ELECTRIC STORAGE AS A TRANSMISSION SOLUTION
IN THE MTEP RELIABILITY PLANNING PROCESS

Phase I Proposal – for Discussion
Presented to the Planning Advisory Committee
January 09, 2019
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1.0 BACKGROUND FOR THIS INITIATIVE

1.1 STAKEHOLDER INTEREST AND ENGAGEMENT

Discussions have been underway for some time within the MISO stakeholder forums related to the treatment of electric storage facilities. Separate from the activities of MISO staff and stakeholders to comply with FERC Order No. 841 dealing with market participation models for Electric Storage Resources, the Energy Storage Task Force has encouraged MISO to develop policies related to the treatment of storage as transmission assets (SATA). At the Stakeholder Steering Committee (SC) of March 28, 2018 a group of planning issues was presented to the SC by the Energy Storage Task Force with a recommendation that these issues be assigned to the Planning Advisory Committee (PAC) for resolution. At the SC meeting of April 25, 2018, the list of planning issues was revised modestly to indicate necessary coordination between the PAC and other committees for select issues. The final version of the current planning issues document can be found at the following link


High level issues assigned to the PAC include:

1. Project proposal submission details – database technicalities
2. Interconnection requirements and processes
3. Planning evaluation considerations / modeling
4. Functional control / State of Charge
5. Facility retirement

Pursuant to this assignment, and the interest expressed by several Transmission Owners in the potential evaluation of SATA in the MTEP 19 planning cycle, MISO staff and the PAC have been engaged in the development of policies for treatment of SATA. MISO presented an Issues Paper on the topic at the June PAC which outlined the background underpinning these discussions, the scope of issues to be addressed, options for stakeholder consideration and comment, and a proposed stakeholder process for the PAC to address the assigned issues. FERC also has issued a Policy Statement addressing the eligibility of storage assets that are receiving cost-based revenues for transmission services to be able to receive market revenues for separate market services. The Policy Statement, currently in effect, provides guidance on several of the issues related to treatment of a storage resource exclusively as a transmission asset (i.e., receiving cost-based revenues for transmission services). The present proposal is limited to such “transmission only” storage resources.
1.2 FERC Policy Statement Regarding Utilization of Electric Storage Resources for Multiple Services When Receiving Cost-Based Rate Recovery

The eligibility of an electric storage resource to provide transmission service for which it is technically capable has been reiterated in FERC Policy Statement No. 158, issued on January 19, 2017 which can be found at this link https://www.ferc.gov/whats-new/comm-meet/2017/011917/E-2.pdf.

As pointed out by the Policy Statement, in Western Grid, FERC had previously accepted the provision of cost-based rate recovery for electric storage resources through transmission rates based upon the proposed uses exclusively for transmission services in that case. The Policy Statement provides additional guidance regarding issues that arise for electric storage resources seeking to recover their costs through both cost-based and market-based rates concurrently. The Policy Statement found that “there may be approaches different from Western Grid’s approach under which an electric storage resource may receive cost-based recovery, and, if technically capable, provide market-based services.” FERC noted that its Policy Statement “is not intended to resolve the detailed implementation issues surrounding how an electric storage resource may concurrently provide services at cost- and market-based rates,” which would be decided on a case-by-case basis. Rather, FERC said that the Policy Statement is intended (1) “to clarify that providing services at both cost- and market-based rates is permissible as a matter of policy,” and (2) “provide guidance on some of the details and allow entities to address these issues through stakeholder processes and in filings before the Commission.” FERC noted that such a resource’s participation likely would be subject to the following principles:

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

It should be noted that the Policy Statement is not about how a storage facility can be a transmission asset, but rather is about its eligibility, whenever classified as a transmission facility, to receive both cost- and market-based revenues, and the

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1Western Grid, 130 FERC ¶ 61,056 at PP 18-24, 45-46. The proposed electric storage projects (Western Grid Projects) were to be composed of sodium sulfur batteries that ranged in size from 10 to 50 MW. Id. P 4.
implementation issues that need to be addressed for purposes of such eligibility. FERC notes in the Policy Statement:

“[T]he Storage Policy Statement does not provide guidance for determining whether a particular electric storage resource is a transmission facility eligible for cost recovery through transmission rates. Rather, the Storage Policy Statement provides guidance only with respect to issues that must be addressed if an electric storage resource seeks to receive cost-based rate recovery for certain services, whether through transmission rates or any other cost-based rate, while also receiving market-based revenues for providing separate market-based services.”

This document will at times refer back to elements of the FERC Policy Statement in discussion of considerations for addressing assigned issues.

2.0 SCOPE OF PLANNING ISSUES TO BE Addressed IN THIS PROCESS

In order to ensure discussions remain focused on addressing issues necessary to enable electric storage facilities to participate in the MTEP process as proposed transmission reliability projects, the following are considered within the scope of these discussions:

1. The issues identified in the assigned Steering Committee Issue document and as summarized above, including related cost and revenue considerations.
2. Electric storage facilities eligible to be transmission assets by virtue of being connected to the MISO Transmission System
3. Treatment of electric storage facilities selected in MTEP to address transmission reliability issues as a transmission asset alternative, including modeling and evaluation in the MTEP reliability planning process, and in the Attachment X Generator interconnection processes.

Topics and issues beyond the scope of these discussions include:

1. Issues identified by FERC Order 841 establishing requirements for the participation model for provision of market services by storage facilities, or otherwise assigned to other committees by the SC (except as may be required to provide necessary coordination with planning issues within scope).
2. The MTEP planning process itself
3. Treatment of Non-transmission Alternatives in planning
4. Modeling of Electric Storage Resources during the course of the MISO Generator Interconnection Procedures (i.e., Attachment X of the Tariff) other than those previously selected as SATA in MTEP reliability studies
5. Cost allocation treatment for reliability-driven projects or any other transmission project classification under the tariff
6. Policies for the treatment of behind the meter generation (BTMG or btmg)
3.0 ISSUES DISCUSSION AND STAKEHOLDER INPUT

PAC discussions since June 2018 have identified the key elements to be developed to enable electric storage participation as transmission assets, and stakeholders have provided input to these elements on several occasions as requested by MISO staff. These issues that MISO has referred to as threshold issues to be resolved are:

3.1 INTERCONNECTION

Stakeholders and MISO staff discussed the present requirement for electric storage facilities to request interconnection via the GIP queuing process outlined in Attachment X of the Tariff. Stakeholders have mixed opinions on the need for an electric storage facility to request interconnection via the GIP, particularly if the asset is being proposed for use only as a transmission reliability solution in the annual MTEP reliability planning process (the MTEP process). Those that believe any electric storage facility should be required to interconnect according to the GIP argue that to do otherwise could disadvantage other energy resources that would compete for the same transmission capacity. Those arguing to the contrary are concerned that the processing timelines for completing the GIP could effectively eliminate consideration of the asset in the MTEP process. If such an asset has not successfully passed through the GIP, it would not be eligible for consideration as a viable solution in the MTEP process since it would not yet be assured to be viable connected device. Additional arguments against requiring electric storage resources to pass through the GIP noted that the selection of the electric storage facility would be to mitigate a baseline reliability issue that future interconnecting generation assets would need to resolve, if not for the preferred MTEP solution. Further, it was noted that use of the electric storage asset to resolve baseline reliability issues in the MTEP process would be no different than an alternative traditional wires solution in that the asset would only be selected as the best solution if it resolved the baseline reliability issue equally or better than any other wires solution in a more cost-effective manner.

3.2 TREATMENT OF MARKET REVENUES

The treatment of market service derived revenues for SATA operating in mixed mode (both transmission and market services) is a key complication in the development of policies for SATA. Stakeholders had mixed opinions on whether and the extent to which market service derived revenues should be used to offset (or provide a credit against) transmission service revenue requirements. Related issues were also raised on the extent to which market revenues would be considered in determining the comparative cost of a SATA in transmission reliability planning. More broadly the impact of market operation of the SATA on its availability and longevity for providing transmission services was discussed. Discussions did not provide sufficient guidance for MISO to take a position yet on these “mixed mode” issues.

3.3 CONTROL FOR TRANSMISSION SERVICES

Discussion around control of electric storage facilities that are receiving cost-based transmission revenues to provide transmission reliability services centered on
whether control of the facility should be directly by the Transmission Operator (TOP) in coordination with MISO as the Security Coordinator (as for traditional transmission assets), or whether MISO as the market operator should control the facility in order to regulate or optimize injections and withdrawals of energy together with other energy resources via market-based unit commitment and dispatch tools.

Some stakeholders argue that as transmission assets SATA should be controlled as any other transmission asset by the Transmission Owner/operator, and that this is an important part of transmission owner assurance of meeting their NERC reliability compliance obligations. MISO staff expressed concerns about the ability to minimize unaccounted for energy injections, and how asset control would be coordinated if control for transmission services was not directed by the market operator while the market operator provides set point instructions for market operations of the same asset.

Stakeholders also raised the point that an electric storage facility may provide voltage control transmission services without injecting or withdrawing real power but rather via Mvar exchange, and in this mode would not contribute to energy imbalance under TOP control.

4.0 SUMMARY OF PHASE I PROPOSAL

Based on consideration of the complexity in resolving all aspects of the comprehensive treatment of electric storage assets operating to provide both transmission services and market services, MISO is proposing to phase the policy development. Phase I will address treatment of Storage as Transmission-Only Assets (SATOA). Initial development of this policy will enable the consideration of electric storage facilities in the MTEP reliability planning process sooner than it will take to resolve potentially more complex policy decisions related to the treatment of such assets providing both transmission and market services. For this mixed-mode operation, future policy will need to be developed that include consideration of:

- Interconnection requirements for SATA that desire to participate in markets in addition to providing transmission services in exchange for receiving cost-based transmission revenues.
- Treatment of market revenues for electric storage facilities also receiving cost-based transmission revenues. This treatment could differ depending on the situation of the asset owner.
- Mechanisms for notifying asset owners/operators when the SATA is cleared for market operations and when it is precluded from market operations in order to address transmission issues for which it is receiving cost-based revenues.
- The extent to which, and how, potential market revenues might be considered in establishing transmission asset costs when comparing the electric storage asset to other alternative transmission solutions in the MTEP process.
• The extent to which market service operations may impact the life or capability of the asset to perform its required transmission services, and possible means of mitigating those impacts.
• The extent to which cost recovery through cost-based rates may inappropriately suppress competitive prices in the wholesale electric markets to the detriment of other competitors who do not receive such cost-based rate recovery, and means of mitigating such possibility.

4.1 SCOPE OF PHASE I

The Phase I policy development will include the following elements:

• Interconnection Process for SATOA Facilities
• MTEP Analysis of SATOA Proposed Transmission Solutions
• Interconnection Agreement for SATOA Connected via MTEP Process
• Modeling SATOA in Interconnection Studies
• Cost recovery for SATOA Selected in MTEP
• Control of SATOA for Transmission Reliability Purposes
• Treatment of Market Charges and Revenues Associated with Transmission Services

4.2 FUTURE PHASE II

Subsequent phases of policy development will address those issues listed above related to the provision of combined transmission and market services for electric storage assets. In addition, the ability of electric storage assets to be transmission assets classified as projects other than Baseline Reliability or Other-reliability projects will be addressed with stakeholder commencing after FERC approval of any filed policies associated with SATOA. This aspect will include the scope of eligibility for development and cost recovery under the Tariff of such transmission assets including competitive development consistent with the Tariff.

5 PHASE I PROPOSAL: STORAGE AS TRANSMISSION-ONLY Assets (SATOA)

5.1 INTERCONNECTION PROCESS FOR SATOA FACILITIES

Attachment X interconnection procedures will not be required in order for an electric storage facility to be considered, selected, and placed into service as the result of the annual MTEP transmission reliability planning process as a transmission-only asset. Because the Phase I proposal does not address the market participation of storage resources that may seek to be classified as transmission facilities, the proposal does not change the MISO Order 841 compliance framework’s requirement of interconnection via the Attachment X procedures before an electric storage facility can participate in providing market services pursuant to Order 841. Any electric
storage facility that is interconnected via the MTEP planning process will be designated as a Storage as Transmission-Only Asset (SATOA). Storage resources seeking treatment as SATOAs will be required to forego market participation under the Tariff provisions relating to compliance with Order 841. Accordingly, although electric storage facilities that connect or have previously interconnected via the Attachment X procedures may be considered for treatment as a transmission asset, they would not be able to participate in markets if selected as SATOAs under the Phase I proposal.

5.2 MODELING SATOA IN INTERCONNECTION STUDIES

Business practices are in development at the Planning Subcommittee (to be coordinated with the Interconnection Process Work Group) for the modeling in subsequent Attachment X interconnection studies of SATOA that have been previously selected for MTEP in MTEP reliability studies. In general terms, the modeling of SATOA in these studies will be flexible from study to study, so as to minimize transmission issues identified in interconnection transmission studies. This means that upgrades identified to be needed in a Definitive Planning Phase (DPP) study will consider the impact of the SATOA in mitigating these needs based on the SATOA capabilities to inject or withdraw energy as needed to best mitigate reliability issues, compatible with the charge and discharge capabilities of the facility as established in the Transmission Interconnection Agreement.

The principle to be employed is that in order for the SATOA to be effective as a “wires” asset receiving cost-based compensation in lieu of a more traditional transmission asset, the SATOA should be operated in a manner to mitigate transmission loading, voltage, stability, and other transmission issues within its design capabilities. This is true as the system will change over time and ongoing planning models will be developed to mimic the changing operation of the SATOA as may be needed to accommodate system changes.

5.3 MTEP ANALYSIS OF SATOA PROPOSED AS TRANSMISSION SOLUTIONS

Business practices are in development at the Planning Subcommittee for the modeling of SATOA in MTEP reliability studies. In general terms, electric storage facilities will be modeled in MTEP studies as providing the discharge (or charge) status necessary to resolve the identified transmission issue at specified critical system conditions, consistent with the facility design capabilities (capacity, duration). Models will test and ensure the ability of the system to absorb the corresponding charge (or discharge) at other non-critical system condition periods. Selection of the facility as the preferred transmission solution will be based on similar cost and effectiveness considerations applied to any other alternative transmission solution.

5.4 TRANSMISSIONS INTERCONNECTION AGREEMENT FOR SATOA CONNECTED VIA MTEP PROCESS
MISO contemplates needing a Transmission Interconnection Agreement between the asset owner/operator, MISO, and the Transmission Owner of the system the SATOA is connected to. This TIA would govern terms and conditions of the selection as a SATOA and include elements to be determined after further discussion with stakeholders.

5.5 COST RECOVERY FOR SATOA SELECTED IN MTEP

Cost recovery for SATOA will be achieved via inclusion of the asset costs in Attachment O to the tariff, as with any other transmission asset. The SATOA owner will need to be a MISO Transmission Owner before recovery via the FERC approved Attachment O template.

5.6 CONTROL OF SATOA FOR TRANSMISSION RELIABILITY PURPOSES

A SATOA is a transmission asset and the MISO TOA requires functional control for all transmission assets connected at 100 kV or above, and at other transmission voltages if MISO deems necessary. MISO contemplates that most SATA will eventually desire to participate in markets in addition to providing cost-based transmission services. The ability to coordinate use of the asset in this mixed mode requires MISO as market operator to instruct the charging and discharging of the SATA for the provision of transmission services. Independent market operator control of the device for transmission service purposes will enable accounting for energy injections and withdrawals whether such transactions are instructed by MISO for transmission service purposes or as cleared market transactions. Further, control of the device by MISO for transmission purposes will mitigate concerns about inappropriate use of the device to the advantage of any particular market participant.

FERC has provided guidance in the Policy Statement that appears consistent with this operational control philosophy.

FERC Policy Statement Regarding Control of State of Charge

- Coordination between the RTO/ISO and the electric storage resource owner or operator will be necessary for electric storage resources that concurrently provide services compensated through cost-based rates and services compensated through market-based rates.
- The electric storage resource should be maintained so that the necessary state of charge can be achieved when necessary to provide the service compensated through cost-based rates.
- Assuming this priority need is reasonably predictable as to size and the time it will arise each day, the electric storage resource should be permitted to deviate from this state of charge at other times of the day in order to provide other, market-based rate services.
• This assignment of responsibility is premised on the need for the service compensated through cost-based rates being predictable enough to allow the appropriate charge management structure to be implemented.

• In situations where this premise does not hold, and the need for the service for which cost-based rates are provided is not reasonably predictable as to size or the time it will arise each day, the cost-based rate service may be the only service that the electric storage resource could provide.

• When the circumstances leading to the need for the service compensated through cost-based rates arise, RTO/ISO dispatch of the electric storage resource to address that need should receive priority over the electric storage resource’s provision of market-based rate services.

• Performance penalties could be imposed on the electric storage resource owner or operator for failure to perform at these times.

• The provision of market-based rate services should be under the control of the electric storage resource owner or operator, rather than the RTO/ISO, to ensure RTO/ISO independence. In other words, while the RTO/ISO always performs the actual optimization of resources participating in the organized wholesale electric markets, during periods when the electric storage resource is not needed for the separate service compensated at cost-based rates, the RTO/ISO would rely on offer parameters provided by the electric storage resource owner or operator for such operation, just as the RTO/ISO does with other market participants.

• There is nothing unreasonable about an RTO/ISO exercising some level of control over the resources it commits or dispatches where it can be shown that the RTO/ISO independence is not at issue. When those resources are dispatched through the organized wholesale electric market clearing process, the level of RTO/ISO control will be lower because such dispatch will be based on offer parameters submitted by resource owners or operators.

• When resources are operated outside of the organized wholesale electric market clearing process (e.g., to address reliability needs), then the RTO’s/ISO’s control may be greater.

• We are willing to consider other solutions proposed by an electric storage resource owner or operator seeking to recover costs through cost-based rates and market-based rates that are shown to be effective in avoiding these RTO/ISO independence issues.

MISO commitment and dispatch of SATA/SATOA may not be needed to the extent that the device is only determined to be needed to provide voltage support to the transmission system through the provision of reactive power (MVars) and not real power (MW). More discussion of this capability and its implementation is needed.

To the extent that a MISO Transmission Operator (TOP/TO) identifies a potential or real-time need for the use of the SATOA that requires MW charge/discharge to address a transmission reliability issue that the MISO market operator has not identified, the TOP will communicate such need to MISO for the instructions to be
issuesd to the SATOA owner/operator. To the extent possible, and time permitting, the TOP shall call the MISO RC and request a specific level of dispatch for the SATAO, the MISO RC shall then ensure the SATAO is dispatched to the requested level. If time does not permit a pro-active dispatch, the TOP shall operate or direct the operation of the SATAO and then call the RC as soon as possible (but no later than 10 minutes) to allow the MISO RC to work with MISO operation personnel to ensure a balanced energy dispatch that includes the MW’s of charge/discharge from the SATAO.

For SATA that may be permitted in the future to also independently participate in markets, a notification mechanism will need to be developed to indicate periods when the asset may be released from transmission service obligations and able to participate in markets. For SATOA this mechanism is not needed as the asset is only available as a transmission service asset. However MISO will need to develop protocols for instructing the asset owner/operator as to the needed state of charge with sufficient time in advance of the anticipated need. MISO will work with stakeholders to develop these state of charge instruction protocols for SATOA.

5.7 TREATMENT OF MARKET CHARGES AND REVENUES ASSOCIATED WITH TRANSMISSION SERVICES

Since the SATOA is not eligible to provide any market services, it will not provide offers and will be a price taker. Any net costs or revenues to the SATOA owner/operator should be borne by the transmission customers responsible for the costs of the SATOA.

When MISO provides dispatch instructions to SATOA, energy transactions associated with charging and discharging will be priced at the prevailing LMP associated with the point of interconnection. Since all charge and discharge energy transactions will be at MISO direction and strictly for the purposes of transmission services, MISO will account for all energy transactions associated with the SATOA and will provide those energy transactions through Market Settlement Statements to the SATOA operator. The SATOA operator will provide the above Market Settlement Statement information to the SATOA owner for inclusion in the SATOA owner’s Attachment O to charge or refund the energy transactions to the MISO transmission customers.

5.8 REGISTRATION OF THE SATOA ASSET AND THE SATOA OPERATING ENTITY

The SATOA operator will need to complete the market participant registration and certification process, as well as the registration of the asset, so MISO can include the asset in its market commitment and dispatch protocols.

The operator would be a non-transmission entity for market registration purposes (generation side of vertically integrated utilities, or owner may contract with a market participant agent).
The owner would be the Transmission Owner for the purposes of cost-based revenue recovery under Attachment O.

6.0 SATOA POLICY WORK PLAN

At the PAC meeting of April 18, 2018 MISO staff provided a high level timeline for addressing planning issues such that barriers to the eligibility for selection of storage facilities in the MTEP process as solutions to transmission reliability issues could be resolved in time for MTEP 19 approval by the MISO Board of Directors in December 2019.

The following is a revision to that timeline based on the current state of discussions.

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<tr>
<td>Apr 18</td>
<td>PAC Mtg: initial discussion of issues and process</td>
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<tr>
<td>Jun 13</td>
<td>PAC Mtg: review and discussion of Issue Paper</td>
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<td>Jul 15</td>
<td>Stakeholder comments on Issue Paper Due</td>
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<td>Aug 17</td>
<td>Tentative - PAC conf. call discussion of comments / revisions</td>
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<td>Sep 26</td>
<td>PAC meeting discussion of comments and any revisions</td>
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<td>Oct 17</td>
<td>Stakeholder comments due</td>
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<td>Nov 14</td>
<td>PAC meeting Recap Workshop &amp; Propose Phased Approach</td>
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<tr>
<td>Dec 5</td>
<td>Stakeholder Comments on Proposal to Phase Policy Development</td>
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<tr>
<td>Jan 2019</td>
<td>PAC Mtg: draft Phase I Policy Proposal</td>
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<td>Feb 2019</td>
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<td>Mar 2019</td>
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