

RTO Charges Explained

IRMA Energy Summit

11/4/09

Generation



Transmission



Distribution



Load

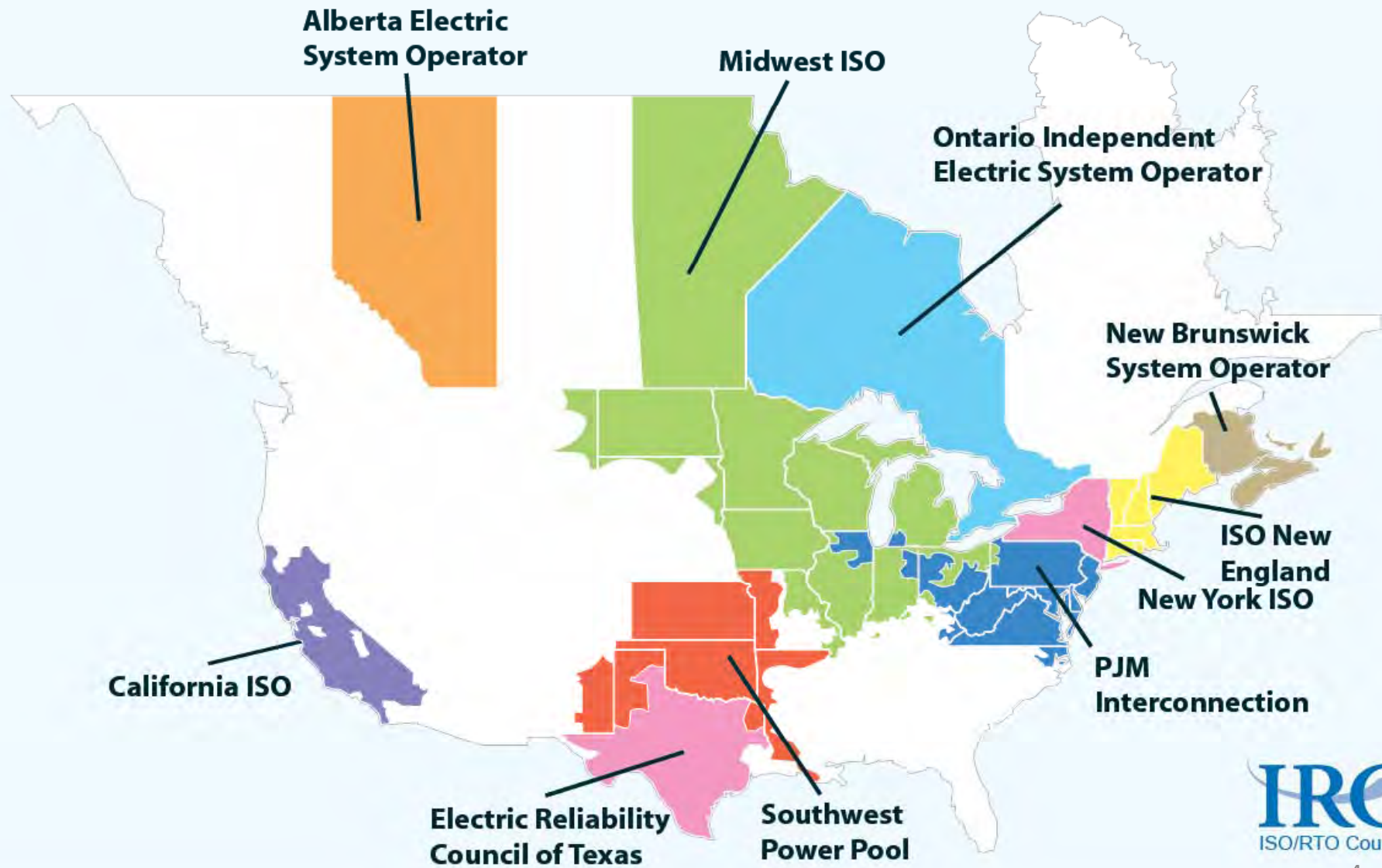


These services are provided by the retail supplier

This service is provided by the local distribution company (utility)

What is an RTO?

- A Regional Transmission Organization(RTO) is: An entity that is independent from all generation and power marketing interests and has exclusive responsibility for grid operations, short-term reliability, and transmission service within a region.
- PJM is responsible for:
 - the reliability of the electric system
 - the operation of competitive wholesale electric markets
 - ensuring that no member has undue influence



RTO Charge Components

- Network Transmission Service
- Ancillary Services
- Capacity
- Congestion

Retail suppliers differ on how these components are packaged, but all components must be accounted for

Ancillary Services

- Scheduling, system control, dispatch
- Reactive supply and voltage control
- Regulation and frequency response
- Operating reserves
- Spinning reserves
- Black start
- RTO, NERC, and transmission owner operations

Network Transmission Service

- Network Transmission Service allows the transmission system owners and operators to integrate, plan, economically dispatch and regulate their resources in order to serve their load.
- Charges are based on:
 - transmission owner's annual revenue requirement which is approved by the Federal Energy Regulatory Commission (FERC)
 - regional transmission expansion projects which are approved by the PJM Board

Capacity

- Capacity is a reliability instrument designed to assure that there is enough generation available to meet peak load conditions.
- Each Load Serving Entity (LSE) must designate a capacity resource equal to its obligation under PJM's Reliability Assurance Agreement.
- Capacity prices are determined through an auction clearing process conducted by PJM.

Congestion

- The extra cost to move power from one point on the transmission system to another. The base cost is covered in the Network Service charge.
- Example: the cost to move power from the NI Hub to the ComEd Zone is typically around \$.50/MWh but changes hourly.
- This charge is often included in the energy price.
- Exelon Energy has moved this charge from the RTO Charges to the Energy Charges for new contracts.

Examples

➤ Customer 1

- 100 kW summer demand
- 21,900 kWh/month
- 262,800 kWh /yr

➤ Customer 2

- 100 kW summer demand
- 36,500 kWh/month
- 438,000 kWh /yr

Load Factor

- Load Factor is the ratio of a facility's actual usage over a period of time to the usage they would have incurred if they operated at their peak load over the entire period.

- $LF = \text{kWh}/(\text{kW} \times \text{hrs})$

Examples

➤ Customer 1

- 100 kW summer demand
- 262,800 kWh /yr
- $LF = 262,800 / (100 \times 8760) = .3$ or 30%

➤ Customer 2

- 100 kW summer demand
- 438,000 kWh /yr
- $LF = 438,000 / (100 \times 8760) = .5$ or 50%

Ancillary Services Charge

➤ Assumptions

➤ Ancillary Services Rate = \$2.10/MWh

➤ Customer 1

➤ 21,900 kWh/month

➤ Monthly Charge = 21.9 MWh x \$2.10/MWh = \$45.99

➤ Customer 2

➤ 36,500 kWh/month

➤ Monthly Charge = 36.5 MWh x \$2.10/MWh = \$76.65

PJM Peak Load Contribution

- In PJM each customer is assigned a capacity peak load contribution (PLC) and a network service PLC
- Capacity PLC is based on the five highest system load hours that occurred in the PJM RTO on different days over the summer
- Network Service PLC is based on the single peak for the ComEd Zone (6/25/09 2-3 pm)

Network Transmission Service Charge

- Assumptions
 - NTS Rate = \$70/MW-day
 - Billing period is 30 days

- Customer 1
 - PLC = 100 kW
 - 21,900 kWh/month
 - Monthly Charge = $.1 \text{ MW} \times \$70/\text{MW-day} \times 30 \text{ days} = \210
 - Equivalent \$/MWh Charge = $\$210/21.9 \text{ MWh} = \$9.59/\text{MWh}$

- Customer 2
 - PLC = 100 kW
 - 36,500 kWh/month
 - Monthly Charge = $.1 \text{ MW} \times \$70/\text{MW-day} \times 30 \text{ days} = \210
 - Equivalent \$/MWh Charge = $\$210/36.5 \text{ MWh} = \$5.75/\text{MWh}$

Capacity

- Capacity is a reliability instrument designed to assure that there is enough generation available to meet peak load conditions. Each Load Serving Entity (LSE) must designate a capacity resource equal to its obligation
- Capacity prices are determined through an auction clearing process conducted by PJM.

Capacity

- Insurance that there is sufficient generation infrastructure to meet the expected peak load plus a reserve margin
- Capacity revenues are paid to committed resource whether or not energy is produced by that resource. Resource must perform during a capacity event.
- Daily product

Capacity, energy & ancillary services revenues together should meet the fixed and variable costs of generation resources to ensure that adequate generation is maintained for reliability of the electric grid.

Energy

- Generation of electrical power over a period of time
- Energy revenues paid to resource based on participation in PJM's Day-Ahead & Real-Time Energy Markets
- Hourly product

Capacity

- Exelon Energy's daily capacity obligation is determined by taking the sum of our customer's capacity PLCs multiplied by the capacity multiplier.
- Capacity multiplier = PJM Forecasted Pool Requirement x ComEd Zonal Scaling Factor
- The Forecasted Pool Requirement and The ComEd Zonal Scaling Factor are determined for each utility zone and take into account the forecasted peak load during the PJM planning year and the forced outage rates of the generators operating in the zone.

ComEd Zone Capacity Prices

Planning Year Start Month	Capacity Price \$/MW-day	Capacity Multiplier	\$/MWh @ 30% LF	\$/MWh @ 50% LF	\$/MWh @ 70% LF
Jun-08	\$ 113.22	1.1393	\$ 17.92	\$ 10.75	\$ 7.68
Jun-09	\$ 104.09	1.1654	\$ 16.85	\$ 10.11	\$ 7.22
Jun-10	\$ 174.29	1.1716	\$ 28.36	\$ 17.02	\$ 12.15
Jun-11	\$ 110.04	1.2091	\$ 18.48	\$ 11.09	\$ 7.92
Jun-12	\$ 16.46	1.2113	\$ 2.77	\$ 1.66	\$ 1.19

ComEd PLC Calculation Steps

Step 1: Determine initial customer contribution to previous year's system load for the identified five peak hours (single peak hour for Net Serv PLC) and apply loss factors

Step 2: Apply profiling imbalance to customers that do not have recording meters

Step 3: For capacity PLC, scale customer contribution to weather-normalized peak

ComEd PLC Rules

- Accounts are assigned a Capacity PLC for the next PJM planning period: June 1 – May 31
- Accounts are assigned a Net Serv PLC for the next calendar year: Jan 1 – Dec 31
- Successor accounts (same premise) have the PLC carried over from the predecessor at the premise
- New customer accounts (new premise) are assigned a customer class average PLC
 - Average of all customer PLCs within that class

PJM vs. MISO

- MISO does not use PLCs to determine capacity charges and network transmission service charges
- MISO bases NTS charges and capacity obligation on monthly peak demand of aggregate LSE load
- MISO does not hold a capacity auction. LSE must meet capacity obligation through 3rd party transactions.
- Exelon Energy uses each customer's historic delivery service "billing" demands to estimate future charges, then converts it to a fixed \$/MWh rate.

Total Monthly RTO Charges

Customer	Monthly Usage (MWh)	PLC (MW)	Ancillary Services (\$2.10/MWh)	Network Transmission Service (\$70/MW-day)	Capacity (\$104.09/MW-day) (CM = 1.1654)	Total	Total (\$/MWh)
Customer 1 (30% LF)	21.9	0.1	\$45.99	\$210.00	\$363.92	\$619.91	\$28.31
Customer 2 (50% LF)	36.5	0.1	\$76.65	\$210.00	\$363.92	\$650.57	\$17.82
Customer 3 (70% LF)	51.1	0.1	\$107.31	\$210.00	\$363.92	\$681.23	\$13.33

Conclusions

- A significant portion of your RTO charges are based on your Peak Load Contribution
- On a \$/MWh basis, RTO charges are inversely proportional to load factor
- Manage your RTO charges by managing your PLCs
- Make use of your data
- Register for a demand response program