Aliso Canyon Gas Electric Coordination

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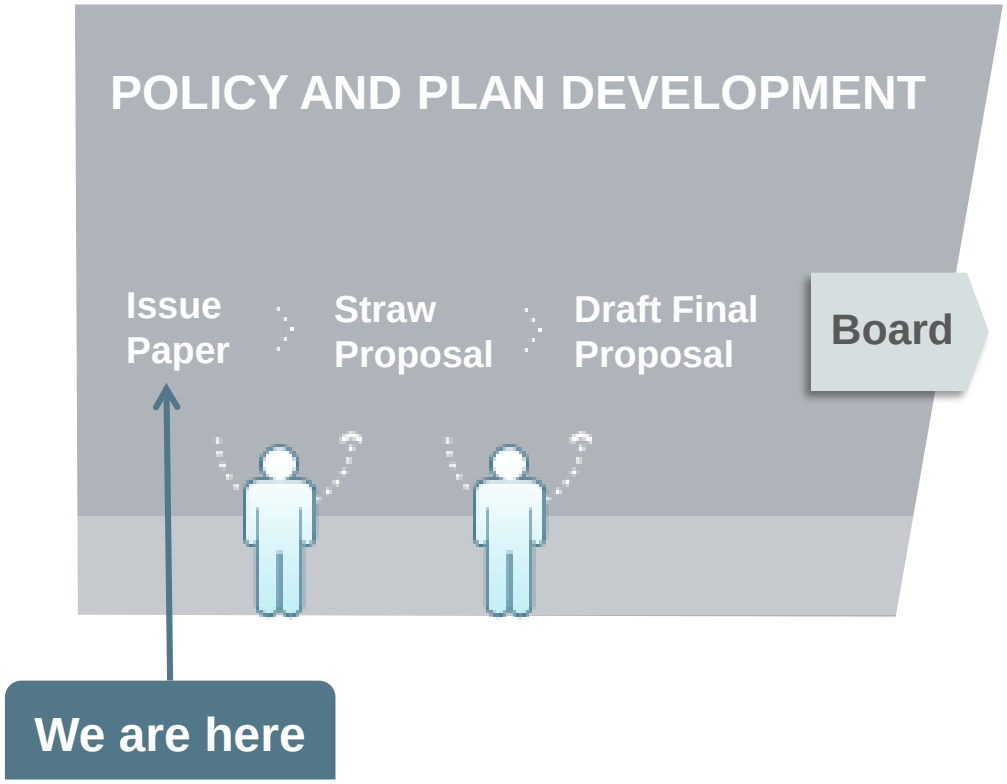
Issue Paper Stakeholder Call
March 23, 2016

Agenda

Time	Topic	Presenter
9:00–9:10	Introduction	Kim Perez
9:10–9:45	Background	Cathleen Colbert
9:45–11:50	Identified Issues and Potential Solutions	Cathleen Colbert
11:50–12:00	Questions & Next Steps	Cathleen Colbert

ISO Policy Initiative Stakeholder Process



Plan for stakeholder engagement

Milestone	Date
Issue Paper Posted	3/17/16
Stakeholder Call	3/23/2016
Stakeholder Written Comments Due	3/30/2016
Straw Proposal Posted	4/01/2016
Stakeholder Meeting	4/06/2016
Stakeholder Written Comments Due	4/13/2016
Draft Final Proposal Posted	4/15/2016
Stakeholder Call	4/22/2016
Stakeholder Written Comments Due	4/29/2016

Aliso Canyon Gas Electric Coordination - Overview

- Beginning Summer 2016, ISO anticipates the limited operability of Aliso Canyon to affect electric operations.
  - ISO participating in inter-agency task force to asses reliability risks associated with limited operations
  - ISO initiating expedited stakeholder process to explore mechanisms or other tools to address risks
- Under stakeholder process, ISO seeks to:
  1. Evaluate reliability risks due to limited operations,
  2. Evaluate how daily gas balancing requirements proposed affect resources' ability to manage generation assets,
  3. Identify and develop market mechanisms or tools necessary to support reliability and ensure markets are not adversely impacted.

BACKGROUND

Background – Aliso Canyon Impact

Oct. 2015, discovered Aliso Canyon leak

Jan. 2016, Gov. Brown issued proclamation of state of emergency

- Continue prohibition on injecting gas into the storage facility
- Direct CPUC, CEC an ISO to coordinate to ensure continued reliability

Jan. 2016, multi-agency technical working group looking at short-term reliability risks associated with summer and peak winter operations due to limited operations of Aliso Canyon facility

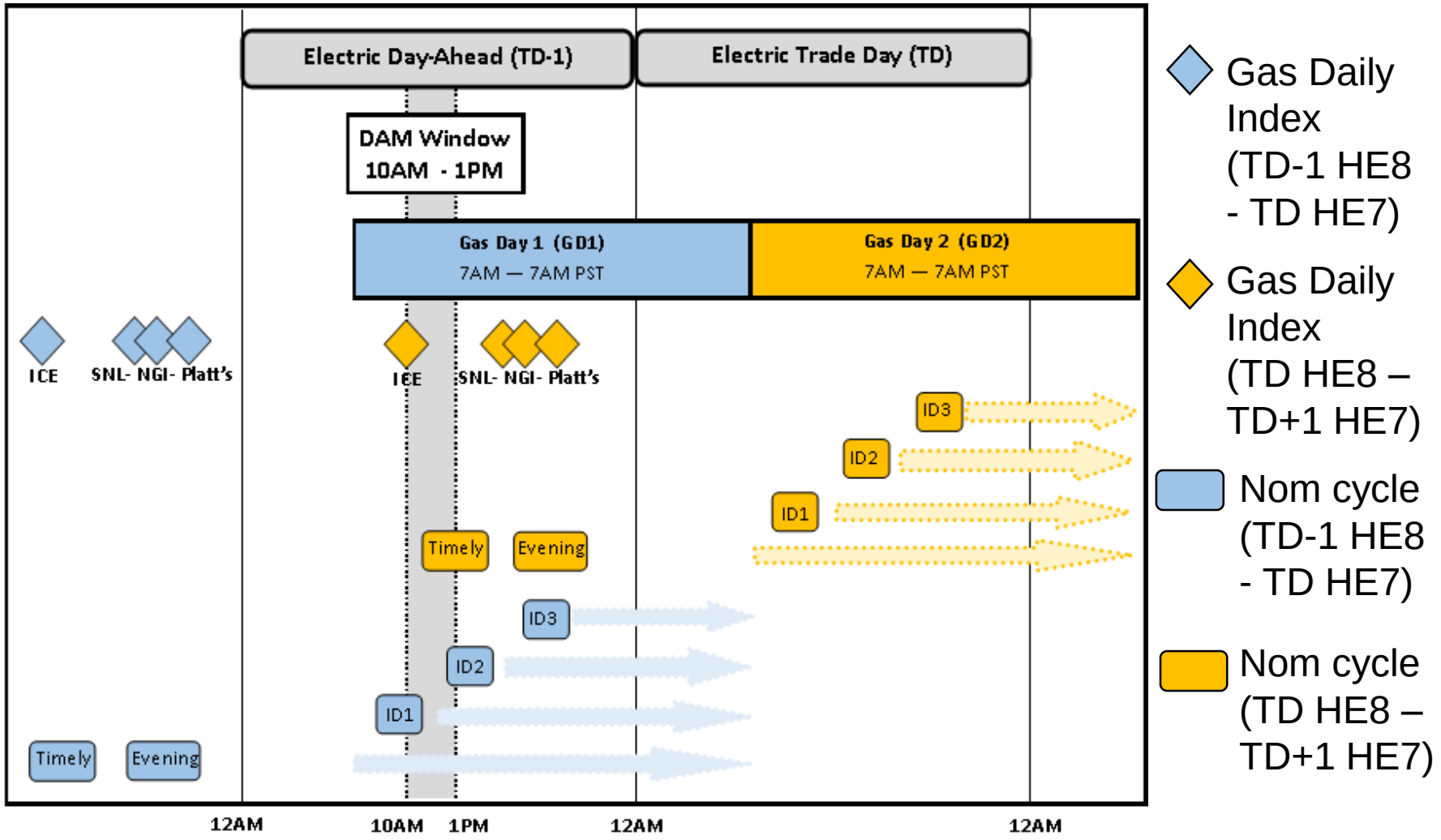
Feb. 2016, State regulators confirmed gas leak sealed but continued moratorium on new injections until Division of Oil, Gas, and Geothermal Resources complete inspections

Mar. 2016, SoCalGas and SDG&E filed motion to establish interim daily balancing requirements effective May 1, 2016 (5% tolerance band / 150% of gas daily penalty)

Background – FERC Order 809

Nomination Cycle	Nomination Deadline (PST)	Notification of Nominate (PST)	Nomination Effective (PST)	Bumping of interruptible transportation
Timely	9:30 a.m. 11:00 a.m.	2:30 p.m. 3:00 p.m.	7:00 a.m. Next Day	N/A
Evening	4:00 p.m.	8:00 p.m. 7:00 p.m.	7:00 a.m. Next Day	Yes Yes
Intra-day 1	8:00 a.m.	12:00 p.m. 11:00 a.m.	3:00 p.m. Current Day 12:00 p.m. effective	Yes Yes
Intra-day 2	3:00 p.m. 12:30 p.m.	7:00 p.m. 3:30 p.m.	7:00 p.m. Current Day 4:00 p.m. effective	No Yes
Intra-day 3	5:00 p.m.	8:00 p.m.	8:00 p.m. effective	No

Background - Alignment natural gas & electric markets



IDENTIFIED ISSUES & POTENTIAL SOLUTIONS

Issues - timing DAM results relative to ID3 nominations for HE1-HE7 or evening nominations for HE8 - HE24

- How might balancing requirements impact resources ability to manage their gas procurement for hours across operating day considering day-ahead market timeline?
- DAM publication time at 1PM PST occurs after:
  - Timely, evening, intraday1 and intraday2 cycle nominations deadlines for HE1 – HE7
  - Timely nomination deadline for HE8 – HE24
- Timing increases risk of mismatch of nominated gas flow and actual gas demand.
- If not procured in advance, procurement during more illiquid periods and likely at higher costs than index.

How could ISO provide additional information to inform generators procurement prior to gas nomination deadlines (timely for GD2 & intraday2 for GD1)?

- Potential solutions identified:
  - ISO could run and post results of a two day ahead (TD-2) to inform gas procurements.
  - ISO could move DAM timeline earlier publishing prior to timely deadline for HE 8-24 and ID2 for HE 1-7.
- Benefit: both would provide more certainty to resources for gas procurement.
- Disadvantage: under current market design this information is advisory (financially binding) so does not completely remove uncertainty.

What market changes or tools, if any, might better support gas reliability while efficiently dispatching resources to support electric reliability in the DAM?

- Potential solutions identified:
  - Allow resources to submit outage card to manage their own fuel constraints
  - ISO constrains resource DAM commitment and dispatch around TD-2 market run results
  - Mandatory procurement requirement in support of DAM schedule
  - Adjust minimum AS requirement limit and/or allocation to other AS regions instead of SP15
  - Suspend virtual bidding in affected area (interim)

Issues – RTM commitments & dispatch might need to be constrained to reflect gas balancing limitations

- Changes to unit commitments
  - DAM schedule is financially binding but does not provide binding start-up i.e. commitment instructions for resources other than long start units.
  - RTM re-optimizes unit commitments to find the least cost, security constrained and medium, short, and fast start units have risk they may receive DAM schedule but not receive a binding instruction by the RTM.
- Changes to dispatch instructions
  - Risk RTM could result in dispatch that could cause difference between nominated flows and gas burn.

What market changes or tools, if any, support gas reliability while efficiently dispatching resources to support electric system reliability in the real-time?

- Potential solutions identified:
  - Allow resources to submit outage card to manage their own fuel constraints
  - Enforce DAM commitments for all resource types as binding in RTM
  - Constrain dispatch decisions around DAM schedules for all resource types
  - Limit RTM instructions to exceptional dispatches

Are there improvements to how the ISO should better address or coordinate gas curtailments that effect ISO generation?

- Current process defined in gas tariff where:
  - Gas company notifies electric BAs of pro-rata curtailment percentage.
  - In response to notification, ISO exceptionally dispatches generators in response.
- ISO created operating procedure 4120 effective Jan. 2016 to address this issue by allowing for outage cards to be used for reasons supporting gas and electric reliability to inform ISO of supply outages.
- Are there other measures ISO should consider?

Issues - commitment cost bid cap & mitigated energy bids may not reflect intraday gas prices

- Under strained gas conditions, intraday gas costs will likely increase due to risks associated with managing gas supply in a daily tolerance band.
- ISO's cost estimates do not currently include information from the intra-day gas markets.
- Costs of generating power to serve load not fully reflected in commitment cost bids or DEBs resulting in:
  - Markets suppress incentives to resources introduced by noncompliance charges to influence behavior
  - Less efficient commitments and dispatch

What market changes, if any, could improve ISO's ability to model & compensate resources for higher costs associated with ISO commitment or dispatch?

- *Bidding Rules Enhancements* proposes re-bidding commitment costs for resources without DAM schedule
  - Pending March BOG approval & target Fall 2016
  - Could consider requesting accelerated implementation
- Potential solutions identified to allow gas market incentives to be reflected and affect market outcomes:
  - Allow intraday gas prices to be reflected in bids
  - Include noncompliance charge in ISO estimates

What market changes, if any, could improve ISO's ability to model & compensate resources for higher costs associated with ISO commitment or dispatch?

- *Bidding Rules Enhancements* proposes extending 205 filing right at FERC for cost recovery evaluation to adjust commitment costs in BCR calculation to include marginal procurement costs exceeding commitment cost bid cap
  - Pending March BOG approval & target Fall 2016
  - Revised draft final proposal to remove explicit restrictions to eligible costs other than marginal costs associated with meeting ISO instruction.
- Potential solution could include providing after-the-fact recovery for RTM instructions through BCR resettlement

QUESTIONS & NEXT STEPS

Next Steps

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Please submit comments to initiativecomments@caiso.com