Revised Straw Proposal

Changes to Bidding and Mitigation of Commitment Costs

May 5, 2010
Changes to Bidding and Mitigation of Commitment Costs

1 Introduction

The new market launched by the California Independent System Operator (ISO) in April 2009 commits generating units based on their Start-Up (SU) and Minimum Load (ML) cost elections that must be in place for six months. Many market participants have stated that this has caused their resources to be committed more frequently than good utility practice would dictate, to be held at minimum operating levels and to be de-committed. Participants observe that this causes extra wear and tear on their generating units, uses up fixed numbers of unit starts and emissions allocations, and makes it difficult for unit owners to recoup their operating costs.¹

In order to try to alleviate these issues, the ISO undertook a two-phased approach to changing SU and ML bidding restrictions. The first phase, which was implemented in July 2009, enabled generation owners to modify their SU and ML elections and to switch between the registered and proxy cost options for SU and ML more frequently. The second phase initially proposed to implement frequent SU and ML cost bidding, and a mechanism for resources to capture opportunity costs for units that face use limitations.

In September, 2009, the ISO proposed that the stakeholder process on this Phase 2 portion of the initiative be extended over a longer period of time than originally proposed. This reopening of the SU and ML stakeholder initiative re-evaluates the preliminary conclusions of the previous iteration of the Straw Proposal, and broadens the range of topics considered in light of the Multi-Stage Generating (MSG) unit modeling design.

Multi-Stage Generating (MSG) units are capable of operating in multiple output ranges due to their generating technology. The MSG modeling functionality, which is scheduled to be launched on October 1, 2010, will enable market participants with MSG units to bid in the various configurations of those units separately. Associated with transitions between configurations are transition costs (TC). The mitigation of TC is now included in this

¹ There are instances in which additional cycling of resources may take place due to the fact that the ISO does not currently have multi-day unit commitment. Participants have expressed a need to manage and control their resources’ frequency of cycling until the ISO has implemented this functionality. To this end, the ISO is considering a process enhancement that would allow a market participant to inform the ISO that it intends to self-commit its resource to bridge the resource across hour ending 24 (HE24) in cases it was not committed across HE24. With this information the ISO can flag the resource as being online for the next day-ahead market (DAM). This will avoid the situation in which the resource is cycled offline for minimum downtime in the case when it is economic to keep the resource online. The ISO anticipates that this enhancement will help address some of the observed cycling. The presentation for that discussion is posted at the following link: http://www.caiso.com/2756/27569a323ba80.pdf. The relevant discussion begins on slide 18.
initiative, which is renamed to indicate the inclusion these commitment costs with the familiar SU and ML commitment costs.

2 Criteria for Evaluating Potential Solutions

- Proposed changes should be mindful of the costs of implementation, both for stakeholders and for the ISO;
- The benefits and costs of market changes should be weighed along with other, competing enhancements to market systems; and
- The proposal for changing the way commitment costs are bid into the ISO markets, and how they are mitigated, should consider the need for flexibility along with the need for fair and reliable market function.

3 Background

3.1 Start-Up and Minimum Load

The new market design bases the decision to commit a unit on that unit’s Start-Up and Minimum Load costs. Market participants bidding in generating resources submit their SU and ML costs to the ISO Master File where those values are static for 30 days. The Start-Up curve can be up to three segments, the dollar values of which correspond to hot, warm, and cold starts of the generating unit. Minimum Load is a single dollar per MWh value that is incurred for hours in which the ISO dispatches the unit to its Pmin and the unit reaches that output level.

Market participants can specify one of two options for the SU and ML values they have in the ISO Master File: either the proxy cost option or the registered cost option, which are described further below.

Proxy Cost Option

The proxy cost option for start-up costs is comprised of two elements: an indexed value that changes daily depending on the natural gas price (or, for units for which that is not applicable, on the energy price), and a fixed natural gas transport adder. The proxy cost option for minimum load costs is based on the same natural gas and gas transport component as is the proxy start-up calculation, and also includes a per MWh operations and maintenance (O&M) adder.

The O&M adder is a fixed $/MWh value that is added to the proxy cost value for Minimum Load. That value is $4/MWh for combustion turbine or reciprocating engine technology, and $2/MWh for all others. There is also the option to negotiate a per MWh value for

---

2 Contrary to previous understanding, there is not currently a 10% adder on any of the components of the proxy cost calculations for start-up or minimum load costs. Confusion arose on this point because the variable cost option for calculating default energy bids (DEB) does include the gas, gas transport, and O&M values, and then provides a 10% adder on that whole sum.
minimum load with the Independent Entity. It is important to note that none of the generating resources currently in the ISO Master File have negotiated O&M costs.

Registered Cost Option

As an alternative to the proxy cost option, market participants can elect the registered cost option which enables them to submit SU and ML values up to 200% of the proxy-cost calculated value. The advantage of this option is that it gives the market participant bidding that resource into the market the ability to specify costs for the unit that take into account their knowledge of and experience with that unit. The registered cost option does not, however, meet the needs of many market participants as they are averse to being exposed to fuel-price risk.

3.2 Multi-Stage Generating Unit Transition Costs

Multi-Stage Generating (MSG) units are capable of operating in multiple configurations due to their generating technology. The MSG modeling functionality, which is scheduled to be launched on October 1, 2010, will enable market participants with MSG units to bid in the various configurations of those units separately. Thus, the market will determine the optimal configuration in which to have the unit operate, and will optimize the transitions between configurations. Associated with transitions between configurations are transition costs (TC). The optimization will consider the costs of a transition when determining whether or not to move an MSG unit from one configuration to another. Just as high SU and ML costs could be used to economically withhold a generating unit from the market, an MSG unit owner could economically withhold one or more of the unit’s configurations by specifying high costs for the transition from one configuration to another.

4 Proposal for Changes to Start-Up and Minimum Load

As noted in the previous section, the ISO currently offers market participants two options for providing the market with a resource’s start-up and minimum load costs. The proxy cost option is tied to indexed natural gas prices and the level of the proxy cost option determines the upper limit of the registered cost option. The registered cost option enables a resource owner to submit start-up and minimum load costs up to 200% of the applicable proxy cost value.

The ISO proposes to enable stakeholders to pick either the proxy cost or registered cost option for Start-Up or Minimum Load independently. For example, a generating unit may elect to have the registered cost option for Start-Up, and the proxy cost option for Minimum Load rather than having to pick the same option for both SU and ML. This is proposed to enable participants to more closely represent their actual costs associated with SU and ML. Stakeholders expressed unanimous support for this feature in comments on the March 16 Straw Proposal.
Additionally, the ISO proposes to allow market participants to submit daily bids for SU and/or ML for a resource provided that they have elected the proxy cost option and those daily bids are below the calculated proxy cost value. This functionality has been requested by stakeholders, and is consistent with the policy behind the design of the SU and ML costs mitigation. In comments on the Straw Proposal, some stakeholders questioned the need for this functionality, but no one was unsupportive of the availability of the feature to those who would like to use it. Indeed, some acknowledged that the ability to submit lower commitment costs benefits generators that want their units committed, and load which will ultimately pay lower uplift costs associated with unit commitment.

The floor for these bid-in SU and/or ML costs is $0. That is, if a resource has elected the proxy cost option for SU and/or ML and chooses to bid in a daily value for that parameter that is less than the calculated proxy cost option, the value must be greater than or equal to $0 per start for SU, and must be greater than or equal to $0 per MWh for ML.

The ISO does not propose any more frequent bidding scheme for commitment costs other than the proposal noted above, and the option to change Master File values each 30 days. The ISO comes to this proposal after much deliberation about the merits and drawbacks of daily SU and ML bidding. Participants opposed to frequent bidding cite concerns about the potential to abuse market power. Participants in favor of daily bidding cite the need to recoup legitimate SU and ML costs without locking into a registered cost value for a month and thus being exposed to fuel price risk.

The current structure holds SU and ML costs static for 30 days which acts as a deterrent to submitting high registered costs since participants could effectively price themselves out of the ISO markets for that time by doing so. Part of the concern about daily bidding of SU and ML costs is the need to then develop dynamic market power mitigation of those costs. Furthermore, with the implementation of convergence bidding in February of 2011, there is concern that physical supply displaced by virtual supply in the DA market would need to be procured in the Residual Unit Commitment (RUC) market in order to meet physical demand. In light of this, daily bidding of SU and ML costs would implicate the need to revamp the Residual Unit Commitment (RUC) algorithms to ensure that commitment costs were also mitigated in that market.

Given these complications and drawbacks associated with daily bidding of SU and ML values, and the lack of a compelling need for daily changes to SU and ML costs beyond natural gas price fluctuations, the ISO does not propose more frequent bidding of SU and ML, except in the case of daily bids for proxy SU and ML costs as long as those bids are below the calculated proxy values.

The ISO does not propose a modification that would enable the submission of a fixed component to the Start-Up proxy cost option. The current structure for SU bidding is designed with two options – one variable and tied to costs, and the other static. Although the ISO recognizes that there is some support for a fixed component of the proxy cost option, it is the ISO’s position that the registered cost option is appropriate for start-up costs with significant non-fuel components. The justification that the ISO has seen for a
fixed component of the proxy start-up value indicates that such a value would be to offset major O&M costs, and could be – for some resources – as high as the per start fuel costs. The scheduling coordinator has the option to negotiate a higher per MWh O&M component for the proxy ML calculation. Alternatively, under this current proposal, the scheduling coordinator can elect the registered cost option for SU costs, and the proxy cost option can be chosen for ML. This would allow the scheduling coordinator to bid in a start-up cost that is up to 200% of the calculated proxy cost value for SU, but still retain the proxy cost option for ML so that they are not exposed to risk from changing natural gas prices for the ML component of commitment costs.

4.1 Proposal for Modifying the Proxy Cost Option

In order to better meet the needs of market participants, the ISO proposes to add an element to the proxy cost calculation, and to refine the existing components. The ISO proposes the refinements, described below, to the fuel price index component of the proxy cost calculation, and to the O&M component. In addition to these refinements, the ISO proposes an opportunity cost component for use-limited resources.

Bidding of Operations & Maintenance Costs

In the Straw Proposal on this initiative, the ISO proposed to offer Market Participants the option of either the O&M default adder, or a submitted O&M value where the default O&M value would simply be the same adder that is used under the current design. The idea was that a resource-specific O&M cost could be developed and submitted for a generating resource in the same objective approach used by PJM Interconnection. That proposal would have obviated the need for the current ability participants have to negotiate a higher per MWh O&M value for minimum load with the Independent Entity.

The ISO here proposes that we maintain the current market design with respect to O&M costs. Further, the ISO commits to re-evaluating the default O&M values every three years. This proposal is made in light of the fact that stakeholder feedback on this element of the Straw Proposal was only somewhat supportive of the “submitted O&M cost” option, and was not in favor of eliminating the option to negotiate an O&M value. Since it is not anticipated that these costs change frequently, and since the adequacy of the current default values is evidenced by the fact that there are currently no generating resources that have opted to negotiate a higher O&M value, the ISO position is that the three year cycle for updating the default values is sufficient. Finally, the ISO proposes that option to negotiate a higher per MWh value of O&M with the Independent Entity be retained.

Refinement to the Proxy Cost Option Natural Gas Prices

---

3 On August 14, 2009, the ISO issued a market notice with a request for additional information from stakeholders on what was at the time described as “operations and maintenance costs.” That market notice is available at the following link: http://www.caiso.com/240a/240ac48161f30.html
Gas that is delivered to the state border must then be transported to the backbone natural gas distribution pipeline, and the expense of this is reflected in the higher price of natural gas at the CityGate delivery points. There are then additional transport costs to move natural gas from the backbone distribution pipeline to the generators themselves, and an approximation of these costs is included in the proxy cost option.

Currently the ISO uses prices for two gas delivery geographies: North of Path 15, and South of Path 15. In the North, the PG&E CityGate price is used, and in the South, the SoCal Border price is used. Therefore, generators to the North of Path 15 all receive the CityGate price, while generators to the South of Path 15 all receive the Border price. This results in the generators in SP15 consistently bearing the extra cost of moving natural gas from the border to the backbone natural gas distribution before it is then moved to the generating plant. The ISO therefore proposes to replace the SoCal Border gas delivery point with the SoCal CityGate for SP15.

Please note that the usage of different gas delivery points pertains only to the instances in which monthly gas prices are employed to calculate the proxy cost option in the Master File on a monthly basis. The addition of gas delivery points for purposes of the proxy cost option does not change the methodology of calculation for default energy bids, nor does it change the methodology for Reliability Must Run (RMR) start-up and minimum load costs which are based on a gas daily price.

Please note that the ISO does not propose to specifically modify the manner in which it accounts for the transport of natural gas in its proxy cost calculation. To do so would be administratively burdensome as these costs are essentially resource-specific. Rather, the ISO proposes to maintain its current methodology which entails using three natural gas transport regions based on the service territories of PG&E, SCE and SDG&E.  

Contrary to what was previously communicated, the ISO does not currently apply a 10% adder to the general natural gas transport values described above in order to accommodate additional transport costs that may not be reflected in those three regions’ transport cost values. That adder is applied only to the variable cost option for the calculation for default energy bids (DEB). The ISO requests specific feedback from market participants on the extent to which such an adder is necessary in order to recoup natural gas transport costs.

Opportunity Cost Component for Use-Limited Resources

In the previous iteration of this Straw Proposal, the ISO proposed to use a methodology currently in use by the Independent Entity to capture opportunity costs for environmentally use-limited resources. Based on feedback from stakeholders and from the Market Surveillance Committee, this methodology is troublesome due to its reliance on incomplete

---

4 Within the SDG&E and SCE fuel transport territories, there are tiered natural gas transport costs which are applied to generators depending on the quantity of natural gas they use.
use-limitation data, and on a price duration curve using forward energy prices. The ISO proposes to eliminate this element of the proposal.

As an important side note, it was learned after the posting of the last iteration of this policy paper that the manner in which the Independent Entity uses the opportunity cost calculation is different than previously understood. Rather than being additive to start-up costs, the Independent Entity uses the greater of the start-up value or the calculated opportunity cost value. Furthermore, the use-limitation data used in the development of the data are more refined than what is submitted to the ISO as part of resources’ use-limitation plans. If stakeholders would like to re-open the potential adoption of this opportunity costs component of start-up costs given these updates, please provide such feedback in written comments.

5 Proposal for Mitigation of MSG Transition Costs

It is important to note that the mitigation of MSG transition costs will be implemented along with the implementation of MSG modeling functionality, on October 1, 2010. The timeline for changes to start-up and minimum load will be determined based on the complexity of the final policy adopted, and on the other market enhancements being implemented.

Transition Cost rules under the Proxy and Registered Cost options

The ISO’s proposal is that the transition costs be governed by two rules that bound the sum of transition costs.

This methodology constrains the costs in the transition matrix without dictating the specific nature or components of the transition costs. This is a “top down” approach to constraining costs within the transition matrix. An alternate methodology would be a “bottom up” approach which would involve specifying the costs associated with each individual transition. The rationale for the proposed “top down” design is twofold – it provides MSG unit owners the freedom to accurately describe their transition costs while enabling the ISO to avoid onerous validation of costs for each transition. Within the boundaries provided by the rules, market participants can determine the distribution of costs across the various transitions associated with their specific MSG resources.

The rules described below differ from those in the Straw Proposal. Feedback on the rules in the previous iteration of this policy development expressed concern that there was too much flexibility in the distribution of the costs within the transition matrix, and that this would permit the submission of “lumpy” costs. Lumpiness of costs in the transition matrix could lead to the ISO not being able to reach a configuration, and/or not being able to transition out of a configuration. This is problematic, as the lumpiness could be used as a tool to economically force or withhold transitions. Also, lumpiness would prevent the smooth and efficient dispatch of MSG units, and this diminishes the benefits of MSG modeling.
Although the details of the rules and their differences from the previous iteration of this policy paper are included in the descriptions of the rules themselves below, a summary of the two main changes is provided here:

- **Downward transition costs** are now excluded from the proposed structure of the MSG transition matrix. Thus, just as is the case for non-MSG start up costs, then, MSG transition costs will have to implicitly include the costs associated with downward transitions. The ISO recognizes that this is somewhat imperfect because is no reason to assume that the downward path along which the resource is dispatched is not necessarily the same as its upward transition path. However, anticipating that downward costs are small relative to upward costs, we feel that this is a reasonable compromise to limit potential lumpiness in the transition matrix, and to simplify the specification and validation of transition costs.

- **Rules 1 and 2 no longer has a lower bound below 100%** since downward paths are not considered. The proposed lower bound on Rule 2 is now 100% reflecting the fact that a larger transition should be just as expensive or less so that taking smaller, incremental transitions.

- There will not be a negotiated “maxSU” value as described in the previous iteration of the policy paper. Instead, the proxy cost start-up value will be calculated for each start-able configuration. Rule 1 will then employ these values to constrain the various paths up to each start-able configuration.

- **Rather than having the acceptable range used by the rules being up to 150%**, the ISO proposes to apply a 10% adder to the configuration start-up values above the calculated proxy values. The Rule 1 and Rule 2 ranges are thus lowered to 125%.

**Rule 1:** To avoid potential lumpiness while still providing flexibility, the ISO proposes to calculate the proxy start-up cost value for each configuration's start-up, apply a 10% adder to that calculated value, and then constrain the sum of upward transition costs along each path to that configuration. Specifically, the ISO proposes to constrain the transition costs along each of the feasible paths from offline to a start-able configuration such that their sum is between 100% and 125% of the SU value for the start-able configuration. Downward transitions will be assumed to be costless, and so downward transitions will not be evaluated as part of this rule. Also, please assume that the SU(i) values in the following notation already include the 10% adder.

As an example, assume that we have an MSG unit with a start-able configuration 3, that the transitions among configurations 1, 2 and 3 are all feasible, and that configurations 1 and 2 are also start-able. In this case, the paths from offline to configuration 3 would be constrained in the following manner:

- \( SU(3) \leq SU(1) + TC(1 \text{ to } 2) + TC(2 \text{ to } 3) \leq (1.5) \times SU(3) \)
- \( SU(3) \leq SU(1) + TC(1 \text{ to } 3) \leq (1.5) \times SU(3) \)
- \( SU(3) \leq SU(2) + TC(2 \text{ to } 3) \leq (1.5) \times SU(3) \)
**Rule 2:** This rule is the same, in principle, as what was originally proposed. The only changes here are that 1) downward transitions now no longer need to be checked, and 2) the limits are 100% and 125%. Rule 2 specifies that each of the feasible transitions is constrained such that the sum of nested transition costs is between 100% and 125% of the direct transition.

For any feasible transition from configuration (i) to configuration (j), the sum of the transition costs across any feasible, unidirectional transition path from configuration (i) to configuration (j) will be constrained to be between 100% and 125% of the transition cost from (i) to (j).

For example, suppose the transition from configuration 1 to configuration 4 is feasible and the transition cost is $8,000. Transition costs from configuration 1 to configuration 2 equal to $6,000 and from configuration 2 to configuration 4 equal to $7,000 would violate the rule. $6,000 + $7,000 = $13,000 which is greater than 125% of $8,000.

**The ISO proposes to indexing Transition Costs to Natural Gas Prices.** For Rule 1, the proxy start-up cost calculation is done for each start-able configuration. These configuration-specific start-up costs will be calculated in the same way that the proxy cost option is calculated for start-up costs for non-MSG generating resources. Thus, just as the current proxy SU values float with the gas-price index on a daily basis, the configuration-specific SU values will float. So that transition costs also adjust to changes in the gas price, the ISO proposes that the percentage change in the gas price between the monthly gas price used to enforce Rule 1 and the daily price be applied to the individual transition costs.

To provide further explanation, each month, the monthly gas price will be used to recalculate the proxy start-up values by configuration. The transition costs will be constrained by those values as described above in the description of Rule 1. As the gas price fluctuates on a daily basis throughout the month, the percentage change between the monthly price and the daily price will be calculated. That percentage will be applied to the transition costs so that they are adjusted proportionately to the start-up values. This will ensure that the transition costs still pass the two rules, and will make sure that MSG resources are not exposed to fuel price risk relative to their transition costs.

Since these rules employ a new approach to constraining prices, the ISO will post, along with this Revised Straw Proposal, a spreadsheet in which an example is provided. This will enable stakeholders to test and evaluate these rules based on their knowledge of their units’ costs.

**Transition Costs and Bid Cost Recovery**

The ISO proposes that Transition Costs will be included as costs when an MSG resource’s revenue and costs are considered for the purpose of determining eligibility for Bid Cost Recovery (BCR), and when calculating the value of BCR for the MSG resource. Within the eligible commitment period defined as the ISO commitment period related to the configuration into which the MSG resource is transitioning, the settlement
intervals in which the resource reached the Pmin of the target configuration will be eligible for BCR. For example, consider a one-hour commitment period with six 10-minute intervals. If the MSG resource transitioning from configuration 1 to configuration 2 does not reach the Pmin of configuration 2 until the fourth 10-minute interval, then the TC are only considered for BCR for the fourth, fifth, and sixth intervals of that commitment period.

A three-percent (or 5 MW, whichever is greater) tolerance band will be applied around the resource’s operating level when determining whether or not the resource has achieved the Pmin of the target configuration. The tolerance band will be determined at the resource level, i.e., it will be based on the resource’s Pmax. Without this tolerance band, a unit that transitions from one configuration up to the Pmin of another configuration could otherwise end up not being paid at all for intervals in which it was running slightly under the target configuration’s Pmin. Note that energy not delivered will not be paid; the tolerance band merely ensures that MSG units are not unduly penalized for small variations in metered values on the edges of their configurations’ operating ranges.

6 Process, Timetable & Conclusion

The changes in this Revised Straw Proposal are a direct result of feedback from stakeholders, the Department of Market Monitoring, and the Market Surveillance Committee. This collaboration is much appreciated, and we look forward to its continuation as we move forward in the stakeholder process. The table below summarizes the next steps in this policy initiative which will culminate in a presentation for decision at the July meeting of the CAISO Board of Governors.

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>March 16</td>
<td>Straw Proposal posted</td>
</tr>
<tr>
<td>March 19</td>
<td>Market Surveillance Committee Meeting</td>
</tr>
<tr>
<td>March 24</td>
<td>Conference call</td>
</tr>
<tr>
<td>April 14</td>
<td>Stakeholder comments due</td>
</tr>
<tr>
<td>May 5</td>
<td>Revised Straw Proposal posted</td>
</tr>
<tr>
<td>May 13</td>
<td>Conference call</td>
</tr>
<tr>
<td>May 21</td>
<td>Stakeholder comments due</td>
</tr>
<tr>
<td>June 2</td>
<td>Draft Final Proposal posted</td>
</tr>
<tr>
<td>June 9</td>
<td>Conference call</td>
</tr>
<tr>
<td>June 16</td>
<td>Final stakeholder comments due</td>
</tr>
<tr>
<td>July 26-27</td>
<td>CAISO Board of Governors</td>
</tr>
</tbody>
</table>

As noted above, a conference call to discuss the Revised Straw Proposal is planned for May 13, 2010. Although comments or questions on this proposal are welcome and encouraged at any time, formal written comments are due on May 21, 2010. With questions or concerns, please contact Gillian Biedler at (916) 608-7203 or via e-mail at gbiedler@caiso.com. Formal comments may be submitted to comcosts@caiso.com.