Storage as a Transmission Asset:

Enabling transmission-connected storage assets providing regulated cost-of-service-based transmission service to also access other market revenue streams

Issue Paper

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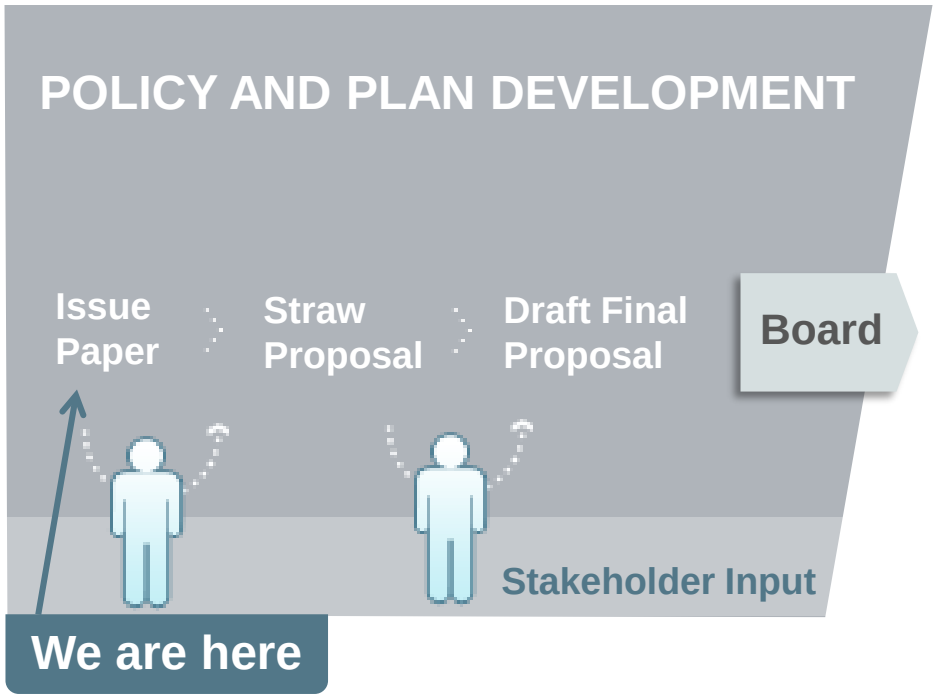
Stakeholder Call

April 6, 2018

Storage as a Transmission Asset Stakeholder Call Agenda – 4/6/2018

Time	Topic	Presenter
9:00 – 9:10	Introduction	James Bishara
9:10 – 9:25	Background	Bill Weaver
9:25 – 10:00	Scope of policy examination	Neil Millar
10:00 – 11:30	Cost recovery mechanisms and Market participation rules and limitations	Karl Meeusen
11:30 – 11:45	Allocation to high or low voltage	Karl Meeusen
11:45 – 12:00	Next Steps	James Bishara

Stakeholder Process



Stakeholder Engagement Plan

Date	Milestone
Mar 30	Issue paper
Apr 6	Stakeholder call on issue paper
Apr 20	Stakeholder comments on issue paper due
May 14	Straw proposal
May 22	Hold stakeholder meeting on Straw proposal
Jun 5	Stakeholder comments on Straw proposal due
Jun 21	Working group meeting
Jul 9	Stakeholder comments on working group meeting due
Aug 14	Revised straw proposal
Aug 21	Hold stakeholder meeting on revised straw proposal
Sep 4	Stakeholder comments on revised straw proposal due
Sep 24	Draft final proposal
Oct 4	Hold stakeholder meeting on draft final proposal
Oct 15	Stakeholder comments due
Nov 14-15	Present proposal to ISO Board

BACKGROUND

The ISO has studied a number of electric storage projects as potential reliability solutions

- The Transmission Planning Process (TPP)
  - Provides a comprehensive evaluation of the ISO transmission grid to address grid reliability requirements,
  - Identifies upgrades needed to successfully meet California's policy goals, and
  - Explores projects that can bring economic benefits to consumers.

- The ISO does not approve non-transmission alternatives in its existing TPP; however:
  - The ISO provides opportunities for non-transmission resources, such as storage, to serve as the preferred solution, and
  - Works to support regulatory approvals for those projects if the TPP identifies them as the preferred alternative solution

The ISO has considered proposals where storage provides cost-of-service based transmission services

- Over the past several years, the ISO has studied
  - 27 battery storage proposals, and
  - One pumped hydro storage proposal as potential transmission assets.
- To date, only two proposals have resulted in storage projects moving forward
  - Both in the 2017-2018 Transmission Plan
- The ISO's experience to date is electric storage has best fit as a market resources providing local capacity resource rather than as a transmission asset

Storage facilities providing transmission and market services introduce unique challenges that will be addressed in this stakeholder initiative

- How to treat and manage a “hybrid” resource, and the ISO’s interpretation of previous FERC rulings, dissuaded the ISO from pursuing the concept further
  - Nevada Hydro (2008)
  - Western Grid (2010)

- ISO will revisit this issue given FERC’s Policy Statement regarding the use of electric storage resources for multiple services when receiving cost-based rate recovery

In its policy statement, FERC clarified several points regarding energy storage providing transmission and market services

1. Providing services at both cost- and market-based rates is permissible as a matter of policy," and
2. FERC provides guidance on some of the details and allows entities to address issues through stakeholder processes and in filings before the Commission

FERC states a resource's participation likely would be subject to the following principles:

- Must be cost competitive with transmission,
- Must avoid double recovery for providing the same service,
- Cannot suppress market bids, and
- Cannot jeopardize ISO/RTO independence

SCOPE OF POLICY EXAMINATION

If storage is selected for cost-of-service based transmission service, how can that resource also provide market services to reduce costs to end use consumers?

- **Transmission-connected storage only** – Transmission connected resources are resources that are connected to the ISO controlled grid. This includes connections to both regional (*e.g*. greater than 200 kV) and local (e.g. lower than 200 kV) ISO controlled grid.
- **Storage resources identified as needed to provide reliability-based transmission services** – Although a resource may be eligible to access market-based revenue streams, the ISO must determine that the resource is needed to address a reliability need as determined in the ISO's Transmission Planning Process.

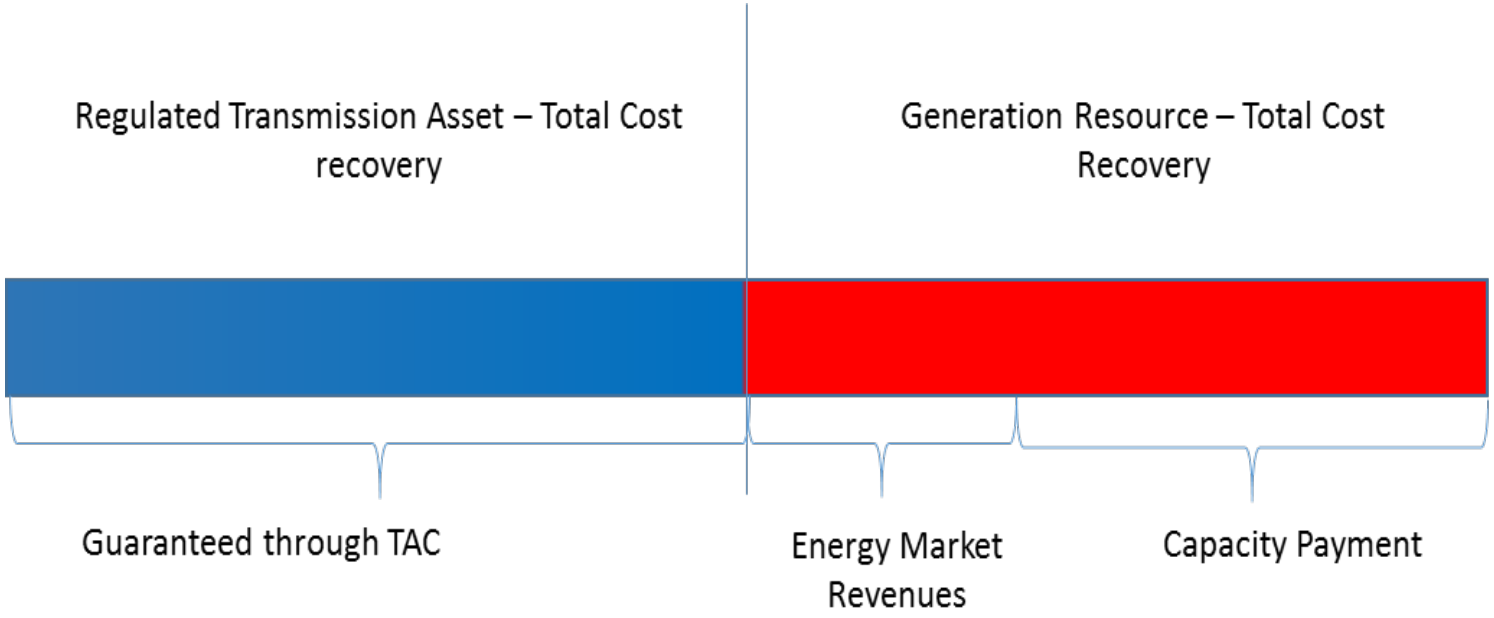
The following issues are outside the scope of this initiative:

- Storage resources procured or contracted for reasons beyond meeting a reliability need identified by the ISO in the TPP
- The TPP evaluation methodologies
- The framework for competitive solicitation and the applicability of the ISO's current competitive solicitation framework
- Cost allocation of the cost-based revenue requirements for rate-based assets
- Resource adequacy value – as the storage is already part of the determination of local capacity needs

COST RECOVERY MECHANISM

Transmission asset have traditionally be been fully guaranteed and recovered through the ISO's TAC

- The lines between a transmission asset and generating asset are clearly defined



If a cost-of-service based resource providing transmission service is also accessing market revenues, the following need to be addressed:

1. The potential for combined cost-based and market-based rate recovery to result in double recovery of costs by the electric storage resource owner or operator to the detriment of the ratepayer;
2. The potential for cost recovery through cost-based rates to inappropriately suppress competitive prices in the wholesale electric markets to the detriment of other competitors who do not receive such cost-based recovery; and
3. The level of ISO control over the operation of an electric storage resource could jeopardize its independence as the market operator.

The ISO offers two alternative cost recovery mechanisms for discussion as part of this issue paper

- The ISO is exploring framework and requirements - and allowable mechanisms - for storage resources to access market revenues

- Market services must not conflict with the fundamental reliability purpose for which the resource was selected in the TPP

The ISO offers two alternative cost recovery mechanisms for discussion as part of this issue paper

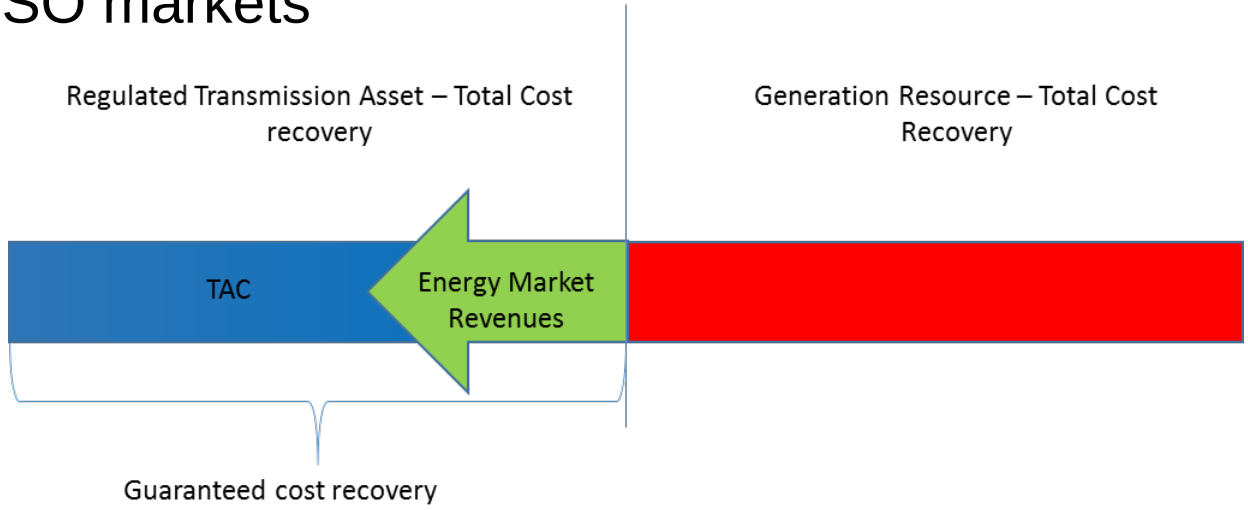
- The following alternative mechanisms are set out for discussion purposes:
  1. Asset in PTO's TAC rate base, and
  2. Contractual provision of "cost-based" transmission service without becoming a PTO
- Under both options, the ISO would treat the storage resource like other transmission assets
  - i.e. Resource would be under ISO operational control
- ISO will need to develop bidding rules that ensure there are no negative consequences to the ISO's markets

For SATA resources under the PTO model, the ISO is considering two options that rely on maintaining cost recovery through TAC

- Specifically, the ISO is exploring the following options:
  - Option (a): Wholly in “rate base”
  - Option (b): Partially in “rate base”

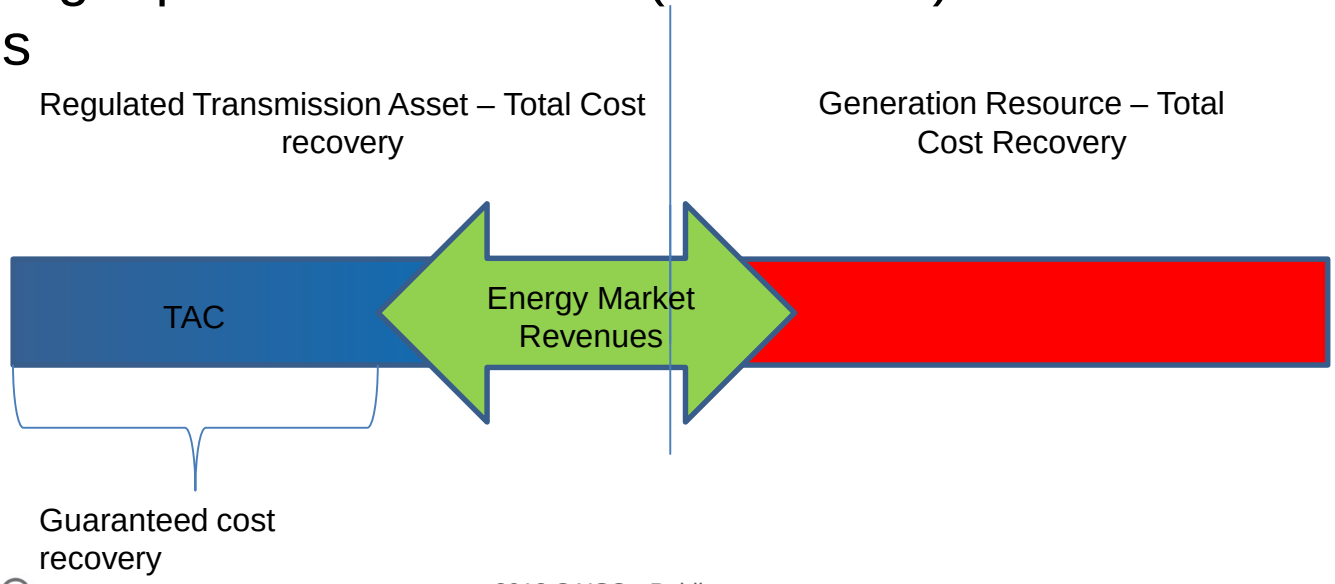
Option (a) ensures that a resource's TRR is covered through TAC

- Any revenue received from market services would be treated as a revenue offset
  - Reduces the revenues otherwise required through TAC
- Require additional consideration regarding how and when SATA resources are either permitted or required to participate in ISO markets



Option (b) ensures that a portion resource's TRR is covered through TAC, with the remainder recovered through market revenues

- Guarantees less of the TRR through TAC
  - ISO market revenues would not be credited against the TAC recovery
- Project sponsor accepts both upside and downside risk of recovering a portion of its costs (and return) from market services



Option (b) creates numerous complexities and risks that must be addressed

- Current transmission planning evaluation method:
  1. ISO first approves the storage resource as the preferred solution,
  2. Assign the project to an incumbent PTO or award the project through a competitive solicitation process
  3. Evaluate projects to determine
     a) Does the project address the identified need, and
     b) What is the cost of the project compared to other alternatives
- Option (b) adds complexities in assessing resources participating in competitive solicitations and assessing financial risks

The ISO planning decision making process considers inputs, comments, and proposals in making transmission planning decisions

- If Option (b) becomes viable, the ISO may have to consider the various applicants' ability to manage and access market-based revenues
- ISO planning process currently assumes no market revenue offsetting the reasonable cost of the storage, but other options may need to be considered:
  - a heavily discounted assumption,
  - or some other assumption
- The final determination regarding the correct assumptions will be addressed in the TPP process

Other issues also need to be addressed, including:

- Notification time-lines – Schedules specifying when the ISO would notify a resource that it is not needed for reliability and is permitted to participate in other markets;
- Capability duration needs – Specifications regarding how long the resource could participate in the market before it would have to return to a set point required to provide reliability service; and
- Energy and/or cycle limitations necessary to maintain the resource's life-cycle – Ensures market participation does not reduce the useful life cycle of the resources, which would result in additional replacement costs to maintain reliability

ALLOCATION TO HIGH OR LOW VOLTAGE

The ISO plans to maintain the current practice of allocating costs to high or low voltage TAC based on the point of interconnection

- Transmission connected resources are resources that are connected to the ISO controlled grid
  - Regional resources – greater than 200 kV and
  - Local resources – lower than 200 kV

The ISO plans to maintain the current practice of allocating costs to high or low voltage TAC based on the point of interconnection

- SATA resource may be connected to the transmission system at a level that differs from the transmission issue it has been identified to resolve
  - For example, the ISO may identify a Regional need, but identify a SATA resource connecting at a Local level as the best solution
- The ISO plans to allocate to high or low voltage TAC based on point of interconnection

Next steps

- Stakeholder written comments due April 20, 2018
  - Submit to initiativecomments@caiso.com
  - Comments template posted by COB April 6, 2018

- Straw proposal posted May 14, 2018

THANK YOU

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