Stakeholder Comments - MegaWatt Storage Farms

Subject: Getting to 33% Renewables Portfolio Standard – Renewable Transmission Projects

Submitted by	Company	Date Submitted
David MacMillan and Edward G. Cazalet	*MegaWatt Storage Farms, Inc*	*Sept. 30,2009*

MegaWatt Storage Farms appreciates this opportunity to submit its comments and thanks the CAISO for leading the stakeholder process to address transmission for the 33% RPS.

The challenge of providing power that is both clean and reliable and that meets the 33% RPS is formidable, but by making full use of technologies available today, we believe it can be successfully met.

Key Challenges and CAISO Straw Proposal - MegaWatt's Comments

The CAISO has released a straw proposal "Getting To 33% Renewables Portfolio Standard: Establishing A New ISO Tariff Category For Renewable Transmission Projects A Straw Proposal And Issue Paper" and invited comments. This "Getting to 33%" straw proposal discusses the transmission challenges that need to be resolved, including:

- Need for an efficient transmission network
- Capable of delivering the 33% RPS target
- Need to move quickly (but ...)
- Need to avoid stranded investment, overbuilding, or inefficient project sizing

The tension between the last two bullets is worth drawing attention to. New transmission lines can take a decade to build and are fraught with risks of delays and cancellation due to "not in my backyard" and other political concerns. Lines built for transmission of renewables also have the risk that once built, they will be severely underutilized if the renewable generation of choice shifts (for example, from remote wind and solar, to distributed PV on commercial buildings, as some experts are now advocating.) The fact that lead times for transmission construction are longer than the time it takes to deploy solar or wind makes the transmission risk profile particularly high.

Given the issues listed in the above bullets, the CAISO straw proposal recommends creation of a new category of transmission that fast tracks network upgrades identified in the generation interconnect process. A new tariff built around this idea is discussed and the CAISO straw proposal outlines how this new, separate transmission track will be added to the existing approaches.

MegaWatt's Perspective

We note that a straw proposal means an idea that is generally floated to solicit other stronger ideas.[1] In that spirit, MegaWatt respectfully submits that any transmission plan, or transmission planning process, that is built around meeting the 33% RPS standard, which fails to take full account of how storage can be used, will do woeful injustice to the the ratepayers of that jurisdiction.

As a result, MegaWatt advocates rethinking the transmission planning process around the idea that storage is a powerful new entity on the grid that should be considered with at least equal status to that afforded generation, wires and load.

In fact, since storage can reduce energy consumption by making the transmission system more efficient, we contend that storage stands first in the Loading Order, in the energy efficiency category. (Storage can reduce consumption of energy because losses on transmission lines are proportional to the square of the current. Storage can be located close to a load center. By moving energy into the storage when transmission lines are lightly loaded, the energy losses due to transmission can be significantly reduced. Storage also can be used for other forms of energy conservation, including: as an alternative to running fossil plants to provide frequency regulation, load following and ramping during periods when renewables can provide sufficient energy; as a way to absorb extra energy when the load is light and hydro is spilling water due to high spring melt; and as a way to avoid feathering wind farms during over generation.)

The word storage is not mentioned once in the "Getting to 33% ..." document, despite the fact that:

- The CAISO's studies and personnel have made it clear that storage can be a key element in solving the challenges presented by California's RPS standards. [2]

- Most other grid operators planning high levels of renewables have reached and publicly released similar conclusions.

[1] From Mirriam-Webster dictionary online: Main Entry: straw man
Function: noun, Date: 1886 - 1 : a weak or imaginary opposition (as an argument or adversary) set up only to be easily confuted.

[2] Some examples: the document "Integration of Renewable Resources, CAISO Report, November 2007", available at http://www.caiso.com/1ca5/1ca5a7a026270.pdf, presentations by David Hawkins and others of CAISO, and (most recently) comments by Jim Detmers, CAISO VP Operations, at his talk at Solartech on Monday September 21, 2009.

- At the Federal level, The President's Council of Advisors on Science and Technology concluded "It is difficult to overstate the importance of energy storage." [3]

- Subsequently, a Congressional Subcommittee report said "To deal with the variability of the wind energy output, approximately 50 GW of new peaking plant gas turbines would be used to supplement or compensate for the variability of the wind power's output. Energy storage could serve a portion of this needed capacity." [4]

- Storage is lower cost alternative to generation and transmission for many applications.

- The recent DOE solicitations for billions of dollars of stimulus money for energy storage for EVs and grid, highlights the commitment to storage at the federal level. [5]

- Some grids are acting now on the green benefits of storage, such as the recent 150 MW NAS storage order by EDF in France for use with PV [6] and the even larger 65 billion yen order from Abu Dhabi (over $700 mil at 90 yen/$) for use in cutting fossil emissions. [7]

- We note also that Japan currently has over 200 battery storage installations totaling over 1800 MWh. Japanese grid executives tell us that battery storage is as inexpensive as pumped hydro, with much more flexibility.

MegaWatt has advocated that California needs at least 4 GW of storage on the grid by 2020. Dr. Edward Cazalet of MegaWatt has presented this estimate at multiple conferences over the last year, to thousands of attendees, including key personnel from utilities, regulatory agencies, CAISO, engineering firms and industry analysts. [8] The general response has been that this

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[3] President's Council of Advisors on Science and Technology, The Energy Imperative: Technology and the Role of Emerging Companies, November 2006, http://www.ostp.gov/pdf/pcast_energyimperative_final.pdf

[4] "Bottling Electricity: Storage as a Strategic Tool for Managing Variability and Capacity Concerns in the Modern Grid", Electricity Advisory Committee, December 2008, http://www.oe.energy.gov/DocumentsandMedia/final-energy-storage_12-16-08.pdf

[5] http://www.energy.gov/recovery/funding.htm

[6] NGK Insulators Reports Big NAS Battery Order, JCN - Japan's Corporate News Network, May 13, 2009, https://www.japancorp.net/Article.asp?Art_ID=21468

[7] NGK Insulators gets 65 billion yen order for batteries from Abu Dhabi, tradingmarkets.com, August 26, 2009, http://www.tradingmarkets.com/.site/news/Stock%20News/2499525/

[8] For example, "California 2020 Vision: GigaWatts ... of Storage", California Energy Commission Staff Workshop - Energy Storage Technologies and Policies Needed to Support California's Renewable Portfolio Standard (RPS) Goals of 2020, Dr. Edward G. Cazalet, April 2, 2009, http://www.energy.ca.gov/2009_energypolicy/documents/2009-04-02_workshop/presentations/1_7%20MegaWatt%20Storage%20Farms%20-%20Ed%20Cazalet.pdf

and:

estimate, if anything, is too low - we have had many, many people tell us their estimate of the need for storage is much larger.

We commented above on the tension between the 33% transmission challenges of "need to move quickly" and the "need to avoid stranded investment, overbuilding or inefficient project size."

Storage can be quickly installed - in many cases, under 1 year from concept to energizing. Thus storage presents a superb way to solve the "need to move quickly" requirement. Storage can be right-sized, at the right time, in the exact number of MW needed - these benefits address the issues of "overbuilding" and "inefficient project size." Some storage can be relocated, which addresses "stranded investment" risks. Where there are existing transmission lines, storage can provide a way to help these existing lines handle increased renewable energy, until such point as a major transmission upgrade can be made at low economic risk. A transmission planning process should evaluate such situations, giving storage an equal consideration relative to the options of immediately adding new lines or restringing existing lines.

We include by reference our earlier feedback of April 22, 2009, regarding including storage in the transmission planning process. [9]

To a large degree, storage is like an "elephant in a room." [10] Many see the value of storage, know that the need for it is real, and yet the planning process and transmission plan are ignoring it. As a result, it is not being considered as an economic alternative to transmission.

But something even worse is happening - severe myopia when looking at the elephant. That elephant is not a mouse!

Specifically, if our 4 GW storage estimate for 2020 is even partially achieved, this will materially change the timing and size of flows over the transmission network. As a result, the mere existence of that storage (even if it is all installed under generation tariffs rather than under transmission tariffs) will markedly change the optimal sizing, placement and timing of transmission system upgrades.

Consequently, it is <u>essential</u> that the transmission plan account for storage.

"California 2020 Vision: GigaWatts ... of Storage" - Northwest & Intermountain Power Producers Coalitions Seattle WA - 12 March, 2009, http://www.megawattsf.com/documents/Cazalet_-_NIPPC_March_12_2009.pdf

Also see MegaWatt's web Site, http://www.megawattsf.com/gridstorage/gridstorage.htm

[9] CAISO's 2010 Transmission Plan Study Plan Revision, Comments of MegaWatt Storage Farms, Inc., April 22, 2009, http://www.caiso.com/23ac/23ac80fa18780.pdf

[10] "Elephant in the room" is an English idiom for an obvious truth that is being ignored or goes unaddressed. It is based on the idea that an elephant in a room would be impossible to overlook; thus, people in the room who pretend the elephant is not there might be concerning themselves with relatively small and even irrelevant matters, compared to the looming big one.

Recommendations

In support of the above Perspective, we recommend that the CAISO:

- Explicitly include storage in its grid planning process, including in the transmission plan,
- Identify likely deployment scenarios for distributed renewables, and the distributed storage likely to be deployed in conjunction with these distributed renewables,
- Identify the degree to which storage can be located at remote renewables sites to reduce, defer or eliminate transmission upgrades,
- Analyze storage as a viable alternative to new transmission and to transmission upgrades,
- Build a transmission plan around the flows on the grid that will occur based on expected storage deployment scenarios, and
- Work proactively with FERC, the CPUC, the CEC and other agencies to create a favorable environment for taking full advantage of storage's many benefits (see Appendix for a list of benefits).

We believe the above are necessary steps to providing California ratepayers and utility customers with a reliable, cost effective network.

Summary

In recognition that the existing planning process can't meet the 33% RPS goal, the CAISO has wisely opened the issue of changing the transmission planning process. We applaud that the CAISO has floated a straw proposal early, so as to identify any shortcomings in the revisions, while there is still time to make revisions to the new planning process.

We respectfully submit that the omission of storage in the both current and planned transmission planning process is a serious problem that needs to be corrected.

Again, MegaWatt thanks the CAISO and its employees for the dedicated hard work they have invested to meet both the 20% and 33% renewable goals. We are very empathetic to the risk taken in floating a straw proposal or floating new ideas. Our strongly worded comments above should be taken in the context of what we are trying to accomplish - redirect the momentum of a massive industry to take full advantage of the tremendous benefits offered by storage.

Appendix

Benefits of Storage

For those readers not familiar with the benefits of storage, we briefly summarize them below. Storage comes in many shapes and forms, including various battery technologies, plus flywheels, pumped hydro and CAES. The specific mix of benefits provided varies depending on which storage technology is used - not every storage technology provides each benefit.

- Storage can boost the utilization of existing transmission lines. With storage, transmission lines do not have to be sized to meet the peak demand - lines can be sized closer to the average demand. This can defer or eliminate the need to build new lines, by allowing better utilization of existing lines.

- Storage can provide regulation services (second-by-second addition of energy to / from the grid to keep total generation precisely matched to total load.)

- Storage can provide load following (adjusting to shifts in wind and solar over timeframes of minutes to hours)

- Storage can provide ramping (compensating for multi-hour changes in renewable outputs)

- Storage can respond instantly (under a second, versus fossil plants taking tens of minutes)

- Storage adds no energy to the grid while it is standing by to protect against a drop-off in the output from renewables. (In contrast, fossil plants create energy and emit pollution when standing by at minimum settings - this energy is unwanted when renewable generation is high.)

- Storage has zero emissions (except CAES)

- Most storage uses zero water resources

- Storage can be quiet

- Storage located near loads can reliably provide power to a community during a blackout

- Storage can be quickly deployed, typically in a few quarters. In contrast, fossil plants take years (and are almost impossible to site in urban areas.) Transmission can take up to a decade to obtain right-of-ways and build.

- Storage can be installed of any size, in almost any location, at almost any time (what we call "right-sized, right-located, at the right time".) This has huge optionality value in the face of uncertain renewable projects.

- Many types of storage can be relocated in the event the needs of the grid change.