (1,3-butadiene, acrylonitrile, BTEX)
Halocarbons	none	BDL (0.1 ppmv)	BDL (0.1 ppmv)
Aldehyde/Ketones <sup>3</sup>	none	not tested	BDL (10) to 103 ppbv
Polychlorinated biphenyls (PCBs)	none	BDL (0.01 ppbv)	BDL (0.01 ppbv)
Pesticides	none	BDL (0.0004) to 0.5 ppbv (gamma-chlordane)	BDL (0.0006 ppbv)

<sup>1</sup> Detection limits for siloxane ranged from 0.5 mg Si/m<sup>3</sup> to 0.1 as analysis methods improved.

<sup>2</sup> Detection limits vary from 1 ppmv (volatiles) to 5 ppbv (semi-volatiles).

<sup>3</sup> Field blanks contained copper, zinc and acetone.

## Observed Ranges Found in Fully Upgraded RNG from WWTPs

The following data on upgraded RNG from WWTPs is from GTI lab analyses from 2006-2016. Only one fully upgraded site was analyzed.

Parameter	AGA 4A Reported Range	Range Found in Upgraded WWTP-Derived RNG	Range Found in Natural Gas Samples
Total Sulfur	maximum 0.5 to 20 grains per 100 SCF	BDL (0.003) to 0.01 grains per 100 SCF	BDL (0.003) to 1.1 grains per 100 SCF
Hydrogen Sulfide	maximum 0.25 to 1.0 grains per 100 SCF	BDL (0.003) to 0.01 grains per 100 SCF	BDL (0.003) to 0.36 grains per 100 SCF
Hydrogen	max. 0.04 to 0.1 vol%	BDL (0.1 vol%)	BDL (0.1) to 0.3 vol%
Carbon dioxide	maximum 1 to 3 vol%	0.49 to 0.66 vol%	BDL (0.03) to 2.6 vol%
Nitrogen	maximum 1 to 4 vol%	BDL (0.03 vol%)	BDL (0.03) to 12.7 vol%
Oxygen	max. 0.001 to 1 vol% majority: 0.1 to 0.2 vol%	BDL (0.03 vol%)	BDL (0.03) to 1.2 vol%
Diluents + Inerts	maximum 3 to 6 vol%	0.49 to 0.66 vol%	0.3 to 12.7 vol %
Ammonia	none	BDL (10 ppmv)	BDL (10 ppmv)
Total Bacteria	none	9.85x10 <sup>5</sup> to 2.14x10 <sup>6</sup> # per 100 SCF	3.47x10 <sup>4</sup> to 6.39x10 <sup>7</sup> # per 100 SCF
Mercury	none	BDL (0.01 µg/m <sup>3</sup> )	BDL (0.01) to 0.06 µg/m <sup>3</sup>
Other Volatile Metals <sup>3</sup>	none	BDL to 229 µg/m <sup>3</sup> (Zn)	BDL (30) to 213 µg/m <sup>3</sup> (As, Cu, Pb, Zn)
Siloxanes (D4)	none	BDL (0.1 mg/m <sup>3</sup> )	BDL <sup>1</sup>
Non-Halogenated Semi-Volatile and Volatile Compounds	none	BDL <sup>2</sup> to 6 ppbv (phthalate)	BDL <sup>2</sup> to 471 ppmv (1,3-butadiene, acrylonitrile, BTEX)
Halocarbons	none	BDL (0.1 ppmv)	BDL (0.1 ppmv)
Aldehyde/Ketones <sup>3</sup>	none	BDL (10 ppbv)	BDL (10) to 103 ppbv
Polychlorinated biphenyls (PCBs)	none	BDL (0.01 ppbv)	BDL (0.01 ppbv)
Pesticides	none	BDL (0.0006) to 0.006 ppbv (4,4'-DDT)	BDL (0.0006 ppbv)

<sup>1</sup> Detection limits for siloxane ranged from 0.5 mg Si/m<sup>3</sup> to 0.1 as analysis methods improved.

<sup>2</sup> Detection limits vary from 1 ppmv (volatiles) to 5 ppbv (semi-volatiles).

<sup>3</sup> Field blanks contained copper, zinc and acetone.