

OPEN MEETING AGENDA ITEM



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ARIZONA CORPORATION COMMISSION
DOCKET CONTROL

October 21, 2015

The Honorable Bob Stump, Chairman
Arizona Corporation Commission
1200 W. Washington St.
Phoenix, AZ 85007

Arizona Corporation Commission
DOCKETED

OCT 22 2014

RE: DOCKET NO. L-00000D-14-0292-00169

DOCKETED BY

Dear Chairman Stump;

Attached please find comments from the Energy Storage Association ("ESA") to the above-referenced Docket No. L-00000D-0292-00169 before the Arizona Corporation Commission ("Commission"). ESA is pleased to have the opportunity to comment on the issue of including energy storage technologies and applications in the planning and procurement process in the State of Arizona.

Feel free to contact me should you have any questions about this filing. ESA looks forward to serving as a resource to the Commission on issues related to the electric grid in Arizona.

Best regards,

Katherine Hamilton
Policy Director

202-524-8832; k.hamilton@energystorage.org

CC: Commissioners Pierce, Burns, Smith, and Burns

BEFORE THE ARIZONA CORPORATION COMMISSION

Comment Opportunity

Considerations for DOCKET NO. L-00000D-14-0292-00169

COMMENTS OF THE ENERGY STORAGE ASSOCIATION

Pursuant to the Comment Opportunity in the Arizona Corporation Commission (“Commission”) open DOCKET L-00000D-14-0292-00169, the Energy Storage Association (“ESA”) appreciates the opportunity to submit the following comments and information for the Commission’s consideration.

I. ABOUT THE ENERGY STORAGE ASSOCIATION

The ESA is an industry association that was established over 25 years ago to foster development and commercialization of energy storage technologies. Since then its mission has 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, thermal and 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 the state-of-the-art in energy storage solutions. See Attachment 1 for a full list of ESA members. The

opinions stated in this filing represent ESA, not necessarily the views of any individual member of the association.

The ESA engages in regulatory, legislative and policy efforts and includes among its membership leaders in the energy storage marketplace. 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 development and commercialization of competitive and reliable electricity storage systems within the United States. The ESA is looking forward to serving as a resource to the Arizona Corporation Commission in this DOCKET.

II. COMMENTS ON THE PROPOSAL

The ESA enthusiastically supports the request put forth by Arizona Public Service (“APS”) and the Residential Utility Consumer Office (“RUCO”) to have the Arizona Corporation Commission approve conditions for Certificate of Environmental Compatibility number 169, laid out in Exhibit A to their request for review. The ESA believes that the (1) issuance of an independently monitored RFP for resource procurement that include alternatives to traditional generators, including demand side resources and storage; (2) 10% floor for simple-cycle gas procurement to include energy storage capacity before 2021; and (3) issuance of a competitive RFP for storage project(s) totaling 10 MWh by 2018 will enhance grid performance resiliency, increase system efficiency, and ultimately provide significant cost benefits to Arizona consumers. More specific background information relevant to this case and specific recommendations from the ESA are enclosed below.

Energy Storage Technology Viability

Energy storage technologies are able to provide a suite of services to the grid at rapidly increasing volumes and declining costs. In 2014, procurements of 25, 50, 60, 200 megawatt (and more) storage systems are being made across the country as alternatives to generation, transmission, and distribution investments as costs have become competitive with traditional grid assets, and operational benefits have been analyzed, valued and proven. In many cases, the cost to install energy storage has proven to be less than that of installing other generation or transmission sources that require infrastructure and environmental permitting.¹ In including alternatives to traditional grid resources in all future procurements, the ESA believes that storage will present as a viable alternative to generation, transmission, and distribution investments.

There are many commercial-scale energy storage projects currently on the grid or under construction. To illustrate this point, we have enclosed a partial list of energy storage projects planned by utilities and system operators in the table below (*Figure 1*). This is simply a sample of the multiple energy storage projects under development; many more are in development due to mandates from California² and efforts in other states. The Department of Energy also hosts and compiles a database of grid-connected storage projects across the globe on its Global Energy Storage Database.³

¹ An example was a project in Presidio, TX, in which the energy storage battery was less expensive to install than transmission replacement.

² California energy storage target can be found here:
<http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M078/K929/78929853.pdf>

³ DOE Global Energy Storage Database
<http://www.energystorageexchange.org>

Figure 1. Example Recent Energy Storage Project Development Chart, Courtesy EnerVault Corporation

Organization	Size (Power)/Duration	Status	Description
 Terna Energie Nazionale	⊙ 14 GW/6 hours	⊙ 140,000 MW PHS; ⊙ 800 MW CAES, NIS, and Flow ⊙ 250 MW Li-Ion, Pb-acid, Flywheel	 ⊙ Contract awarded (May 2013)
 ECCO (Hokkaido Electric)	⊙ 35 MW / 7 hours	⊙ Installed NIS	⊙ Contract awarded (July 2013)
 PSC	⊙ 12 MW / 5 hours	⊙ Underway	⊙ Contract awarded (July 2013)
 PSC	⊙ Min 1.5 MW / 4 hours	⊙ In Contracting	⊙ RPS RFO (Dec 2013) PV+ Storage; 1.8X TOD, penalize intermittency, curtail rights
 ieso	⊙ 50 MW	⊙ 34 of 50 MW selections announced	⊙ RFP issued (March 2014), selections announced (July 2014) to increase wind and solar use
 EDISON Midwest Edison	⊙ 50 MW/4 hours	⊙ In contract negotiations	⊙ RFP issued (October 2013) for local capacity requirements
 PSEG LONG ISLAND	⊙ 150 MW /12 hrs	⊙ In short-listing (Mar 2014)	⊙ RFP issued (November 2014) post Superstorm Sandy
 California ISO Sharing a Common Future	⊙ Avg 58 MW ⊙ >2 GW Storage Interconnects	⊙ Cluster 7 Applications closed (April 2014)	⊙ Interconnect application increased from 9 (cluster 6, 2013) to 36 projects ⊙ Typical size 25 and 50 MW ⊙ Average application fee: \$105k
 conEdison	⊙ 58 MW / 12 hours	⊙ RFI July 2014	⊙ 12 hour demand reduction beginning 2016
 HECO	⊙ 60 MW / 0.5 hours	⊙ RFP July 2014	⊙ HECO response to PUC over-ruling capital plan because not solving problems of DG
 SDGE	⊙ >25 MW / 4 hours	⊙ RFP September 2014	⊙ To meet Local Capacity Requirements, alternative to CT
 Terna Energie Nazionale	⊙ 2MW / 4 hours	⊙ RFP Oct 2014	⊙ Flow battery demonstration
 EDISON Midwest Edison	⊙ PG&E: 80.5 MW / 4 hours	⊙ RFP Dec 2014	⊙ First procurement for AB 2514, 1325 MW (October 2013), Procurement plan approved July 2014
 PSC	⊙ SCE: 16 MW / 4 hours		
 SDGE	⊙ SDG&E 16.3 MW / 4 hours		

Benefits to APS and RUCO Conditions

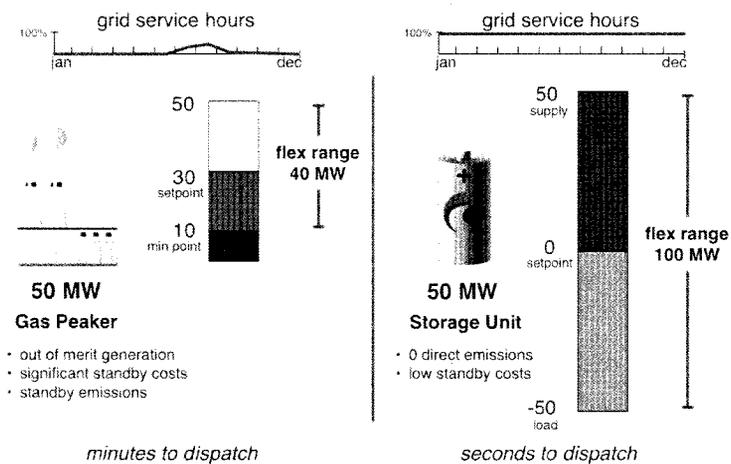
APS and RUCO's request is an optimal approach to the resource procurement process by allowing the market to identify the best resource solutions and then giving developers the ability to bid on tangible projects without the need for mandates. As noted above, storage technologies can offer viable alternatives to traditional grid resources in a

host of applications. With the prospect of the need for multiple thousands of megawatts in additional peaker capacity coming online within the next decade, in addition to other incremental baseload and performance resource needs, the ESA believes that storage will demonstrate numerous benefits in all-source procurement processes.

Two notable benefits of energy storage of specific interest to the APS and RUCO request conditions are:

1. *Fuel neutrality:* Energy storage is fuel-neutral and can be charged from any resource on the grid. In fact, as a flexible resource, energy storage can serve to both inject and absorb supply, providing double the flexible capacity of traditional generation and allowing all types of generation, including variable resources, to function more smoothly (See Figure 2 below).

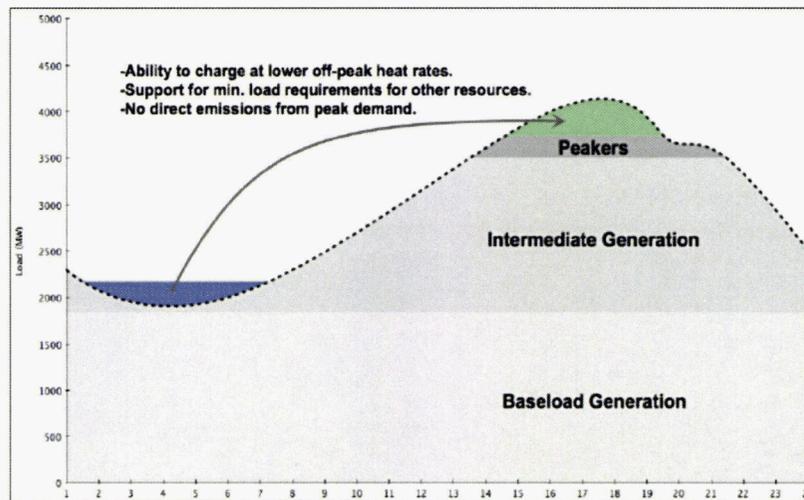
Figure 2. Energy Storage as Flexible Capacity as Compared with Gas Peaker



2. *Efficient ramping ability:* Energy storage enables more efficient ramping of existing plants, smooth integration of renewable energy facilities, and shifts peak load to off peak hours (see Figure 3 below), all of which increase the

efficiency of the entire system. Storage also increases the utilization of existing transmission and distribution level investments and helps defer the need for new investments in this infrastructure until it can be fully utilized.

Figure 3. Energy Storage for Peak Shaving



The ability for energy storage technologies to charge from any fuel source on the grid and ramp quickly offers the system greater assurance of reliability at times of greatest need and the ability to adjust to a system fuel mix that is increasingly becoming more reliant on variable resources.

Given the points made above, the ESA believes that conditions for CEC 169 should be applied to all utilities going forward in Arizona. The benefits laid out above in the deployment of storage technologies set out for APS should equally apply to other utilities within Arizona. Additionally, creating procedural uniformity for resource procurements will drive top storage innovators and developers to the Arizona economy while benefiting all consumers in the state.

Additional benefits to the APS and RUCO approach include the ability for Arizona utilities to have a direct view into the pace of technological innovation and cost reductions over time of storage technologies, as storage project developers will have incentive to participate in RFPs, at least for APS, and preferably throughout the state.

Recommendations for the RFP Process

The ESA believes cost effectiveness, reliability, resiliency, and performance should be the metrics used to evaluate responses to future RFPs. Overall, ESA believes that preference should be given to projects that demonstrate full integration of technology, environmental attributes, project siting and design, project safety, development planning, EPC, financing, and cost allocation. While strengths in individual facets of proposed projects should be all individually measured, the value of project integration should be a key consideration. RFPs should be fully technology-neutral, focusing on the characteristics needed for the application and the full range of values each project can provide. Proposals should highlight values to the system that projects should have, and applicants should propose solutions, including the technology, with supporting evidence for why the technology best suits the application and stated value preference. Of equal importance is the need for the RFP process to be conducted with third party input such that bias toward specific technologies is not a factor in the selection process.

III. CONCLUSION

The ESA is again enthusiastically supportive of the APS and RUCO proposed conditions for Certificate of Environmental Compatibility number 169. The ESA appreciates the opportunity to offer recommendations in this inquiry and looks forward to continuing to work with the Arizona Corporation Commission on this and other issues pertaining to the development of energy resources in the state.

Respectfully submitted.

ENERGY STORAGE ASSOCIATION

By its Policy Director,



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Attachment 1
ENERGY STORAGE ASSOCIATION MEMBERS (July 2014)

- ▶ 1Energy Systems, Inc.
- ▶ 24M Technologies, Inc.
- ▶ ABB, Inc.
- ▶ AES Energy Storage
- ▶ AltaLink
- ▶ Ambri
- ▶ American Vanadium
- ▶ Aquion Energy
- ▶ ARPA-E
- ▶ Argonne National Laboratory
- ▶ Axion Power International, Inc.
- ▶ Beacon Power LLC.
- ▶ Black & Veatch Corporation
- ▶ Bosch Energy Storage
- ▶ Brown Rudnick LLP
- ▶ California ISO
- ▶ CALMAC Manufacturing Corporation
- ▶ CODA Energy, LLC.
- ▶ Customized Energy Solutions
- ▶ DNV GL Energy
- ▶ Duke Energy
- ▶ Dynapower Company LLC
- ▶ EaglePicher Technologies, LLC.
- ▶ East Penn Manufacturing Co., Inc.
- ▶ Energy and Environmental Economics, Inc.
- ▶ Energy Power Systems, LLC
- ▶ EnerSys
- ▶ EnerVault Corporation
- ▶ Eos Energy Storage
- ▶ EPRI
- ▶ Exelon Generation
- ▶ FIAMM
- ▶ FirstEnergy Service Company
- ▶ GE Energy Storage
- ▶ Greensmith Energy Management Systems
- ▶ HDR Engineering, Inc.
- ▶ Highview Power Storage
- ▶ Hitachi Chemical Co. America
- ▶ Hydrogenics Corporation
- ▶ Hyosung Corporation
- ▶ Ice Energy
- ▶ Imergy Power Systems
- ▶ INABENSA
- ▶ INGETEAM INC.
- ▶ Innovation Core SEI, Inc.
- ▶ Landis+Gyr
- ▶ LG Chem Power
- ▶ MCV Energy Systems, Inc.
- ▶ Mitsubishi Electric Power Products, Inc.
- ▶ Morrison & Foerster LLP
- ▶ National Rural Electric Cooperative Association (NRECA)
- ▶ Nation-E
- ▶ Navigant Consulting
- ▶ NEC Energy Solutions
- ▶ NextEra Energy Resources, LLC.
- ▶ NGK Insulators, LTD.
- ▶ Oncor
- ▶ Pacific Northwest National Laboratory
- ▶ Panasonic
- ▶ Parker Hannifin – Energy Grid Tie Division
- ▶ PJM Interconnection, LLC
- ▶ Primus Power
- ▶ Prudent Energy Corporation
- ▶ Public Service Co. of New Mexico
- ▶ RedFlow Limited
- ▶ Recurrent Energy
- ▶ RES Americas
- ▶ S&C Electric Company
- ▶ Saft America, Inc.
- ▶ San Diego Gas & Electric
- ▶ Sandia National Laboratories
- ▶ SkyPower Services
- ▶ Southern Company
- ▶ Steffes Corporation
- ▶ Stoel Rives LLP
- ▶ Strategen Consulting, LLC
- ▶ SunEdison, Inc.
- ▶ SustainX
- ▶ Sutherland Asbill & Brennan LLP
- ▶ TAS Energy
- ▶ Temporal Power Ltd.
- ▶ UniEnergy Technologies
- ▶ Viridity Energy
- ▶ Younicos Inc.
- ▶ ZBB Energy Corporation

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- ▶ Richard Baxter, Mustang Prairie
- ▶ John Boyes, John Boyes Consulting
- ▶ Bill Capp, Grid Storage Consulting
- ▶ James M. Eyer, E&I Consulting
- ▶ Pete Hamilton, Better Energies, LLC
- ▶ William V. Hassenzahl, Advanced Energy Analysis
- ▶ Darrell Hayslip, Narrow Gate Energy, LLC
- ▶ Udi Helman, Independent Consultant
- ▶ Michael Kepros, Kepros Battery Consulting
- ▶ Matt Lazarewicz, Energy Storage Solutions, LLC.
- ▶ Robert Lockhart, Acuity Power Group
- ▶ Bob Mango, Independent Consultant
- ▶ Jeff Pierson, Bethesda Capital LLC
- ▶ Anthony Price, Swanbarton Limited

- ▶ Charles Ricker, Ricker Strategic Advisors
- ▶ William Riley, Aquifer Based Hydroelectric Systems
- ▶ Susan Schoenung, Longitude 122 West, Inc.
- ▶ Jim Staudt, Andover Technology Partners
- ▶ H. Chandler Williamson, HCW Consulting

Associate Members (12)

- ▶ Companies
 - CARNOT 2G, Inc.
 - Halotechnica
 - ICL Industrial Products
 - Kilpatrick Townsend & Stockton LLP
 - Microvast Power Solutions
 - National Electrical Contractors Association (NECA)
 - North Carolina Sustainable Energy Association (NCSEA)
 - Nubenergy
 - Wind Energy Institute of Canada
- ▶ Individuals/Students
 - John Goatcher
 - Glenn Skutt
 - Zach Taylor