California ISO

Storage as a Transmission Asset:

Enabling storage assets providing regulated cost-of-service-based transmission service to access market revenues

Straw Proposal

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Stakeholder Meeting

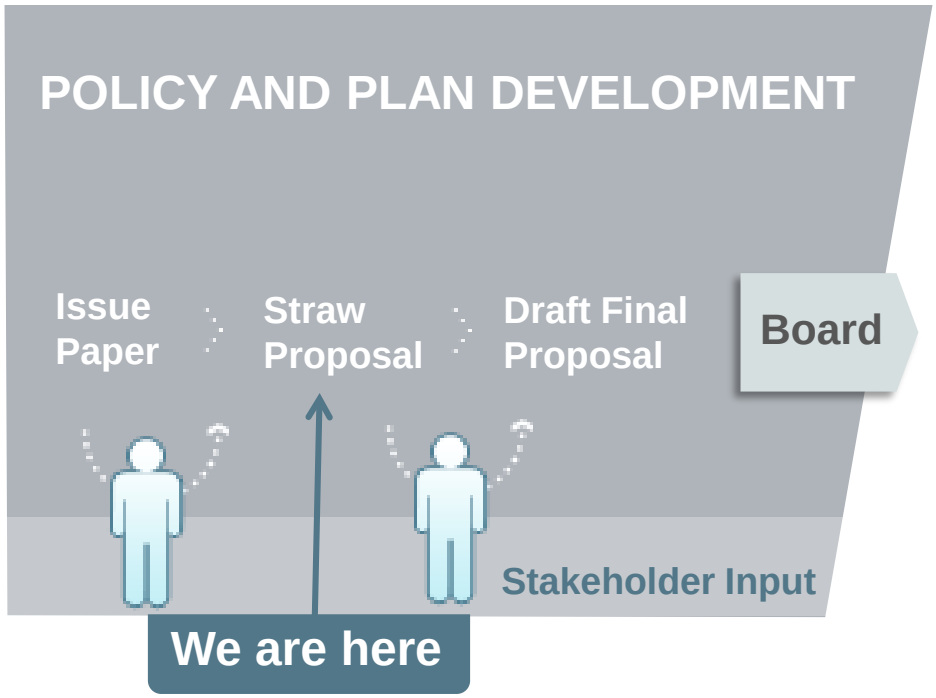
May 24, 2018

2018 CAISO - Public

Storage as a Transmission Asset Stakeholder Meeting
Agenda – 5/24/2018

Time	Topic	Presenter
10:00 – 10:10	Introduction	James Bishara
10:10 – 10:30	Scope of policy Examination	Karl Meeusen
10:30 – 12:00	Background and alignment with existing TPP processes	Neil Millar
12:00 – 1:00	Lunch	
1:00 – 2:00	Contractual Arrangements	Karl Meeusen
2:00 – 3:00	Market Participation	
3:00 – 3:45	Cost Recovery Mechanisms	
3:45 – 4:00	Next Steps	James Bishara

Stakeholder Process



Stakeholder Engagement Plan

Date	Milestone
May 18	Straw proposal
May 24	Hold stakeholder meeting on straw proposal
Jun 7	Stakeholder comments on straw proposal due
Jun 22	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

SCOPE OF POLICY EXAMINATION

Scope will focus on: 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?

- **Initiative will not restrict consideration to Transmission-connected storage only** – While connection to distribution will pose unique planning and operating challenges, those issues are outside the scope and not affected by the issues in this initiative
- **Initiative will not restrict consideration to only storage resources providing reliability-based transmission services** – While this remains the most likely area for storage to be identified as a transmission asset, those issues can be address in the transmission planning process and are not affected by the issues in this initiative

Several issues remain outside the scope of this initiative

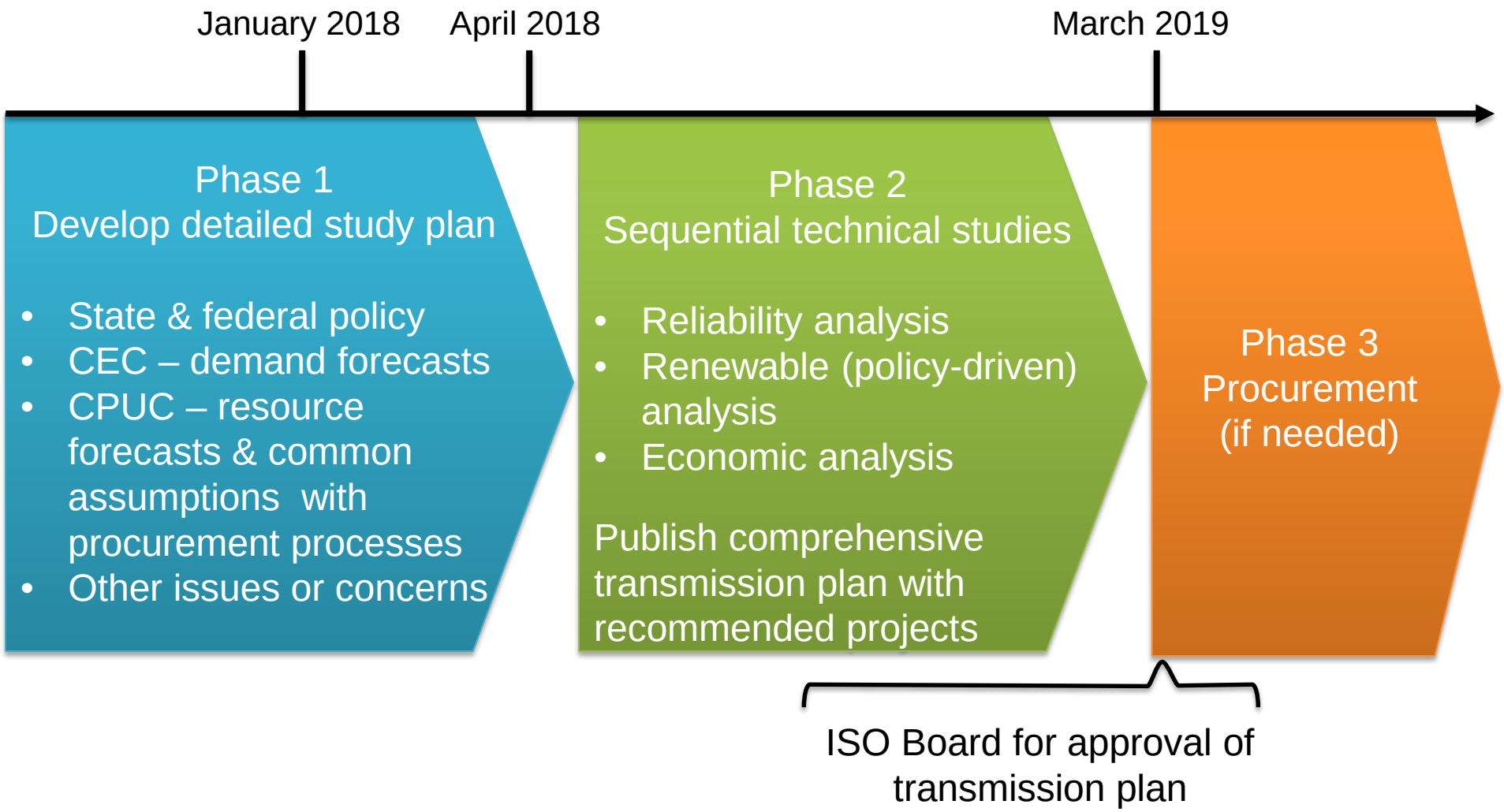
- These issues may be considered on a case by case basis in the ISO's annual transmission planning process or other processes
  - The TPP evaluation methodologies
  - The framework for competitive solicitation and the applicability of the ISO's current competitive solicitation framework
  - Cost allocation 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

BACKGROUND AND ALIGNMENT WITH EXISTING TPP PROCESSES

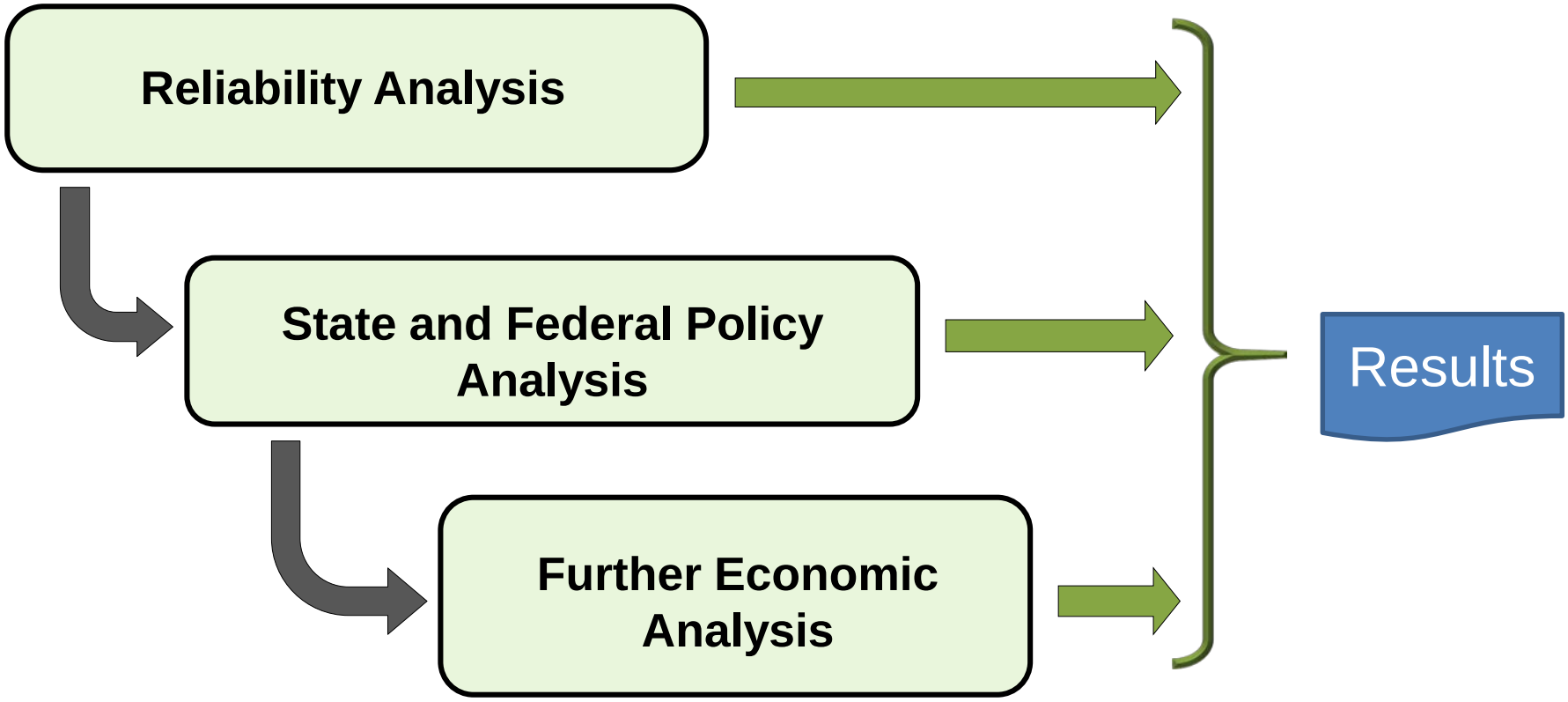
While the transmission planning process is not the subject of this process, the straw proposal provides additional background beyond the issue paper:

- An overview of the transmission planning process
- Discussion of how certain stakeholder comments can be addressed inside the current TPP framework – on a case-by-case basis

2018-2019 Transmission Planning Process



The ISO comprehensive long-term planning process considers all aspects of transmission system needs



The ISO clarified its consideration of non-transmission alternatives and coordination with local regulatory agencies

- 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
- Distribution-connected resources raise concerns with visibility of the path from the resource to the transmission grid
- These issues are discussed in more detail as background in the straw proposal

The likelihood of storage in meeting different categories of transmission planning needs differs

- Addressing grid reliability requirements:
  - The most frequent candidate for storage in the past, as identified by the ISO and stakeholder submissions
- Identifying upgrades needed to meet California's policy goals (e.g. Renewable Portfolio Standards)
  - While possible, no identified opportunities for storage thus far
- Exploring projects that can bring economic benefits to consumers
  - Upgrades alleviating congestion to provide access to lower cost resources, but not a competing resource
  - The bulk of all storage market economic benefits identified to date have been as a market resource inside a constrained area

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 on this basis
  - 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

The provided addition details about its selection of a solution and the ISO's competitive solicitation process

- The "Phase 3" competitive solicitation process takes place – for eligible projects – after the solution has been approved in Phase 2 by the ISO's Board of Governors
- The ISO's solicitation process does not include preferred (market) resources
  - These projects are coordinated with the local regulatory agency and load serving entity
- The framework can accommodate "Phase 2" approval in the Transmission Plan of multiple transmission alternatives including storage
  - The determination is then based on the criteria established in the ISO's tariff for approved project sponsor selection

Consideration of FERC's policy statement remains unchanged from issue paper regarding cost based rates and market revenues:

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 prices, and
- Cannot jeopardize ISO/RTO independence

CONTRACTUAL ARRANGEMENTS

SATA resources that can access market revenues do not fit precisely into any current ISO contract structure

- Propose to create a new agreement and not have the owner of SATA resources accessing market revenues execute a PGA, PLA, RMR or TCA agreement
- New agreement would be combination of
  - Needed TCA provisions (if the owner is not already a PTO) and
  - Provisions regarding how resource will be compensated, when it can participate in market and treatment of market revenues

The new SATA agreement will perform the function of several agreements

- New agreement would cover TCA, PGA, PLA and RMR concepts so it is all contained in one agreement
- TCA type of provisions include
  - Transfer of operational control
  - System operation and maintenance
  - Critical protective systems that support ISO controlled grid
  - System emergencies
  - Access and interconnection
  - Expansion of facilities
  - Use and administration of ISO grid
  - Maintenance standards

The new agreement will specify the terms and conditions for market participation

- Will use concepts similar to those in RMR agreements where resource is compensated by ISO for all or some portion of its fixed costs and also can participate in ISO market
- Specific times resource is needed for transmission services will be defined through Phase 2 of TPP and laid out in agreement
- ISO will have right to recall resource at any time to serve its primary function as a transmission asset

MARKET PARTICIPATION

Eligibility to access market revenues will be based on predictability of transmission need

- The ISO will identify both the need and the opportunities for market participation in Phase 2 of the TPP
  - If the transmission need is unpredictable, market participation is precluded
- ISO cannot predict future needs years in advance

Eligibility to access market revenues will be based on predictability of transmission need

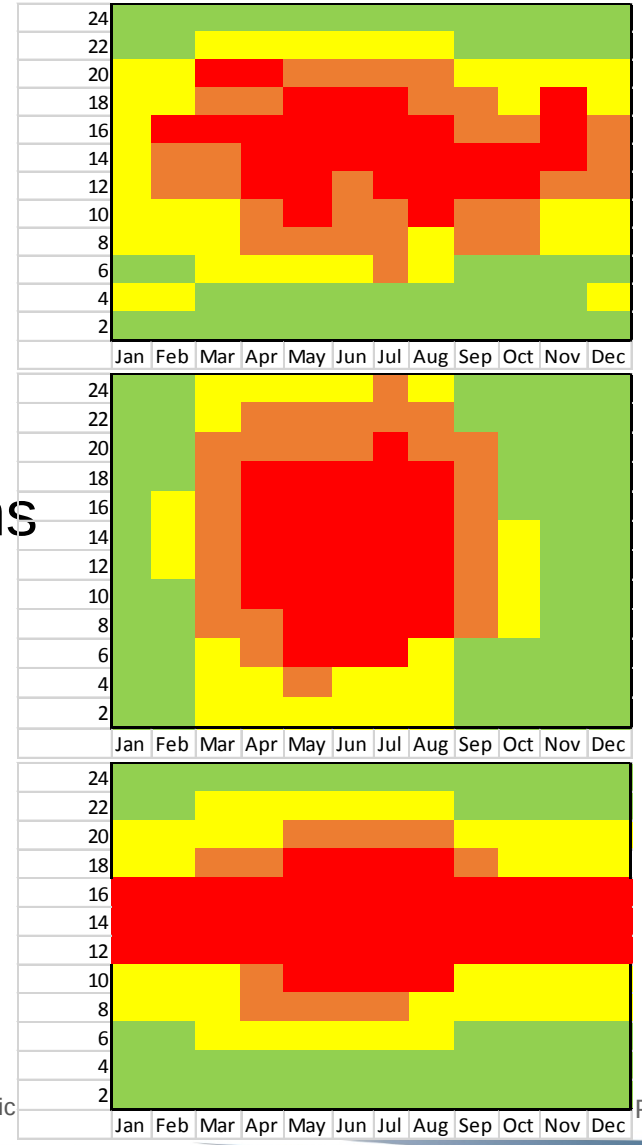
- Predictability is likely not a binary condition
  - Variable probabilities and predictability that may change over time
  - All probabilities will be examined on a case by case basis
- The ISO will examine these probabilities when determining market participation eligibility
  - Similar probabilities may result in different market eligibility in different locations

There are three potential market participation scenarios

1. Unpredictable

2. Reasonably predictable months

3. Reasonably predictable hours



The ISO does not believe predictability of size of a need is a viable option

- The ISO approves specific detailed preferred solutions though the TPP
  - Preferred solutions are “right-sized” to address a specific need (*i.e.*, TPP would not specify capabilities beyond what is needed)
- Any additional capacity is required to utilize the ISO’s generation interconnection process and would not be eligible for cost-of-service rate recovery

Resources selected in Phase 3 of the TPP would not be required to request interconnection through the ISO's generator interconnection process

- Selected resources would proceed as transmission projects
- Requiring additional capacity to use the ISO's interconnection process creates questions regarding the use of common facilities
  - *i.e.,* Portion of the facility used for transmission services and the portion used for additional market participation by excess capacity interconnecting at the same point
  - ISO seeks stakeholder comments about how such concerns can be resolved

The ISO reserves the right to recall any SATA resource from market participation to transmission service

- Access to market revenues made based on an ISO assessment of the probability that a SATA resource is not needed during certain times
- Emergency conditions may arise at any hour
- ISO will provide notice to the resource owner regarding
  - Nature of the need
  - Expected duration of the need
- Resource owner will be responsible for ensuring that the resource is able to provide transmission services at the time and for the duration determined by the ISO

The ISO may need to modify ability to provide market services over time

- The needs for a SATA resource may change over time
  - Initial ability to access market revenues is not a guarantee of access for the life of the resource
- ISO reserves the right
  - To build in additional limitations and
  - Make necessary modifications regarding market participation over time
- Absent the ability to account for changing system conditions, ISO would be forced to identify new costly system additions that could be addressed by existing resources

The ISO's proposal is consistent with the FERC Policy Statement

- The FERC policy statement states that the ISO needs to be able to demonstrate the following:
  - Will not inappropriately suppress competitive prices in the wholesale electric markets to the detriment of others
  - Jeopardize its independence as the market operator
  - Will not result in double recovery of costs to the detriment of the ratepayer

ISO proposal should not inappropriately suppress market prices

- Hours resource most needed for transmission are likely the same hours it could significantly impact energy market prices
- Able to access market revenues during competitive hours
  - Likely to have little to no impact on market prices
- May lower energy prices in some intervals, but would increase the price in others
- DMM notes that resources procured through a competitive process “could enhance market efficiency”

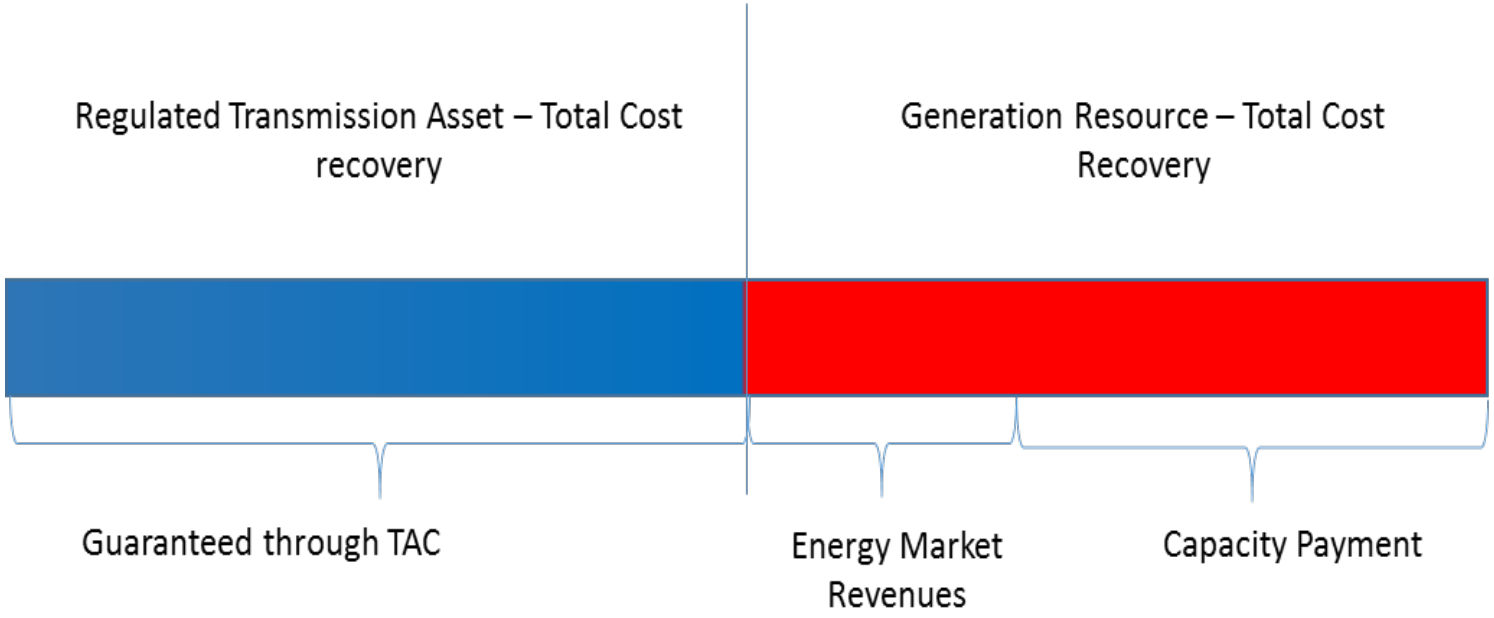
ISO independence is not jeopardized by this proposal

- ISO will not be responsible for the bidding and market participation of the resource
- Opportunities for market participation are made known well in advance of any energy market optimization
  - Creates an additional layer of separation

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



The ISO is proposing two cost recovery options

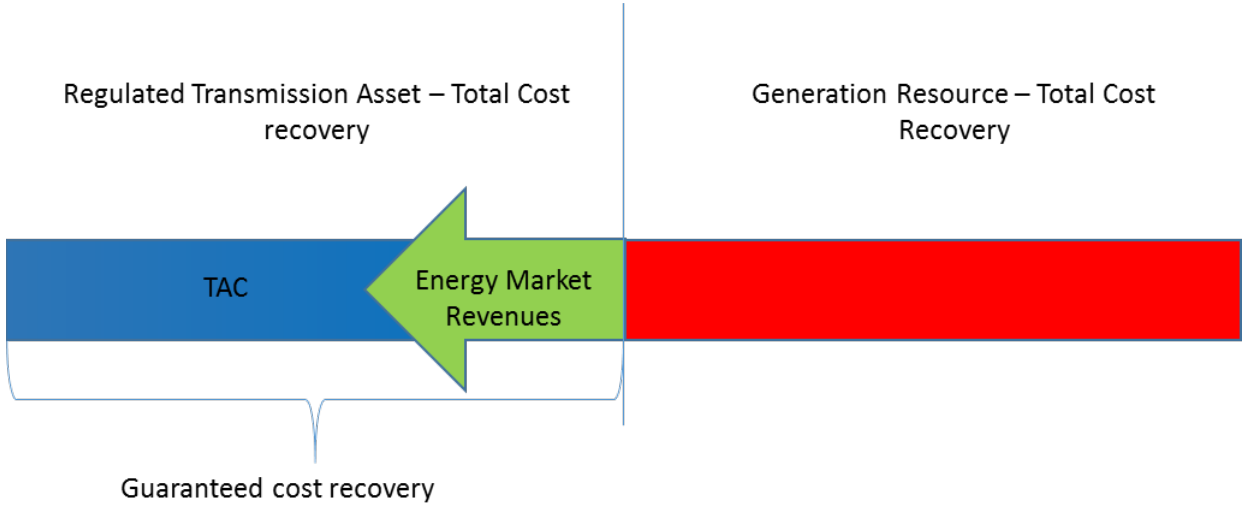
1. Full cost-of-service based cost recovery with energy market crediting

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

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

Full cost-of-service based cost recovery with energy market crediting 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



Resources must be available to meet identified need, but still participate in the market to the extent possible

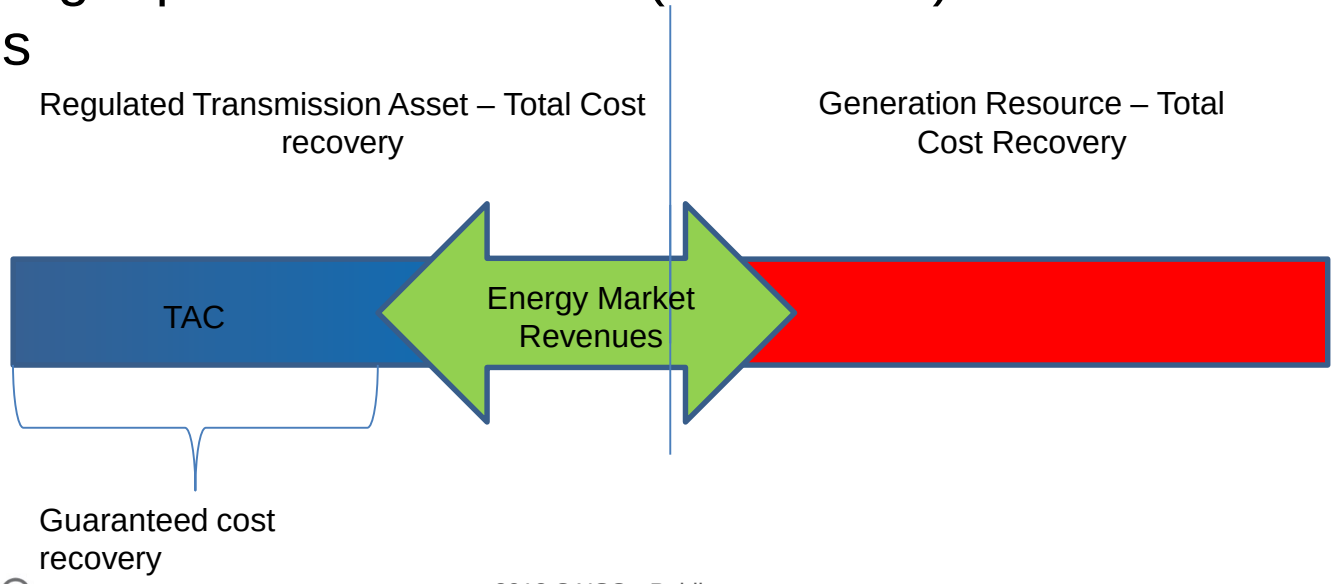
- ISO does not need to provide any additional compensation to the SATA resource if conditions change opportunities for market participation
- Provides little incentive for the resource to participate in the market
  - Absent additional obligations, no assurance that the resource sponsor would follow through on pursuing market revenues
- ISO seeks stakeholder comments on how to ensure resources receiving full cost-of-service based cost recovery make reasonable efforts to earn market revenues when permissible

Cost of service with energy market crediting option avoids double compensation for a particular service

- FERC stated that the ISO must also demonstrate that resources will not receive double compensation for a particular service
- Any market revenues are credited against the resource's transmission revenue requirement
- Resource using revenues from providing a separate and distinct service to reduce its TRR
  - *i.e.,* not receiving duplicative revenues from providing transmission services

Partial cost-of-service with no energy market crediting ensures that a portion resource's total costs are covered, the remainder is recovered through market

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



Changes in market participation opportunities can impact a resource's ability to cover costs

- ISO proposes to work with the resource to determine appropriate compensation to ensure the resource is justly compensated for any changes in the ability to participate in markets
- SATA resource may not request a change to the opportunities to provide market services
  - *i.e.,* If the expected market revenues are not reaching forecasted levels, the resource cannot seek to revise the agreement to increase the portion of costs covered under cost-of-service rates

Partial cost-of-service option adds complexities in assessing the resources financial risk in Phase 3

- Willingness and ability to take risk can impact the outcome of competitive solicitations
- Current evaluation method for assessing projects considers
  - Does the project address the identified need, and
  - What is the cost compared to other alternatives
- In TPP Phase 3, ISO will assess bids for
  - Assumptions of reasonable levels of expected market revenues and/or
  - Project sponsor's ability to accept the risks that all costs may not be recovered

Partial cost-of-service model ensures resources will not receive double compensation for providing transmission services

- Revenues earned through the energy market are earned from providing a separate service
  - Resource may be able to earn combined revenues in excess of its total cost-of-service
- Energy market revenue streams only occur at times when the ISO has stated that resource is not expected to be needed to provide transmission services

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 to the CAISO controlled grid

Next steps

- Stakeholder comments due June 7, 2018
  - Submit to initiativecomments@caiso.com
  - Comments template posted by COB May 25, 2018 on the initiative webpage at http://www.caiso.com/informed/Pages/StakeholderProcesses/StorageAsATransmissionAsset.aspx
- Working group meeting June 22, 2018