Counterflow
By Steve Huntoon

Big Transmission — Still Not the Right Stuff

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Every couple years I critique Big Transmission. My original long-play version from 2015 is here.[1] And updates are here.[2] Just to be clear at the outset, by Big Transmission I mean long extra-high-voltage lines (typically DC voltage) — not incremental expansions like MISO's MVP Projects and SPP's Priority Projects, which make sense and get built.[3]

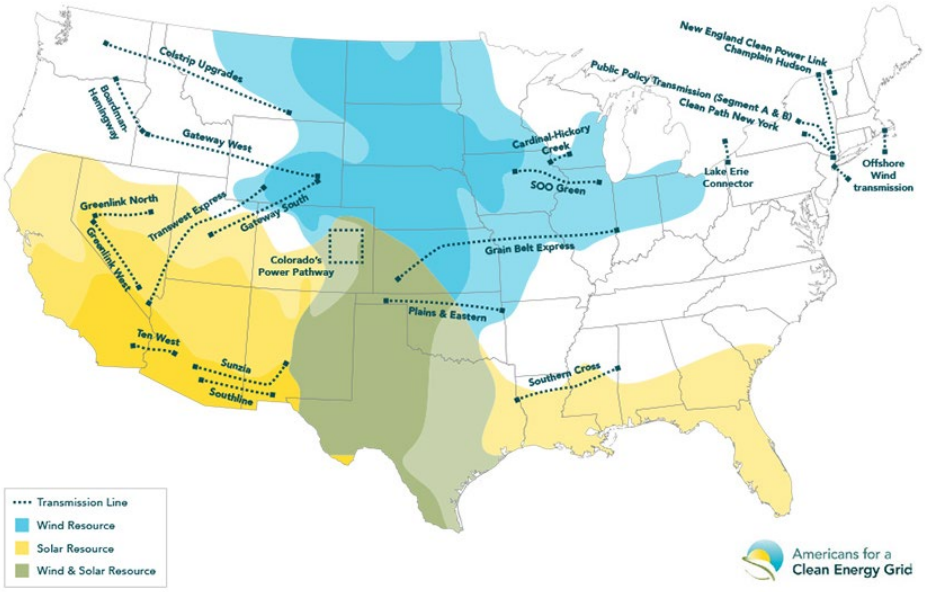
As Scotty Said, 'Ye Cannae Change the Laws of Physics'

The core problem with Big Transmission is the laws of physics. Unlike vehicles on the highway system — the oft-cited analogy for the grid — *electrons don't actually move (or least not more than glacially).*[4] That's why, as I have said before, nine times out of 10, the most efficient and fastest way to increase transmission capability to move new renewables to market is incremental upgrades of the existing grid.

To put it in practical terms, an upgrade of some substation equipment in PJM costing $2 million could potentially increase the transfer capability from MISO to PJM by 2,000 MW, whereas a new high-voltage transmission line adding equivalent transfer capability could cost $2 billion. The former could be done in less than a year while the latter could take 10 years (if ever). And, as I noted above, there are larger incremental projects worth doing that are not Big Transmission, such as MISO's MVP Projects and SPP's Priority Projects.

And then there's the matter of emergency (contingency) ratings. As I've said before, many transmission owners outside of PJM don't use unique emergency ratings for planning and interconnection studies.[5] Not to repeat the detail on why this matters (you can check out my column in the footnote for that) but suffice it to say that failure to use unique emergency ratings dramatically understates the true capability of the grid, and thus the ability to accommodate the renewable generation we need.

Unfortunately, these two sensible means of increasing renewable generation interconnection don't get the attention they deserve. Instead, much political and media attention is devoted to expensive Big Transmission projects that seldom make sense and are unlikely to get built.



Regionally significant transmission projects identified by Americans for a Clean Energy Grid as "shovel ready." | *ACEG*

And this focus on Big Transmission also distracts from non-grid means of reducing carbon emissions, such as the nine measures I offered in my last column.[6]

The Latest

Big Transmission has had a revival of late. Most recently the Biden Administration has bought into Big Transmission with a White House fact sheet promoting 22 "shovel ready" transmission projects as shown on this map.[7]

Most of the projects are Big Transmission that, as I've said, seldom make sense and are unlikely to be built.

This is illustrated by Princeton University's massive study released last December on pathways to net zero. Of relevance is the high electrification pathway with a huge transmission expansion costing $2.4 *trillion* by 2050, as shown on this map.[8]

So here's the question: How many of the Biden Administration's 22 projects have some parallel in the Princeton study's $2.4 trillion transmission expansion?

By my count, nine. So the remaining 13 Biden Administration projects don't make the Princeton study's cut for the best way to spend $2.4 trillion on transmission.

Wrong Rights of Way

The Biden Administration concurrently promoted Big Transmission's use of existing *highway* rights of way.[9] Big Transmission generally requires a 160-200 feet right-of-way,[10] while the design "clear zone" off the travel lanes of the largest highways is 46 feet.[11] It is unclear how 160-200 feet might fit into 46 feet (or less).

Not to mention the federal requirement that right-of-way use not impair the "aesthetic quality" of the highway.[12] I'm not sure what impairment of the aesthetic quality of a highway might be, but I have a feeling that Big Transmission might qualify.

The Princeton study reflects the rational planning concept of using existing *transmission* rights of way.

Experience in PJM shows the importance of using existing transmission rights of ways to upgrade the grid. The Potomac-Appalachian Transmission Highline (PATH) project, not principally in existing transmission rights of way, encountered enormous resistance and ultimately failed. The Trans-Allegheny Interstate Line (TrAIL) and the Susquehanna-Roseland projects, sited almost exclusively in existing transmission rights of way, were certificated and built.[13]

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Not Shovel Ready

As noted above, the White House claims there are 22 "shovel ready" Big Transmission projects that need only X to start. X is an amorphous concept.

Let's pick one of the projects and take a closer look: Southern Cross.

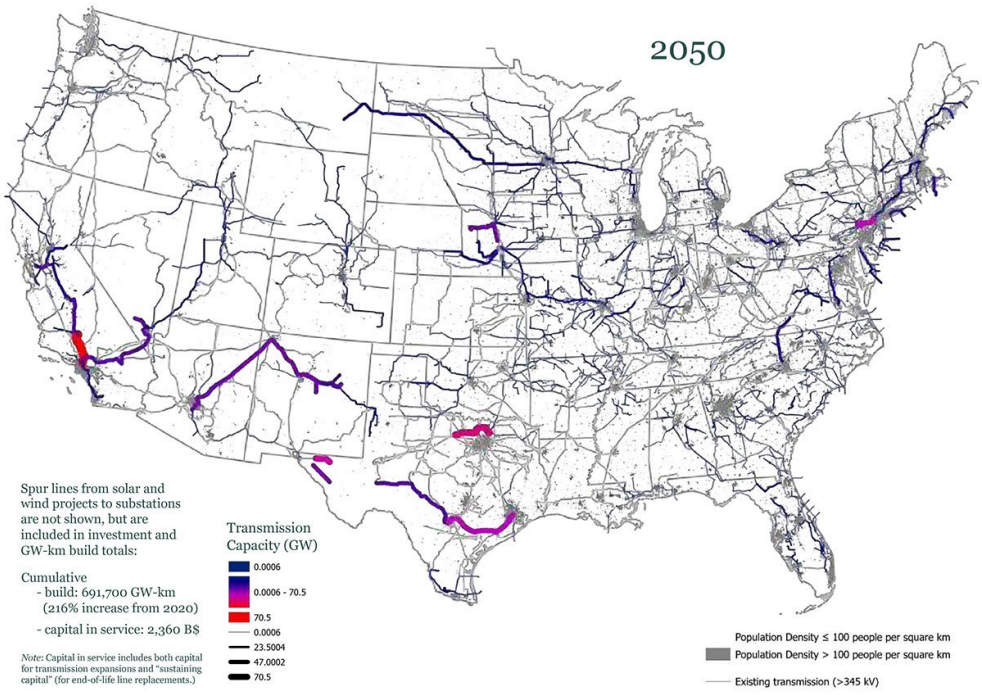
Yes, it's a great CSN song.[14] No, it's not "shovel ready."

In a nutshell this project, which has been around for more than 10 years, proposes to transmit 2,000 MW of Texas wind from the east Texas border to eastern Mississippi.[15] Exactly how west Texas wind is transmitted to the east Texas border isn't entirely clear, but be that as it may.

The Texas Commission imposed 14 tasks to be completed before the portion of the line in Texas could be done. ERCOT says Southern Cross has completed five tasks, is in progress on six and has not started three. [16]

Meanwhile in Mississippi, Southern Cross filed for a certificate in 2017, and it doesn't seem any progress has been made since then. [17]

In Louisiana, it appears no state commission filing has been made. It seems a certificate isn't necessarily required there,[18] but every landowner who refuses Southern Cross' offer can force litigation on, among other things, whether the project's attempted expropriation interferes "more than is necessary, with the convenience of the landowners."[19] Good luck with hundreds of Louisiana landowners on that.



Note: Transmission expansion is visualized along existing rights of way (>160 kV); paths are indicative not definitive.

Transmission expansions to support wind and solar generation in E+ scenario assuming aggressive end-use electrification with Base siting availability, 2050 | *Princeton University*

The FERC order in 2016 required Southern Cross to file a report on its open solicitation of customers.[20] No report has been filed, so it seems there's been no solicitation and thus no customers.

And presumably no financing. Maybe that's where the U.S. taxpayer comes in.

Wrapping Up

Big Transmission projects seldom make sense and are unlikely to get built. Incremental grid expansions focusing on existing transmission facilities and rights of way make sense and can get built. Not to mention the many non-grid measures that make eminent sense. ■

[1] http://www.energy-counsel.com/docs/The-Rise-and-Fallof-BigTransmission-Fortnightly-September2015.pdf.

[2] http://www.energy-counsel.com/docs/The-Test-of-Time.pdf and http://www.energy-counsel.com/docs/big-transmission-is-still-dead.pdf.

[3] https://cdn.misoenergy.org/MTEP17%20MVP%20Triennial%20Review%20Report117065.pdf; https://www.spp.org/documents/35297/the%20value%20of%20transmission%20report.pdf.

[4] Discussed at length in my original article. A cute writeup is here, https://www.google.com/url?sa=t&source=web&rct=j&url=https://www.bpa.gov/PublicInvolvement/CommunityEducation/CurriculumActivities/CurriculumDocuments/ride_the_surprisingly_slow_electron_express.doc&ved=0ahUKEwjAw7r7srvXAhUYwWMKHZuZALUQFggmMAA&usg=AOvVaw32-osI7Og-w5GRMue1G-tAS. And another here, https://www.khanacademy.org/test-prep/mcat/physical-processes/current-and-resistance/a/do-electrons-move-rapidly-through-direct-current-circuits.

[5] http://energy-counsel.com/docs/waste-not-what-not.pdf.

[6] http://energy-counsel.com/docs/we-see-through-a-glass-darkly.pdf.

[7] https://www.whitehouse.gov/briefing-room/statements-releases/2021/04/27/fact-sheet-biden-administration-advances-expansion-modernization-of-the-electric-grid/; https://acore.org/new-report-identifies-22-shovel-ready-regional-and-interregional-transmission-projects/; https://cleanenergygrid.org/wp-content/uploads/2019/04/Transmission-Projects-Ready-to-Go-Final.pdf. (page 5).

[8] https://netzeroamerica.princeton.edu/img/Princeton_NZA_Interim_Report_15_Dec_2020_FINAL.pdf (slide 136).

[9] https://www.fhwa.dot.gov/real_estate/right-of-way/corridor_management/alternative_uses_guidance.cfm.

[10] https://www.transmissionhub.com/transmission-101/basics.

[11] https://epg.modot.org/index.php/231.2_Clear_Zones; https://epg.modot.org/files/6/69/231.2_Clear_Zone_Distance 2019.docx

[12] 23 C.F.R. § 645.205.

[13] The history of these projects is provided in my 2015 article in footnote 1.

[14] A great music video of the song is here, https://www.youtube.com/watch?v=Bw9gLjEGJrw

[15] http://www.ercot.com/content/meetings/rpg/keydocs/2010/0813/Southern_Cross_RPG_Presentation_Aug_13_2010_FINAL_TO_ERCOT.PDF

[16] http://www.ercot.com/content/wcm/key_documents_lists/163228/PUC_Project_46304_Directive_Status_Dashboard_v12152020.pptx

[17] https://www.psc.state.ms.us/trinityview/mspsc.html (search for Case Year 2017, Case Type UA, Case No. 79). I also can't find any sign of federal permitting activity (Army Corps of Engineers, National Park Service, Fish and Wildlife Service), but it's hard to prove a negative.

[18] http://www.lpsc.louisiana.gov/_docs/_Orders/General%20Order%2010-10-2013%20(R-26018).pdf

[19] https://law.justia.com/cases/louisiana/supreme-court/1978/360-so-2d-848-1.html

[20] Southern Cross Transmission LLC, Docket No. ER16-2420, 157 FERC ¶ 61,090 (2016).