

Question	Answer
Why did you choose the HVDC you did in the TX study? MISO and SPP had their own outage problems, so it isn't obvious that those regions would have helped.	We chose HVDC as they are in different interconnections. MISO and SPP did have issues as well, but the timings were not the same and therefore it demonstrates how they could have helped each other. Going further is better, but adds costs and a network is better than long single lines
People have come around to accepting there is a need for a lot more transmission. What we need are ideas how to get it built. Got any?	Yes, build it underground where necessary and do it in a way that enhances the lower cost for bills. These are two ideas should easily enable more transmission.
Have we freed ourselves from SF6 step down vulnerabilities? at what cost?	Not fully, though there is active research in removing this gas from transformers and using other insulators for the breakers and equipment.
What opportunities exist to "add on" transmission to existing transportation proposals that would require similar ROW requirements?	There is lots of opportunities for existing ROW conversion from AC to DC that would increase capacity. There is also opportunities for electrifying transportation routes that could be enhanced by transmission augmentation.
On the question, would HVDC help TX, you're ignoring that over the long-term it will mean less generation gets built in TX because of competition. Thoughts?	No, we are not ignoring that at all. The generation within ERCOT was not producing at the time and the variability across ERCOT was not much better, meaning no matter how much was built outside assistance would be valuable. Indeed, with better ties, MORE generation would be built in ERCOT/Texas as they can export lower-cost electricity at different times to other regions. We want to build the minimum needed everywhere. Otherwise costs will get too high and resources too diluted.
Would a 3000MW HVDC tie become the largest source contingency requiring ERCOT to carry more reserves thus defeating some of the savings?	It would be a large contingency if it is assumed to be firm (which it likely would not) it would rather be an addition EIM type entity. Some savings might get removed with some addition reserves if that were the case.
Is HVDC politically possible in Texas/ERCOT? It seems like state officials are still opposed to interstate transmission even after the latest cold snap.	Too early to determine if it will become politically palatable in Texas. It provides more customers for their energy, so eventually, one would hope they might be convinced of the opportunity.
Do the 2050 scenarios include worst case scenarios impacted by climate change: e.g. large swaths of transmission damaged by wildfires or snowstorms?	Huge assumptions about the climate in 2050. Best case scenario is undergrounding the transmission. Solves both the wild fire and snow storm issues. Higher costs of course. Still lower cost than exclusive local generation.
To what extent can transmission help shut down some of the dirtiest and most damaging peaker plants?	Can help a lot given the ability to move remote resources locally and for small amounts of energy (peakers) this is warranted. The key would be reserve sharing agreements between regions and markets.
Are these affordable/accessible enough to be applied to textile industries' carbon contributions off the Citarrum River; amplifying GAP or the Ganga River BMP?	I am sorry, I don't have an answer to this.

Are there transmission requirements that require above ground installation or is underground an option for long range transmission lines?	Underground entirely possible. The price point can be higher based upon terrain.
Solar potential...isn't this based on current efficiencies of 20% which is going to increase. Germany does pretty well?	Not really a big change with efficiency. It just lowers the space or increases the ILR for same space. Highest efficiency in US is ~30-40%. Capacity factors are more important in driving costs.
For wind power: any plans for alternative/more sustainable materials to the current fiberglass-made panels??	The turbine blades are currently fiberglass. There is work ongoing with respect to graphene and carbon fiber. These are early days. More fruitful work is replacing fossil derived road surfaces with ground down turbine blades.
Isn't "ZBF 2050 TWh without climate change" a wrong assumption, since the impacts are already here and will continue; only the magnitude might be lesser/greater	No the "without climate change" is using baked in CC from data. The RCP values are from projections that are estimates of the future. Just with all modeling. We need to determine the impacts of these on the systems. We can either optimize for them or test robustness of systems against change. We do both.
Is the \$1.2 billion cost for each of the HVDC line from SPP and MISO each, includes weatherization infrastructure?	No, the \$1.2 billion is the cost of the HVDC lines each. Weatherization of existing or new plants (wind) would be additional.
The dynamic view shows a lot of exporting energy to Canada . That surprises me. Especially the NY wind. What is driving that?	Lower cost VRE generation in US over the Canadian generation. The plots switch later in the year when we import. The model uses Canadian storage to its advantage over seasons
How do you see Canada playing into the transmission Storage picture	Canada and its great hydro resources are included. We do not overly rely on expansion into Canada as predictions are hard with respect to water and Canadian requirements in coming years.