UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

Integration of Variable Energy Resources	**)**	**Docket No. RM10-11-000**
	)	

COMMENTS OF THE COALITION TO ADVANCE RENEWABLE ENERGY THROUGH BULK STORAGE

The Coalition to Advance Renewable Energy Through Bulk Energy Storage ("CAREBS") hereby respectfully submits comments on certain of the issues identified in the notice of inquiry issued by the Federal Energy Regulatory Commission (the "Commission") in the above-captioned proceeding on January 21, 2010.[1] As discussed in more detail below, bulk energy storage projects can perform transmission functions that substantially aid in the effective integration of variable energy resources into the electric grid. Because lack of adequate transmission capacity is a key hindrance to the integration of renewable energy resources, CAREBS encourages the Commission to promote competition by affirmatively stating that bulk energy storage projects will be treated on par with other transmission solutions. Moreover, CAREBS requests that the Commission clarify that bulk energy storage projects, like other new transmission projects, are eligible to seek transmission rate treatment, including all applicable incentives.

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1 *See Integration of Variable Energy Resources*, 130 FERC ¶ 61,053 (2010) (the "NOI").

I.

CORRESPONDENCE AND COMMUNICATIONS

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II.

DESCRIPTION OF CAREBS

CAREBS is a coalition formed to educate legislators, regulators, other policy makers, and the public about the enormous benefits that bulk energy storage[2] – *i.e.*, primarily compressed air energy storage ("CAES")[3] and pumped storage hydroelectric ("PSH") facilities[4] – can provide in facilitating the development of renewable energy resources and increasing the efficiency and reliability of the nation's electric grid. CAREBS supports policies that will accelerate the development and commercial deployment of CAES, PSH, and other bulk energy storage

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[2] *See* The Electricity Advisory Committee, *Bottling Electricity: Storage as a Strategic Tool for Managing Variability and Capacity Concerns in the Modern Grid* at 3-4 (Dec. 2008) ("*Bottling Electricity*") (distinguishing bulk and distributed energy storage), *available at* http:// www.oe.energy.gov/DocumentsandMedia/final-energy-storage_12-16-08.pdf.

[3] CAES involves the use of electric energy to drive compressors that compress air into a cavern, where the energy, in the form of compressed air, is stored until electric energy is needed, at which time the compressed air is released through a natural gas-fired turbine to generate electric energy. *See Norton Energy Storage, L.L.C.*, 95 FERC ¶ 61,476 at 62,699-62,700 (2001) (describing a CAES system).

[4] Pumped hydroelectric power involves pumping water from a lower elevation to a higher elevation during off-peak periods for release through turbines during peak periods. *See Bottling Electricity* at 1 (describing pumped hydroelectric systems).

technologies. CAREBS members include: (1) Texas CAES, LLC ("Texas CAES"), which is evaluating several sites for a planned CAES facility in Texas; (2) Haddington Ventures, L.L.C., a private equity firm based in Houston, Texas that pioneered the development of high-deliverability natural gas storage projects and that is currently participating in the development of various CAES projects, including that being developed by Texas CAES; (3) Dresser-Rand Corporation, a corporation based in Houston, Texas that is, among other things, a U.S. manufacturer of CAES equipment; (4) Iowa Stored Energy Plant Agency, an Iowa corporation formed by interested members of the Iowa Association of Municipal Utilities that is developing a CAES facility in Iowa known as the Iowa Stored Energy Park; (5) HDR/DTA, a consulting firm based in Portland, Maine that provides hydropower and related renewable energy consulting services to utility, industry and government clients; and (6) Windsohy LLC, an Overland Park, Kansas-based energy company developing wind, CAES and synthetic gas projects in order to help meet the demand for reliable baseload power from renewable sources.

Additional information about CAREBS and bulk energy storage can be found on CAREBS's website at: http://www.carebs.org.

III.

BACKGROUND

In the NOI, the Commission seeks comment on barriers that may "impede the reliable and efficient integration of variable energy resources" into the electric grid.[5] The Commission notes that variable energy resources "present unique challenges as public utilities work to

[5] NOI at P 1.

integrate [them] in a way that ensures system reliability"[6] and "encourages all comments regarding the topics broadly discussed" in the NOI.[7]

IV.

COMMENTS

As the voice of the bulk energy storage community, CAREBS brings a unique perspective to the questions posed in the NOI. As discussed below, bulk energy storage can play a vital role in facilitating the integration of variable energy resources into the grid. As a consequence, encouraging the development of bulk energy storage will necessarily operate to remove a barrier to adding variable energy resources. In order to encourage the development of bulk energy storage devices, the Commission should make clear that bulk energy storage facilities are distinct from, but have characteristics of, both generation assets and transmission assets, and that an energy storage device performing transmission functions will be eligible for transmission rate treatment, including applicable incentives. The Commission should also make clear that owners/operators of energy storage devices may obtain exempt wholesale generator ("EWG") status under Section 1262 of the Public Utility Holding Company Act of 2005 ("PUHCA")[8] and Section 366.7 of the Commission's regulations,[9] even if those devices have been functionalized as transmission facilities for ratemaking purposes.

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6 *Id.* at P 3.

7 *Id.* at P 13.

8 16 U.S.C. § 16451 (2006).

9 18 C.F.R. § 366.7 (2009).

A. Benefits of Bulk Energy Storage

As noted in the NOI, variable energy resources "cannot control or store their fuel source" and have "limited ability to control their production of electricity."[10] By storing electric energy produced when it is not needed and making that energy available when it is needed, bulk energy storage devices can be invaluable in integrating variable energy resources. In addition, by increasing the load factor and utilization of transmission facilities, bulk energy storage devices can help ensure that new transmission facilities needed to access variable energy resources are "right-sized," or optimized, and thereby help avoid overbuilding transmission. Bulk energy storage is particularly well suited to facilitate the integration of renewable energy resources that are variable in nature because bulk energy storage can be dispatched in conjunction with variable energy resources to produce a firm dispatchable renewable-energy resource.[11]

Bulk energy storage can substantially increase the load factor and utilization of existing and proposed transmission facilities – thereby optimizing existing transmission assets and avoiding unnecessary or premature transmission construction. It can also provide solutions during the often long lead-time required to develop/upgrade transmission infrastructure. Because transmission providers will naturally have a bias in favor of their existing transmission investments, capital improvements to such existing transmission, and costly new-build transmission solutions (incremental rate base and return to investors), bulk energy storage represents a quintessential example of why the Commission "cannot rely on the self-interest of

[10] NOI at P 13.

[11] *See Bottling Electricity* at 6.

transmission providers to expand the grid in a nondiscriminatory manner."[12] Indeed, as explained in a December 2008 report of the Electricity Advisory Committee:

> A utility that is guaranteed to receive cost recovery of either a transmission or generation project, or both, may have little incentive to put an energy storage project in place. Rather than invest in energy storage technology, a utility may simply opt to construct a transmission and/or generation facility, the costs of which are more likely to be approved and recovered.[13]

Mandating consideration of bulk energy storage solutions to transmission challenges is one essential step towards overcoming the natural inclination of a transmission provider to view every problem as a nail that requires the application of the transmission investment hammer.

In addition to optimizing existing transmission assets and avoiding unnecessary or premature transmission construction, bulk energy storage can play an essential role in the development of a "self-healing" Smart Grid by balancing large variations in load and generation. As the Department of Energy's National Energy Technology Laboratory has noted, grid-scale (*i.e.*, bulk) energy storage is essential if the Nation is "[t]o reap the full benefits of Smart Grid technologies. . . ."[14]

Bulk energy storage can also facilitate the integration of renewable energy resources, such as wind and solar power, into the transmission grid, both by enabling the more efficient use

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[12] *Preventing Undue Discrimination and Preference in Transmission Serv.*, Order No. 890, FERC Stats. & Regs. ¶ 31,241 at P 422 (2007), *on reh'g*, Order No. 890-A, FERC Stats. & Regs. ¶ 31,261 (2007), *on reh'g*, Order No. 890-B, 123 FERC ¶ 61,299 (2008), *reh'g denied*, Order No. 890-C, 126 FERC ¶ 61,228 (2009).

[13] *Bottling Electricity* at 16.

[14] U.S. Department of Energy, National Energy Technology Laboratory, *Recovery Act – Smart Grid Demonstrations*, Funding Opportunity No. DE-FOA-00000365, Funding Opportunity Announcement at 5 (June 25, 2009), available at https://www.fedconnect.net/FedConnect/PublicPages/PublicSearch/Public_Opportunities.aspx.

of existing and new transmission facilities and by addressing the variability of wind.[15] As the North American Electric Reliability Corporation explains with respect to wind:

> Wind generation ramps can have an inverse correlation (out-of-phase ramping) to daily load profiles resulting in the need for additional reserves. Operators may need to closely monitor the system and introduce operational resources, such as Demand Response or energy storage, that support the variability and ancillary services needed to reliably support integration.[16]

Combining bulk energy storage and renewable resources can produce a firm dispatchable resource,[17] thus greatly increasing the renewable resource value. In so doing, it "opens the door to participation in baseload markets" for wind.[18] In sum, bulk energy storage can make renewable-sourced energy available to consumers in all hours of the day.

Bulk energy storage also can provide the ancillary services needed to integrate more renewable energy, including:

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[15] *See* Samir Succar, *Impact of Aggregated Wind Output on Wind Integration Costs* at 1 (June 2009), *available at* http://www.usaee.org/usaee2009/submissions/OnlineProceedings/Succar%20AggregBaseloadWind%20IAEE%202009%20v2.pdf ("*Impact of Aggregated Wind Output*").

[16] North American Electric Reliability Corporation, *2009 Scenario Reliability Assessment* 10 (Oct. 2009), *available at* http://www.nerc.com//files/2009_LTRA.pdf.

[17] *See Bottling Electricity* at 6.

[18] Samir Succar & Robert H. Williams, *Compressed Air Energy Storage: Theory, Resources, and Applications for Wind Power* at 65 (Princeton Environmental Institute Apr. 8, 2008), *available at* http://www.energystorageandpower.com/pdf/SuccarWilliams_PEI_CAES_2008April8.pdf. The authors explain:

> The variability of wind makes it impossible for a "pure" wind system to provide baseload power. Moreover, current and prospective high natural gas prices exclude natural gas combined cycle power technology from providing baseload power if there is a substantial amount of coal power on the grid. But coupling wind to CAES makes it possible for wind to deliver firm power. And the use of wind to provide compressor energy results in fuel consumption that is sufficiently low for wind/CAES to be competitive with coal in economic dispatch. This represents an important opportunity for both wind and natural gas to compete in baseload power markets, and opens the door to an important option for realizing cost-effectively deep reductions in GHG emissions from the power sector.

Id.

- Regulation and Frequency Response Service,
- Reactive Power Support,
- Energy Imbalance Service,
- Operation Reserve Service,
- Spinning Reserve,
- Supplemental Reserve,
- Black Start Service, and
- Generator Imbalance Service.

Additionally, bulk energy storage can assist in meeting environmental objectives related to carbon reduction and air quality initiatives by providing services that would otherwise be provided by fossil-fueled generation. Bulk energy storage thus provides an environmentally benign way to ensure that the lights stay on when the wind is not blowing and the sun is not shining. It does so by "salvaging" low-value energy generated when the wind is blowing or the sun is shining but the lights are off, and making that energy available for use when needed. As explained in a recent paper co-authored by researchers from the Electric Power Research Institute: "CAES is an effective way to store renewable energy from wind energy that is produced during off-peak periods of the day. This energy arbitrage reduces CO_2 emissions that are normally higher during on-peak hours."[19]

Finally, bulk energy storage technologies are large-scale options (hundreds of megawatts typically) that connect at transmission level voltages, unlike other storage technologies which are primarily considered for distributed applications, given the state of their development. Bulk

[19] Robert B. Schainker, *et al.*, *New Utility Scale CAES Technology: Performance and Benefits (Including CO2 Benefits)* at 1 (Sept. 2007), *available at* http://www.energystorageandpower.com/pdf/epri_paper.pdf. *See also Impact of Aggregated Wind Output* at 2 (explaining that a combination of wind and CAES has lower greenhouse gas emissions than either conventional baseload technology or wind backed by gas-fired generation). While the focus of many of these comments has been on wind, the same can be said of bulk energy storage as an enabler of solar power.

storage technologies CAES and PHS can be further distinguished from distributed options in that they pose little or no technological risk, are considered fully mature, technologies offered by established suppliers, and can be purchased as fully commercial, financeable systems. Because these systems are proven, they pose little or no additional reliability risk to the grid.

B. Energy Storage Devices That Perform Transmission Functions Should Be Eligible For Transmission Rate Treatment, Including Applicable Incentives.

As the Commission has observed, electricity storage devices "do not readily fit into only one of the traditional asset functions of generation, transmission or distribution" because they "can resemble any of these functions or even load."[20] As a result, the Commission determines the classification of such devices on a "case-by-case basis."[21] When bulk energy storage projects are operating to "mimic a wholesale transmission function," and have a "mechanism to deal with the potential costs and revenues" from any "market operation,"[22] those projects should be treated as transmission resources by the Commission.[23]

CAREBS urges the Commission to make clear that when energy storage devices – including a CAES or PHS facility – is performing a transmission function, *e.g.*, displacing new-build transmission that would otherwise have been required to integrate variable energy resources, that device should be eligible to be treated on a comparable basis with traditional "wires" projects, including with respect to rate treatment. To be clear, CAREBS is not suggesting that energy storage devices ***always*** be deemed to perform a transmission function or that such facilities automatically qualify for transmission rate treatment. To the contrary,

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[20] *Western Grid Development, LLC*, 130 FERC ¶ 61,056 at P 44 (2010) ("*Western Grid*"). *See also AES Westover, LLC*, 131 FERC ¶ 61,008 at P 7 (2010) ("*AES Westover*").

[21] *Western Grid* at P 44.

[22] *Id*. at P 48.

[23] *See id*. at P 43.

CAREBS agrees with the Commission that energy storage devices do not readily fit into the traditional generation, transmission and distribution categories, and recognizes that, in many instances, storage facilities will be able to participate in the markets as generation and/or demand response resources.

Nor is CAREBS seeking a rule granting bulk energy storage projects preferential treatment relative to traditional transmission projects. But where a bulk energy storage project can provide the same benefits as all or part of a new-build transmission project at lower cost, the owner of that resource should be permitted to seek transmission rate treatment on a basis comparable to that available to the transmission provider. While it is perfectly reasonable to expect that bulk energy storage projects seeking transmission rate incentives meet the same requirements as traditional transmission projects, including requirements relating to regional transmission planning contemplated by Order No. 890, they must also be given an opportunity to participate in the planning processes on an equal footing with traditional transmission providers.[24]

The Commission made clear in Order Nos. 679 and 679-A that it "will authorize incentive based rate treatments for investment by public utilities, including Transcos, in new transmission capacity that reduces the cost of delivered power by reducing congestion or promotes reliability"[25] as long as the requested incentives are "tailored to address the demonstrable risk and challenges of the applicant."[26] Such incentives include Return on Equity ("ROE") adders, additional cost recovery for Construction Work In Progress, and cost recovery

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[24] *See* Initial Comments of the Coalition of Advance Renewable Energy Storage Through Bulk Storage, Docket No. AD09-8-000 (filed Nov. 23, 2009)

[25] *See Promoting Transmission Investment through Pricing Reform*, Order No. 679, FERC Stats. & Regs. ¶ 31,222 at P 37 (2006), *on reh'g*, Order No. 679-A, FERC Stats. & Regs. ¶ 31,236 at P 115 (2007).

[26] *See* Order No. 679-A at P 115.

when projects that are abandoned for reasons beyond the developer's control. In *Western Grid*, the Commission applied these criteria, without revision, to energy storage devices determined to be wholesale transmission facilities.[27] CAREBS requests clarification that the Commission will continue to apply such criteria to energy storage devices providing a transmission function.

Given that the inclusion of bulk energy storage projects as transmission resources is still relatively novel, and that many bulk energy storage projects are using advanced technologies that are capital intensive, CAREBS believes it is essential for the Commission to provide firm guidance that bulk energy projects will be treated like other transmission projects in order to incentivize open competition in transmission service. As discussed above, this proceeding is an appropriate place for the Commission to make such a determination because the lack of storage is a barrier that must be overcome in order to effectively integrate variable energy resources.

C. Owners/Operators Of Energy Storage Devices Should Be Able To Obtain EWG Status, Even If Those Devices Have Been Functionalized As Transmission Facilities For Ratemaking Purposes.

While the Commission can and should allow energy storage devices that perform transmission functions to be eligible for transmission rate treatment and applicable incentives, it should likewise make clear that the classification of a device for ratemaking purposes is not determinative for purposes of obtaining EWG status. In a recent order granting the application for EWG status by a battery storage facility, the Commission made a point of noting that:

> [O]ur decision here addresses whether the Facility is an "eligible facility" as defined in the Commission's regulations implementing PUHCA 2005, and it is not determinative of how any particular electricity storage facility should be viewed for purposes of specific provisions of the Federal Power Act. Nothing in this order

[27] *See Western Grid* at PP 81, 95-98 (granting an energy storage project 100 percent CWIP, a 50 basis point ROE adder reflecting participation in an RTO/ISO, a 100 basis point incentive adder for being a Transco, and a 45 basis point incentive adder for using "advanced technology.")

> is intended to interfere with or prejudge a general rulemaking in the future.[28]

Consistent with the foregoing, CAREBS requests that the Commission affirmatively state that an energy storage device may be considered an "eligible facility," the owner or operator of which may obtain EWG status, even if it has been functionalized as a transmission asset for ratemaking purposes.

As discussed above, CAREBS agrees with the Commission that energy storage devices can have attributes of both transmission and generation, and it is for that reason that CAREBS believes such devices should be eligible for transmission rate treatment under appropriate circumstances. At the same time, however, there is no question that when electric energy is being "withdrawn" from an energy storage device (*i.e.*, stored energy is being converted into electric energy), that device is functioning as a generation facility. Given that electric energy is being "injected" into energy storage device (*i.e.*, electric energy is being converted into stored energy) in order to be withdrawn and sold at some later time, it is entirely appropriate that the owner/operator of such a device be regarded as engaged exclusively in the business and exclusively in the business of owning or operating, or both owning and operating, an eligible facility and selling electric energy. Provided that energy is sold at wholesale, therefore, the owner/operator should be able to obtain EWG status, irrespective of how the device has been functionalized for ratemaking purposes.

[28] *AES Westover* at P 8.

V.

CONCLUSION

WHEREFORE, for the foregoing reasons, CAREBS respectfully requests that the Commission take these comments into account in determining what further actions are warranted in response to comments on the NOI.

Respectfully submitted,

THE COALITION TO ADVANCE RENEWABLE ENERGY THROUGH BULK STORAGE

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