Sliding Pressure Unit Frequency Response Requirement Impacts

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Comparison Basis

- Current Sliding Valve Operation and Heat Rate Vs. Proposed Fixed Pressure Operation and Heat Rate
- Modeling only includes the change in gross margin resulting from changed dispatch curves. It does not address lost or “out of money” output resulting from frequency response commands.
- Operational comparisons were made dispatching against market curves.

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Merchant Impacts

- Fixed Pressure Operation results in higher average heat rates.
  - Slightly higher at full load and significantly higher at minimum load.
  - Due to the increased slope of the average heat rate, marginal heat rates within the operating range of the unit are lower for fixed pressure operation.
- Lower marginal heat rates result in a slight increase in generation if unit is on line.
  - These MWh have some gross margin value.
- Gross margin on additional MWh is more than offset by the increased fuel and consumables costs resulting from higher average heat rates on all generation.
  - Gross margin losses vary significantly based on price and relative position in the dispatch stack.
  - Preliminary estimates indicate annual losses in gross margin of $500k - $3.1 Million per unit and could go higher.

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Merchant Impacts

Delta Measure	Low	High
Gross Margin $000	-$500	-$3,100
Generation GWh	32	93
CO2 kTons	58	151
SO2 Tons	41	243
NOx Tons	6	58
Hg lbs	0.5	1.4

Sample high and low values taken from 5 years of data on multiple units. Costs structures and control technologies vary by unit. Each metric is individually ranged. High and low figures to not necessarily correlate to a single unit run.

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Other Impacts

- Incremental O&M expenditures that may be required to address wear and tear for rapid response operations are not included.
- Sample years do not include potential impacts of future emissions caps, possible carbon taxes or other regulations.