Stakeholder Comments Template

Submitted by	Company	Date Submitted
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Please use this template to provide your comments on the Issue Paper & Straw Proposal posted on June 24, 2014 in the Energy Storage Interconnection initiative and as supplemented by the presentation and discussion during the stakeholder web conference held on July 1, 2014.

Submit comments to EnergyStorage@caiso.com

Comments are due July 15, 2014 by 5:00pm

The Issue Paper & Straw Proposal posted on June 24, 2014 may be found at:

http://www.caiso.com/Documents/IssuePaper_StrawProposal-EnergyStorageInterconnection.pdf

The presentation discussed during the July 1, 2014 stakeholder web conference may be found at:

http://www.caiso.com/Documents/Agenda_Presentation-EnergyStorageInterconnectionJul1_2014.pdf

Please provide your comments in each of the topic areas listed below.

Applying the GIDAP to Cluster 7 energy storage projects

The ISO invites stakeholders to comment on its proposed approach for the application of existing GIDAP rules to energy storage projects in Cluster 7 (e.g., that existing GIDAP rules can accommodate Cluster 7 storage projects that want to be treated as generators for both aspects of their operation; how reliability and deliverability studies will be performed; that GIDAP will not be utilized to assess requests to obtain a higher level of service for charging mode; and, the

process for interconnection customers to seek such firm load service from the PTO through means other than the GIDAP). Stakeholders are asked to identify any issues with this approach for Cluster 7 and to suggest potential alternatives.

Comments:

CPUC Staff understand that what can be done with the *current* interconnection process is limited not only by the need to work within tariff-defined procedures but also by the unfamiliar and potentially complex challenges presented by interconnection of diverse storage projects. However, it is essential to coordinate and integrate the different kinds of studies to the extent possible, and to understand and address the important (sometimes unprecedented) issues and needs presented by particular storage interconnection customers. Furthermore, the interconnection studies should be conducted and reported in a manner that provides maximum useful information for customers and stakeholders going forward. Even studies that are only "informational" can be very helpful for interconnection customers, the CAISO and stakeholders as we refine the process for future cycles. Issues identified but not resolved for the Cluster 7 Phase 1 studies might then be more fully addressed in subsequent cycles of the interconnection process, after a refined process is deployed. Cluster 7 interconnection customers should have opportunity to benefit from such refinements where possible, including reforms in place for Cluster 7 Phase 2 studies.

For Cluster 7, even before interconnection process refinements pursuant to the present initiative are in place, the reliability (for discharging and charging) and deliverability studies should be conducted in as coordinated, consistent and transparent manner as possible, across *all* of the studies. In particular, the data requirements, modeling assumptions, anticipated modes of storage facility operation, and other relevant information and assumptions should be established, discussed with customers and documented in a unified manner encompassing *all* of the studies. Interconnection customers should have ongoing opportunity to explain how their projects are expected to operate such as regarding patterns of charging and discharging, services to be provided (e.g., energy, RA capacity, flexible RA capacity, ancillary services, local capacity), and whether discharging and charging would be to/from the system vs. on-site.

The CAISO should clarify how having interconnection reliability studies performed "by PTOs under ISO direction" would compare to how interconnection studies have been performed up to now, and if/how reliability studies for charging would be efficiently and transparently coordinated with the Transmission Planning Process's reliability studies for serving loads in the same locations as the storage projects.

Issues in scope for this initiative

Beyond Cluster 7, the ISO anticipates that it will receive further requests to interconnect energy storage projects in the Cluster 8 application window that will close April 30, 2015. Through this initiative, it may be possible to identify improvements that could be implemented prior to the Cluster 8 window so that those improvements can be applied to projects in that cluster. Toward this goal, the ISO has identified the following three issue areas as in scope and invites stakeholders to comment on these.

- Interconnection request process. The objective is to ensure a one-stop, streamlined process for interconnecting energy storage to the ISO grid. Consolidation of all aspects (i.e., impacts of both discharging and charging) of energy storage interconnection under the GIDAP will be explored. Stakeholders are asked to explain where process improvements are most needed and could be most beneficial, and to suggest potential improvements.

  Comments:

  CPUC Staff support the objective of developing a one-stop internally consistent and transparent process for interconnecting storage projects. This includes having a unified interconnection request process that encompasses all information and issues required to characterize a storage project's intended operation including discharging and charging cycles, services to be provided (e.g., energy; RA, flexible and local capacity), and nature of discharging/charging to/from the grid versus on-site.

  If, as we expect, a future refined interconnection process will provide expanded options for having particular charging/discharging conditions studied for reliability and/or deliverability, then the interconnection request process should provide for requesting such an expanded range of studies.

  A refined interconnection process for storage should provide options to seek deliverability beyond basic "plain vanilla" deliverability for providing system RA, such as for providing flexible capacity, for delivering a higher level of output maintainable for less than 4 hours, or for charging. For example, flexible capacity is based on three-hour and not four-hour performance, and the most recent RA decision allows for 1.5 hours of charging to be combined with 1.5 hours of discharging to meet this requirement.

  Under some conditions, studying or providing such extended (not plain vanilla system RA) deliverability might entail the interconnection customers paying

(without reimbursement) for certain studies or certain grid upgrades, which should be considered in the present initiative. The interconnection request process should allow for (1) seeking such extended deliverability options, (2) having the cost of such options studied, and (3) based on initial studies, making a timely decision (e.g. after Phase 1 studies) whether to ultimately pursue such options. It will be essential to avoid repeated iterations of either requests or studies, by clearly defining and limiting what kinds of requests or subsequent re-requests (e.g., regarding MW or deliverability) are allowable.

- Interconnection study process. The objectives are to: (1) examine the alignment between the methodologies used in ISO interconnection studies (e.g., reliability, deliverability) and the energy storage configurations and use cases, and (2) determine whether any changes can or should be made to these methodologies. Although the ISO is not making any commitments as to the extent of any changes that may be made to these methodologies (again, both reliability and deliverability), the ISO is open to this examination and is inviting stakeholder input. Stakeholders are asked to explain how current interconnection study methodologies may not align with energy storage use cases and to suggest potential alternatives for how these studies could be performed. Given that the current deliverability study methodology is aligned with existing resources adequacy rules, stakeholders are asked to suggest how these studies could be performed if those rules are assumed to change.

  Comments:

  As discussed above, a refined interconnection *request* process should give storage interconnection customers a clear "one-stop" opportunity to request and explain the particular discharging and charging conditions they anticipate and wish to have studied. We expect that a corresponding refined interconnection *study* process would have enhanced "one-stop" ability to accommodate such requests via expanded study options within a unified framework of reliability and deliverability studies. This should include as much integration and coordination as possible – between reliability and deliverability studies, and between discharging and charging studies. We recognize that there are limits to expanding the scope of studies. In some instances expanded studies may entail additional responsibilities for interconnection customers such as regarding provision of information and regarding study or network upgrade costs.

  The variety of potential operational modes for individual storage facilities and especially across different storage facilities implies a likely need for reliability and deliverability studies covering a wider range of circumstances than traditionally examined. This includes discharging or charging under conditions that go beyond

the limited stress conditions traditionally considered for reliability and deliverability studies, but that are economically or physically important for storage operations. For example, this might involve temporal coordination of (or constraints on) storage discharging and charging windows,[1] or it might involve coordination of storage charging and/or discharging with expected energy market conditions (e.g., energy and ancillary services prices) or with operations of co-located load or generation.

On the other hand, it is likely that some of the diverse possible charging and discharging scenarios may not be *practically* important in driving need for infrastructure or operational solutions. Some scenarios may be unlikely (e.g., charging certain storage facilities on-peak) or may clearly not be limiting (clearly stressing transmission less than more conventional stress scenarios). Such scenarios may thus not need to be studied in any depth, thus reducing the study burden for testing reliability and deliverability. This may especially be the case when storage projects are small and located close to load (or co-located generation), are expected to charge under off-peak conditions, or are expected to discharge either when nearby load is high and can absorb storage output or else when co-located generation is not operating. Thus, a refined interconnection process should have provisions not only for identifying and designing a broader (than traditional) range of reliability and deliverability studies and for limiting what requests or request revisions (for studies and for service) are allowed, but also for efficiently screening the range of potential or requested operational scenarios to identify a more compact set of scenarios having significant potential to impact infrastructure or operational needs.

One foreseeable use for storage is to provide upward and downward ramping to meet system flexibility needs. For example, storage projects may wish to qualify as effective flexible capacity (EFC) based on 3-hour ramping capability as described in recent CPUC Decision D.14-06-050. What conditions of discharging and charging should be studied to support designation of EFC is a new issue not yet resolved.[2] In theory and perhaps in practice determinations of transmission implications (reliability and deliverability) for supporting the new EFC might consider a range of interrelated discharging and charging conditions. This could be done via the interconnection process refinements now being considered, if not in initial reforms then perhaps in subsequent reforms. It may (hopefully) be possible to assess "deliverability" of storage flexibility using a compact subset of the wider

[1] E.g., a need to fully charge ahead of a time window for which discharging-related services are anticipated, such as upward ramping.

[2] The above CPUC decision does specify that the upper MW limit for qualified EFC should be bounded by a facility's Net Qualifying Capacity which takes into account on-peak deliverability.

range of theoretically possible charging/discharging scenarios. We recognize that the broader issue of "deliverability of flexibility" from any kind of resource has not yet been formally pursued.

- Project modification process. The objective is to examine whether any further changes (to the two existing project modification processes discussed in the paper: the modification request process and the independent study behind-the-meter expansion process) can or should be made given that developers may want to modify projects (e.g., to add energy storage to a renewable project) either still in queue or those is commercial operation. Although the ISO is not making any commitments as to the extent of any changes that may be made to these existing project modification processes, the ISO is open to this examination and is inviting stakeholder input. Stakeholders are asked to explain how these existing processes may not provide adequate means for requesting project modifications, and are asked to describe changes that could be made or suggest potential alternatives to these processes.

  Comments:

  If storage additions to existing facilities do not increase the maximum output or consumption level, and otherwise do not add significant reliability issues, those additions should be considered for possible treatment as non-material modifications and for expedited interconnection (e.g., fast-track or independent study). We recognize that other factors may still need to be considered for such a determination, and that deliverability implications and studies might still be entailed.

A framework for differentiating between energy storage configurations

Although the ISO has identified the range of configurations that may be possible, due to time constraints the ISO is concerned that inclusion of all possible configurations in this initiative may jeopardize the goal of identifying GIDAP improvements that could be implemented prior to the Cluster 8 window. Thus, the ISO is recommending that this initiative focus solely on ISO grid connected storage configurations (and not distribution connected and customer sited). The ISO believes that solutions developed for ISO grid connected storage configurations will likely inform solutions for distribution connected and customer sited configurations (e.g., where appropriate, conforming changes could be made to distribution utility WDATs). Consistent with this approach, the ISO asks stakeholders to identify energy storage interconnection issues or

challenges associated with ISO grid connected configurations (e.g., where the current interconnection rules may either fail to address or conflict with the needs of storage projects) and to make proposals for addressing these issues.

Comments:

CPUC Staff agree with an initial focus on CAISO grid-connected storage interconnection in order to expedite the deployment of initial process refinements by early 2015. We agree and hope that this may inform solutions for distribution connected and customer-side storage. Furthermore, stakeholders should be encouraged to comment on (and the CAISO is encouraged to consider) implications of transmission level storage interconnection reforms for distribution connected and customer-side storage. Conversely, we should not overlook the possibility that issues identified and raised for distribution connected and customer-side storage may *themselves* inform or impact transmission-level storage interconnection reforms. For example, as pending in R.11-09-011 the CPUC may be considering reforms to Rule 21 for distribution connected and customer-side storage, and any coordination and consistency with transmission-level processes can only be helpful.

With regard to transmission connected storage, CPUC Staff agree that the different configurations and sub-configurations described on page 15 of the June 24 Straw Proposal (and slide 17 from the July 1 webconference) represent a good initial framework for considering process reforms and the situations the reforms would need to address. As discussed above, the actual storage interconnection process should provide clear opportunity for interconnection customers to explain and discuss their particular operational expectations and needs, which may be both diverse and untraditional. Consistent with this, the CAISO should be prepared in the current interconnection reform initiative to consider additional storage "configurations" or operational paradigms presented by stakeholders, beyond those presented on page 15 of the Straw Proposal. Furthermore, we note that what constitutes "on-site" generation or load may need to be clarified or even broken into multiple variations reflecting operational, electrical, metering and communication/control relationships between the storage and the other "on-site" facilities.

Finally, we note that the proposed category "customer-sited, behind-the-meter *stand-alone* storage" (page 16 of the June 24 Straw Proposal) may not be necessary. If there is no pre-existing load or generation "behind the meter" so that only the new storage is behind the meter, without load or generation, then the new storage project may simply represent "distribution connected storage."