COUNTERFLOW
By Steve Huntoon

The Test of Time

Big Transmission, Microgrids, Grid Batteries and Escape from New York

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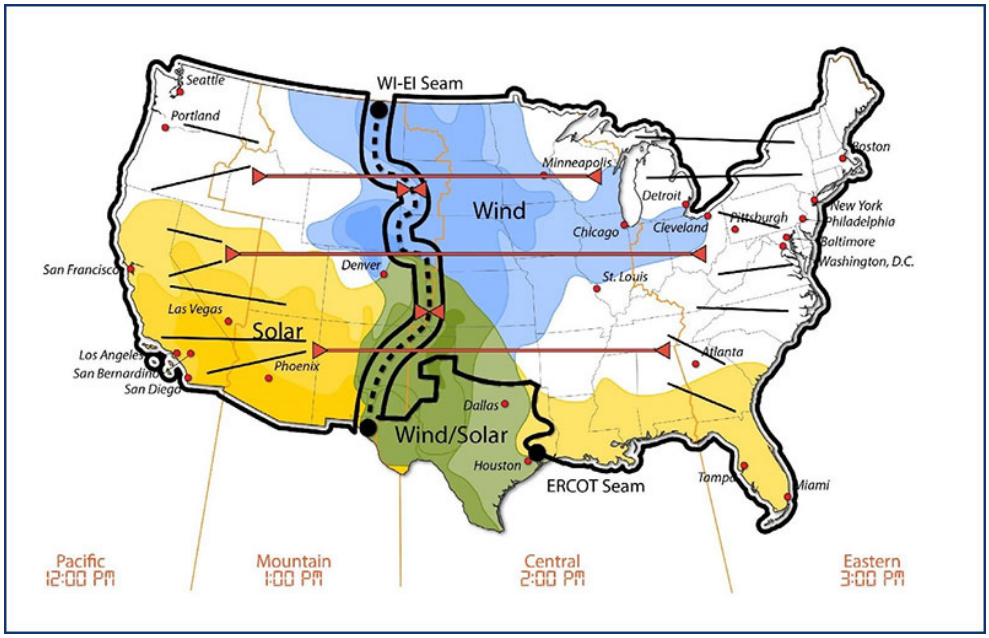
Three years ago I wrote skeptical analyses of Big Transmission, microgrids and grid batteries.

I thought it might be interesting to see how those analyses are holding up and add a New York note.



In its 2018 Interconnection Seams Study, the National Renewable Energy Laboratory's "Design 2b" envisions three HVDC transmission segments built between the Eastern and Western Interconnections, with existing facilities co-optimized with other investments in AC transmission and generation. | *NREL*

Big Transmission

"The Rise and Fall of Big Transmission"[1] gave the reasons why Big Transmission has never made sense. Much of it is pretty basic, such as the fact that energy is transmitted, not electrons. As Scotty said, you can't change the laws of physics.

Since that article, Clean Line Energy (remember them?) has sold off a couple pieces and seems to be otherwise winding down. Hopefully someone will write that history.

Getting a lot of hype last year was the release of a "study" led by the National Renewable Energy Laboratory claiming that huge interregional transmission projects make economic sense. [2] I put "study" in quotes because even though it was reported as a "study," it actually was a slide deck describing some future real study. A slide deck is essentially a black box because you can't tell what's going on with somewhat important stuff like input assumptions, algorithms, etc.

This study is like its predecessors that I debunked in the original article.

One screaming flaw is the study's claim of an estimated $14 billion cost for an HVDC transmission buildout to transmit 36 GW from west to east.[3]

Such an HVDC transmission buildout, if ever politically possible, actually would cost at least $50 billion under the least expensive Energy Information Administration estimate of HVDC cost per megawatt-mile of $700.[4] This minimum $50 billion cost is more than the study's claimed benefits.[5]

For Big Transmission, the song remains the same.

Microgrids

"Microgrids: Where's the Beef?"[6] explained why microgrids are an inherently uneconomic throwback to the utility islands of the 19th century (yes, that century). Amusingly, some microgrid proponents are now talking about the importance of integrating microgrids into the grid,[7] which of course is what the grid itself is all about: integration.

Microgrid proposals continue to proliferate but only where subsidized by Other People's Money, which in utility parlance means utilities get enormous returns on microgrid projects that are paid for by other — non-microgrid — customers.

The acid test should be whether microgrid beneficiaries are willing to pay for the cost of the microgrid themselves. The answer is never — because people aren't dumb.

One shocking attempted raid of federal taxpayers, and the undermining of our national defense, was a study by a consultancy Noblis for the Pew Charitable Trusts urging that our nation's military bases replace individual backup generators at critical buildings with base-wide microgrids. I pointed out in a later article[8] that because 87% of base outages were cause by on-base distribution system failures that centralizing backup base generation in a microgrid would dramatically *increase* outage risk for critical buildings. Not to mention that microgrids are inherently vulnerable to cyberattack while individual building backup, typically diesel, is not internet-connected and therefore not vulnerable to such attack.

My favorite factoid remains this: The nation's "flagship" microgrid at the University of California, San Diego flunked its acid test in the Southwest Blackout of 2011. The campus shut down with the rest of San Diego.[9]

You can't make this stuff up.

Grid Batteries

"Grid Batteries: Drinking the Electric Kool-Aid"[10] debunked this continuing infatuation of our *haute couture* crowd. The newest shell game is the notion of "value stacking," which is the equivalent of saying that you can jog around the neighborhood while watching your kids at home. No, not possible.

By the way, batteries *increase* carbon emissions.[11] Two reasons: The generation used to charge batteries tends to be dirtier than the generation displaced when batteries are discharging. And there are losses from converting AC to DC, storing energy and converting back. Batteries ≠ green.

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Battery boosters, realizing they can't make it on the merits,[12] have been lobbying regulators and legislators to subsidize them through procurement mandates, direct subsidies, utility rate base and other special treatment.

My favorite is New York arbitrarily deciding that 1,500 MW (oops, now 3,000 MW) of grid batteries sounded like a good, round number and putting up $265 million of Other Peoples' Money for that.[13]

Escape from New York

This is the same New York that is forcing the shutdown of the *economic* Indian Point Nuclear Plant; subsidizing *uneconomic* upstate nuclear plants; subsidizing 2,400 MW (oops, now 9,000 MW) of uneconomic offshore wind;[14] risking electric reliability in New York and New England and curtailing new natural gas home connections by blocking federally certificated natural gas pipelines;[15] paying $1,973 per public housing apartment to install LED lighting;[16] and stiffing Cheryl LaFleur,[17] a dedicated public servant, for another FERC term because Chuck Schumer didn't like a highly technical, totally correct NYISO decision.[18]

New York, you are a Green New Deal Mini-Me. Condolences.

Amazon, you got out while the gettin's good. Congratulations. ■

[1] *http://www.energy-counsel.com/docs/The-Rise-and-Fallof-BigTransmission-Fortnightly-September2015.pdf*. Big Transmission is somewhat arbitrarily defined by me as at least 250 miles of 500 kV.

[2] *https://cleanenergygrid.org/wp-content/uploads/2018/08/NREL-seams-transgridx-2018.pdf*.

[3] *https://cleanenergygrid.org/wp-content/uploads/2018/10/Seam-Study-Webinar_10_9_18_Final.pdf* (see slides 7 and 11 for three HVDC lines and the transmission capacity total of 36 GW under Design 2b, and slide 15 for the incremental capital cost of Design 2b of $13.67 billion).

[4] The cheapest HVDC cost per megawatt-mile is $700 per this EIA study, *https://www.eia.gov/analysis/studies/electricity/hvdctransmission/pdf/transmission.pdf* (pdf pages 33-34). $700 MW-mile x 12,000 MW each HVDC line x three HVDC lines x 2,000 miles each line = $50 billion. This does not include the enormous AC transmission facilities that would be required to accommodate the HVDC lines (i.e., inject/withdraw 12,000 MW each line from their converter stations in the middle of nowhere).

[5] The negative "Total Non-transmission Cost" of $45.16 billion on slide 15 of deck in footnote 3.

[6] *http://www.energy-counsel.com/docs/Microgrids-Wheres-the-Beef-Fortnightly-November2015.pdf*.

[7] *https://microgridknowledge.com/microgrids-islands-siemens/*.

[8] *http://www.energy-counsel.com/docs/Microgrid-Kool-Aid-and-National-Security-2017-03-14-RTO-Insider-Individual-Column.pdf*.

[9] *http://www.eenews.net/stories/1059996047*. ("The university's two 13.5-MW Trident turbines were running full-bore when power from the utility abruptly went dead. With no time to shed their load, the turbines also shut down, and the campus lost electricity.")

[10] *http://www.energy-counsel.com/docs/Battery-Storage-Drinking-the-Electric-Kool-Aid-Fortnightly-January-2016.pdf*.

[11] *https://www.vox.com/energy-and-environment/2018/4/27/17283830/batteries-energy-storage-carbon-emissions*.

[12] *https://www.greentechmedia.com/articles/read/why-is-the-texas-market-so-tough-for-energy-storage*. A long story about the Texas market that basically says batteries can't make it there because the Texas market is based on economic merit.

[13] *https://www.energy-storage.news/news/industry-reacts-positively-to-new-yorks-1500mw-energy-storage-target*.

[14] *https://www.rtoinsider.com/new-york-renewable-energy-109515/*. Gov. Andrew Cuomo claims that the offshore wind would be located in "this state." No, it would not. It would be located far outside New York's nautical boundary that is 3 miles from shore.

[15] *https://www.wsj.com/articles/gas-shortages-give-new-york-an-early-taste-of-the-green-new-deal-11550272395?mod=cx_picks&cx_navSource=cx_picks&cx_tag=contextual&cx_artPos=2#cxrecs_s*.

[16] *https://www.wsj.com/articles/1-973-leds-and-the-green-new-deal-11550274408*.

[17] *https://www.rtoinsider.com/lafleur-ferc-departure-110182/*.

[18] *https://www.poughkeepsiejournal.com/story/news/2014/07/03/molinaro-ferc-letter-reps/12193953/*.