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# Planning for Resource Adequacy

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**WGA/WECC** *June 21-22, 2010 Resource Planners Forum*



# Summary

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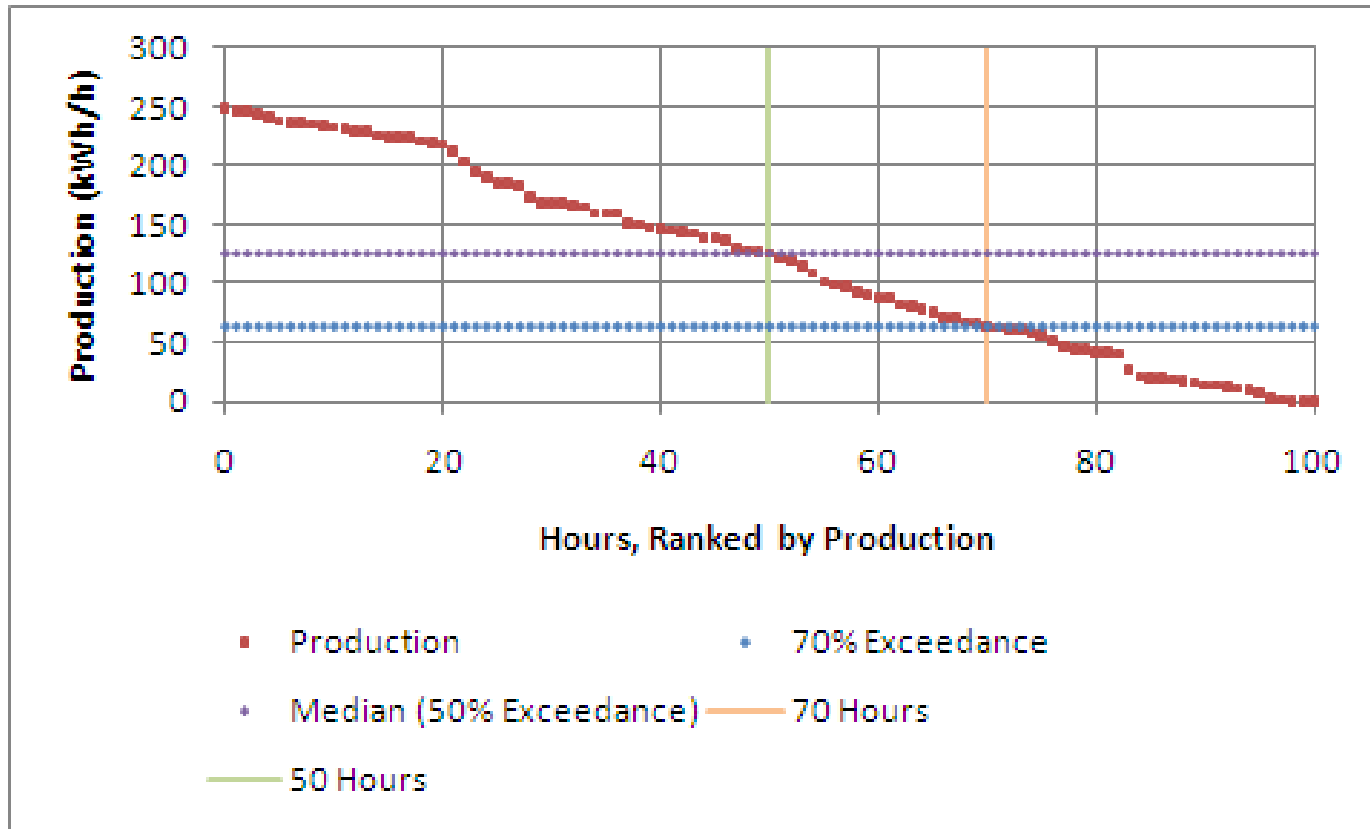
- Resource adequacy (RA) value is not static and changes as a function of the needs of the resource portfolio
- Current tools used to estimate the RA of a resource do not address the operational flexibility needs of the system
- Operational flexibility is likely to be more important than typical reliability (RA) value in the future because of the anticipated large variable resource additions

# Resource adequacy value is not static

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- RA value changes due to increases in variable generation and changes in load (e.g., the more solar is added, the less that it contributed to RA because period of need shifts to later in the day)
- RA value of a resource should be determined based on a range of possible portfolios
- RA value is typically calculated using an reliability model
- Typically, RA values are expressed in terms of
  - ELCC (Expected load carrying capability): Incremental load that can be served by resource without changing outage outlook; or
  - Equivalent CT value: Amount of CTs avoided
- Actual calculation and implementation of RA valuation varies from region to region and organization to organization (e.g. CPUC 70% exceedance method)

# Net Qualifying Capacity- 70% Exceedance Methodology



4-9 p.m. November to March  
1-6 p.m. April to October

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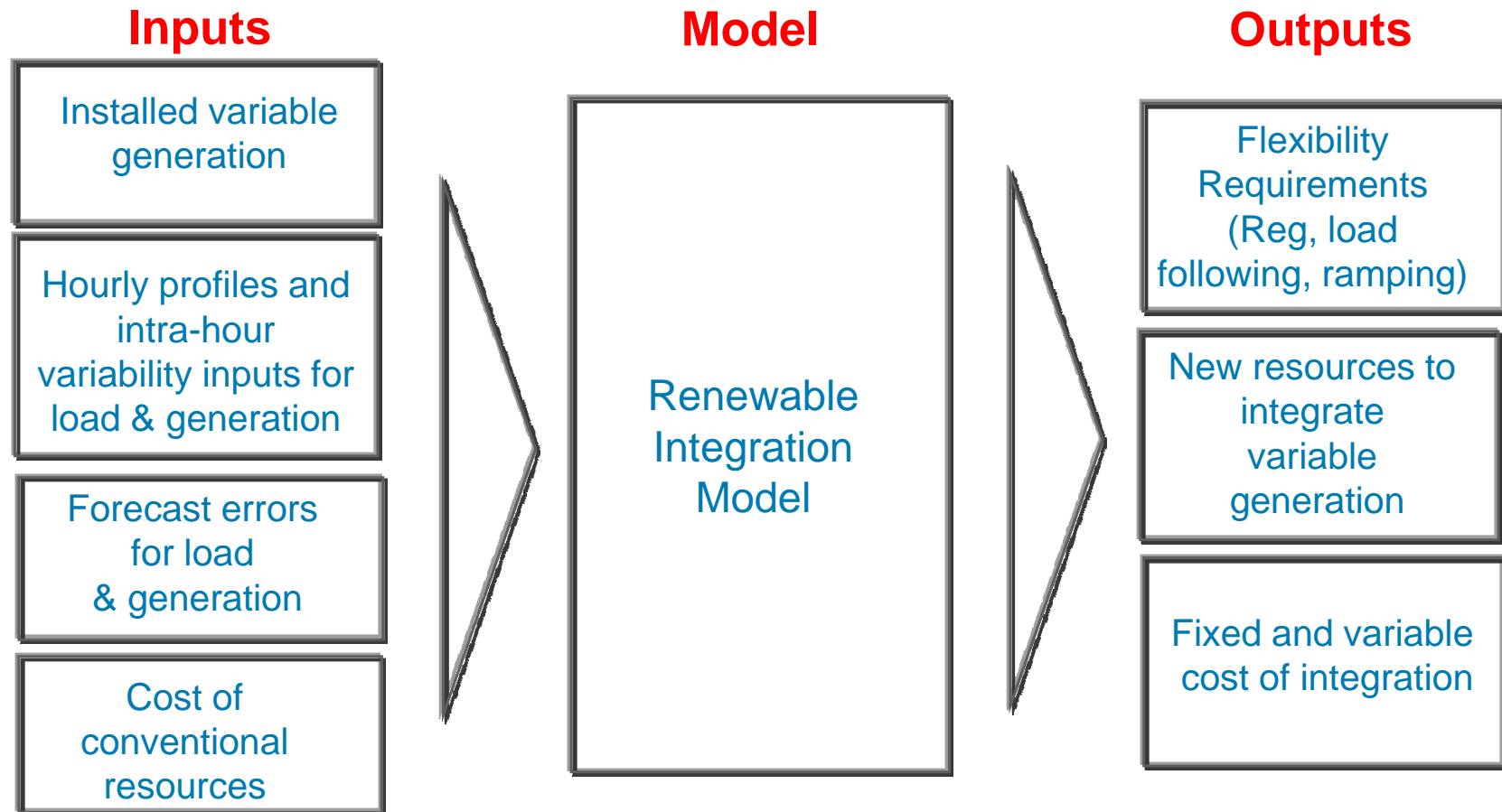
# PG&E's Renewable Integration Model

# Current RA valuation does not address operational flexibility

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- PG&E developed a prototype tool (Renewable Integration Model or RIM) to estimate the incremental integration needs and costs of variable generation
- RIM update
  - Completed estimates of operational flexibility services needed to integrate different amounts of VER additions in California
  - Hope to complete the calibration process as part of CAISO's 33% RPS integration study
  - Prototype model is available under a licensing agreement with PG&E. There is no fee required. Licensee must be willing to share improvements to the model
  - Plan to file model and results of analysis with the CPUC later this month in the 2010 Long-term Procurement Plan (LTPP) proceeding

# Model Overview: Model uses a variety of inputs to determine the integration needs and costs of variable generation

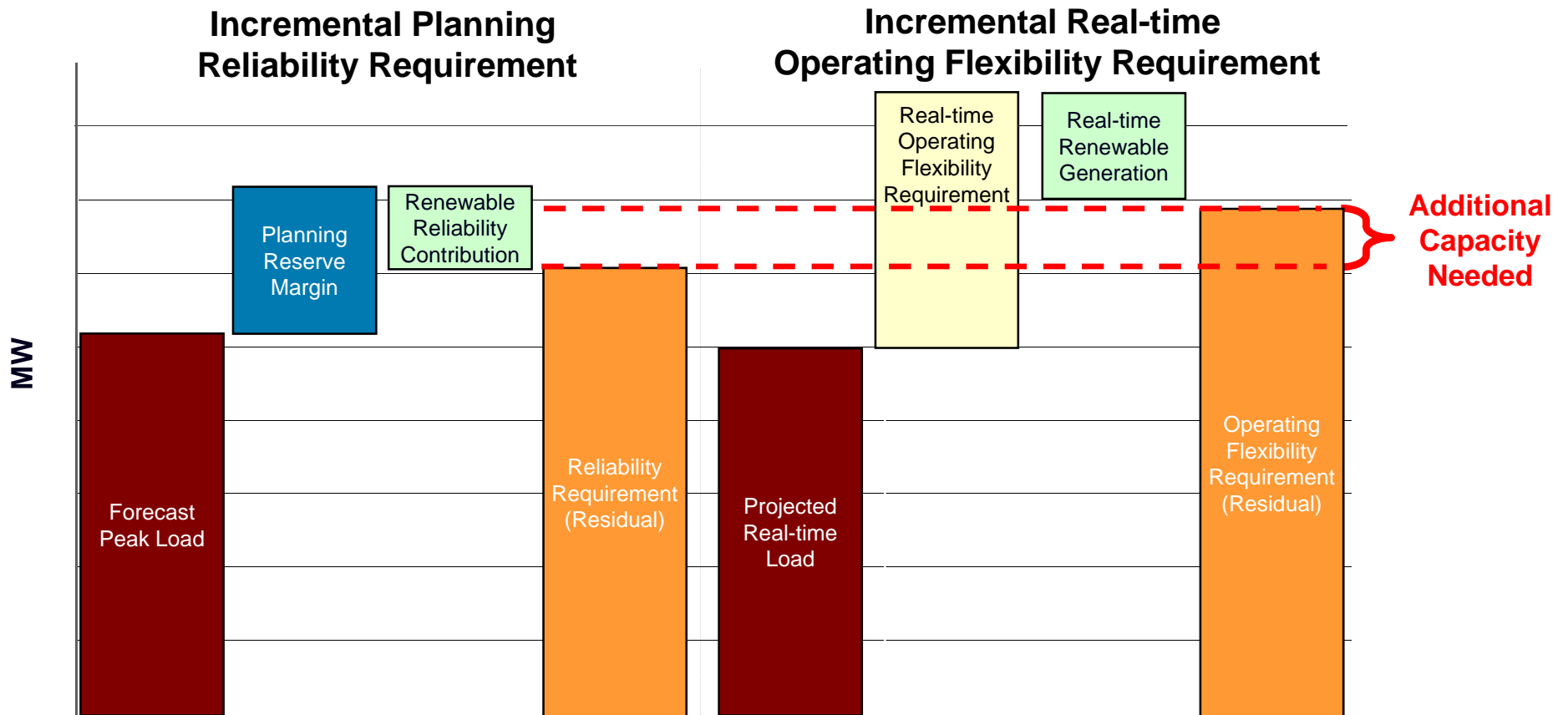


**Hourly profiles & intra-hour variability parameters capture variability**  
**Forecast errors capture forecast uncertainty**  
**Conventional generation cost/emissions used to estimate integration cost**

# RIM Methodology:

## Incremental Reliability and Operating Flexibility Needs

Incremental reliability and flexibility requirements must be satisfied, if flexibility exceeds reliability, additional capacity is needed for integration



**Reliability Requirement =**  
Forecast peak demand + the planning reserve margin – reliability contribution of renewables (NQC)

**Operating Flexibility Requirement =**  
Real-time hourly load – hourly renewable generation + hourly operating flexibility requirement