



Energy+Environmental Economics

Workshop Discussion: NEM Successor Examples

September 20th, 2017



Agenda

+ Context for Net Energy Metering (NEM)

+ Update on State Actions on NEM

- California
- Hawaii
- Colorado
- Arizona

+ Discussion

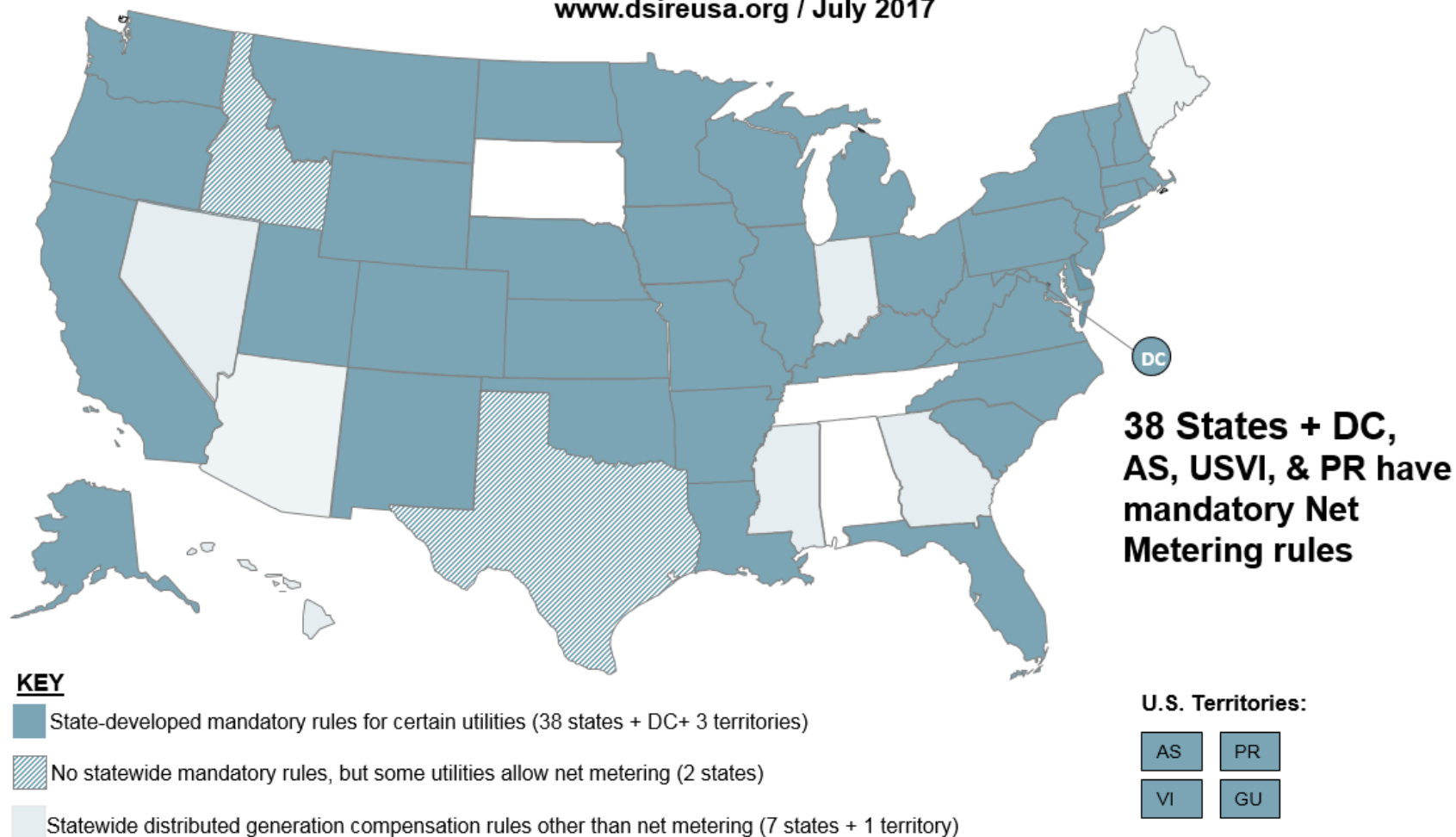
- Common features, what commissions are adopting



States with some form of NEM

Net Metering

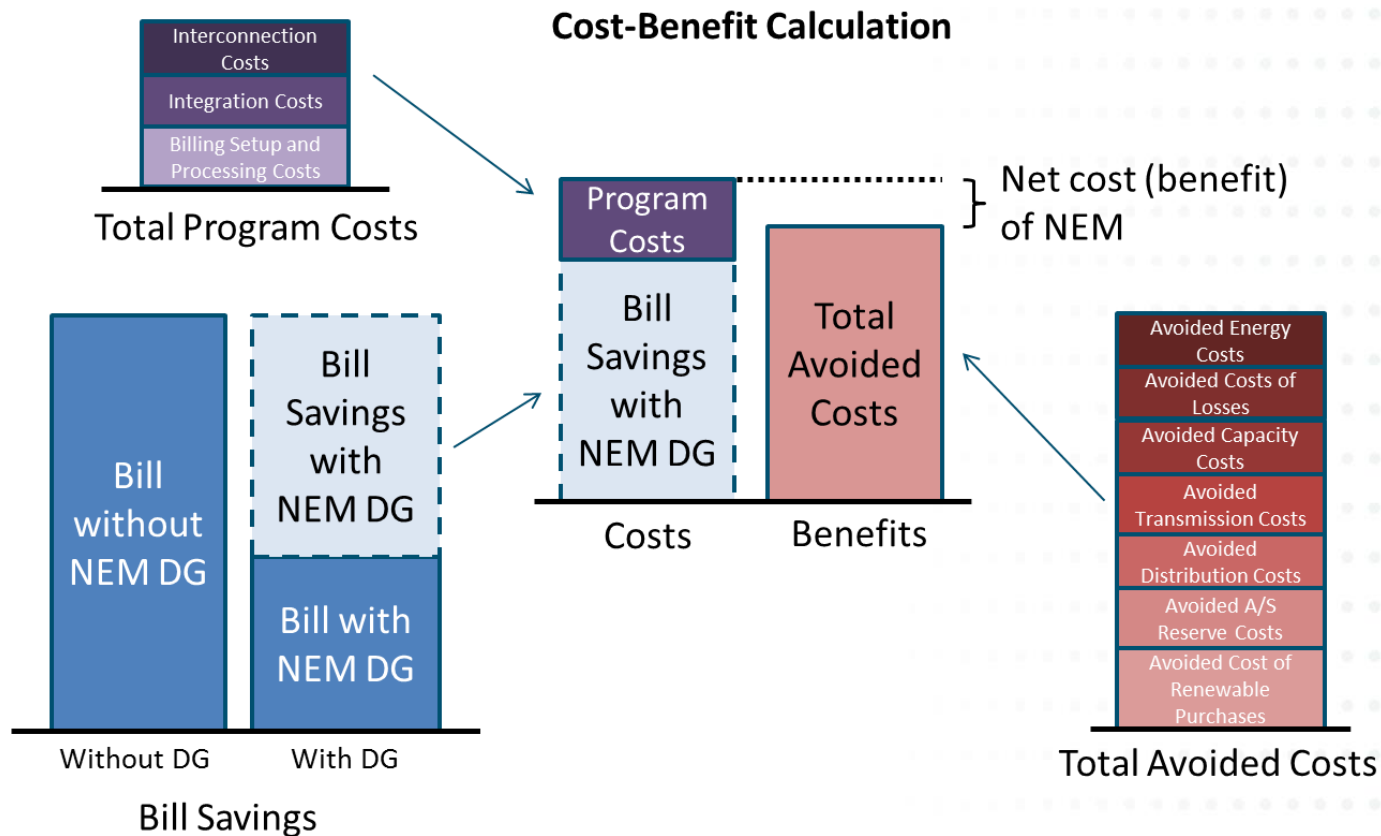
www.dsireusa.org / July 2017





The Crux of the Debate on NEM

+ Estimating the impact on non-participating customers



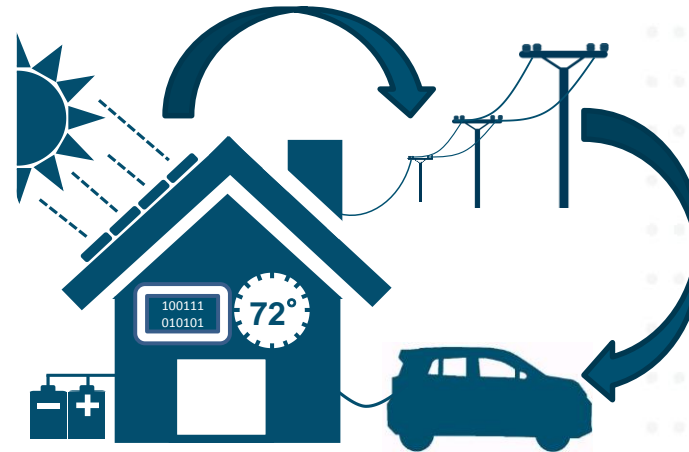
*Not drawn to scale



A “smart” multi-part dynamic retail rate or tariff is one pricing solution that also serves to create a virtual retail market

- + Existing rates and tariffs do not effectively encourage dispatchable or high value DERs nor do they allow for efficient recovery of utility costs
- + A multi-part dynamic rate or tariff can work in tandem with other utility or state programs and it can also accommodate various public policy and regulatory goals
- + This design offers utilities the opportunity to create virtual retail markets based on rates and tariffs rather than entirely new distribution level markets

Energy and other products/services to the grid?



Energy and other products/ service to the customer?

Part 1: Embedded Costs
Customer Charge

\$/customer?
Other?

Part 2: Embedded Costs
Network/Grid Access Charge

\$/kW, \$/kWh?
Other?

Part 3: Marginal Costs
Value-Based Charge/Payment

\$/kW, \$/kWh?
Other?



In the future there will be many more types of customers with diverse needs around utility products and services

Historic utility generation, transmission, distribution, and “other” products/services

'G'

*Procurement,
Scheduling, Energy,
Losses, Capacity,
Reserves, Reliability, etc.*

'T'

*Losses, Bulk/Sub-
Transmission Capacity,
Reliability, etc.*

'D'

*Losses, Distribution
Capacity, Customer,
Billing, Reliability, etc.*

'O'

*Public Policy Goals,
Settlements, etc.*

Full Requirements Customers

Relatively homogeneous and similar to today's traditional bundled customers requiring the same type of full requirements service, power quality, and universal access

Partial Requirements Customers (DERs, etc.)

Diverse in grid use and profiles that may be served by functional unbundling of utility services through multi-part rates, specific programs, and interconnection standards

Enhanced Services Customers

Customers that value reliability or other enhanced utility products/services



Proposed Full Value Tariff is a Three-Part Rate

Reference
at end of
slide deck

Revenue Neutrality is Assumed for
FVT Formulation

+ 1) Customer Charge

- Collects customer related embedded costs and expenses

+ 2) Network Subscription Charge

- Collects embedded costs and invariant costs of the grid based on the customer's use of the grid
- Mechanism for area-differentiation and revenue neutrality

+ 3) Dynamic Price

- Collects forward looking marginal or avoidable costs of load
- Area and time specific
- Can include externalities linked to energy use (CO₂ emissions, criteria emissions, etc.)

Residential & Small
Commercial
(Mass Market)

Large Commercial &
Industrial
(Demand Metered)

\$/customer-month

\$/customer-month

\$/proxy-kW based on
12-month rolling max
monthly kWh

\$/kW of max
monthly demand or
contract demand

\$/kWh by hour provided
day-ahead,
differs by area

\$/kWh by hour
provided day-ahead,
differs by area



SURVEY OF STATE ACTIONS ON NEM



Beyond NEM: California

- + As of July 2017, all IOUs have switched to the current NEM tariff
- + Default TOU tariff is impending

NEM 2.0

- + Full retail credit for energy exports
- + Interconnection fee (\$75-\$145)
- + Mandatory TOU rates
- + Non-bypassable charges for public services (per kWh)
 - Based on “netted out” quantity of energy consumed per metered interval (hour for residential, 15 min otherwise)
- + To be reviewed in 2019

Time-of-Use (TOU)

- + Varies by time of day, day of week, and season
- + Required for all commercial, industrial, agricultural customers
- + Currently optional for residential customers, but becomes mandatory for all in 2018



Proposed Time of Use Rates

- + San Diego Gas and Electric's proposed TOU periods:
 - + Effective Dec 1, 2017 (pending final approval from the CPUC)

Proposed Seasons:

Summer: Jun 1 – Oct 31

Winter: Nov 1 – May 31

On-Peak	3pm - 9pm (daily)
Off-Peak	All other times
Super Off-Peak (weekends and holidays)	12am - 2pm
Super Off-Peak (weekdays)	12am - 6am

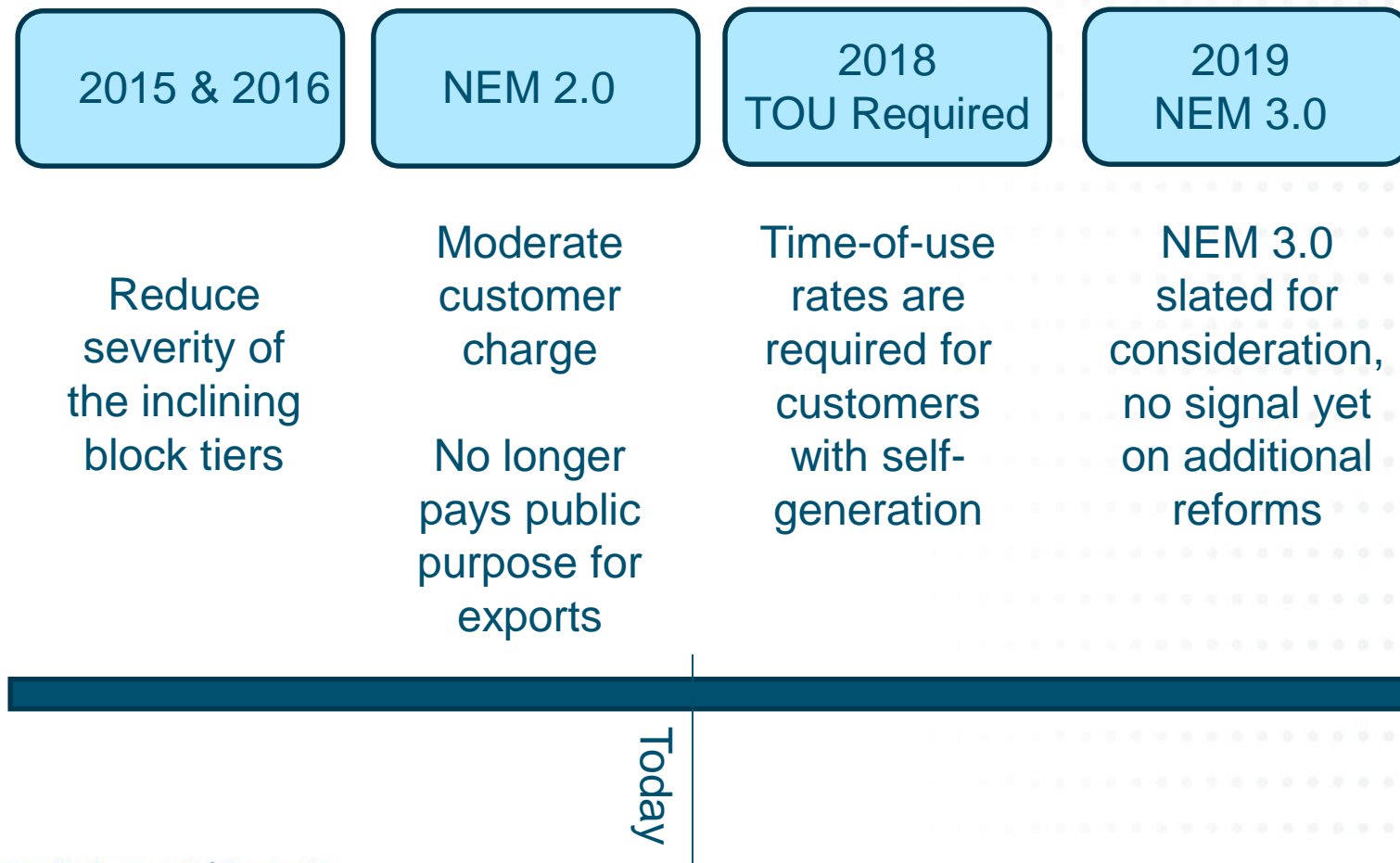
<https://www.sdge.com/clean-energy/time-use-period-grandfathering-net-energy-metering-customers>

SDG&E Peak Period Currently 11am to 6pm Weekdays, May through October.



'Glide path' for NEM transition

+ California residential example





Beyond NEM: Hawaii

- + NEM was closed to new entrants in 2015
- + **Phase 1 (Solar rate redesign):** New customers and existing customers seeking to increase system capacity must choose from two plans:

A. Customer Self-Supply

- + Intended only for solar PV
- + Exports are not allowed
- + Customers not compensated for export
- + \$25 + green infrastructure fee minimum monthly charge (residential customers)

B. Customer Grid-Supply

- + Billed at retail rate for grid consumed energy
- + Compensated at PUC-approved rates for exports
- + Credit in excess of billed amount is forfeited at end of billing cycle
- + \$25 + green infrastructure fee minimum monthly charge (residential customers)
- + Limited program capacity

- + **Phase 2 (Solar rate redesign):** Currently in development



Beyond NEM: Colorado

- + PUC rejected Xcel Energy's request to lower NEM compensation in 2015
- + In 2016, Xcel Energy successfully settled 3 proceedings: its 2016 rate case, the 2017-2019 Renewable Energy compliance plan, & the Solar*Connect Program
- + 26 signatories in settlement, including the PUC, solar, consumer and environmental groups

Key Aspects of Dispute

- + Xcel proposed new tiered monthly fixed charge for residential and small commercial customers, based on energy consumption over last 12 month period
- + Fixed charge to cover expenditures associated with grid use
- + New rate structure expected to increase bills majority of customer

Settlement

- + Withdrew fixed charge proposal
- + Initiated trial TOU pricing models, with the understanding of an eventual move to a default TOU rate



Beyond NEM: Arizona

- + Arizona Public Service's successful rate case settlement in 2017 moved forward value-based solar rate design in the state
- + Concluded a multi-year investigation of the cost and value of solar
- + APS will not another request rate review until 2019

Key Aspects of Dispute

- + Proposed significant decrease in export rates, which would be based on wholesale rates
- + Introduced mandatory fixed demand charge for all customers
- + Offset rate would also be substantially decreased
- + Opposed by solar interests

Settlement

- + Demand charge no longer mandatory (pilot)
- + Customers choose either demand-based rates or TOU rate plans
- + Existing NEM grandfathered for 20 years
- + Export and offset rates from NEM, but higher than original proposed rates
- + Export rates to be determined by avoided cost methodology that forecasts value and costs of DG to grid



DISCUSSION



Discussion of Different Features

+ **Increase customer charge or minimum monthly bill**

- E.g. California, Hawaii have moderately increased theirs
- Need to be careful about small customer impact

+ **Demand-charge to collect more embedded cost**

- New paradigm for many small customers, bill complaints

+ **Different value for exports to the grid**

- California NEM 2.0, Hawaii post-NEM (grid-supply)
- Increases financial incentive for storage systems

+ **Time-of-use tariffs**

- California, Arizona

+ **Grandfathering**

- Seems universal, Nevada had bad outcome without it



THANK YOU!

Contact Information

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Full Value Tariff Study Background

- + **The study directly builds upon the REV Track 2 Department of Public Service Staff white paper**
 - Study link:
<http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={A0BF2F42-82A1-4ED0-AE6D-D7E38F8D655D}>
- + **The study presents a number of choices and options**
- + **The study examines the creation of a conceptual, but implementable full value tariff (FVT) with illustrative rate levels based on sound economic principles to achieve the following goals:**
 - To more accurately compensate customer and third party contributions to managing the grid
 - To collect utility embedded costs equitably and efficiently
 - To increase competition for distribution services
 - To lower customer costs through more efficient use of the distribution system