

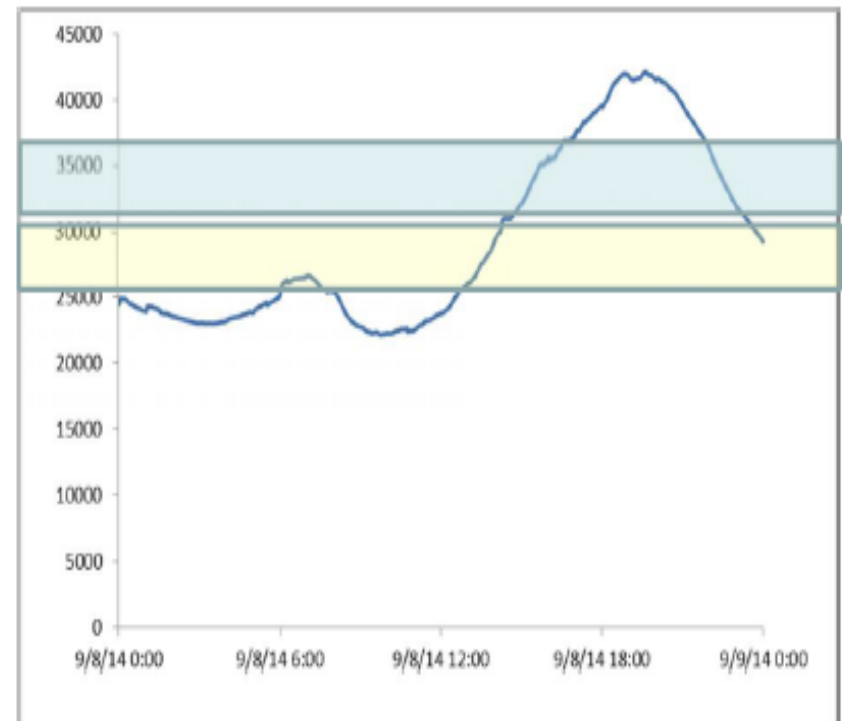
Simplifying Flexible RA: Specific PG&E Proposals

Flexible Capacity Workshop
February 7, 2017

1. Relax 2 Start Requirement
2. Net Load Uncertainty as basis of definition of flexibility requirement

- Energy Division observation:
 - Flex 1 category set based on secondary ramp, but in the summer, secondary ramp is more often part of one long ramp.
 - Requirement should be based on actual secondary ramp.
 - This is important because of Flex 1 category requires 2 starts/day, and we should not procure starts and/or resource if not needed for planning purposes or for reliability.

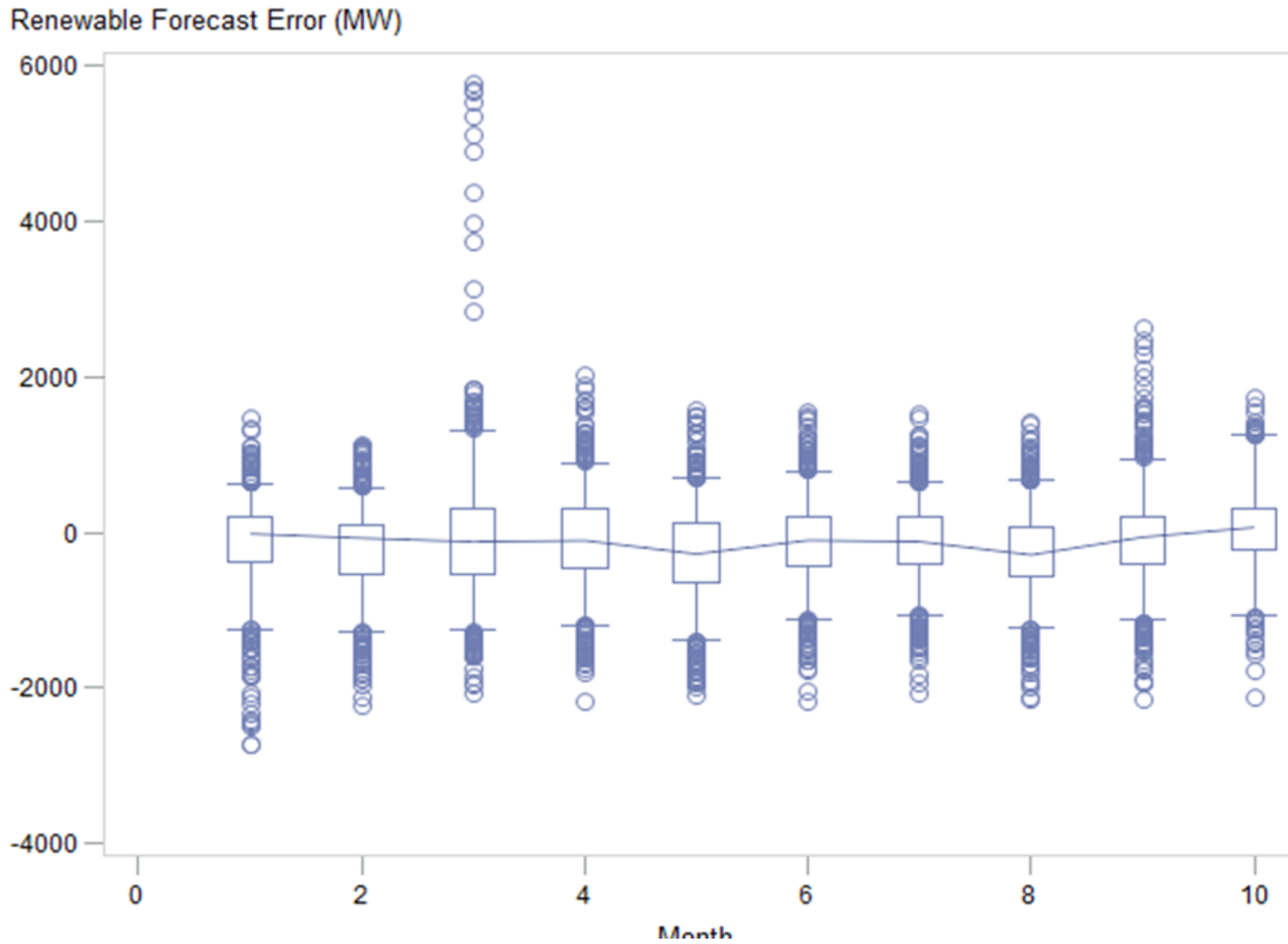
Flexible Requirement Studies



- PG&E proposal for 2018:
 - In June-September, Category 1 flexible resources are only required to have one start per day.
 - In other months, Category 1 flexible resources are required to have two starts per day.
- Revisit this exception annually as summer net load shape evolves.

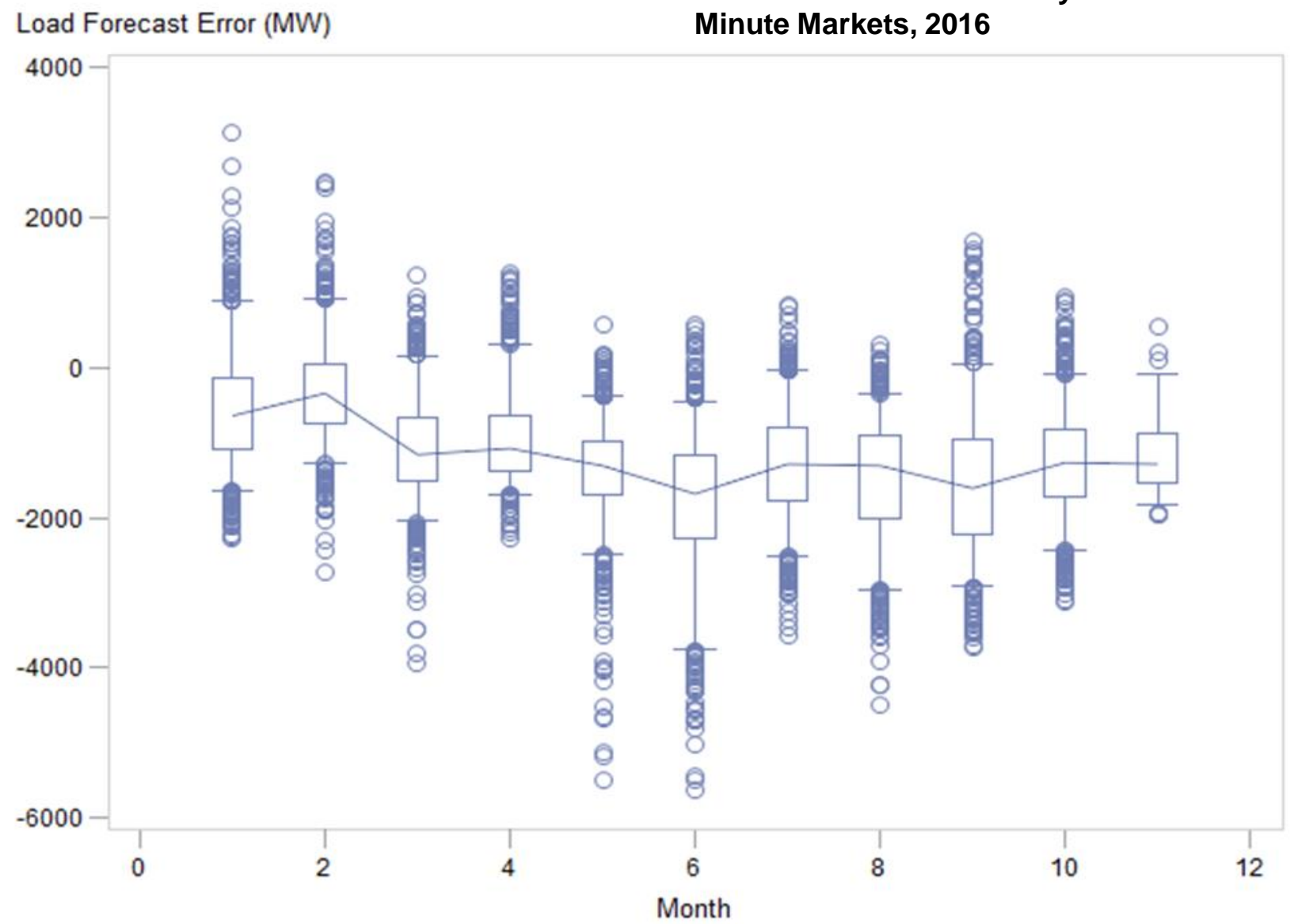
- Current definition does not distinguish between day-ahead and real-time needs for flexibility
- PG&E Suggestion: flexibility requirement be focused on need for flexible capacity in real-time market.
 - Three-hour ramping needs may be better addressed through day-ahead market solutions to improve the day-ahead dispatch of flexible resources;
- Uncertainty in load and resource output may better capture real-time flexibility needs.
- These ideas are very preliminary.
- Much more data analysis and detail are needed.

Distribution of Renewable Forecast Errors between Day-ahead and Five-Minute Markets, 2016



Note: Positive values indicate a need for upward ramp. Negative values indicate a need for downward ramp.

Distribution of Load Forecast Errors between Day-ahead and Five-Minute Markets, 2016



Note: Positive values indicate a need for upward ramp. Negative values indicate a need for downward ramp.

<p>What <u>problem</u> is being solved?</p>	<p>Ensure there is enough flexibility capacity in RT market to meet maximum expected forecast error between DA and RT markets.</p>
<p>How to translate this need into a <u>requirement</u>? <i>This should be quantitative and doable, with a simple “rule of thumb”</i></p>	<p>Estimate of forecast error between DA and RT markets for load, wind and solar resources in each month. Possibly: Max load*historic forecast error for load (as %) + Max wind production*historic forecast error for wind (as %) + Max solar production * historic forecast error for solar (as %)</p>
<p>How do resources <u>count</u> towards the requirement?</p>	<p>CPUC determines QC while CAISO determines NQC (same as for system/local RA) Flexible resources required to have minimum number of daily starts and minimum ramp rate.</p>