Comments on ESDER Issue Paper & Straw Proposal

Submitted by	Company	Date Submitted
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I. Overall Comments

CESA, as an association with over ninety members, represents companies with diverse business approaches. To this end, CESA is identifying key energy storage use cases that can and should inform discussion of rules for multi-use ESDER applications, *e.g*. when an ESDER solutions seeks to serve both distribution and market functions at various times over the course of a year.

CESA believes ESDER solutions can and will support reliable grid operations, even under multiple use applications. Similar to other resources, market designs should address deviations, poor performance, and other predictable challenges. In this regard, ESDER solutions should not have different or special "controls". Nevertheless, CESA still supports the development of reasonable rules to consider and ensure how reliable operations are achieved and how markets should ensure fairness and prevent gaming. As CESA develops its perspectives on multi-use applications, CESA anticipates that some of its approaches and assessments may evolve to ensure appropriate market participation and outcomes.

II. Responses to the Questions Template:

Non-generator resources (NGR) enhancements

1. Update documentation on NGR to capture material and clarifications compiled for April education forums.

Comments: CESA strongly supports this effort.

2. Clarify how ISO uses state of charge (SOC) in market optimization.

Comments:

CESA appreciates the CAISO clarifying SOC usage in market optimization. Some CESA members can carefully managing resources with limited energy. Thus resources can also plan to serve multiple uses (as discussed below), the SOC statements for the DAM should be by hour, not just in t=0 of the market optimization's reference. This way, a resource can plan to exit the market or derate its capability in some hours and then resume full participation at a different SOC while having provided out-of-market functions.

CESA understands, however, that certain aspects of market optimization cannot be disclosed due to market gaming concerns. CESA therefore requests that the CAISO disclose as much detail as it can on the market optimization process so that dispatchable distributed energy resources may provide the best availability to the CAISO's markets.

3. Evaluate initial SOC as a submitted parameter in the day-ahead market.

Comments:

CESA strongly encourages the CAISO to enable SOC as a submitted parameter in the day-ahead market. This capability should increase the ultimate accuracy of day-ahead market participation while allowing ESDER resources to compete in the market more readily, improving competition.

4. Evaluate option to not provide energy limits or have the ISO co-optimize an NGR based on state of charge.

Comments:

CESA strongly encourages the CAISO to allow the functionality for resources not to provide energy limits or CAISO co-optimization of an NGR based on SOC. In this regard, resources will bear their own risks of deviations based on energy limitations, similar to how other resources bear such risks.

The ability to "turn off" energy limits should not necessarily apply to a resource's parameters for purposes of out-of-market dispatches, default energy bid formulation, or other administratively-derived cost and cost-recovery elements of market participation.

A related issue that has come up repeatedly is the lack of access to anonymized historical AGC signal data. Resources working to manage their energy would greatly benefit from guidance on the potential MWh per MW required to provide high performance in regulation markets. CESA understands that historical data is not predictive of future AGC dispatch, but a release by the CAISO of some historical data that could inform all market participants would be extremely helpful.

PDR/RDRR enhancements – alternative baseline methodologies

1. Develop meter generator output (MGO) as a new ISO baseline methodology.

Comments:

CESA strongly supports this effort. So long as the solution complies with NERC requirements, the CAISO should thoroughly consider approaches to support this methodology. Allowing market participants to access the markets via this functionality seems very appropriate, especially as select aspects of the DERP and NGR functionalities remain in development.

2. Develop additional detail regarding the "ISO Type 2" baseline methodology (i.e., provision of statistically derived meter data) and document that in the appropriate BPMs.

Comments:

CESA strongly supports this effort and appreciates the CAISO's willingness to work with the industry on this issue. We look forward seeing a more detailed proposal soon.

This methodology still provides necessary information to the CAISO. Notably, estimating what the load would have been using historical meter data in conjunction with an energy storage system is unnecessarily duplicative because the actual, accurate real time data is available from the meters onsite. These meters record in real time the precise load of a utility customer and any capacity delivered in the form of load reduction during a dispatch event. Additionally, many PDRs backed by energy storage are designed to be dispatched more often than traditional demand response (DR), which could make any attempt to collect 10 days (or 4 days) of accurate load data on non-event days difficult.

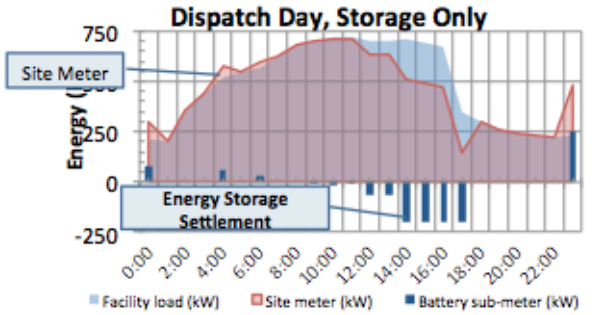
DR providers that are able to use the existing baseline should not be impacted in any way by the addition of an alternative. However all PDR's should be allowed to take advantage of an alternative baseline that uses the meter for real time measurement of net load drop.

CESA supports a proposal that allows for use of the onsite meter to measure dispatch similar to the methods described in NAESB as Metering Generator Output. For systems that combine traditional DR with battery-backed DR CESA supports the use of some sort of "Battery Normalized Baseline" where performance on the day of the DR event is measured using Battery Normalized Baseline minus the site meter. Only DR due to load modifications appears on those days because the contributions of the battery (if any) are eliminated by this new baseline.

Retail energy use, demand charges, etc., are measured by site meter. In the hours when it is not "on-duty" for wholesale RA, a battery may perform energy arbitrage, demand charge management, etc. to minimize ratepayer retail costs. In addition, CESA supports extending the look-back window for the baseline to 180 days (from 45 days) and amending the ratio adjustment factor from 20% to 40%.

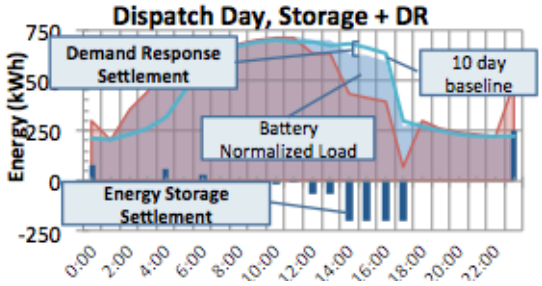
Dispatch Day, Settlement: 2 Scenarios

Energy storage contribution uses battery submeter (meter generator output)
Demand response (traditional) uses 10 day baseline minus battery normalized load



1) Storage Only

H.E.	Demand Response Action	Demand Response Settlement	Battery Submeter Settlement	Total Settlement
3pm			203 kW	**203 kW**
4pm			203 kW	**203 kW**
5pm			203kW	**203kW**
6pm			203kW	**203kW**



2) Storage + Traditional DR

H.E.	Demand Response Action	Demand Response Settlement	Battery Submeter Settlement	Total Settlement
3pm	75 kW	45 kW	203 kW	**248 kW**
4pm	75 kW	46 kW	203 kW	**249 kW**
5pm	75 kW	38 kW	203kW	**241 kW**
6pm	75 kW	26 kW	203kW	**229 kW**

Example 1:

Consider a PDR resource of 50 MW aggregated behind the meter across multiple service accounts, with the LSE acting as the CAISO scheduling coordinator. The resource can be dispatched for CAISO market participation by the LSE according to certain contractual event parameters negotiated with the resource. Outside those event parameters, the resource can provide other grid services like demand charge management. With meter generator output, the energy storage meter can measure and demonstrate the dispatch performance during dispatch periods. Meter data can also be used to show that an aggregated pool of resources has been dispatched. A methodology to show the actual impact needs to be confirmed along the lines of existing DR credit methods.

Example 2:

Consider a DERP aggregation consisting of 10 100 kW energy storage resources. These resources are individually varying their dispatch to provide demand charge management for

retail customers. On an aggregated basis, those resources are discharging at no more than 200 kW. The resource should be free to bid the remaining 800 kW into CAISO markets. If the resources are awarded a dispatch, their meter data can show that the resources in aggregate increased their dispatch by 800 kW during the dispatch period.

Example 3:

Consider a DERP aggregation consisting of 100 10 kW EV charging resources. These resources are charging at an aggregated rate of 500 kW. The resource should be free to bid the as much as 500 kW of potential load reduction into the CAISO's markets. If the resources are awarded a bid resulting in a dispatch of 200 kW, their collective meter data can show that the resources in aggregate decreased their charging by 200 kW during the dispatch period.

During the course of this initiative, CESA has come to agree with other stakeholders that PDR may provide a better construct for load modifying resources behind the retail meter than NGR. PDR already allows for partial dispatch as well as dispatch only during limited hours of the day. CESA suggests that PDR be amended to allow A/S services to be provided, assuming the telemetry is in place to meet A/S requirements. Other ISOs (such as PJM) have allowed A/S to be provided under supply side DR constructs without a requirement to use a Wholesale Distribution Tariff, based upon meter data that shows that PDR resources will not net export to the grid. CESA encourages the CAISO to reconsider its position with regard to PDR resources providing A/S.

Non-resource adequacy multiple use applications

Comments:

CESA believes that it is critical that a process be created for a non-RA-eligible resource performing multiple functions (*e.g*. distribution services and wholesale market services) to exempt its dispatch for non-CAISO market services during periods when the resource does not receive an award in the CAISO's markets. Such resources can provide value to the CAISO's markets and to other market participant, *e.g*. customers or distribution system operators, likely improving resource utilization and lowering costs for services provided in all areas of service. Naturally, these rules should be workable both for the market participant and for the CAISO's market structures.

As a non-RA resource, the resource would have no obligation to participate in the CAISO's markets and should, in principle, be able to participate voluntarily. Those resources, therefore, need a structure to provide non-market services when not participating in the CAISO's markets without incurring out-of-market penalties. CESA looks forward to collaborating with the CAISO and other stakeholders on the creation of this process. Examples of multiple functionality and

exempt non-market dispatch are provided in both the Type 1 and Type 2 section of these comments.

1. Type 1: Resource provides services to the distribution system and participates in the ISO market. Question 1 – How do we manage conflicting real-time needs or dispatches by the distribution utility and the ISO? Question 2 – If distribution system and ISO needs are aligned, and the resource's actions meet the needs of both, is there a concern about the resource being paid twice for the same performance? Under what situations is double payment a concern? How should we address this concern? Question 3 – Should any restrictions be on a DER aggregation providing distribution-level services? Would the distribution utility ever call upon a multi-pnode DER aggregation to address a local distribution problem?

Question 1 - How do we manage conflicting real-time needs or dispatches by the distribution utility and the ISO?

Comments:

Generally, CAISO market rules should encourage market participation, allow for non-RA-eligible resources to not participate as they so choose, and should create efficient deep markets while preventing gaming. The CAISO should not be tasked with managing a resource's "other service goals", only with honoring its input parameters and limitations.

The CAISO should thus focus on developing adequate rules for resources that will, at times, not participate in the CAISO market, or that will structure bids/parameters so that both sets of obligations are met. If in the market while simultaneously seeking to meet other needs, *e.g*. distribution system needs, a resource will need to manage its compliance to multiple obligations and/or face its exposure to deviations, via appropriate market signals applied non-discriminatorily to all market participants within reason. Importantly, the ability to not participate in the market at key times and the ability to input parameters to limit dispatch ranges from the CAISO's markets can avoid this exposure.

From CESA's perspective, multi-use applications providing market and distribution services include:

1. Absorbing high renewable generation in a distribution circuit to avoid excessive back feeding.

2. Serving load at times of high demand on a distribution circuit to avoid overload on the distribution circuit.

These are valuable functions that can avoid or defer costly distribution upgrades due to high load or high-distributed generation. Of note, these roles are likely to occur during only a limited number of hours per month. Rules should consider these infrequent multi-use roles.

In conclusion, CESA proposes the following process:

If the SC/operator of a resource anticipates that distribution services will be required, the SC/operator can either:

a) not submit bids in wholesale markets when providing those distribution services, exempting the resource from wholesale market dispatch during that time period.

b) accept any performance penalties or compensation that result from the resource dispatch according to any wholesale market bids that were awarded.

c) if part of an aggregated system, the resource could serve the distribution level dispatch instruction or need and issue counter-balancing instructions or adjustments to unaffected resources in the same resource ID, collectively responding to the overall instruction. The resource owner/operator and SC must be able to demonstrate an audit trail to account for the different activities.

Question 2 – If distribution system and ISO needs are aligned, and the resource's actions meet the needs of both, is there a concern about the resource being paid twice for the same performance? Under what situations is double payment a concern? How should we address this concern?

Comments:

If distribution and CAISO needs align, CESA does not see a double payment issue. One of the benefits of resources at the distribution level is that they can, in certain locations and at certain times, provide multiple grid benefits. The CAISO should focus on rules and services provided through its markets, *e.g*. wholesale market services, transmission operations, and transmission cost-recovery. Rules and cost-recovery structures for distribution system operations or for retail customers need not be addressed, within reason, in the CAISO's markets.

In the case of a resource providing both distribution services and CAISO market services, the resource may actually provide two benefits:

1. The distribution services can defer or avoid procurement of conventional distribution upgrades.

2. The CAISO market services provided by the resource provide benefits similar to other CAISO resources.

CESA believes that these benefits are discrete. To the extent that CAISO needs align with local distribution circuit needs, there is no reason to prevent compensation to a resources in two ways by providing both benefits simultaneously. If local distribution needs ultimately conflict with CAISO needs, then, according to the proposal above, a resource SC/operator would have two choices:

a) The resource SC/Operator could refrain from entering CAISO market bids. In this case, the resource would be exempt from performance penalties during this interval. Solutions to metering the actions of a resource and separating it from utility-procured load are needed as part of the distribution service agreement, not as part of the CAISO's tariff. For instance, the utility's substation CAISO meter would still register any dispatch, positive or negative, as a load increase or decrease, which would be settled between the utility and the CAISO. For non-utility owned resources, the distribution services contract could pass through this settlement value.

b) The resource SC/Operator could bid into the CAISO's market and face penalties if the resource fails to perform according to CAISO dispatch.

CESA anticipates working with the CAISO and other stakeholders to enable this process and resolve outstanding issues.

Question 3 – Should any restrictions be on a DER aggregation providing distribution-level services? Would the distribution utility ever call upon a multi-pnode DER aggregation to address a local distribution problem?

Comments:

Generally, CESA believes the CAISO should focus entirely on wholesale and transmission system operations. Distribution system operations have their own processes and can develop compensation structures for distribution services as needed in the appropriate forums.

As ESDER solutions grow in size and use, the CAISO should, however, have insight into distribution system solutions that may affect real-time load procurement or load-distribution factors. Distribution system operators will need tools to inform the CAISO of changes to real-time load so that the CAISO Forecast of ISO Demand, used in Real-Time procurement, and the CAISO may need tools to update load distribution factors. CESA expects distributions system operators will need tools to relay information to the CAISO for these purposes, if they do not already exist.

At this time, CESA does not see a need for restrictions on a DER aggregation providing distribution-level services, but is open to stakeholder input. CESA looks forward to input from other stakeholders on the second aspect of this question.

2. Type 2: Resource provides services to end-use customers and participates in the ISO market. The ISO has identified the following three sub-types (are there others?): (a) DER installed behind the customer meter, such that flow across the customer meter is always net load; (b) DER installed behind customer meter, such that flow across the customer meter can be net load or net injection at different time; and (c) DER installed on the utility side of the meter, may provide service to end-use customers and participate in wholesale market.

Comments:

CESA agrees with the three sub-types identified by the CAISO, and requests several modifications to the CAISO's current approach to make these three sub-types commercially viable. Examples will follow to illustrate the rationale for each of these changes.

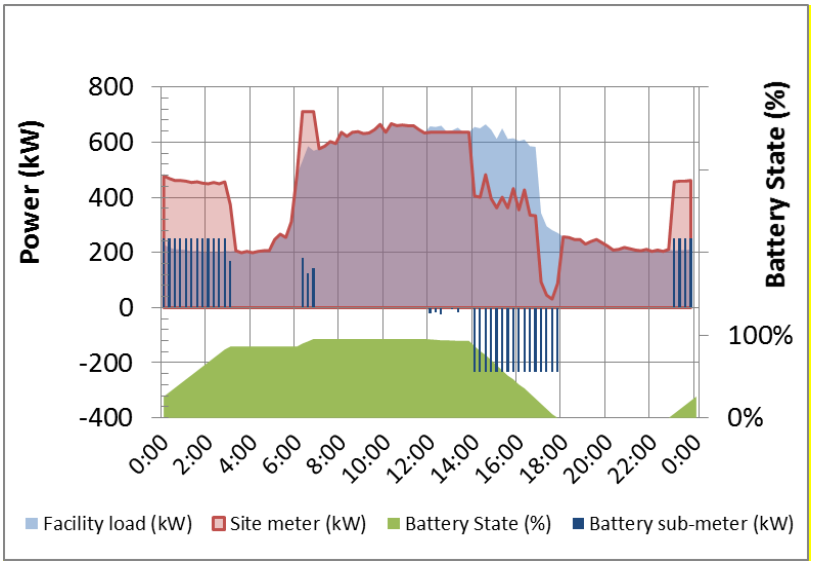
- As with Type 1 resources, the value of customer-sited resources comes from providing several independent benefits, including peak demand reduction as well as traditional generation functions. Given that these value streams may at times either correlate or conflict, CESA believes that there should be an option for a sub-type "a" or "b" resource to remove itself from wholesale market participation and metering during times when it is providing an exclusive retail benefit. CESA asks the CAISO to strongly consider a process whereby a resource that has not received a market award be allowed to dispatch for other purposes without undue penalties. Artificially constraining behind the retail meter NGR resources to participate in wholesale markets on a full time basis limits the value of those resources to customers and ratepayers.
- Understanding that resources may provide several benefits simultaneously, CESA requests the CAISO to allow NGR resources to dispatch only a portion of their aggregated capacity into the CAISO's markets.
- There are also potential issues with double billing between the substation-sited utility CAISO meter and the NGR submeters during CAISO market operation. CESA requests that the CAISO work with utilities to resolve this issue. Specifically, it makes sense for the CAISO to credit utilities for round trip efficiency losses that are counted at both the substation-sited meter and the NGR submeter.
- CESA supports sub-type "a", as defined by the CAISO. CESA suggests that sub-type "a" resources not be required to interconnect under a WDAT. For resources that will do not flow power back through the retail meter in excess of the onsite NEM-eligible generation, it is not clear that a WDAT requirement is necessary. Submeter data can clearly demonstrate and verify that NGR resource operations that will not net-export relative to other customer load. Resources whose operation does involve net export could simply interconnect under a WDAT as sub-type "b" resources.
- Finally, CESA requests that the CAISO explicitly allow sub-type "c" resources as full-time wholesale market participants, and work with utilities and sub-type "c" providers to clarify the metering configurations that are allowable under this configuration.

Resource Examples

Sub-type a) DER installed behind the customer meter, such that flow across the customer meter is always net load;

Example 4

In the following case, an NGR behind the meter is used to shave customer peaks from the 12:00– 14:00. The NGR bids into the CAISO's market from 14:00-18:00, receiving awards and dispatching appropriately for each of those four hours.



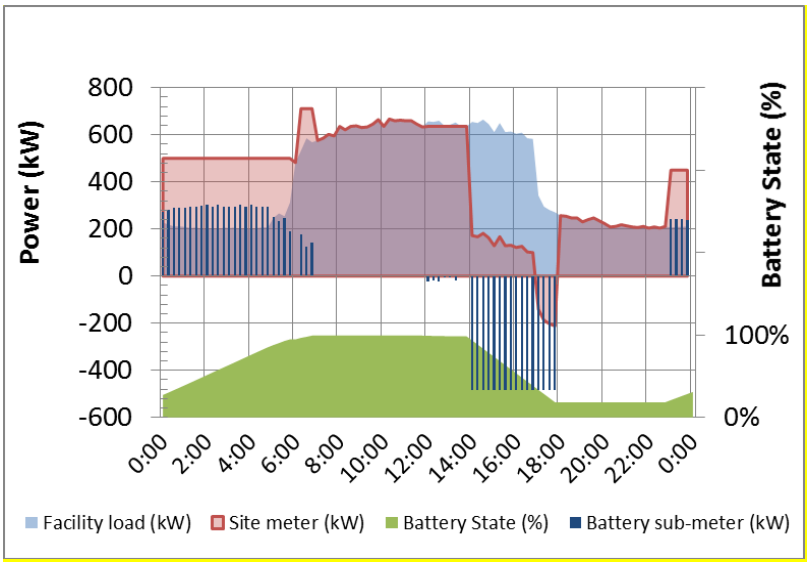
CESA believes that it is unreasonable to count the 12:00-14:00 demand charge reduction as out-of-market dispatch. That dispatch provides a benefit to the retail customer and the utilities, based upon rates, and is separately accounted for as load reduction by the CAISO and the utility. When the NGR does bid into the CAISO's markets, and is awarded a dispatch, the resource delivers accordingly, and so should receive market compensation.

Note that this resource does not net export. From the perspective of the retail meter, this case is a load reduction only; power does not flow back onto the grid. Therefore, CESA reiterates its position that the resource should not be required to comply with WDAT requirement.

Sub-type b) DER installed behind customer meter, such that flow across the customer meter can be net load or net injection at different time;

Example 5

Example 5 is similar to Example 4, except that the dispatch of the energy storage resource would flow power back across the retail meter.

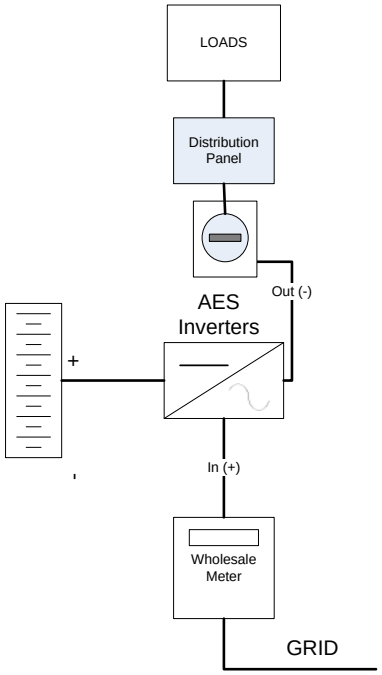


This sub-type of resource should clearly interconnect under a WDAT.

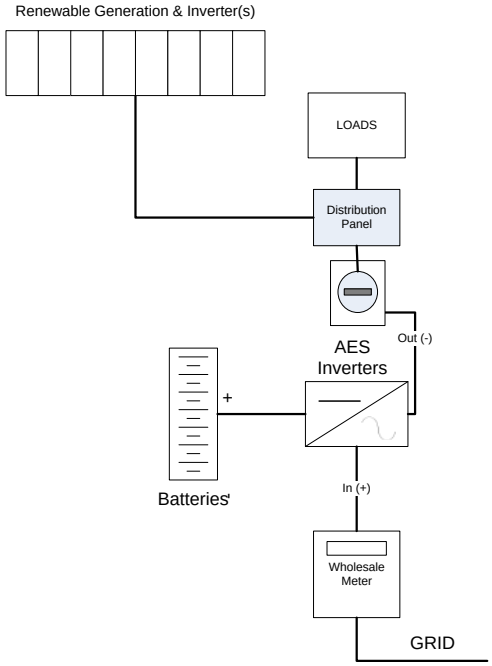
However, for the same reasons identified in Example 4, the demand charge reduction activities should not be counted as out of market dispatch.

Sub-type c) (c) DER installed on the utility side of the meter, may provide service to end-use customers and participate in wholesale market.

A resource installed in "front of the meter" can provide several additional customer benefits while cleanly providing both wholesale and distribution level services. Here are two generic illustrations showing a front of the meter energy storage resource with and without onsite generation:



Front of Meter AES with Retail Loads



Front of Meter AES DER with Solar PV Behind the Meter

No Retail Changes: No Retail Tariffs require modification and a variety of typical customer configurations can all benefit. These include NEM, retail load rate schedules and specialty rates such as EV.

Measure In Isolation: By being placed in front of the meter and measured "in isolation" (*i.e*. output and inputs are separately measured and added/subtracted from each other such that a purchase is counted when energy is imported into the resource and a credit (sale) is counted when energy is released from the resource) the mixing of wholesale and retail energy is avoided.

No Double Counting: Since the in front of the meter energy storage is <u>not</u> being double counted by a Wholesale (CAISO) meter and a Retail Meter the settlement and double credit/payment issues are eliminated. Settlements, as a result, can proceed immediately with <u>existing</u> billing and settlement procedures and systems at BOTH the retail utility AND the ISO.

Accurate NEM Credits: Further, pre-existing on site Generation such as Solar PV can be accommodated as it is behind the meter under a NEM metering arrangement typically. Energy

that is released from that SolarPV will always receive proper value credits for the time at which generation is performed and charges when load is drawn. This avoids many operator concerns about "gaming" or "value shifting" that have characterized many discussions.

All Retail Loads measured at Retail: Since all loads are placed behind the retail meter on the output of the resource they will be measured at the appropriate retail rate(s). This simplifies and avoids operator concerns about unauthorized parties purchasing energy at wholesale for delivery to retail loads and bypassing the local Utility.

Consistent with CAISO Positions: In front of the meter energy storage if an , remains consistent with the currently announced positions of the CAISO regarding round trip efficiency losses as wholesale activities and NGR REM. Of note, is that behind the meter approaches result in RTE losses inevitably being charged at retail and raising the cost of market participation to retail. This retail pricing will make many resources uneconomic to operate in the CAISO's market's, and thus wholesale in front of the meter placement and full wholesale rate treatment is critical.

Enhanced Reliability and Distribution Level Control: Since the resource is placed on a customer premise ahead of the meter it can be managed either in concert with the distribution utility or by the CAISO (See above discussion) without the additional complications of retail-wholesale interleaving or cross settlement. Further, if the resource is energy storage then there is potential for the resource to provide full site load reduction, as seen by the distribution Utility, while leaving onsite operations of the customer unaffected. This can, in cases of full grid outage, serve to provide enhanced reliability and safety for the customers as energy and power can be drawn from the energy storage resource and yet still be delivered as retail energy through the current Utility retail meter.

No Lost GHG Free Generation/Minimize Curtailment: With an energy storage resource that is in front of the meter on a site with onsite GHG emission-free generation the generation value and GHG avoidance is completely lost when outages occur or curtailment is ordered. This creates a conflict between the retail customer/generators need for savings and revenue and the grid operator's needs for reliable operations. Being in front of the meter, an energy storage resource can act to safely maintain the operation of the onsite generation resource even in the case of grid outage and also absorb the GHG emission-free generation during times when it might otherwise be curtailed.

Enhance Availability and Reliability to Grid Operator(s): When an in front of the meter energy storage resource is aggregated the onsite benefits and capabilities described above are enhanced. By being placed in front of the meter an energy storage resource can more economically operate as all RTE losses are at wholesale rather than retail. Further the reliability of the resource is enhanced as part of an aggregation since a single point location of a resource

is able to be turned down with other resources in the same aggregation being instructed to increase or adjust their behavior as needed.