UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

Centralized Capacity Markets in Regional Transmission Organizations and Independent System Operators	)))	Docket No. AD13-7-000

STATEMENT OF THE ELECTRICITY STORAGE ASSOCATION

Representing the ESA: Judith Judson McQueeney, Chair of the ESA Advocacy Council

On behalf of the Electricity Storage Association, thank you for the invitation to address the panel as it contemplates how best to integrate electricity storage into centralized capacity markets. The below statement will first introduce you to the Electricity Storage Association and its representative members. Second, we will provide an overview of how electricity storage can be used to benefit the centralized capacity markets. We look forward to making our full presentation to the panel and to responding to questions at the Technical Conference.

ABOUT THE ELECTRICITY STORAGE ASSOCIATION

The ESA is an international trade association that was established over 20 years ago to foster development and commercialization of electricity storage technologies. Since then, its mission has always been the promotion, development and commercialization of competitive and reliable energy storage delivery systems for use by electricity suppliers and their customers.

ESA members represent a diverse group of entities, including electric utilities, energy service companies, independent power producers, technology developers involved with advanced batteries, flywheels, compressed air energy storage, pumped hydro, supercapacitors and component suppliers, such as power conversion systems. ESA's members also include researchers who are committed to advancing state-of-the-art energy storage solutions.

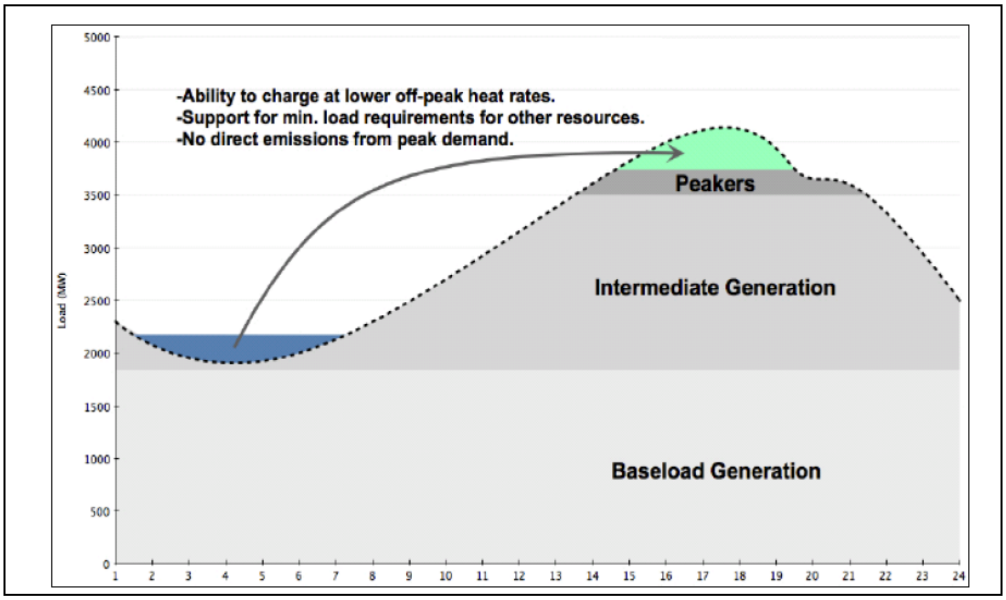
The ESA's Advocacy Council engages in regulatory, legislative and policy advocacy efforts on behalf of the ESA. Advocacy Council Members include: A123 Systems, LLC; AES Energy Storage; Aquion Energy; Beacon Power, LLC; East Penn Manufacturing Co., Inc.; FIAMM; NextEra Energy; S&C Electric Company; Saft America Inc.; and Temporal Power. These member companies have firsthand knowledge of the regulatory challenges that need to be overcome to finance and operate commercial-scale energy storage facilities and are working to promote the continuing development and commercialization of competitive and reliable electricity storage systems within the United States.

THE ROLE OF ELECTRICITY STORAGE FOR RESOURCE ADEQUACY

Energy Storage resources have the ability to play a valuable and increasing role in meeting the needs of the power grid by providing operators with the necessary tools to adapt to changes in energy generation and utilization profiles resulting from public policy objectives and environmental regulations, among other factors. The primary drivers of benefits provided by energy storage resources are their capacity and flexibility characteristics.

Storage as a Peak Capacity Resource

Storage has the unique ability to provide peak power using lower cost off-peak power, as the figure below shows (provided by AES Energy Storage).



Moreover, the use of storage unlocks latent economic value system-wide by relieving constraints that allow further optimization of thermal and renewable energy dispatch. Specifically, energy storage resources avoid or reduce:

- thermal unit start/stop costs because the use of "peakers" is reduced;
- costs associated with "must run" minimum generation from thermal units because storage is withdrawing energy during off-peak; and
- renewable energy curtailments or negative pricing because storage is withdrawing energy during off-peak .

To date rules have not been developed in the Eastern markets to enable the participation storage in these capacity markets. Integrating storage resources into the existing capacity markets by the development of rules specific to these resources, as has been done for other alternative resources such as demand response, will send the right market signals for investment.

Storage as a Flexible Capacity Resource

Current capacity markets are designed with the narrow focus of ensuring that there is adequate peak energy during high load conditions which has been a primary reliability issue in years past. Growing demand, environmental restrictions, and high penetration of VERs into the market are expected to create a need for other resource attributes in order to reliably maintain the system. The California ISO has found that among the challenges for integrating 33% renewable resources is ensuring that there is sufficient flexible capacity to address the added variability and uncertainty of VERs. The specific flexibility attributes the ISO requires include, at a minimum, multi-hour ramping needs, load following, and regulation.[1] Because of this need the CAISO is proposing flexible capacity procurement targets to the CPUC's Resource Adequacy (RA) program. Likewise, FERC should consider capacity market measures that value flexibility in order to encourage investment today in resources that provide flexible capacity in order to avoid reliability issues in the future.

Furthermore, CAISO has begun a "Flexible Resource Adequacy" initiative, working with local regulatory authorities to ensure flexible capacity resources are available to reliably operate the grid while fulfilling state energy mandates.[2] The latest straw proposal from the CAISO specifically includes energy storage as an eligible resource for providing Flexible RA, acknowledging the flexibility and reliability benefits of storage resources.

Storage resources have fast, accurate ramping capability making it ideally suited to provide system flexibility. As FERC found in Order No. 755, the use of fast-ramping storage technologies to provide frequency regulation had the potential to reduce the total amount of regulation that needs to be procured by the ISO to meet its reliability requirements, i.e. 1 MW of storage has the potential to offset 2 – 4 MWs of traditional fossil generation providing frequency regulation. Moreover, these generation MWs displaced from providing regulation can be used to provide more efficient energy at peak periods by operating at their preferred output and at lower heat rates.

Furthermore, unlike generators that experience higher rates of fuel consumption and air pollutant emissions when they provide ramping and regulation services, storage resources recycle existing power without burning fossil fuel or producing any direct air emissions, thereby lowering total system operating costs and air pollutant emissions. A study by Carnegie Mellon in October 2008

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[1] For a more detailed discussion of these studies, see http://www.caiso.com/Documents/SecondRevisedDraftFinalProposal-FlexibleCapacityProcurement.pdf.
[2] For a more detailed discussion of this effort, see http://www.caiso.com/informed/Pages/StakeholderProcesses/FlexibleResourceAdequacyCriteria-MustOfferObligations.aspx

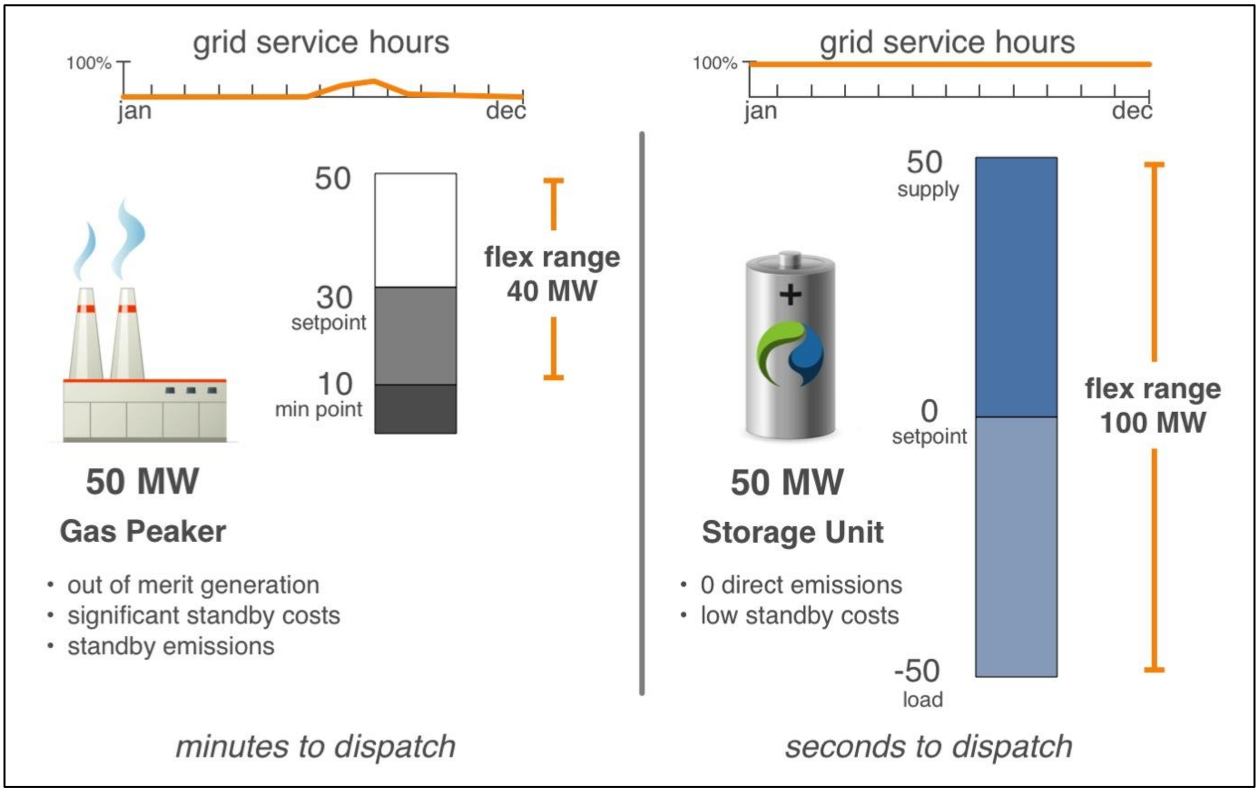
estimated that 20% of the CO2 emission reduction and up 100% of the NOX emission reduction expected from introducing wind and solar power will be lost because of the extra ramping requirements they impose on traditional generation. Continued reliance on thermal generating units to meet increased ramping requirements could actually increase emissions of CO2, NOX and other pollutants.

Additional Benefits of Storage for Capacity

Additionally, the development of energy storage resources generally requires less time to perform siting and permitting, which creates flexibility in the planning process. This planning flexibility reduces the development risk associated with procurement of energy storage resources relative to traditional generation. Energy storage resources that are brought online primarily to meet capacity requirements are able to provide value across all hours of the year, unlike new natural gas-fired peaking generation which is used in relatively few hours.

Many advanced energy storage resources are designed to be modular with many independent units running in parallel, an architecture that improves overall system reliability through its inherent redundancy. By comparison, most conventional generation facilities are comprised of a few large units. The “shaft risk”, a capacity resource’s contribution to loss of load probability from the failure of a single unit or piece of equipment, is lower for storage under the modular architecture. A modular architecture with many parallel units also allows maintenance of those units to be performed in sequence, reducing outage rates and improving the resource’s availability. Modularity allows energy storage resources to deliver a superior reliability benefit.

As shown in the figure below (source AES Energy Storage), per MW of nameplate capacity storage provides more MWs of flexible capacity because it has no minimum generation requirement, provides service across its entire range of ability to inject and withdraw power, and is available to operate in more hours. This coupled with its ability to be dispatched within seconds, makes storage resources a cost-effective source of needed flexible resource adequacy.



<u>Need for Fixed Cost Recovery Mechanisms</u>

Just like other "steel in the ground" resources, energy storage resources have a need for fixed-cost recovery mechanisms in order to ensure recovery of fixed costs and to obtain project finance capital. However, the Energy and Ancillary Services markets generally are designed to ensure recovery of variable costs only. One of the primary purposes of capacity markets is to ensure that resources needed for system adequacy have a market mechanism to recover the fixed costs associated with market entry. Ensuring market rules are developed to enable storage resources to access to the capacity markets would remove a major barrier to investment in new storage resources.

<u>Conclusion</u>

The ESA looks forward to being part of developing capacity market rules and regulations for storage and to working with FERC and the other members of today's panelists to resolve any issues effectively and expeditiously.