Comments by James Adcock on UE-191023 Regarding Energy Storage.

Docket number of this proceeding: UE-191023

Commenting party's name: James Adcock, Electrical Engineer

The title and date of the comment or comments:

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6/14/2020

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Re: Docket UE-191023 James Adcock Regarding Energy Storage

Restating the problem of Pumped Hydro, Battery Storage, and Hydro-Flow Synthetic Storage.

In addition to DR and other forms of customer-demand modification, there are two well-recognized and one less-well-recognized forms of energy storage available to utilities in the PNW which may be helpful in integrating variable renewables – particularly Wind and Solar into the operations of those utilities. I don't believe I need to further explain Pumped Hydro and Battery Storage. But it seems less well-understood that modulating the rate of power generation vs. pond energy storage of the region's gigantic Hydro Generation system – in large part BPA managed – can accomplish the exact same kind of energy storage as Pumped Hydro and Battery Storage. I believe "Wind Integration" is in effect already one such system. BPA also "automatically" to some extent modulates hydro to accommodate Wind and Solar, and to avoid putting power into market at low market prices. But, at least in theory, a utility could contract explicitly with a hydro provider to provide "power modulation" – which is the same as "energy storage" [barring rare spill] – equivalent to a "synthetic" battery storage facility or pumped hydro, potentially at a very attractive price. Of course, any such contract would have to be cognizant of the realities of fish and flood protection.

Since these three technologies are more-or-less equivalent in terms of energy storage I will simply refer to them together generically as Energy Storage in what follows.

Utilities use Energy Storage in at least three general ways:

1) Peak Shaving.

2) Smoothing out the variability of Wind and Solar renewables.

3) Arbitraging market prices – an attempt to buy power at low-priced times of day and sell at high-priced times of day.

These three usages can be managed in software, such that the Energy Storage system seamlessly switches between these three strategies – or even makes weighted trade-offs between them – at every moment of the time and day. Subject to transmission availability and efficiency, it does not particularly matter where such Energy Storage units are located. Placing one near a Wind Farm does not result in that Energy Storage unit being dedicated to that Wind Farm. Placing one near Mid-C does not result in the unit being dedicated to Arbitrage. And placing one near a load center does not result in the unit being dedicated to Peak Shaving. Where one is located may indicate, however, where a utility believes transmission issues at large may be minimized by that placement. Or placement may simply be dictated by other practicalities.

In general it is "A Good Thing" to allow utilities to perform such software seamless shifting and weighting between three modes. And in fact I don't know how one would prove that they are not doing so at any point in time.

The question then becomes:

"What portion of an Energy Storage" unit's costs can be properly charged to CEIP?"

and

"Was the energy that was placed into Energy Storage emitting, or non-emitting?"

I do not claim to necessarily know a "fair answer" to these questions. I do make one clear suggestion however:

"Energy placed into Energy Storage that was emitting, remains emitting when it comes back out, and energy placed into Energy Storage that was non-emitting when it went it remains non-emitting when it comes back out, and that the energy losses associated with that storage technology be allocated proportionally to the two respected kinds of energy being storage."

I.E. "No 'Pump Washing' Is Allowed!"

One possible "fair answer" might be to allocate Energy Storage CEIP costs proportionally to the actual yearly emitting vs. non-emitting energy storage in the unit. Utilities then wanting to claim a proportion of the Energy Storage unit against CEIP then would also have to accept the storage-losses related to the non-emitting stored in that Energy Storage unit.

Thank you for your consideration,

James Adcock, Electrical Engineer