



California ISO
Your Link to Power

Changes to Bidding and Mitigation of Commitment Costs

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Market Surveillance Committee Meeting

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Background

- At the start of the new market in April 2009
 - Excessive cycling of units
 - Commitment to Pmin and then shutdown
- Changes considered to SU and ML
 - Daily bidding?
 - More frequent election to proxy/registered?
 - Account for opportunity costs?
- Since then...
 - Improvements to software and processes
 - Fewer generation and transmission outages
 - SU/ML changes set aside

Overview

- Changes to Start-Up and Minimum Load
 - Independent election to proxy or registered
 - Daily bidding of proxy SU and/or ML **IF** bid price below proxy
- Changes to the proxy cost option
 - Registered O&M option
 - Gas delivery points granularity
 - Opportunity costs for use-limited resources
- Rules for MSG Transition Costs
 - Two rules that bound costs within the MSG transition matrix

Election of Proxy or Registered SU and ML costs

- Independent election of SU and ML costs
 - A registered cost can be submitted for start-up which can account for non-fuel costs such as maintenance
 - Proxy cost can be elected for minimum load costs as these costs are highly dependent on fuel costs

Daily bids for SU/ML

- Resources that have elected the **proxy** cost option for SU and/or ML
- Can bid in on a **daily** basis
- As long as those bid values are **below** the proxy cost value

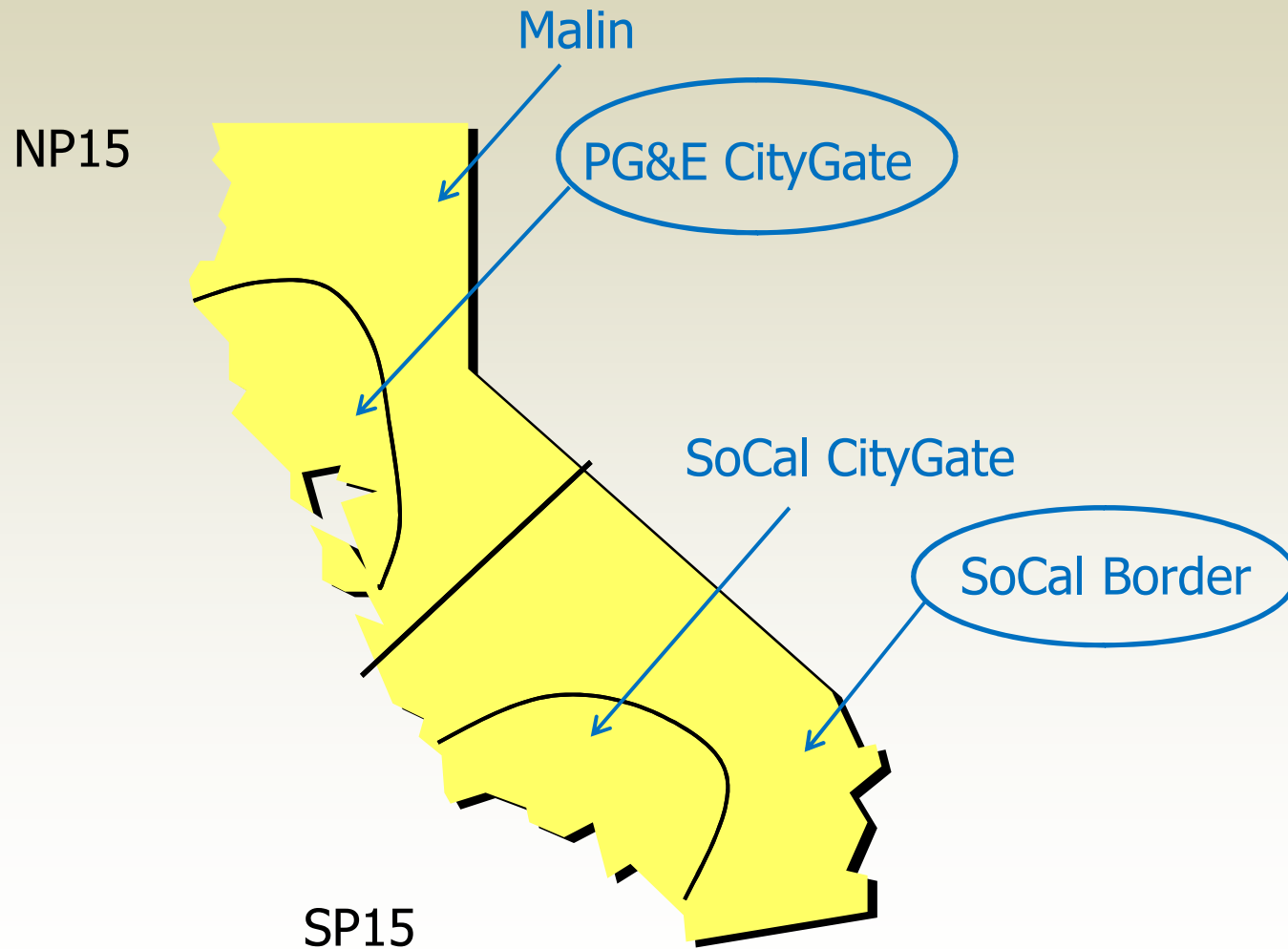
Modification of the Proxy Cost option

- Bidding of O&M costs (SU)
 - Annual basis
- Refinement to Gas Prices (SU and ML)
 - Two additional delivery points
- Opportunity Costs for use-limited resources (SU)
 - Based on forecasted prices and use-limitation plan

Bidding O&M Costs

- Current ISO defaults would be the proxy option
 - Gas Turbine – \$4/MWh
 - Combined Cycle – \$2/MWh
 - ~~Negotiated – \$6/MWh~~
- PJM Approach would be the registered option
 - FERC Accounts prescribe costs
 - Annual election/update
- PJM Results
 - Gas Turbine: \$6.47 in 2008, and \$7.09 in 2009
 - Combined Cycle: \$2.80 in 2008, and \$3.07 in 2009

Refinement to Gas Prices



Comparison of gas delivery point prices

- On average, the price at Malin is 31¢ *per* MMBtu (5%) less than the price at PG&E CityGate
- The correlation coefficient between PG&E CityGate and Malin is 0.87

- On average, the price at SoCal Border is 1¢ *per* MMBtu (0.01%) less than the price at SoCal CityGate
- The correlation coefficient between SoCal Border and SoCal CityGate is 0.99

Gas transport costs

- Gas transport costs
 - Highly locational – essentially resource-specific
 - Prescribed by multiple FERC tariffs
- Current gas transport component of proxy SU/ML
 - Based on PG&E, SCE and SDG&E rates
 - Includes a 10% adder to account for other additional costs
- The ISO proposes not to change this
 - The 10% adder in addition to more granular gas delivery point prices should improve participants' ability to recoup gas transport costs

Opportunity Costs for Use-Limited Resources

- Methodology for valuing run-hours for use-limited resources
 - Forecasted prices
 - Historical energy and gas prices used to derive an implicit heat rate
 - Heat rate applied to forward energy and gas prices
 - Price duration curve
 - Ranks prices by the number of hours in which they occur
 - As run-hours get scarcer, value increases
- Adapting the methodology for start-ups of use-limited resources
 - Monthly updates to annual use-limitation plans
 - Weekly break-outs?

Example of Opportunity Cost valuation

- Maximum of 120 run-hours, maximum MWh is 15,000 and estimates 10 starts for the month
- 10 starts lasting is estimated to be 12 hours at 125MWh
- Take the 120 highest forecasted prices for the month and rank them by frequency
- The first start is the value of the sum of the 12 most frequent prices ($p_1 \cdot 125 + p_2 \cdot 125 + \dots + p_{12} \cdot 125$)
- The tenth start is the value of the sum of the 12 least frequent prices ($p_{109} \cdot 125 + p_{110} \cdot 125 + \dots + p_{120} \cdot 125$)

Multi-Stage Generating Resource Background

- **MSG Resources**
 - Units with multiple configurations
 - Only one configuration operates at a time
- **Transition Matrix**
 - Maps costs and operating parameters associated with transitioning between configurations
 - Transition costs are static in the Master File for 30 days

MSG Transition Matrix

		"To" Configuration			
		Offline	1	2	3
"From" Configuration	Offline		\$ minUp minDown	\$ minUp minDown	\$ minUp minDown
	1	\$ minUp minDown		\$ minUp minDown	\$ minUp minDown
	2	\$ minUp minDown	\$ minUp minDown		\$ minUp minDown
	3	\$ minUp minDown	\$ minUp minDown	\$ minUp minDown	

MSG Transition Costs

- Design principles
 - Prevent economic withholding
 - Provide flexibility
 - Avoid rigid rules
 - Difficult to prescribe parameters
 - Onerous to validate data
- How TC are different from SU costs
 - Unidirectional
 - Widely varied sources of costs
 - Explicit downward transition costs

MSG Transition Cost Rules

- maxSU: \$ value of going from offline to the highest or most expensive configuration – Negotiated
- Rule 1: The sum of costs from offline to the pmax of the maxSU configuration back to offline must be between 50% and 150% of maxSU
- Rule 2: For any feasible transition from $i \rightarrow j$, feasible transitions that nest within it must be between 50% and 150% of the cost of the transition from $i \rightarrow j$

MSG Transition Cost Rule Examples

- Rule 1: The sum of costs from offline to the pmax of the maxSU configuration back to offline must be between 50% and 150% of maxSU
- Example:
 - maxSU = \$18,000 (associated with configuration 4)
 - SU = \$10,000
 - Transition 1→2 has TC = \$5,000
 - Transition 2→4 has TC = \$7,000
 - Transition 4→3 has TC = \$1,000
 - Transition 3→1 has TC = \$1,500
 - $SU + TC(1 \rightarrow 2) + TC(2 \rightarrow 4) + TC(4 \rightarrow 3) + TC(3 \rightarrow 1) = \$24,500$
 - 150% of maxSU = \$27,000 > \$24,500 so it PASSES Rule 1

MSG Transition Cost Rule Examples

- Rule 2: For any feasible transition from $i \rightarrow j$, feasible transitions that nest within it must be between 50% and 150% of the cost of the transition from $i \rightarrow j$
- Example:
 - Transition $1 \rightarrow 4$ has $TC = \$8,000$
 - Transition $1 \rightarrow 2$ has $TC = \$6,000$
 - Transition $2 \rightarrow 4$ has $TC = \$7,000$
 - Look at $TC(1 \rightarrow 2) + TC(2 \rightarrow 4)$ to make sure it is between 50% and 150% of $TC(1 \rightarrow 4)$
 - $\$6,000 + \$7,000 > 150\%$ of $\$8,000$
 - These transition costs FAIL Rule 2

Commitment Costs Stakeholder Process

DATE	EVENT
March 16	<i>Straw Proposal</i> posted
March 19	Market Surveillance Committee Meeting
March 24	Conference call
April 2	Stakeholder comments due
April 7	<i>Draft Final Proposal</i> posted
April 14	Call to answer any remaining questions
April 22	Final SH comments due
May 17-18	CAISO Board of Governors

Questions, Comments, Concerns & Compliments...

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