VOM Examples

MRC

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Comments on PJM Cost Impacts

- A full cost impact of either proposal on LMP requires a full rerunning of the market and assumptions about offer behavior.
  - Simplistic estimates are misleading.
- Per the SOM, 0.3 percent of annual MWh are offer capped for energy.
  - When price offer greater than cost offer.
  - Approximately one third of generators offer below the cost-based offer.
  - Price offers increase when cost offers increase.
- PJM ignores start and no load costs.
- PJM ignores cyclic starting and peaking factors.

Comments on PJM Cost Impacts

- **PJM approved maintenance adders already exceed EIA benchmarks, without major maintenance and overhauls.**
  - **Average CT approved adder: $48.42/MWh.**
    - 45 percent of reviewed CTs have an adder between 1x and 10x EIA's $3.50/MWh.
    - 16 percent of reviewed CTs have an adder greater than 10x EIA's $3.50/MWh.
  - **Average CC approved adder: $3.59/MWh**
    - 19 percent of reviewed CTs have an adder between 1x and 20x EIA's $3.50/MWh.

Potential Impacts Ignored by PJM

- **In 2017, 7,756 GWh were made whole via day-ahead uplift. The average payment was $9.88/MWh. An increase of $1/MWh results in an increase of $8 million in uplift.**
- **In 2017, 6,357 GWh were made whole via balancing operating reserves (uplift). The average payment was $9.00/MWh. An increase of $1/MWh results in an increase of $6 million in uplift.**
- **In 2017, an increase of $1/MWh in offers results in an increase of $14 million in uplift.**

Potential Impacts Ignored by PJM

- **High maintenance costs will allow more units to be offered above $1,000 per MWh. For example, a 100 MW unit with a $6 per MWh maintenance adder and a 2 MW peaking segment can calculate a $900 per MWh adder.**
  - **$6/MWh is equivalent to $600/hour for a 100 MW CT**
  - **Manual 15 peaking maintenance adder equation:**

$$\text{Peak Incremental Maintenance Rate} = \frac{\text{Cyclic Peaking Factor}}{\text{Peak Pickup}} * \text{Equivalent Hourly Maintenance Cost}$$

  - **3 / (2 MW) * $600/hour = $900 per MWh**

Maintenance Cost Calculation Overview

- **Total maintenance dollars calculated annually**
- **Maintenance dollars are applied to energy MWh, starts, hourly no load, and peaking energy MWh.**
- **Starts and peaking energy hours use a multiplier to reach an equivalent service hour.**
- **PJM allows generators to adjust their allocation of maintenance dollars among starts, hours, energy, and peaking energy.**

Example 1: CONE CT

		CONE CT
ICAP	MW	205
Total Maintenance	$	2,998,740
Assumptions		
Run Hours	hours	2,952
Peaking hours	hours	20
Starts	starts	170
Peaking Segment	MW	10

Example 1: CONE CT

		CONE CT
ICAP	MW	205
Total Maintenance	$	2,998,740
Assumptions		
Run Hours	hours	2,952
Peaking hours	hours	20
Starts	starts	170
Peaking Segment	MW	10

		CONE CT
Maintenance Cost Allocation per Manual 15		
In $ per hour (applied to the no load cost)	$/hour	636
In $ per start (applied to the start cost)	$/start	6,364
In $ per MWh (applied to peaking MW)	$/MWh	191

Example 1: CONE CT

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In $ per MWh (applied to peaking MW)	$/MWh	191
Maintenance Cost Allocation Result		
Effective Cost in $/MWh for a 2 hour run		
Allocation per Manual 15	$/MWh	27.94
All allocated in the incremental curve	$/MWh	4.96
All allocated in the start cost	$/MWh	43.02

Example 2: $3.50/MWh

		EIA CT
ICAP	MW	150
Total Maintenance	$	1,000,000
Assumptions		
Run Hours	hours	1,905
Peaking hours	hours	20
Starts	starts	170
Peaking Segment	MW	15

Example 2: $3.50/MWh

		EIA CT
ICAP	MW	150
Total Maintenance	$	1,000,000
Assumptions		
Run Hours	hours	1,905
Peaking hours	hours	20
Starts	starts	170
Peaking Segment	MW	15

		EIA CT
Maintenance Cost Allocation per Manual 15		
In $ per hour (applied to the no load cost)	$/hour	273
In $ per start (applied to the start cost)	$/start	2,729
In $ per MWh (applied to peaking MW)	$/MWh	54.57

Example 2: $3.50/MWh

		EIA CT
ICAP	MW	150
Total Maintenance	$	1,000,000
Assumptions		
Run Hours	hours	1,905
Peaking hours	hours	20
Starts	starts	170
Peaking Segment	MW	15

		EIA CT
Maintenance Cost Allocation per Manual 15		
In $ per hour (applied to the no load cost)	$/hour	273
In $ per start (applied to the start cost)	$/start	2,729
In $ per MWh (applied to peaking MW)	$/MWh	54.57
Maintenance Cost Allocation Result		
Effective Cost in $/MWh for a 2 hour run		
Allocation per Manual 15	$/MWh	16.37
All allocated in the incremental curve	$/MWh	3.50
All allocated in the start cost	$/MWh	19.61

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