Storage as a Transmission Asset

Stakeholder Comment Template

Submitted by	Company	Date Submitted
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Please use this template to provide your comments on the Storage as a Transmission Asset stakeholder initiative Straw Proposal that was published on May 18, 2018.

Submit comments to InitiativeComments@CAISO.com

Comments are due June 7, 2018 by 5:00pm

The straw proposal, posted on May 18, 2018, as well as the presentation discussed during the May 24, 2018 stakeholder web conference, may be found on the Storage as a Transmission Asset webpage.

Please provide your comments on the Straw Proposal topics listed below, as well as any additional comments you wish to provide using this template.

Proposal for a Foundational Principle for this Initiative

Before addressing the ISO's specific questions, the Center for Renewables Integration (CRI) team, would like to propose a foundational principle which, if adopted, we believe will be helpful for resolving some of the open issues in this initiative.

The following are some of the core questions and concerns that have been raised by the ISO, CRI, or other stakeholders.

[1] The CRI team participating in this ISO initiative consists of Kerinia Cusick, Jon Wellinghoff and Lorenzo Kristov.

1. If a SATA asset has been selected under an Option A (wholly in ratebase) contract structure and its cost effectiveness requires market revenues to offset some rate-base cost, the asset owner has no motivation to participate in markets and maximize market revenues, thereby implicitly setting up the risk that ratepayers will be responsible for the shortfall in anticipated market revenues.
2. Given that the ISO currently proposes allowing an asset owner choose either Option A or Option B (partially in ratebase), it seems possible that in a Phase 3 competitive procurement the ISO could be required to choose among a set of proposals that include both Option A and Option B contract structures. To make a fair evaluation of the two options, the ISO would be required to determine the risk associated with market revenues.
3. A number of parties have mentioned concerns associated with obtaining financing to develop solutions that are based on revenue streams that are subject to standard market risks. Therefore, it is highly probable that any project sponsor will need to secure a significant portion of the market-based revenues via a bilateral contract, or a hedge product, in order to obtain cost-effective financing terms. While the ISO has a responsibility to ratepayers to ensure that any solutions it procures are cost effective and it isn't setting up a scenario that allows an asset to be paid twice for services provided, the ISO acknowledges that it has little to no visibility into bi-lateral contracts. It is vital that the ISO develop a structure that accommodates bi-lateral contracts and/or hedge products, otherwise all asset owners will be inclined to opt for Option A (wholly in ratebase), in which case this initiative may not actually result in a significant impact on SATA development, or ratepayer savings.
4. As the ISO has already seen, it is highly probable that some solution sponsors will want to propose "hybrid solutions" which could include a SATA, in addition to upgrades to existing transmission or substation infrastructure. Additionally, given the potential for energy storage to take the Federal Investment Tax Credit (ITC) when combined with solar, the ISO should expect that solution sponsors may want to propose a combination of solar and storage. CRI understands the ISO has proposed that it will view these two assets as distinct, but in situations when the two assets are combined behind one inverter and the addition of solar PV does not increase the maximum output rate (PMax) of the storage device, CRI proposes the ISO should be indifferent.

To address some of these core challenges, the CRI team suggests the following principle:

Proposed principle: In cases where cost-effectiveness of the SATA solution requires some market revenue offset to the rate-base cost of the solution, instead of the ISO selecting a SATA versus a "wires-based" solution in Phase 2, the ISO recommends both types of solutions to the ISO Board. In the competitive process, the solution sponsor (either a SATA solution or a conventional transmission infrastructure solution) must submit a proposed maximum cost (i.e. a "cost cap"), net of market revenues, for which the developer will be seeking rate-base cost recovery if the proposed solution is selected, with the commitment that the asset will provide the required performance and availability at the proposed maximum cost and the sponsor will not seek additional rate-base cost recovery to compensate for, for example, higher cost to implement the solution or lower than expected revenues from other sources. Thus, if the cost effectiveness of the SATA solution hinges on a certain amount of market revenues to

offset rate-base cost, the SATA sponsor assumes both the risk of any shortfall and the reward of any overage in realized market revenues.[2]

To explain this principle further, CRI offers this hypothetical scenario. Suppose the TPP identifies in Phase 2 a specific transmission need, for which the ISO identifies a conventional transmission solution but which could also be satisfied by a SATA solution. In Phase 2 the ISO also specifies the performance and other relevant requirements the solution must meet, as well as the amount and pattern of hours on an annual basis for which the transmission service is needed and the hours in which the SATA resource would be free to pursue other sources of revenue by providing other services, including ISO market services. CRI proposes that the comprehensive transmission plan presented to the Board at the end of Phase 2 would report both the conventional solution and the potential for a SATA solution, with the final determination to be made following either the ISO's conduct of a Phase 3 competitive solicitation or, if the solution must connect to local transmission, the relevant PTO's procedure for soliciting SATA solutions.

Once the sponsor and the ISO agree on all the terms, the ISO's only concern would be to ensure the solution provides the required transmission service when needed. In particular, it would not matter to the ISO what the asset's full cost to implement is, how much money the asset earns from the provision of market services or from other sources, or whether the sponsor falls short of recovering its costs or earns extra profit. The ISO will have performed its due diligence on behalf of transmission ratepayers by obtaining the most cost-effective solution to the transmission need and exercising its operational control of the asset when it provides transmission services, as the ISO does with other transmission assets.

The philosophy underlying this principle, as articulated above, is consistent with the cost recovery philosophy utilized by FERC for the compensation of other grid services. Specifically, in Order 745 the Commission required that demand response bidding a MWh of reduction of energy use into the energy markets be compensated the same amount as a generator who bids in a MWh of energy injection into that market. This requirement was incorporated into Order 745, and upheld by the U.S. Supreme Court, regardless of the contention by those opposing the Order that demand response otherwise compensated the customer by lowering their overall energy bill and/or lowering their monthly demand charges. Thus the argument was offered that demand response should be compensated less than a generator for the same wholesale market service because the demand response provider was otherwise compensated in the retail market from their reduction in energy use. This argument was rejected by FERC. Similarly, we are proposing here that revenues that a SATA developer receives, outside of those it receives for providing transmission services under a rate base cost of service tariff, should not be considered in determining the compensation for that transmission service.

CRI believes that adopting the principle described above has certain implications that will resolve some of the other design and policy questions raised in this initiative. These are discussed below in relation to the questions the ISO has asked.

[2] Obviously there still need to be provisions for adjusting compensation should the ISO need to change the terms of availability or performance requirements.

Scope of policy examination

The ISO has modified its initial identified scope for this stakeholder process. The scope of this initiative will focus on: If storage is selected for cost-of-service-based transmission service, how could that resource also provide market services to reduce costs to end-use consumers? Please provide comments on this proposed scope (including those issues identified as out-of-scope). If there is a specific item not already identified by the ISO that you believe should be considered, please provide the specific rationale for why the ISO should consider it as part of this initiative.

Comments:

1. The starting premise, "if storage is selected …" leaves unclear whether the ISO envisions this selection to occur in Phase 2 or in Phase 3 of the TPP. CRI realizes it has largely been assumed that it would be in Phase 2 of the TPP, as has been done to date. However, we are also aware, through verbal comments made by the ISO at the first stakeholder meeting, although the ISO hasn't yet proposed dual solutions to the board, it isn't inconceivable. The distinction of when the SATA solution is selected is very important. If the selection of the SATA solution occurs in Phase 2 and some amount of rate-base cost offset from market revenues is required for the SATA to be cost effective, then it requires the ISO to estimate the expected market revenues the SATA could earn. The ISO outlined this "none or some" approach in their Issue Paper. This would then implicitly allocate to ratepayers the risk of any shortfall in realized market revenues. Alternatively, if the selection occurs in Phase 3 (with the conventional transmission solution still on the table as potential fallback if no SATA offering is cost competitive), then market revenue estimates would be elements of the competitive bids submitted by aspiring project sponsors, with the winning sponsor assuming the risk of any market revenue shortfall. In other words, per the foundational principle stated above, if the ISO's preference for the SATA resource depends on market revenues to offset project cost, then the project sponsor should estimate and commit to a specific market revenue amount to avoid ratepayer risk of a market revenue shortfall. Alternatively, if the ISO determines SATA is cost effective even without any market revenues, then it could recommend just the SATA solution.

2. CRI and other parties have asked whether a SATA resource would be able earn revenues from services beyond the ISO market, such as through bilateral contracts. The foundational principle stated at the beginning of these comments implies the following hypothesis: As long as the SATA resource provides the required transmission services in accordance with the ISO's performance and availability specifications, the ISO does not need to know about any earnings the asset may obtain from other sources. The ISO's concern is limited to the resource's provision of the required transmission services when needed. Of course, this assumes that the ISO will have observation and enforcement capabilities sufficient to ensure full provision of the transmission services.

3. CRI recognizes the ISO already uses the willingness of parties to accept a binding cost cap as a criterion in the competitive transmission sponsor selection process. For example, in the Delaney-Colorado River Transmission Line Project Sponsor Selection Report (page 98) the ISO summarizes the selection factor as "demonstrated cost containment capability of the Project Sponsor and its team,

specifically, binding cost control measures the Project Sponsor agrees to accept, including any binding agreement by the Project Sponsor and its team to accept a cost cap that would preclude costs for the transmission solution above the cap from being recovered through the CAISO's Transmission Access Charge and if none of the competing Project Sponsors proposes a binding cost cap, the authority of the selected siting authority to impose binding cost caps or cost containment measures on the Project Sponsor, and its history of imposing such measures." Using the binding cost cap for SATA transmission costs, net of market revenues, will simplify the ISO's selection process and allow comparable comparison of SATA with traditional, wires-based, solutions.

Background and the ISO's Transmission Planning Process ("TPP")

The ISO has provided a discussion on how certain stakeholder comments could be addressed within the current Transmission Planning Process (TPP) framework – on a case-by-case basis. Please provide any additional questions or clarifications regarding how the ISO's TPP might incorporate the market participation by SATA resources.

Comments:

1. The straw proposal states (p 15): "… the specific assessment methodologies for energy storage resources that will be applied in Phase 2 of the transmission planning process will be adapted in future planning cycles." CRI is unclear whether the ISO intends "specific assessment methodologies" to include the estimation of market revenues a SATA resource can be expected to earn to offset its rate-base cost recovery requirement, and how the ISO will use such an estimate to decide whether to recommend the SATA solution over the more conventional transmission solution at the end of Phase 2. CRI believes this matter should be addressed in the present initiative, as it is central to the question of who bears the risk of any subsequent shortfall in realized market revenues. See also CRI's comments on the cost recovery mechanisms below.

2. If the ISO identifies an economic or policy-driven transmission need that could be met by a SATA resource, this information will only become available to stakeholders in mid November. This does not seem to allow enough time for interested developers to advance SATA solutions, to have such solutions evaluated by the ISO and incorporated into the draft comprehensive transmission plan by the end of January. CRI requests that the ISO clarify the process it envisions for SATA solutions to compete on a level playing field for economic and policy-driven transmission needs.

Contractual Arrangement

The ISO proposes to develop a new agreement with SATA resource owners that captures elements from Participating Generator Agreement (PGA), Participating Load Agreement (PLA), Reliability-Must-Run (RMR) agreement and Transmission Control Agreement (TCA). Additionally, the ISO has indicated its preference to control SATAs when they operate as transmission assets. Please provide comments on this proposal.

Comments:

1. CRI agrees with the ISO's logic for creating a new contractual agreement between the SATA project sponsor and the ISO, and believes the ISO's description of the contents of such agreement to be fairly complete. It is important, however, that a SATA resource not be overly burdened with contractual requirements that are not imposed on traditional transmission solutions. The ISO must have sufficient contractual requirements to assure performance and reliability of the SATA resource to the level of performance of a traditional transmission resource. But the contractual requirements providing such assurance should not be excessively complex or burdensome.

2. One thing the ISO has not mentioned, however, is compliance with NERC requirements. It is not clear how the new entity would fit into the NERC functional model, nor how the new contract would ensure that the SATA sponsor meet all NERC requirements applicable to a TO and other relevant entities in the NERC model. CRI requests that the ISO clarify its views on this matter and consider adding explicit reference to NERC requirements into the new contract.

3. Regarding ISO control of the SATA resource when it's performing transmission services, CRI requests that the ISO provide additional detail on the practical meaning of "ISO operational control." For example, CRI expects that operational control would be effected through the ISO's transmission desk in the same manner that ISO transmission dispatchers give instructions to PTOs regarding conventional transmission assets, and that these instructions would be issued in advance of and used as inputs to running the ISO market. Additionally, in the Straw Proposal, the ISO states that distribution-connected resources may be able to provide transmission services, but only if the ISO has visibility and operational control of the asset. Therefore, CRI asks that the ISO provide additional details regarding the requirements of "operational control" for distribution-connected transmission assets, and that the ISO define the associated visibility requirements. For example, what if any new coordination procedures with the distribution utility may be needed? Finally, see CRI comments below regarding the Western Grid case and the potential limitations that may place on asset control. CRI believes that the ISO can not undertake physical control of the SATA resource and still maintain required independence as a market operator as required by FERC precedent.

4. Finally, CRI reiterates the importance of the ISO allowing SATA to engage in bi-lateral contracts or procure hedge products in order to minimize financing costs. A contract structure that enables developers to obtain structured finance, where the asset is ultimately owned by a bank or financial institution but operated by developer, also protects the ISO and ratepayers from bankruptcy risk. Historically the ISO has had to rely upon evaluating the financial ability of the project sponsor to finance the project and continue to operate it for the life of the project. The ISO can minimize risk for ratepayers by separating asset ownership from operation, which is enabled by allowing for structured finance, which requires securing revenue streams either via contract or hedge products.

Market Participation

The ISO provided additional details regarding how and when SATA resources would be permitted to provide market services and access market revenues. Please provide comments on this proposal.

Comments:

CRI believes it is essential that the ISO provide its assessment of the amount and pattern of hours in which the SATA resource may be free to participate in market services. This information along with the technical performance requirements is of equal importance to enable a SATA developer to structure a feasible SATA solution. CRI agrees that the approach the ISO outlined in section 5.3.1 is conceptually reasonable, but would benefit from a realistic example to illustrate how the four color zones would be determined in practice. CRI suggests the ISO assign probabilities to times the ISO would need the asset to provide transmission services and be under ISO control. For example, some scenarios may have a 10% probability (P10) that the ISO may need the asset to be available to provide transmission services, while other months/days/times of day, may have a higher probability (e.g. P50 or P90). Finally, CRI suggests that the design of SATA solutions will require information regarding the notification time the ISO will be able to provide the SATA, both under normal operational circumstances and emergency operations. Ideally, the ISO would be able to provide the SATA at least 24-hour notification for a day/month/hour of the day for which transmission services are required, if the asset had been released and was operating in market or providing services to other customers.

Cost Recovery Mechanism

The ISO has proposed two alternative cost recovery mechanisms in the straw proposal:

1. Full cost-of-service based cost recovery with energy market crediting
2. Partial cost-of-service based cost recovery with no energy market crediting

Please provide comments on these two options and any other options the ISO has not identified. Please include how the ISO might incentivize or compel SATAs to participate in the markets competitively and efficiently where they would receive full cost-based recovery.

Comments:

Following the foundational principle stated at the beginning of these comments, CRI suggests that the discussion of cost recovery options should be linked to two other factors in considering SATA solutions to a transmission need: (a) Is the SATA solution cost effective at its full cost, without earning market revenues to offset the cost? (b) Does the temporal pattern of the transmission need allow reasonable opportunity for the SATA resource to earn market revenues (as already suggested by the ISO)? Or equivalently, does the temporal pattern of the transmission need ("H") allow for substantive market participation ("H > 0") or not ("H = 0")?

The following table illustrates how these factors could be considered, in conjunction with the proposed foundational principle, in determining the appropriate cost recovery mechanism.

	SATA is cost effective without market revenues	SATA requires market revenues to be cost effective
Temporal Pattern Allows for Substantive Market Participation (H > 0)	Since SATA is cost effective without market revenues, the ISO could allow a project sponsor to choose Option A or Option B. In this case the ISO may receive both Option A and Option B bids to meet a given transmission need. Under Option A market revenues would benefit ratepayers but the SATA sponsor would not necessarily have incentives to try to maximize such revenues. Willingness of a sponsor to commit to a cost cap would be a relevant selection criterion in this case. Under Option B sponsor must commit to a cost cap on the rate-base portion of its cost, and take the risk of any shortfall (and get the benefit of any overage) in market revenues.	Sponsor must choose Option B (partially in rate-base) with a cost cap on the rate-base portion of the costs, and take the risk of any shortfall (and get the benefit of any overage) in market revenues.
No Opportunity for Market Participation (H = 0)	Cost recovery Option A (wholly in rate-base) is required. The amount of cost caps is a differentiator between two otherwise equal solutions.	SATA solution is not selected.

Based on the above analysis, the ISO's question about incentives for market participation arises only in the upper-left quadrant of the matrix if the winning project sponsor chooses Option A. In that case CRI would support consideration of some kind of market revenue sharing between the rate-base cost requirement (ratepayer benefits) and the SATA's scheduling coordinator. CRI does not believe this would violate the no-double-payment concern because any additional revenues earned by the SATA resource would be for services other than the transmission service for which it was selected in the TPP.

Allocation to High- or Low-Voltage TAC

The ISO proposes to maintain the current practice of allocating costs to high- or low- voltage TAC, based on the point of interconnection, and consistent with other transmission asset classifications to regional (high voltage) or local (low voltage) TAC. Please provide comments on this proposal.

Comments:

CRI agrees with this element of the proposal.

Consistent with FERC Policy Statement

The ISO believes the straw proposal is consistent with the FERC Policy Statement. Specifically, that the straw proposal does not inappropriately suppress market prices, impact ISO independence, nor result in double recovery of costs. Please provide comments on the whether you agree or disagree with the ISO. If you disagree, please clarify why and how the ISO might address this issue.

Comments:

CRI generally agrees that the ISO's proposal addresses the concerns FERC expressed in the policy statement, though some details need to be clarified and expanded. First, a SATA resource, unlike conventional transmission assets, will inject energy into the grid when it discharges and withdraw energy from the grid when it charges. These activities will require the ISO to specify some form of energy settlement provisions, whereby energy payments and charges that result from the SATA performing transmission services are used to adjust the rate-base revenue requirement, or are part of the SATA resource's market revenues, or some combination of both. To ensure there is no violation of the policy statement concerns (e.g., ISO independence), it needs to be clear whether the charging and discharging activities are in response to ISO transmission dispatch instructions or decisions by the SATA operator.

FERC made it clear in the Western Grid case[3] that for CAISO to maintain its independence as a market operator it can not physically operate a storage asset providing transmission services, but only direct the asset owner how to operate the asset. Specifically, the Commission stated at P. 15, paragraph 45:

> *"45. Here, Western Grid proposes to operate the Projects under the direction of the CAISO in a similar manner to the way in which high-voltage wholesale transmission facilities are operated by PTOs under the direction of the CAISO. Western Grid states that these are the only ways in which it will operate the Projects. These functions are consistent with the CAISOs operating obligations with other transmission assets. Western Grid will be responsible for all operating functions, including maintenance, communication, and system emergencies. Most importantly, Western Grid will be responsible for energizing the NaS batteries used in the Projects. Because of this, the independence of the CAISO will be maintained, as the CAISO will not be responsible for buying power to energize the Projects, or physically operating the batteries when they are being charged and discharged. Importantly, Western Grid will operate the Projects, at the CAISO's direction, only as transmission assets."*

[3] *Western Grid Development, LLC., Docket No.EL10-19-000 ORDER ON PETITION FOR DECLARATORY ORDER, January 21, 2010*

Second, pursuant to the previous point, it is not clear whether the ISO considers the charging activity of the SATA resource to be part of its transmission service or not. For example, if the transmission service requirement is specified in terms of discharging energy, or being charged and ready to discharge energy to meet a contingency, and thus charging per se is not part of providing transmission service, then who decides when the SATA resource will charge, the ISO or the SATA operator, and how is that cost settled?

CRI urges the ISO to explore these and other operational specifics in order to ensure that the three policy statement concerns are satisfied under various realistic scenarios. -

Use Cases

Stakeholders raised numerous scenarios involving a storage device being used as a transmission asset, and with having additional storage or other generation capacity at the same site. The ISO provided feedback on how some, but not all, of these concerns expressed at the stakeholder session could be addressed. The ISO seeks stakeholder feedback on issues or concerns that would need to be addressed, as well as possible mechanisms to address such concerns.

Comments:

CRI believes the ISO should expect that project sponsors will be very creative in developing solutions that include SATA, and the ISO should expect that hybrid solutions will be submitted, as they have already seen in Oakland and Moorpark. Not only combining a SATA with other generation, but also combining SATA with some amount of transmission upgrades. Finally, the ISO should anticipate cases where SATA is combined with generation behind a single inverter, particularly solar or wind given the potential to apply the ITC to combined assets.

In particular, CRI believes that it should be possible for a right sized SATA solution to install generating capacity (such as solar PV) at the same site as the storage asset (i.e., behind the same POI and inverter) without having to go through the ISO's GIDAP, provided the sponsor commits to operating the combined resource within the same maximum power injection (Pmax) and maximum power withdrawal limits of the right-sized pure SATA solution. Such a modification could allow the sponsor to charge the storage using the on-site PV instead of relying entirely on grid power to charge, thus increasing the resource's flexibility and duration of discharge, yet without triggering any additional interconnection requirements. These qualities should benefit ratepayers by reducing the SATA solution's rate-base cost recovery amount.

EIM classification

The ISO believes this initiative falls outside the scope of the Energy Imbalance Market (EIM) Governing Body's advisory role. The ISO seeks stakeholder feedback on this proposed decisional classification for the initiative.

Comments:

CRI has no comments on this question at this time.

Other

Please provide any comments not addressed above, including any comments on process or scope of the Storage as a Transmission Asset initiative, here.

Comments:

CRI has no additional comments at this time.