

# DOCKET

11-IEP-1N

DATE MAY 11 2011

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## comments due

**Written comments;** for May 16, 2011. “Energy Storage for Renewable Integration”

[[docket@energy.state.ca.us](mailto:docket@energy.state.ca.us)]

California Energy Commission

Dockets Office, MS-4

Re: Docket No. 11-IEP-1N

1516 Ninth Street

Sacramento, CA 95814-5512

Original signed by” Garth Barker Wild River Consulting

Topics:

2) explain the electric power system and the issues with integrating renewable generation;

3) discuss how energy storage can support renewable integration.

### **Public involvement request:**

To: [PublicAdviser@energy.state.ca.us](mailto:PublicAdviser@energy.state.ca.us)

Though not a registered stakeholder in the process for developing a workable storage program for the State of California; I am involved with an energy development company (Symbiotics) in the process of licensing grid level bulk storage within the Western Interconnect.

Within this process we have requested the WECC/TEPPC Transmission Scenario Planning Committee to model Closed Loop Pumped Storage (CLPS), particularly our Utah and Oregon projects as transmission assets for the planning study request process.

### **To Whom it May Concern,**

Some interesting issues have resulted from this request that the CEC should be interested in knowing; the following are comments that address CEC topics from the May Workshop however they are formed as comments to the WECC/TEPPC committee requesting re-evaluation of our Study Requests and have a profound correlation to what California is doing in the storage arena.

To: WECC/TEPPC

Transmission Expansion Planning Policy Committee (TEPPC)

Bradley Nickell, Director of Transmission Expansion Planning, [bnickell@wecc.biz](mailto:bnickell@wecc.biz)

Heidi Pacini, [hpacini@wecc.biz](mailto:hpacini@wecc.biz)

Topic: **DRAFT TEPPC 2011 Study Program Public Comment** / Requests for reconsideration of the study cases.

To whom it may concern,

Please consider the following as public comment; also a request to reconsider. The following statement found in appendix D of the draft 2011 Study Request concerns and confuses those who submitted study requests for Parker Knoll and Swan Lake pumped hydro storage projects to TEPPC Transmission Expansion Planning Policy Committee for the WECC Scenario Planning effort.

Concerns: "Past experience indicates energy storage does not have a noticeable impact on production cost model runs without significant penetrations of renewable resources being present in the study case. As such, the following requests for energy storage study cases will be addressed when study cases are identified with appropriate levels of transmission congestion or renewable penetration near the storage project of interest."

It is well documented that energy storage will be a profound element of the national energy grid; in fact one of the power industry leading entities, California Energy Commission CEC is responding to legislation to include storage as an necessary part of their future energy needs, not only to help integrate renewable energy but to aid in meeting their robust 33% clean energy goals. CEC is in the process at this time to establish market values for the benefits found at all levels of storages' inclusion into the energy grid. As early as 1980, industry experts and academicians have understood that energy storage is a vital element for a complete, integrated National energy grid; see: Joseph Silverman, National Academy of Sciences.

"Energy storage: A vital element in mankind's quest for survival and progress, transactions of the international assembly, 1st, 1979," in *PESC Record - IEEE Power Electronics Specialists Conference*, 1980, pp. 579.

Our study requests to include bulk grid storage as a transmission asset in scenario planning seemed well founded and supported by numerous studies on the benefits and attributes of storage. With the technological improvements of variable pump turbine designs described in our study request that outline numerous ancillary benefits along with the more traditional use of pumped hydro for arbitrage or the time shifting of unused energy; it seemed perfectly sound that bulk storage should be considered for study as a transmission asset. The integration of variable renewable energy generation using storage rather than combustion generation for load following ramp up and down should also be an important consideration for WECC scenario planning in view of the ever growing concern of the need to reduce Ghg emissions.

The determination, by the model used, that bulk storage is only assigned as an avenue for the integration of renewable energy rather than a transmission asset to address environmental re-dispatch, deferment of transmission buildup, avoidance of increased emissions, among other attributes, needs re-evaluation for WECC scenario planning efforts.

“This problem has been noted many times. For example, “traditionally, when electric utilities evaluate generating additions to their facilities, the evaluation process considers the contribution of each alternative to both capacity and energy requirements. However, the evaluation process often neglects or inaccurately measure potential costs and benefits not directly related to capacity and energy. Operating considerations that reflect the ability (or inability) of a generation resource to respond to the electric system’s dynamic operating needs usually fall into this category.” (Jabbour and Wells 1992).

There are models available that address storage and its benefits / value as related to the grid; since storage as a whole offers both load serving attributes and generation benefits, it is suggested that WECC/TEPPC incorporate scenarios developed via more precise modeling for transmission planning.

REFlex is a reduced form dispatch model that evaluates the limits of variable renewable generation as a function of system flexibility. It can also evaluate the role of enabling technologies such as demand response and energy storage. It is an updated version of the PVFlex model described in the following articles: *Evaluating the Limits of Solar Photovoltaics (PV) in Traditional Electric Power Systems*, by Paul Denholm and Robert Margolis, NREL Report No. JA-640-41459; [doi:10.1016/j.enpol.2006.10.014](https://doi.org/10.1016/j.enpol.2006.10.014)<sup>[1]</sup> and *Evaluating the Limits of Solar Photovoltaics (PV) in Electric Power Systems Utilizing Energy Storage and Other Enabling Technologies*, by Paul Denholm and Robert Margolis, NREL Report No. JA-6A2-45315. [doi:10.1016/j.enpol.2007.03.004](https://doi.org/10.1016/j.enpol.2007.03.004)<sup>[2]</sup>

#### Referenced

1. ↑ [1.0 1.1](#) "[Evaluating the Limits of Solar Photovoltaics \(PV\) in Traditional Electric Power Systems](#), NREL Report No. JA-640-41459"
2. ↑ [2.0 2.1](#) "[Evaluating the Limits of Solar Photovoltaics \(PV\) in Electric Power Systems Utilizing Energy Storage and Other Enabling Technologies](#), NREL Report No. JA-6A2-45315"

#### Conclusion for this comment:

It is apparent that storage will be the “Black Swan” for the energy grid and it is becoming apparent that there is resistance from those whose asset bases will be affected. “Business as usual” will change.

A recent confidential interconnection study shows that CLPS, when incorporated into the north western U.S., will change the way energy is generated – to the tune of approximately 24 million dollars per year; a loss the ISO’s are reluctant to accept. Simply put CLPS removes much of the need for ramping and spinning reserve combustion generation; an eventuality that’s needed to meet numerous States’ RPS goals.

In other areas of the WECC, when storage is incorporated, bi-directional, sub-hourly markets will be possible; again a profound and expensive change for all fossil based fuel generation assigned to balancing, due to a better, cleaner choice for the integration of variable renewable generation.

T&D deferral, the potential to service Western Governors Association (WGA) WREZ projected renewable energy hubs and reduce fossil fuel base energy with time shifted, firmed,

dispatchable renewable energy, are important service products of bulk grid level storage, beyond traditional arbitrage. However, the potential benefits of storage are costly scenarios for the traditional power structure as we know it; resistance to change is real yet un-warranted- if a cleaner healthier environment is desired.

This commenter applauds the leadership role California has taken to place a value on the benefits of energy storage; Symbiotics, as a front runner for the development of environmentally sound bulk grid level storage, is willing to offer CPUC suggestion and opinion pertaining to the valuation of storage benefits, having a working knowledge of the attributes of advanced CLPS acquired during the development of their storage projects.

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