Comments of Pacific Gas & Electric Company

Energy Storage and Distributed Energy Resources (ESDER)

Issue Paper and Straw Proposal

Submitted by	Company	Date Submitted
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PG&E appreciates the opportunity to comment on CAISO's Energy Storage and Distributed Energy Resources (ESDER) Issue Paper and Straw Proposal. In its Issue Paper, CAISO outlines how it will enhance the non-generator resource (NGR) model, demand response products [i.e., the Proxy Demand Resource (PDR) and the Reliability Demand Response Resource (RDRR) products] and requests feedback on scenarios proposed for non-resource adequacy behind the meter applications. In summary, PG&E:

- Supports the proposed enhancements to the NGR model and encourages CAISO to share the mathematical formulation of the NGR model with stakeholders.
- Requests CAISO align its proposal with the CPUC's work on multiple use applications as it relates to rate treatment, interconnection, metering and reliability.
- Supports the proposed enhancements to the PDR and RDRR products, but recommends CAISO align any new alternative baselines with NAESB standards and allow demand response resources under these products to be dispatched on a discrete basis.

Below are PG&E's comment on the CAISO's Energy Storage and Distributed Energy Resources (ESDER) Issue Paper and Straw Proposal using the comment template requested by the CAISO.

Non-generator resources (NGR) enhancements

Please provide your comments in each of the four areas of proposed NGR enhancement.

1. Update documentation on NGR to capture material and clarifications compiled for April education forums by:

- Reviewing the ISO Business Practice Manuals (BPMs) and updating them with new or revised information to help classify NGR model functionality and market participation requirements. This will affect multiple BPMs including Market Operations, Market Instruments, Direct Telemetry, Metering, Outage Management, Reliability Requirements, and Settlements and Billing.

- Ensuring the BMP content distinguishes between requirements for resources participating as NGR from NGR participating under the Regulation Energy Management (REM) option.

PG&E Comments: PG&E supports CAISO's efforts to update documentation on NGR to capture material and clarifications compiled for April education forums into applicable BPMs. The updated documentation separating NGR functionality from the combined discussion of NGR- REM will more accurately reflect the operating procedures of the NGR model.

2. Clarify how ISO uses state of charge (SOC) in market optimization.

CAISO plans to clarify how it uses the SOC in market optimization and include this information in externally available NGR documentation.

PG&E Comments: PG&E supports CAISO's efforts to clarify how ISO uses state of charge (SOC) in market optimization. Clarification of how the SOC is used including the mathematical formulations will increase transparency to market participants and as a result enable PG&E to more effectively manage and bid in resources when SOC limitations are managed by CAISO for the NGR model.

3. Evaluate initial SOC as a submitted parameter in the day-ahead market.

To this end CAISO has stated it will evaluate the ability to submit a daily SOC bidding parameter. Under CAISO's current rules infeasible day-ahead awards can result as CAISO makes two assumptions regarding the initial SOC value used for that trading day, either: 1.) assuming the initial SOC value for the trading day is the ending SOC value from the previous day's day-ahead awards 2.) assuming that the initial SOC for a resource is 50% of the maximum energy limit, if there is no day-ahead award. CAISO also plans to clarify how the daily SOC bid value is reconciled with the real-time state of charge value passed to the state of charge in real-time telemetry for real-time market operation. Lastly, CAISO plans to review Day Ahead and Real Time settlement rules for instances when Day Ahead daily bid state of charge values differ from Real Time operation.

PG&E Comments: PG&E had previously understood that the initial SOC as a submitted parameter in the day-ahead market was something that the CAISO supported and had established as a worthwhile market enhancement. The current proposal suggests that this improvement will be 'evaluated'; PG&E would like to confirm the CAISO's commitment to allow the initial SOC as a submitted parameter in the day-ahead market. Without the option to submit the SOC as a submitted parameter (in daily bids), PG&E is concerned there are scenarios in which PG&E will be awarded infeasible day-ahead awards for its NGR resources. For example, if there is no previous day-ahead award or there is significant real time participation (i.e., ancillary services or energy), CAISO may incorrectly estimate the initial SOC which may create infeasible day-ahead awards for the following day. We appreciate that the CAISO will need to evaluate the improvement to ensure it is designed appropriately and successfully implementation though robust testing, and we believe that allowing for the initial SOC as a submitted parameter in the day-ahead market is a worthwhile market enhancement which the CAISO should prioritize.

4. Evaluate option to not provide energy limits or have CAISO co-optimize an NGR based on state of charge, meaning:

- CAISO's co-optimization process would not utilize energy limits or co-optimize an NGR based on a SOC.
- For some resources (e.g., aggregated sub-resource comprised of multiple types of resources) the scheduling coordinator would manage the SOC constraint and manage bids in the day-ahead and real time market in line with the resource's ability to avoid non-performance conditions.

PG&E Comments: PG&E supports CAISO's flexible framework for NGR, which would also allow the resource to manage their SOC constraint, energy limits and their own bids. Similar to Item 3 above, PG&E's understanding was that this feature was something that the CAISO supported and was possibly a capability of the existing NGR software; PG&E would like to confirm the CAISO's commitment to this change. As PG&E's experience with the NGR model increases, we would also like to explore the possibility that some resources may have a preference for managing their own SOC constraints and bids, as opposed to CAISO. This option would be similar to other alternatives available to use-limited resources (e.g. using energy bids directly to manage the use-limitations, or alternatively providing daily energy limits to CAISO).

Other Comments:

- CAISO should clarify why they believe NGR model is "best suited for smaller, distribution connected resources."[1] It is PG&E's view that the NGR model should benefit all resource sizes and would like to understand why CAISO specifically identified smaller resources.

[1] Pg. 11, http://www.caiso.com/Documents/EnergyStorageandDistributedEnergyResources-IssuePaperStrawProposal.pdf

- PG&E encourages CAISO to share the mathematical formulation of the Day-Ahead and Real-Time Security Constrained Unit Commitment and Security Constrained Economic Dispatch models that include the NGR model to ensure market transparency and help resolve any issues identified.

PDR/RDRR enhancements – alternative baseline methodologies

Please provide your comments in each of the two areas of proposed enhancement.

1. Develop meter generator output (MGO) as a new ISO baseline methodology.

One of the three Supply Integration Working Group[2] (SIWG) recommendations regarding expanding baselines was for CAISO to adopt the MGO as an acceptable baseline methodology. The MGO performance evaluation methodology uses the metered output of a generator behind load as a means of measuring demand reduction.

PG&E Comments: PG&E would like CAISO to include a discussion that resolves the conflict between using a methodology that lacks a baseline and CAISO's commitment to follow NAESB standards which require a baseline. The MGO methodology inherently does not have a baseline and instead provides meter generated output. However, CAISO has stated as a part of the principles it plans to follow for the PDR/RDRR alternative baseline development that will include compliance with NAESB baseline standards, which require a baseline. While PG&E is not opposed to the MGO methodology, PG&E encourages CAISO to clarify if it does not require a baseline for some of the PDR/RDRR alternative baseline methodologies.

2. Develop additional detail regarding the "ISO Type 2" baseline methodology (i.e., provision of statistically derived meter data) and document that in the appropriate BPMs. ISO Type 2 baselines are envisioned to be best suited for large, direct load control aggregations (e.g., residential A/C cycling) that are homogeneous, exhibit similar behavior, and where interval meter data is not readily available (within the timeframe that CAISO needs for settlements). While no market participants currently use CAISO's Type 2 baseline methodology, PG&E is conducting a pilot program to develop an ISO Type 2 baseline methodology.

PG&E Comments: PG&E supports CAISO's efforts to develop additional detail regarding the "ISO Type 2" baseline methodology as we believe it will remove some of the existing barriers to participation and

[2] The SIWG was created under the California Public Utilities Commission's Demand Response OIR and was established to 1.) identify areas where requirements for the integration of supply resource demand response in CAISO's market may be adding cost and complexity, determine whether these requirements can be simplified or changed without creating operational problems, prioritize these possible changes, and resolve them and 2.) identify program modifications and operational techniques to make demand response programs more suitable and successful as supply resources.

lower the cost of demand response. We will continue to participate in the CAISO's Supply Integration Working Group.

Other Comments: PG&E recommends CAISO allow discrete dispatch capability for demand response resources. Current CAISO rules include the possibility of demand response resources being partially dispatched. However, due to constraints, this may not be feasible for many demand response resources. CAISO should allow discrete dispatch of demand response resources, to ensure these resources are not given infeasible awards.

Non-resource adequacy multiple use applications

PG&E appreciates CAISO's work to enable participation of DERs in wholesale markets, but would like to ensure that critical details are addressed prior to implementation. Some of these issues were raised in PG&E's June 25, 2015 comments[3] as a part of CAISO's Expanded Metering and Telemetry Options Phase 2 initiative, but are also relevant to this initiative. For all DERs participating in wholesale markets, and especially in Question 2b, where energy is being exported, PG&E does not agree that solely addressing "the NGR topic within the ESDER Initiative will adequately address issues related to this scenario, and there is no need for additional treatment as a multiple use scenario."[4] In summary, PG&E believes that more clarification is needed on how the CAISO will coordinate and align with the CPUC on timing and cost recovery as well as clarify interconnection agreements and metering.

Timing of addressing multiple use applications

The multiple use application of retail distributed resources participating in wholesale markets will straddle the jurisdictional boundaries of CAISO and the CPUC. In order to ensure that there is clarity on the CAISO's and CPUC's work on multiple use applications, PG&E recommends CAISO wait until at least October 2015 prior to addressing these multiple use applications. Per the CPUC's Energy Storage Scoping Memo[5], multiple use applications (topics will include determination of retail vs. wholesale energy, cost recovery, interconnection, metering and dispatch coordination) are slated to be addressed in Track 2 of the CPUC's Energy Storage OIR which should begin in October of 2015.

Cost Recovery

In the long-run, as the CPUC moves to reform its compensation policy for customer-generated energy to better reflect the value to the grid, consideration should be given to leveraging the CAISO wholesale market as a mechanism to value the commodity and services provided by distributed energy resources.

[3] https://www.caiso.com/Documents/PGEComments-ExpandingMeteringandTelemetryOptions-DraftFinalProposal.pdf
[4] ESDER Issue Paper and Straw Proposal p. 24
[5] http://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M152/K484/152484522.PDF

Customers generating their own energy under the existing Net Energy Metering (NEM) tariff are currently credited for their energy at the bundled retail rate, which over-compensates customers relative to the value provided.

While additional clarification is needed regarding determining retail vs. whole rate treatment, PG&E cautions against a hasty determination of retail vs. wholesale energy when considering DER participation in wholesale markets. Challenges exist with splitting retail and wholesale energy at customer sites, especially when considering storage devices. Storage devices may charge from the grid in order to both serve customer load and to export into wholesale markets. Designating charging energy as retail or wholesale would be very challenging and presents the risk of failure to recover costs by the utility if any designated 'wholesale' energy is then used to serve on-site retail load. Further, as stated in PG&E's comments to the CAISO Expanded Metering and Telemetry proposal, PG&E believes that under the current paradigm NEM customers should be precluded from participating in CAISO markets because the NEM compensation credit includes ancillary services and other grid usage values and costs. In the case of storage, this would pertain to storage devices that are "fully integrated" with NEM generators (i.e. can only charge from the NEM generator).

Clarity Regarding Interconnection

CAISO has stated that DERs sited at retail load will need a wholesale Generator Interconnection Agreement to participate in many wholesale market programs. It is PG&E's understanding that a Generating Facility at a given Point of Interconnection must have a single Interconnection Agreement under a single jurisdiction, either the FERC (through the Wholesale Distribution Tariff) or through the CPUC (through Rule 21). If a DER interconnects to the distribution grid under Rule 21 with one use case outlined in the Interconnection Agreement (IA), and then decides to participate in CAISO markets, changing the use case, the DER participate may have to re-apply for interconnection under Rule 21, and may be responsible for upgrade costs. CAISO should work with the CPUC to make interconnection requirements clear to DERs wishing to participate in the wholesale market.

Clarity Regarding Metering

In the Expanded Metering and Telemetry proposal, the CAISO proposed that all DERs be submetered. If this requirement is to be upheld in the ESDER initiative, then the CAISO should work with the CPUC on cost responsibility regarding metering. For example, energy storage behind a retail meter is never required by the CPUC to be sub-metered from load,[6] and so if metering is required, it is not clear which entity should pay for the separate meter. PG&E believes that if sub-metering is required, it should be at participant expense.

[6] Only in cases where storage is paired with a NEM generator and the storage is larger than 10 kW does the NEM generator require a separate meter, but storage does not require a separate meter.

Comments on CAISO's Use Cases:

1. Type 1: Resource provides services to the distribution system and participates in the ISO market.

Question 1 – How do we manage conflicting real-time needs or dispatches by the distribution utility and the ISO?

PG&E Comments: To maintain safety, distribution reliability and distribution capacity, PG&E will prioritize the local service requirements. PG&E plans to work both internally and with stakeholder and as a part of the Energy Storage and Distributed Energy Resource initiative to help develop a path forward on how CAISO and the Distribution Utility can manage conflicting needs.

Question 2 – If distribution system and ISO needs are aligned, and the resource's actions meet the needs of both, is there a concern about the resource being paid twice for the same performance? Under what situations is double payment a concern? How should we address this concern?

PG&E Comments: Per the general comments issued above, PG&E believes that currently all NEM customers, including storage devices fully integrated with NEM generators, should be precluded from participating in CAISO markets because the fully bundled NEM retail credit contains many of the same grid use charges and value streams that comprise CAISO compensation. As the compensation policy for customer-generated energy is reformed, we should further consider effective measures for distributed energy resources to use the CAISO wholesale market.

Question 3 – Should any restrictions be on a DER aggregation or the sub-resources of a DER aggregation providing distribution-level services? Would the distribution utility ever call upon a multi-pricing node DER aggregation to address a local distribution problem?

PG&E Comments: PG&E believes there should be restrictions on a DER aggregation and the sub-resources of a DER aggregation providing distribution-level services. Accordingly, PG&E believes to manage conflicting real-time needs or dispatches by the Distribution Utility and CAISO, the Distribution Utility, in conjunction with the California Public Utilities Commission, would need to develop those restrictions to ensure reliability and safety concerns are addressed. PG&E envisions in the future calling upon multiple-pricing node DER aggregation to address a local distribution problem.

2. Type 2: Resource provides services to end-use customers and participates in the ISO market.

CAISO has identified the following three sub-types: (a) DER installed behind the customer meter, such that flow across the customer meter is always net load; (b) DER installed behind customer meter, such that flow across the customer meter can be net load or net injection at different time; and (c) DER installed on the utility side of the meter, may provide service to end-use customers and participate in wholesale market.

PG&E Comments: At this time PG&E has not identified other use cases beyond what CAISO has defined. PG&E would like to clarify that case (a) includes non-exporting generators which are subject to generator interconnection procedures under the applicable tariff. Despite not resulting in net power flow across the customer onto the distribution system, non-exporting generators present risks to safety and reliability of the distribution system which must be rigorously addressed through the interconnection process. PG&E agrees that case (c) is not relevant at this time: such a case is either indistinguishable from Type 1 above or raises questions on a generator's status and responsibilities under PU Code Section 218.