JOINT UTILITIES
OF NEW YORK

VDER Rate Design Working Group
Joint Utilities Presentations

February 8, 2018

NYSEG nationalgrid Orange & Rockland Rockland Electric Company conEdison Central Hudson RG&E

Agenda and Preliminary Matters

- Meeting Objective:

  The purpose of the meeting is to provide an overview of rate design and NY utility cost data so that all stakeholders will have a similar understanding of rate design fundamentals, and can use common language and data to develop and discuss rate design proposals in this process.

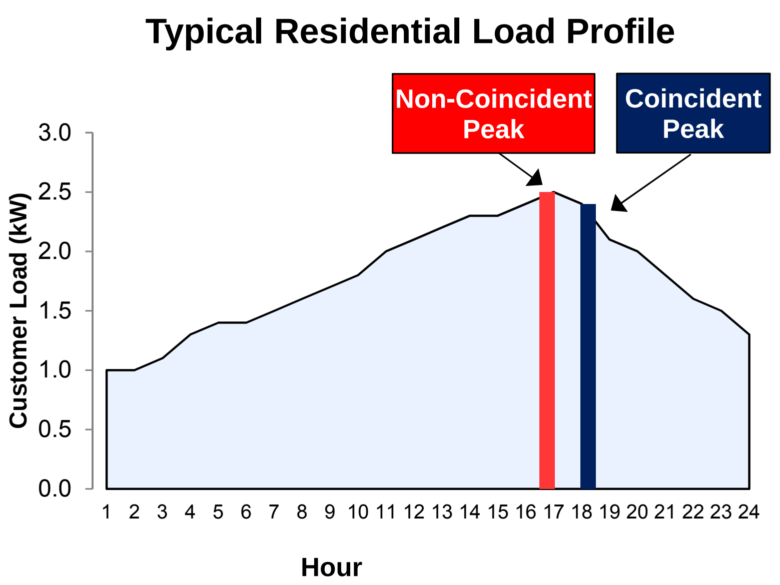
- Agenda:
  - Rate design elements overview
  - NY utilities to present on their cost classifications
  - Rate design example

Rate Design Elements Overview

Examples of Possible Rate Design Approaches Noted in Staff's Guidance Rate Design and Bill Impact Analysis Document	Applies to Delivery	Applies to Commodity
Demand Charges	✓	✓
Fixed Subscription Fees	✓	
Minimum Bills	✓	
Grid Access Charge	✓	
TOU Pricing	✓	✓
Critical Peak Pricing	✓	✓
Seasonal/Tiered Pricing	✓	✓
Reduced or Increased Customer Charge	✓	
Standby Rates	✓	
Market Based Rates - Energy and Capacity Supply		✓

Demand Charges: Delivery Service (Non-coincident (NCP) and Coincident Peak (CP))

Rate Design Illustration



Terms defined:

- Non-coincident Peak (NCP) demand: a customer's maximum demand
- Coincident Peak (CP) demand: a customer's demand at time of maximum system or local demand.

Rate Design Considerations

- T&D Capacity-related Cost-causation:
  - NCP demand affects distribution capacity close to individual customers
  - CP demand affects distribution capacity further from the customer
    - But billing Mass Market classes on CP is challenging: Time of CP is not known until end of month
- Rate structures that include CP demand require interval meters and revisions to billing systems and processes
- Using longer intervals to measure billing demand "smooths over" short-duration fluctuations in load (spikes)
- Using averages of top peak demand to measure billing demand "smooths over" longer-duration fluctuations in load.

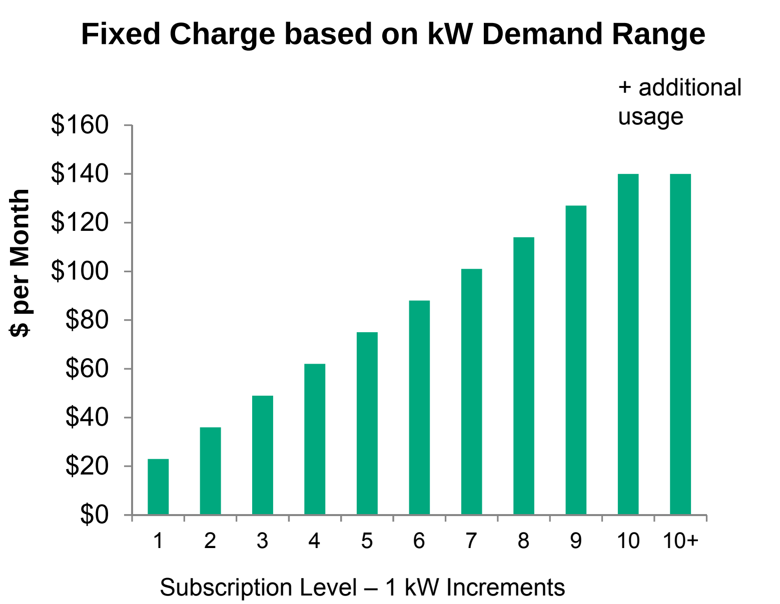
Rate Design Decisions

There are several decisions concerning measurement of Billing Demand:

- Demand can be measured at time of:
  - Non-coincident Peak (NCP)
  - Coincident Peak (CP)
  - NCP is most common measure of demand;
    - CP is used for SCs with small number of very large sophisticated customers
- Demand is measured in intervals – can be, e.g., 15, 30, or 60 minutes
- Demand can be measured as average of customer's top 1 to 5 maximum demands in the month
- Billing demand can be measured as kW or kVA; kVa accounts for reactive power. Or, can measure kVAR
- Billing demand can be measured separately for Peak and Off Peak periods. (See Slide 7)

Subscription Service

Rate Design Illustration



Rate Design Considerations

- Fixed delivery charge based on kW usage range (measured using annual peak demand)
- Charge does not vary with kWh usage
- Single charge includes customer and other delivery costs
- Favors customers with high annual load factor

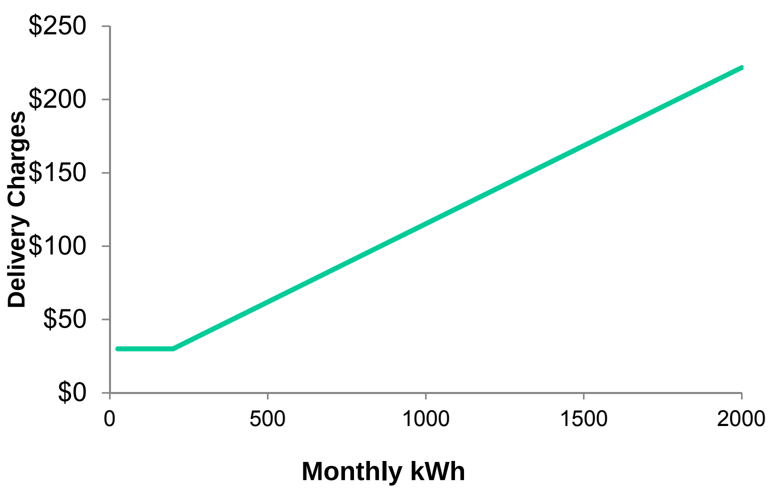
Rate Design Decisions

- Determination of kW usage ranges
- Determination of individual customer subscription kW levels
  - – Customer choice (any minimum)
  - – Default level based on history
- Measurement of actual demands:
  - – Demand interval
  - – Number of measurements/averaging
  - – Time period for measurement
- Need to address actual demands that exceed subscription level:
  - - Additional charge for excess kW
  - - Reset subscription

Minimum Bill

Rate Design Illustration

Residential Monthly Example: $30 Minimum Bill



Based on minimum bill of $30 for 0 to 200 kWh and volumetric rate of $0.10654 /kWh for consumption in excess of 200 kWh/month.

Rate Design Considerations

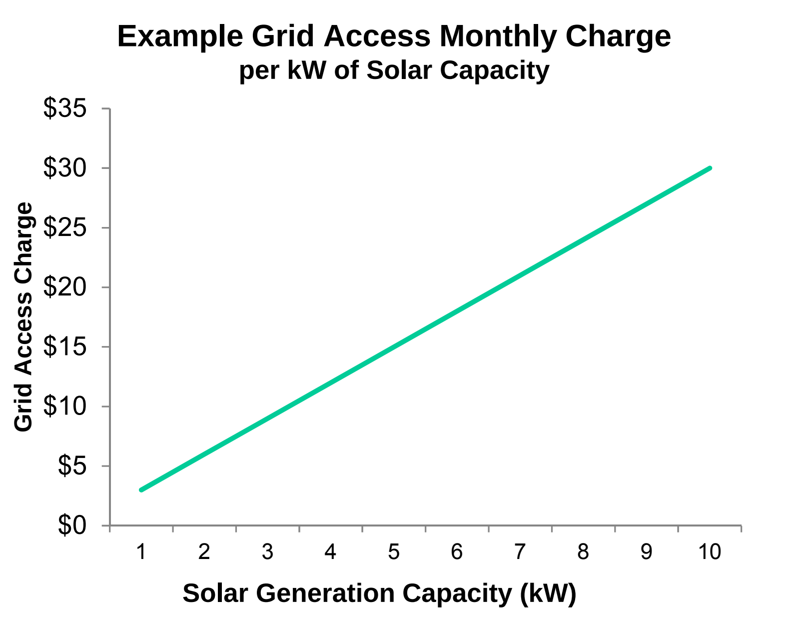
- Fixed charge for customer-related costs and a minimum level of kWh or kW consumption
- Ensures that each customer makes some minimum contribution to the recovery of utility costs regardless of consumption
- Some customers may be adversely affected if they use less than the minimum consumption amount

Rate Design Decisions

- Minimum bill amount must be determined.
- Minimum consumption amount must be determined.
- Can also be set as a minimum dollar amount, regardless of consumption

Grid Access Charge

Rate Design Illustration



Based on Access Charge $3 / kW of Demand of Customer's installed solar capacity

Rate Design Considerations

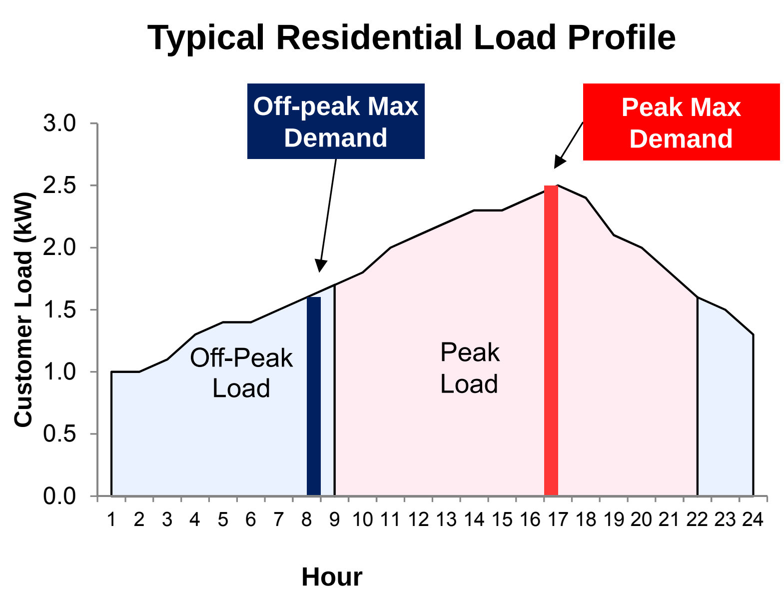
- Charge per kW of solar generating capacity
- Ensures that solar customers contribute to the recovery of utility costs regardless of net monthly energy consumption.
- Technology-specific mechanism.
- May not be appropriate for non-solar technologies.

Rate Design Decisions

- Determine level of per unit charge.
- Determine basis for individual customer's charge
  - Inverter rating
  - Measured maximum export

Time-of-Use (TOU) - Distribution Service: Two Period Example

Rate Design Illustration



Rate Design Considerations

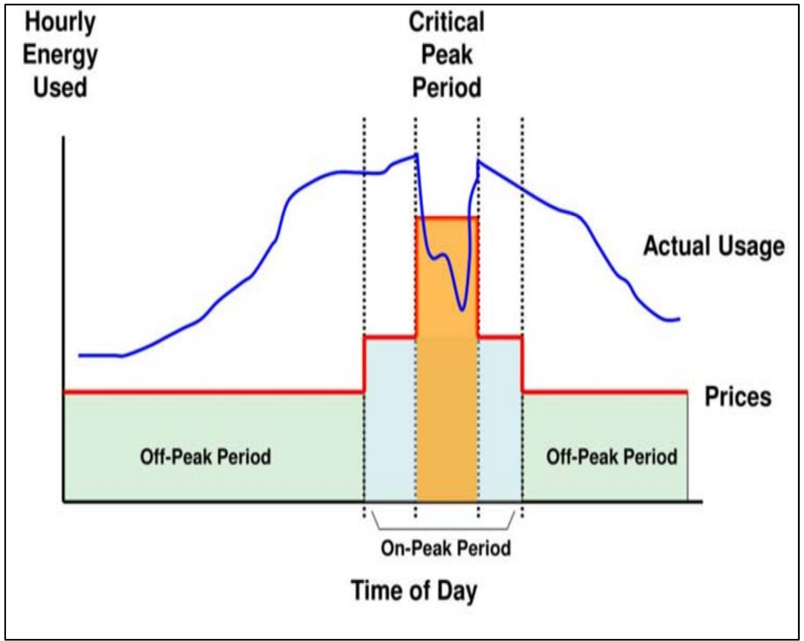
- TOU periods are determined based on analysis of hourly loads for one or more years
- Peak period(s) are defined to separate high load / high cost hours from remaining hours.
  - TOU periods may be determined separately for "Summer" and "Winter" seasons
- TOU parameters (e.g., Peak period hours and rates) must be set to prevent creating new maximum demand in Off-peak period due to customer responsiveness.
- Rate structures that include TOU demand require TOU meters or interval meters and revisions to billing systems and processes

Rate Design Decisions

- Off-peak period is generally defined as: nights, weekends and holidays
- Typical Peak period parameters:
  - Duration of Peak period
  - Start time / end time
- Three Period distribution rate structures introduce a shoulder periods

Critical Peak Pricing

Rate Design Illustration



Source: Demand Response At Southern Company,
Leonard Haynes July 15, 2007

Rate Design Considerations

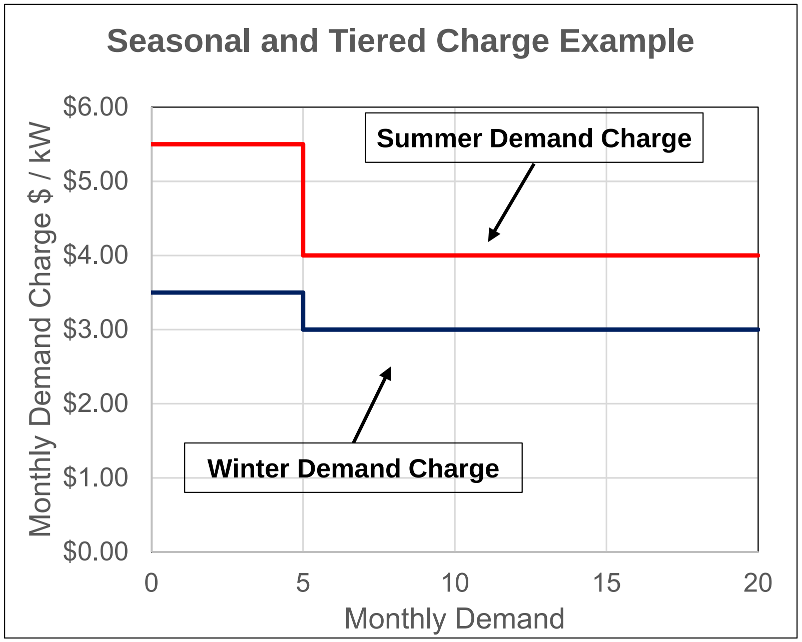
- Critical peak pricing (CPP):
  - CPP event declared when high Wholesale market (NYISO) prices or high delivery system loads are expected
  - High prices are charged on Event Day for specified time period
  - Event days are declared when pre-specified conditions are met; expected number of event days may be 10 – 20
- Typically, a two-part TOU rate structure applies at all times except for when a CPP event is called
  - Decisions on Commodity TOU periods are similar to decisions on Delivery TOU periods

Rate Design Decisions

- Determine whether CPP charge is a demand charge or kWh usage charge.
- Determine magnitude of the CPP charge
  - Constant charge for all events
  - Charge that varies by event (also known as variable peak pricing (VPP).
- Event day Notification options:
  - Day ahead or Short notice – e.g., 4 hours
- CPP period options:
  - Set duration for all Event days (e.g., 5 hours) or vary (e.g., 1 – 5 hours)
  - Hours of potential CPP periods could be set (e.g., CPP between 1 pm and 8 pm)
- CPP Peak and Off-peak rates would be lower than two-part TOU Peak and Off Peak rates (CPP pricing is revenue neutral)
- CPP has been offered both as an opt-in or opt-out option
- Any true up mechanism to address differences in events called and event assumptions used in rate design.

Seasonal / Tiered Pricing

Rate Design Illustration



Rate Design Considerations

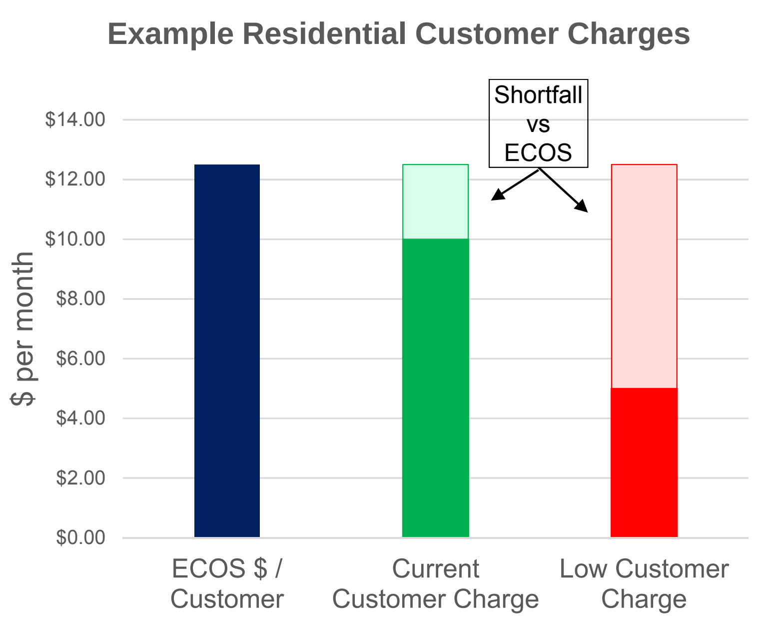
- Seasonal rates generally reflect differences in cost and demand
  - Commodity and / or Delivery rates are higher in high demand season
- Under tiered rates, the rates per kwh or kw can increase or decrease with monthly usage.

Rate Design Decisions

- For seasonal pricing, the seasonal differential must be determined.
- For tiered pricing, rate design must determine (a) number of blocks; (b) kW or kWh breakpoints for each block and (c) rate for each block
- Tiered Pricing:
  - A customer's charge per kW or kWh changes as the customer's monthly demand or usage increases
  - Rate design decisions:
    - Tiers (blocks) of demand or usage
    - Rate to be charged for each block
      - Alternative block structures: Declining or Inclining (Inverted)

Reduced or Increased Customer Charges

Rate Design Illustration



Rate Design Considerations

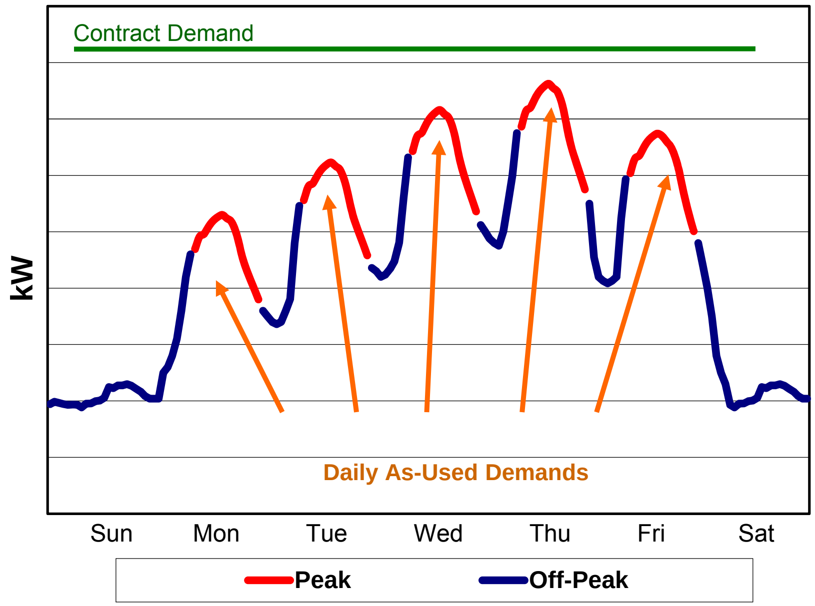
- Fixed monthly charge associated with the presence of a customer on the utility system.

Rate Design Decisions

- Common arguments for increasing customer charge, compared to current rates:
  - ECOS typically indicates that customer charges are significantly less cost
  - Higher customer charge would:
    - Reduce subsidization of low use customers by high use customers in class
    - Reduce cost shifting to DER non-participants
- Common arguments for decreasing customer charge, compared to current rates:
  - Higher kWh and kW charges resulting from lower customer charges incent energy efficient behavior and investments
  - Higher kWh charges may encourage desired market and policy outcomes including energy efficiency and peak load reduction

Standby Rates

Rate Design Illustration



Rate Design Considerations

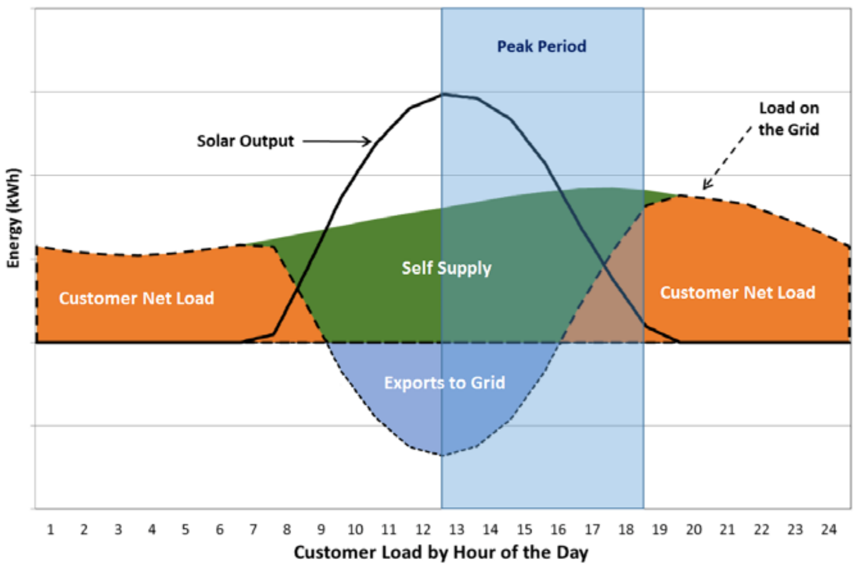
- Customer Charges recover full customer costs.
- Contract Demand Charges recover the costs of “local” facilities.
- Daily As-Used Demand Charges recover the costs of “shared” facilities.
- No delivery charges assessed on a per kWh basis.

Rate Design Decisions

- Determination of costs to be included in contract demand charges vs daily as-used demand charges
- Measurement of as-used demands:
  - Demand interval
  - Number of measurements/averaging
  - Time period for measurement
- Need to address actual demands that exceed contract demand level:
  - Additional charge for excess kW
  - Reset contract demand

VDER Stack – Prosumer Rate Option

Rate Design Illustration



Rate Design Considerations

- Mass Market rates that mirror Value Stack add complexity
  - Locational costs are not static – locational costs change as customer behavior changes in reaction to price signals.

Rate Design Decisions

- Value Stack sets compensation for injections; Value Stack reflects the value of
  - Energy
  - ICAP
  - Distribution benefits (either system wide or locational)
  - Reduced carbon.

Market Based – Energy and Capacity Supply

Rate Design Considerations

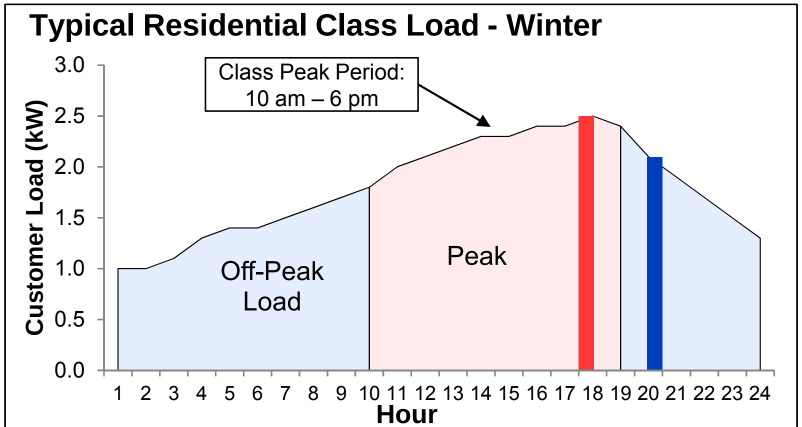
- Commodity rates reflect market prices
- Alternative approaches to market pricing
  - Single volumetric rate set monthly based on forecasted supply costs.
  - Single volumetric rate set monthly based on actual NYISO energy prices for the customer's billing period, load weighted by class load shape. Capacity included on a volumetric basis.
  - Peak and off-peak volumetric rates set monthly based on actual NYISO energy prices for the customer's billing period, load weighted by class load shape. Capacity included on a volumetric basis.
  - Hourly pricing based on NYISO hourly energy prices for customer's billing period. Capacity included on a volumetric basis.
  - Hourly pricing based on NYISO hourly energy prices for customer's billing period. Capacity assessed based on ICAP tags.
- Market based energy and capacity hourly pricing is generally implemented for service classifications with largest customers

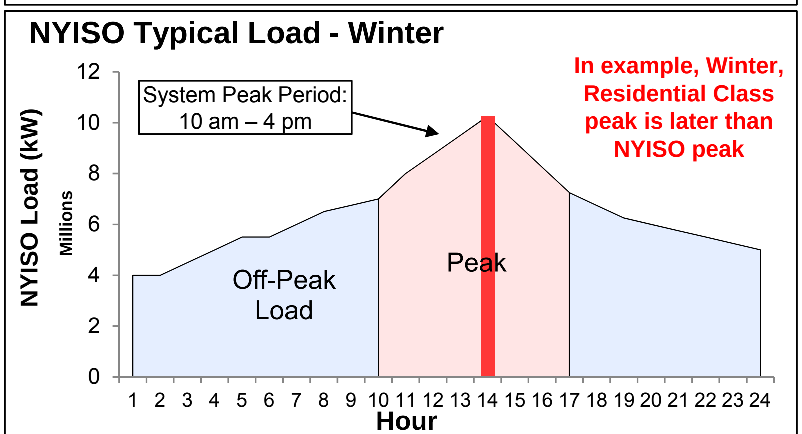
Rate Design Decisions

- Must determine approach
- Must determine parameters for selected approach

Commodity vs. Delivery / overlapping price signals

Rate Design Illustration





Rate Design Considerations

- Distribution TOU rate design may not be consistent with Supply TOU (or CPP) rate design
  - Distribution TOU rate design parameters (e.g., Peak period defined, Peak / Off-peak rate differentials) determined by utility (or location) load patterns
  - Supply TOU (or CPP) rate design parameters determined by combination of utility and NYISO load patterns
- For example: if proposed rate design includes both TOU rates for Distribution and Supply, and "optimal" peak period hours are different for Distribution and Supply, additional analysis is required to determine effect of sub-optimal TOU rate design parameters on principles and objectives.

Rate Design Decisions

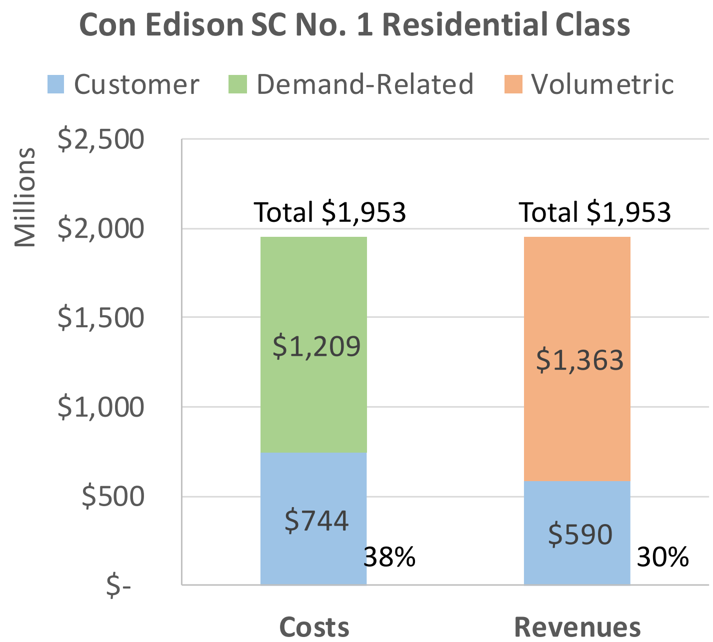
- Should Delivery Peak period and Commodity Peak period provide consistent price signals?
  - Delivery Peak period duration and start time
  - Commodity Peak period duration and start time

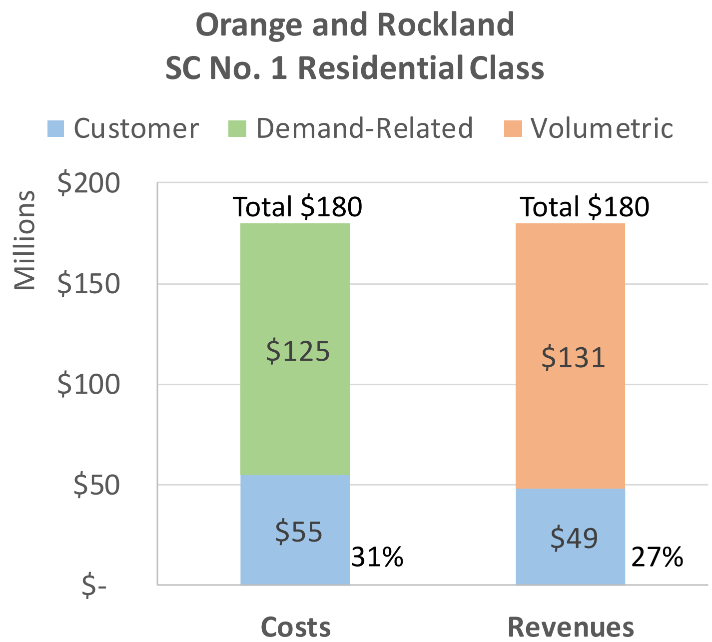
Delivery Revenue vs. Cost

Under the current rate structure, there is a misalignment between revenues and costs

- Delivery costs are mainly fixed/demand related, but a significant portion of delivery costs are recovered through volumetric charges
- Critical to shift delivery rate design to a more cost based rate structure to promote more efficient use of the electric delivery system

Delivery Revenue vs. Cost





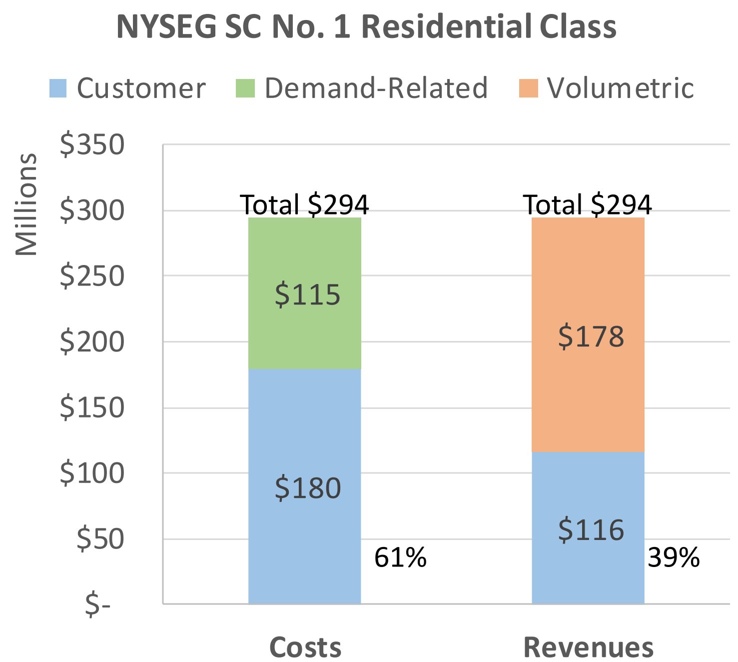
Breakdown of Demand-Related Costs ($M)		
Transmission	$	240
Primary	$	524
Secondary	$	445
Total Demand Related	$	1,209

Source: 2013 Electric Embedded Cost of Service Study

Breakdown of Demand-Related Costs ($M)		
Transmission	$	29
Primary	$	66
Secondary	$	30
Total Demand Related	$	125

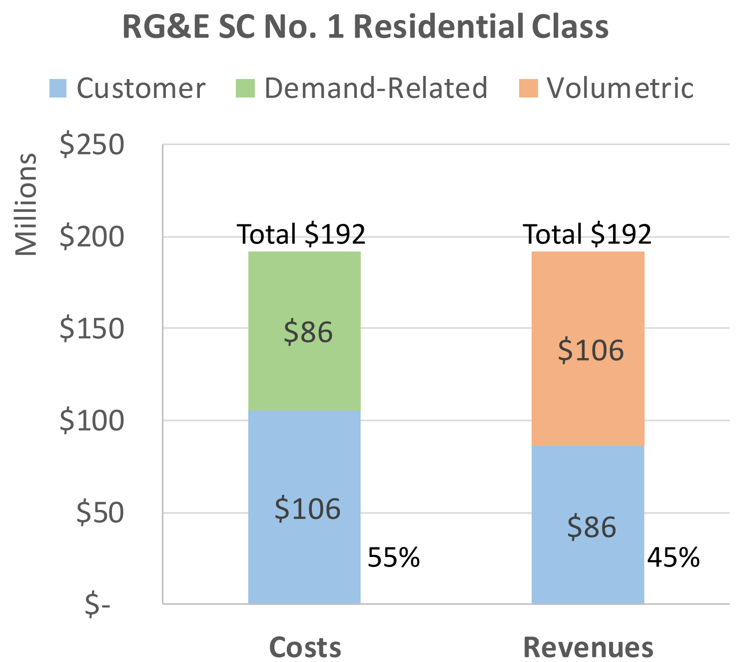
Source: 2015 Electric Embedded Cost of Service Study

Delivery Revenue vs. Cost



Breakdown of Demand-Related Costs ($M)		
Transmission	$	43
Distribution	$	72
Total Demand Related	$	115

Source: 2013 Electric Embedded Cost of Service Study

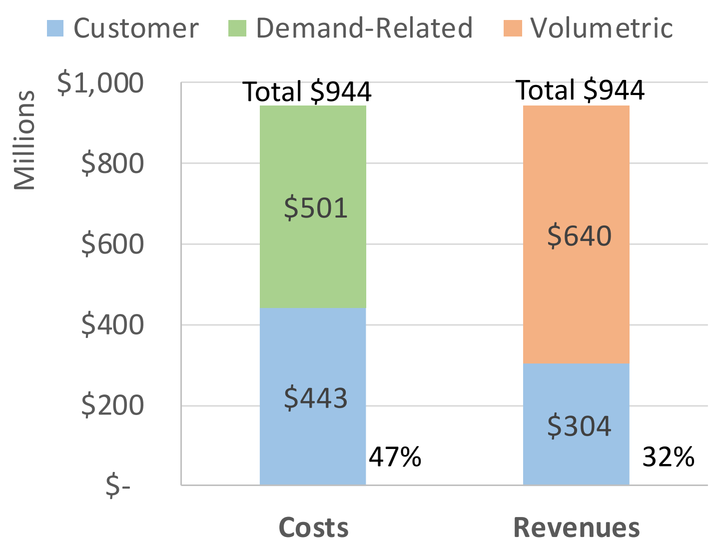


Breakdown of Demand-Related Costs ($M)		
Transmission	$	29
Distribution	$	58
Total Demand Related	$	86

Source: 2013 Electric Embedded Cost of Service Study

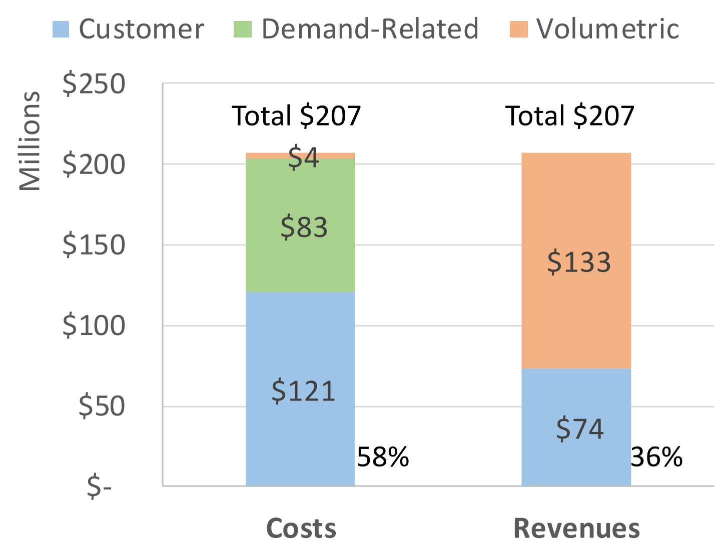
Delivery Revenue vs. Cost

National Grid
SC No. 1/1C Residential Classes



Breakdown of Demand-Related Costs ($M)		
Transmission	$	172
Primary	$	222
Secondary	$	107
Total Demand Related	$	501

Central Hudson
SC No. 1 Residential Classes



Breakdown of Demand-Related Costs ($M)		
Production	$	1
Transmission	$	43
Primary	$	27
Secondary	$	11
Total Demand Related	$	83

Notes:
Costs are based on ACOS study, Corrections & Update Testimony Filing, July 10, 2017, Case 17-E-0238. Pass through charges are not included.

Revenues are delivery charge revenues, Rate Year 1, Joint Proposal January 19, 2018, Case 17-E-0238. Deferral credits and other pass through charges are not included; tax credits are included.

Central Hudson cost classification excludes merchant function charges.

RATE DESIGN EXAMPLE

Steps for Rate Development

Who Conducts Step?

		Who Conducts Step?
Step 1	• Identify current service class revenue requirement	Utilities
Step 2	• Identify desired rate elements • e.g., customer charge, non-coincident peak demand charge, coincident peak demand charge, per kWh charge • Identify time-of-use, seasonal differentiation, if applicable • Determine how much annual cost to be collected through each element • Provide rationale for chosen rate elements and allocated amounts	Requesting Party(s)
Step 3	• Determine the annual billing determinants for each rate element • e.g., # customer months, non-coincident peak kW, coincident peak kW, kWh • Most determinants likely to be developed through load research-type data	Utilities
Step 4	• Calculate unit rates for each desired rate element • Ensure rates collect the appropriate service class revenue requirement	Utilities

RATE DESIGN EXAMPLE

Illustrative Example – SC 1 Residential

Step 1: Service Class Revenue Requirement $500,000,000

Step 2: Identify Desired Rate Elements and Cost Allocation

a) Customer Charge to collect 30% of delivery revenue requirement

- Rationale: Current rate, within range of customer cost represented in ECOS cost study

b) Demand charge to collect remaining 70% of delivery revenue requirement

- Half through On-Peak Demand Charge, Summer Season (J, J, A, S), weekdays, Noon-8:00 pm
- Rationale: Recovers all transmission costs and portion of distribution costs;
  Provides strong price signal reduce or shift load during time system is likely to peak;
  3:1 Peak/Off-Peak price ratio

- Half through Off-Peak Demand Charge, all months
- Rationale: Recovers remaining distribution costs

Step 3: Determine Annual Billing Determinants for Each Rate Element

- Number of Customer Months:	700,000	x 12 months	=	8,400,000
- On-Peak Demand, kW, Summer Months, Noon-8:00 pm:				8,750,000
- Off-Peak Demand, kW All Months, all other hours:				28,000,000

Step 4: Calculate Unit Rates for Each Rate Element

- Total Revenue Requirement	$500,000,000
Amount through Customer Charge	$150,000,000
Amount through Demand Charge	$350,000,000

- Customer Charge	$150,000,000	⁄	8,400,000	=	$17.86
- On-Peak Demand Charge, Summer, M-F, Noon-8:00 pm	$175,000,000	⁄	8,750,000	=	$20.00
- Off-Peak Demand Charge, All Months, all other hours	$175,000,000	⁄	28,000,000	=	$6.25

Meeting Objective Review and Questions

- The purpose of the meeting is to provide an overview of rate design and NY utility cost data so that all stakeholders will have a similar understanding of rate design fundamentals, and can use common language and data to develop and discuss rate design proposals in this process.
- Questions?