Submitted By	Company	Date Submitted
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NRG offers the following comments on the CAISO's March 17, 2016 Aliso Canyon Gas-Electric Coordination Issue Paper.

Challenges:

The unavailability of natural gas storage at Aliso Canyon, coupled with the CAISO's current market timing, bidding and cost recovery rules, will result in or exacerbate the following problems:

- Bidding into the CAISO's Day-Ahead ("DA") market closes at 10 AM Pacific Prevailing Time (PPT), and DA market results are not required to be published until 1 PM PPT. Effective April 1, gas nominations into the Timely Cycle are due by 11 AM PPT. This means that generators will continue to not be able to accurately and reliably use the Timely Cycle nomination process to procure gas based upon CAISO DA market awards. The inability to accurately use CAISO DA market awards as a basis to procure gas in the Timely Cycle will mean that **generators in the area affected by the unavailability of Aliso Canyon will be forced to transact in the intra-day cycles to meet the daily balancing requirements** being proposed by Sothern California Gas Company and San Diego Gas and Electric Company ("SoCalGas" and "SDG&E", collectively "the Gas Companies").

- The **increasing reliance on the intra-day markets poses these cost recovery challenges:**

    - Commitment cost (start-up and minimum load cost) bids are submitted in the DA market and may not be changed once accepted by the CAISO. While the CAISO has proposed to allow generators that do not receive DA schedules to re-bid their commitment costs in real-time, it is not currently anticipated that proposal will be in effect by the time daily balancing is adopted for the Aliso Canyon-affected area. This means that generators that do not procure start-up and minimum load gas in the Timely Cycle for their start-up and minimum load will be forced to transact gas in the intra-day cycles. However, the CAISO's commitment cost bidding rules limit a generator to bidding no more than 125% of its proxy start-up and minimum load costs – costs that are determined relative to what usually is a two-day lagging price. The use of stale gas prices prevents generators from reflecting the increased costs associated with intra-day gas procurement. As a result, generators are not ensured of recovering their start-up and minimum load gas costs through the CAISO's commitment cost bidding process.

    - **In the event the CAISO dispatches a generating unit to address a non-competitive constraint, the CAISO will dispatch that resource (*i.e.,* at levels above the unit's PMin) based on the resource's Default Energy Bid ("DEB").** Like with commitment costs, the DEBs are based on a lagging gas index that does not address the cost of gas that must be

transacted in the intra-day markets in order to address real-time dispatch from DA schedules.

- The last intra-day cycle closes at 5 PM PPT. This means that **generators cannot adjust their nominations to account for real-time ("RT") changes to DA schedules or to meet real-time commitments after 5 PM until HE 24**. Any CAISO RT dispatch towards the end of the day will almost certainly result in the generator being outside of a five percent (5%) daily balancing threshold.

- Gas procurement for unit commitment and dispatch that cannot be predicted based on DA market prices will be forced into the more volatile and less liquid intra-day markets, exacerbating the challenges listed above.

Alternatives under consideration

NRG offers comments on the proposed list of things the CAISO could do to facilitate transacting gas in the Timely Cycle or promoting an assurance of cost recovery:

- **Providing market participants with two-day-ahead advisory notice of DA schedules.** While these advisory schedules might better inform timely cycle procurement of gas, ***NRG doubts whether this alternative would be truly useful.*** *First*, because these advisory schedules would be issued two days before the operating day, actual electric conditions might be very different than those used in developing these advisory schedules, especially under peak load conditions, in which load can change significantly day to day. *Second*, given the likely inaccuracy of these advisory schedules, there would still be significant RT changes that would require transacting in the intra-day cycles. Unless a schedule is binding it cannot be acted upon. For these reasons, NRG does not support pursuing this alternative.

- **Moving DA market timing.** In the CAISO's Order 809 process, NRG supported moving forward the CAISO's DA market timing so that DA market results would be published far enough in advance of the close of the Timely Cycle to allow market participants to transact gas in that cycle. NRG continues to support the CAISO advancing the timing of its DA market. ***NRG offers that the CAISO should:***

  - ***Set the deadline for submitting DA bids as 6:30 AM PPT.***
  - ***Set the deadline for publishing DA market awards as 9:30 AM PPT.***

  Assuming the CAISO meets the publication timelines, this would allow market participants to transact gas in the Timely Cycle to meet DA awards. While this would not address the issues associated with real-time dispatch, it would help with gas procurement associated with the DA and RUC processes.

- **Allow resources to submit outage cards to manage their own fuel constraints.** NRG supports this option, but sees it as a measure of last resort. NRG would prefer that affected generators manage the use of their resources by reflecting the true costs of operating the unit in bids rather than restricting the operation of the unit though extra-market means like outage cards. However, it is also important that these outage cards, used for the purpose of managing gas burns, not affect the RA availability of these resources (e.g., do not lead to RAAIM penalties).

- **Constrain resource DAM commitment and dispatch around D-2 market run results.** As noted above, ***this is likely to result in inefficient outcomes***, because it will be highly likely that D-2 schedules will not reflect actual conditions when loads change significantly under volatile peak conditions.

- **Adjust minimum AS requirement limit and/or allocation to other AS regions instead of SP15.** Limiting Ancillary Services to outside of the affected area may help reduce the likelihood that changes in real-time gas burns caused by the deployment of energy from reserves in the affected area would help generators in the affected area avoid gas imbalance charges under daily balancing. However, from a practical standpoint, carrying all of the CAISO's ancillary services outside of SP15 could set up the system for a problem if the CAISO was left unable to deploy all of the reserves outside of SP15 – due to the loss of transmission, for example. The CAISO could also consider other modifications to AS procurement, such as flagging all AS from generators in the affected area as "contingency only".

  While the CAISO could take extra-market steps to limit real-time changes to affected generators, it would seem impossible to ensure that there would be NO real-time changes that could cause affected generators to incur imbalance charges under daily balancing. ***Rather than artificially constraining dispatch, the CAISO should focus on allowing the costs and risks of natural gas procurement to be reflected in bids and recovered through the CAISO's markets***. This will lead to more efficient dispatch and better cost recovery than putting artificial and extra-market constraints on the CAISO's market optimization.

- **Suspend virtual bidding in affected area for an interim period.** ***NRG does not support this proposal***. NRG understands the CAISO's concern that virtual supply could displace physical generation and lead to a distorted sense of the actual required gas burn, and that the RUC process, because it only commits units and does not dispatch energy from the units, would not fully address this issue. However, suspending virtual bidding would leave market participants in the affected area unable to hedge the risk of high real time prices through virtual demand. During these challenging conditions, it will be critical to provide market participants with more, not fewer, tools to allow them to manage their risks.

- **Enforce DAM commitments for all resource types as binding in the Real-Time Market ("RTM").** ***NRG questions this alternative.*** Presuming units committed in the DAM are truly economic (i.e.,

recover their costs through market prices and not through uplifts), this option should not be needed. Most units committed in the DAM are base-load combined-cycle resources who should not have difficulty in managing their fuel risk through economic bids. The issue is much more significant for those units that cannot rationally anticipate their dispatch, such as higher heat-rate steamers or peaking units, which by design, are not dispatched on a regular basis. The tradeoffs that will need to be weighed are providing certainty of gas burns versus the potential for inefficient outcomes.

- **Limit RTM instructions to exceptional dispatches for units in the affected areas.** Rather than artificially constraining RT dispatch, which presumably the electric grid requires to remain in balance and to maintain reliability in light of changing conditions, ***NRG would prefer that generators be able to reflect their costs and risks in their bids and allow the market optimization to dispatch the system in an efficient manner.***

Principles

The CAISO should follow the following principles when considering its responses to the unavailability of Aliso Canyon:

1. The CAISO should ensure that generators can reflect the costs and risks of gas procurement in their bids to the maximum extent possible.

2. The CAISO should avoid artificially constraining operations through extra-market means (such as the use of OMS cards to constrain RT operation, or limiting real-time changes to only Exceptional Dispatch). These techniques are likely to limit operational flexibility, detrimentally impact price formation, increase uplifts, and result in inefficient dispatch.

3. Gas procurement is generally more liquid in the morning and becomes increasingly illiquid throughout the day. This stems from the pipeline's elapsed pro-rata rule requirement that customers keep a larger portion of their then-current nomination throughout the day. (Elapsed pro-rata rules will change in calculation starting April 1 for Cycles 3 – 5. In short, the amount of nominated gas that cannot be changed throughout the day will go up versus what customers see in today's rules.) The mechanics of the gas market and its impact on the physical availability of gas and the resultant intra-day risk to both procurement and price must be carefully considered when considering how gas prices and potential imbalance charges should folded into a generator's real-time bid.

4. With regards to gas procurement - Saturdays, Sundays, Mondays and holidays are different than other weekdays. There are no transparent InterContinental Exchange (ICE) screens from which to view intra-day gas prices on weekends and holidays. Intra-day markets on Mondays are routinely elevated in their pricing due to the reluctance of market participants (i.e. generators) to purchase a 3-day package of gas (Saturday – Monday) for a Monday-only dispatch. These

weekend and Monday concerns are exacerbated by the Aliso Canyon issue and should be addressed by any CAISO solution.

5. Given that the affected units are in a local capacity area, it is likely that those units will be dispatch to address constraints that the CAISO deems to be non-competitive. Because such units will be dispatched according to their Default Energy Bids (DEBs), the CAISO must ensure that the DEBs reflect the gas costs and risks that those generators face. This means:

    a. Using the ICE same-day price to set the level of the gas price index used in the CAISO's markets through the day.

    b. Including the projected balancing penalties in the DEBs from HE16-HE24. There is no real opportunity to transact gas in the intra-day market after HE16, and any CAISO dispatch after this hour must be done using bids that take this risk into account.

Recommendations

NRG's recommendations are:

- Move the timing of the DA market to provide that DA awards are known before the timely nomination cycle. As noted above, the CAISO should:
    - Change the deadline for submitting DA bids to 6:30 AM PPT.
    - Change the deadline for posting DA market results to 9:30 AM PPT.
    - Allow generators to re-bid commitment costs and energy awards throughout the dispatch day (not just at one opportunity), assuming no prior ISO commitment.
    - Modify the gas price used in the CAISO's markets to:
        - Account for gas that must be transacted in the intra-day gas market (NRG recommends using the Weighted Average Price (WAP) of same-day transactions available from ICE. NRG notes that this data is readily available from ICE, and expects that ICE will provide it to the CAISO upon request).
        - Include, for any commitment made by the ISO from HE 14 and beyond (*i.e.*, balance of day), potential imbalance costs due to restrictions on changing nominated gas volumes and reduced market liquidity. This must apply to DEBs as well.

        - Starting HE 14, change the gas index to be: 150% of the high point of ICE's intraday gas market, plus the previously described WAP of the unit's applicable gas price.

    - Allow for after-the-fact invoicing of gas costs, including imbalance penalties incurred due to following CAISO dispatch instructions when there is no available intra-day market in which to try to find balancing gas.

As noted on the CAISO's March 23rd stakeholder call, while these modifications to CAISO market processes may help mitigate some of the impacts of not having storage from Aliso Canyon, given that there is no real substitute for the services provided by Aliso Canyon storage, NRG also encourages the CAISO to advocate for and support efforts to accelerate the safe return of Aliso Canyon to service.