



the future of electricity

June 18, 2018

Kelly Collins
Legislative Clerk
Committee on Energy and Commerce
2125 Rayburn House Office Building
Washington, DC 20515

RE: Responses to Additional Questions for the Record, "Examining the State of Electric Transmission Infrastructure: Investment, Planning, Construction, and Alternatives"

Dear Ms. Collins,

Please find enclosed my responses to the additional questions for the record submitted by Representative Upton and Representative Hudson following my testimony before the Subcommittee on Energy on Thursday, May 10, 2018.

Hard copies of these responses will be mailed to you via FedEx, and an email copy of these responses will be sent to you at Kelly.Collins@mail.house.gov.

Please be in touch with any further questions.

Sincerely,

A black rectangular box redacting the signature of Edward N. Krapels.

Edward N. Krapels
Chief Executive Officer
Anbaric Development Partners, LLC

Question from the Honorable Fred Upton:

1. *You are an infrastructure developer and you've actually built transmission projects, including an underwater DC cable connecting New Jersey with Long Island. As you know, DC lines have been around ever since Thomas Edison championed the technology.*

- a. *Can you explain why high-voltage DC transmission lines are not more prevalent in this country?*

Answer: The US electric system was built from the inside out: from the cities to the country. As a result, electric systems were organized first where there were a lot of consumers and only much later was electric service extended out to rural areas. Not accidentally, extension to the countryside required an act of congress (The Rural Electrification Act of 1936). It was natural that the incentives of electric companies was to economize on the transmission side of the business. Better short distances to consumer demand areas than long ones, and AC was cheaper from that perspective than DC, which always needs a considerable investment in converter stations (converting from AC to DC on one end, and DC to AC on the other end of the transmission line).

Where electricity had to be transmitted a very long distance (which only made economic sense if the remote generating sources was especially desirable), DC technology received greater consideration. Thus, the Pacific Intertie was built in the 1980s to allow California to obtain power from the Columbia River hydro system, and the Quebec – New England DC project was built in the 1990s. Also, in the 2000s, a series of DC projects (Cross Sound Cable, Neptune and Hudson) were built to connect the downstate New York market to New Jersey and Connecticut.

These projects constitute a tiny fraction of the overall North American transmission system. This stands in marked contrast to the American acceptance of the interstate highway system as the lifeblood of transportation commerce. The highway system, however, was a creature of the federal government. Washington has never placed the same political clout behind the building of an interstate electric transmission system. FERC's efforts to stimulate interregional transmission have largely been unsuccessful.

- b. *What are the major benefits of DC over AC transmission?*

Answer: Direct current is more controllable than alternating current, and it experiences smaller line losses over longer distances.

2. *In a recent article in the Electricity Journal you wrote that interregional coordination almost always reaches a dead end because transmission planners only care about the reliability of their own systems without having to rely on neighboring regions.*

Answer: Over the last two decades, innovative elective interregional transmission ideas have cropped up all over the country in response to the opening of transmission to competition by federal and most state regulators, but very few have been built. In the West, several multibillion dollar power lines are under development that would connect the resource rich areas of Wyoming, Nevada, and New Mexico to California. In New England, new transmission proposals are competing to better the links with Quebec and the Maritimes. In the mid-continent, bold transmission initiatives would connect previously

unconnected states and provinces. In each of these areas, inter-regional electric trade is touted as a beneficial result of new infrastructure. After all, transmission is to the power business what the interstate highway system is to the broader economy: it is the infrastructure that facilitates trade to the benefit of both sides of the line. Those who can make electricity more cheaply can transmit to those where it is more costly. Both sides benefit.

This is why FERC issued “Order 1000” in 2011, to accelerate the development of interregional transmission lines. Seven years later, however, little has been done in pursuit of this laudable objective, and this paper will argue that little has been done because FERC was not sufficiently prescriptive in how interregional projects should be treated by those who have the power to approve and maintain them at a regional and state level.

The new FERC commissioners appointed by President Donald Trump have a number of opportunities to free the development of innovative interregional transmission proposals from regulations that not only discourage anyone from proposing new projects, but render existing projects uneconomic. The development of new interregional transmission lines should be an important federal policy goal for the Trump Administration because it will promote economic growth within the United States. To get that growth, FERC needs to develop a more prescriptive policy on how such projects can be originated and how their cost should be allocated.

The primary reason to build interregional transmission lines should be similar to the primary reason to build the interstate highway system: as infrastructure that unites the states, and enables economic growth.

- a. *If we had this mentality, highways would end at state borders and we would not have an interstate highway system. How can we encourage or direct the development of inter-regional transmission lines?*

Answer: A key factor allowing the federal government to finance the majority of the cost of the interstate highway system was the willingness of President Eisenhower to promote and Congress to support the National Interstate and Defense Highways Act of 1956. It provided a new federal gasoline tax that was instrumental in the financing of this massive project. In contrast, no President to my knowledge has ever supported legislation to create an electric superhighway, nor has Congress initiated and passed such legislation. Without a federal push, it is extremely unlikely that the states – who have massively different electric market preferences – will provide the energy or the funding to create one.

Extremely complex and unpredictable interconnection procedures, “mitigation” and regional transmission cost allocations imposed on “outside” customers have huge implications for interregional transmission projects. If they continue to be applied to new interregional transmission projects, very few will be built and some existing projects will become uneconomic. In many parts of America, transmission development is already incredibly difficult and demanding. Both existing and new penalties on interregional projects make it almost impossible.

Prevent the damage these regulations wreak starts with FERC. First, FERC should finally follow up on the promise made in Order 1000 and create a new category of cost allocation for interregional transmission lines. The narrowest version of “beneficiary pays” is simply too restrictive, because it tends to rely too heavily on a static analysis of the effects of transmission. In conventional electric power market thinking, a powerflow model will show that a new transmission line will raise the price in the “source” market and lower it in the “sink” market. But that static picture is never the entire picture.

Instead, a transmission line changes the dynamic topography of the region in which it sits: it creates a new dynamic that in one year might be to the advantage of the source market, and another year to the sink market. The courts have made this more difficult by insisting on extremely narrow “beneficiary pays” formulations that, had they applied to interstate highways, the interstate highways system would never have been built.

Second, FERC should direct all ISOs and RTOs to refrain from imposing mitigation rules on interregional transmission lines. States have a right, and some would argue the federal government has a responsibility, to encourage interregional transmission and thereby enhance competition. The mitigation rules prevent that from happening by raising, not lowering, barriers to entry.

Third, FERC must not allow ISOs and RTOs to impose disproportionately large costs on interregional transmission lines. Imposing costs on “foreigners” (THAT IS, American consumers in regions that receive power exports) is irresistible. While export customers should pay their fair share of maintaining reliability in the regions from which they import electricity, they should not be victims to the kind of extremely disproportionate allocations they have suffered in recent PJM procedures.

The new FERC of the Donald Trump era has an opportunity to dismantle the triple jeopardy. With that, not only New York, Connecticut, and New Jersey but also other parts of the country can get on with the development one of the critical components of the Administration’s infrastructure policy, and make electric America great again.

Question from the Honorable Richard Hudson:

On April 19, FERC issued a new rule (Order No. 845) concerning revisions to the interconnection process for large generators which are over 20 MWs. The intent of this rule is to reduce the backlog of interconnection queue requests, however, these new regulations put the onus on the transmission provider to develop new procedures to accommodate additional flexibility for interconnecting generators. The interconnection process is already quite complicated with several studies often required to determine the impact of the new generation on the transmission grid with various deadlines for each specific step in the process. This was manageable when there were only a handful of interconnection requests in a year. However, these queues have grown more recently due to the significant increase in the number of smaller-sized interconnection requests for wind and solar generation. Developers typically put in several requests at one time, knowing that many of them will not get built. In some cases, there is more proposed generation in the queue than the total customer load in a particular area.

1. Do you believe that this new interconnection rule will alleviate these backlogs?

As summarized by the reporters at UtilityDive, “more closely aligning output and nameplate capacity will help improve the interconnection process...[in which] there is also a recurring problem of late interconnection request withdrawals that can lead to interconnection restudies that can increase costs and timelines for other participants in the interconnection queue... Order 845 requires transmission providers to allow for provisional interconnection agreements for limited operation of a generating facility prior to completion of the full interconnection process. The order also requires transmission providers to create a process for interconnection customers to use surplus interconnection service at existing points of interconnection.”

These changes are likely to further increase the number of interconnection proposals, and possibly contribute to an even greater backlog. In a way, this is good news: it indicates that competition for customers is increasing instead of abating, which Congress should welcome. To the extent this increases the burden on ISOs and RTOs, it would seem better to give them more resources to handle the demand than to choke off the transformation these interconnection requests are ushering in.

2. *How would modifications made by interconnection customers affect the interconnection studies of later-queued requests?*

It will increase the complexity of the interconnection process. Again, this is a sign of a vibrant and changing market, not a problem to be alleviated by limiting the flexibility of interconnection requests.



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