October 14, 2022

New England Energy Vision States

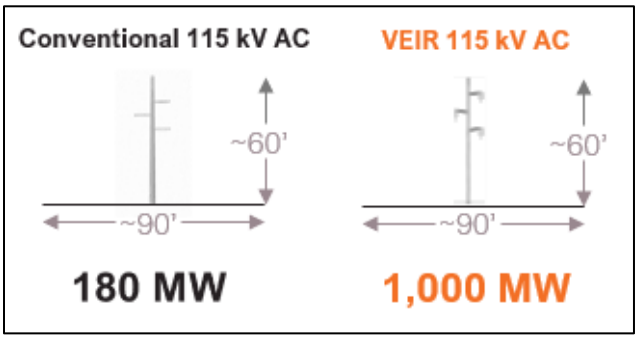
Dear State Participants,

VEIR (www.VEIR.com) thanks you for the opportunity to provide information for your Regional Transmission Initiative regarding changes and upgrades to the regional electric transmission system needed to integrate renewable energy resources. Numerous studies have found that a major challenge to integrating more renewable energy is expansion of the transmission grid. A key obstacle to that expansion is the siting and permitting of new transmission lines. VEIR is a new company developing the next generation of superconducting transmission technology that should ease the siting and permitting of new transmission lines. While VEIR is new to the market, the development timeline for commercialization of our technology synchronizes with that projected for the integration of offshore wind resources in New England. We urge you to consider and support emerging technologies like VEIR's that will be available for use within your planning horizon.

Background on VEIR's technology

VEIR is developing the next generation of high-temperature superconducting (HTS) electric transmission lines that operate with negligible resistive losses. Negligible losses enable VEIR's transmission lines to operate at up to ten times the capacity of conventional lines. Very high current

enables VEIR's lines to (a) transmit much more power than conventional lines at any given voltage level, and (b) transmit the same amounts of power as conventional transmission lines but at much lower voltage levels.[1] As shown in the illustration below, an overhead VEIR 115kV AC transmission line can provide up to five times the capacity of a conventional 115kV AC line with no increase in tower height or expansion of right of way.



VEIR's breakthrough technology is very relevant to helping the New England States rise to the challenge of integrating more renewable energy resource to the regional grid.

VEIR's Comments

VEIR addresses its comments to three items called out in the Request for Information (RFI) that are relevant to the consideration of emerging technologies such as ours:

1) "[D]eveloping and building new transmission infrastructure takes many years." RFI p.2,
2) "…significant landside upgrades will be necessary to enable interconnection of additional offshore wind…" – MOWIP/RFI p.8, and

[1] VEIR's breakthrough innovation is a passive, distributed evaporative liquid nitrogen-based cryogenic cooling system that delivers 20 times the cooling power per kilogram of nitrogen flow compared to the active mechanical sub-cooling systems deployed in earlier generations of HTS electric transmission facilities. VEIR's innovative cooling method is the first to enable reliable, cost–effective overhead deployment of HTS transmission lines. In addition to overhead transmission lines, VEIR is developing on-ground and underground transmission lines that utilize similar cooling approaches.

3) the "identify potential POIs for renewable energy resources, including offshore wind." – RFI page 5.

ITEM 1 "[D]eveloping and building new transmission infrastructure takes many years."

When planning for the integration of gigawatts of offshore wind to the New England by the early 2030s and beyond consideration should be given and support provided to transmission technologies now under development to aid the integration. Grid technology is not stagnant. Take for example voltage source converter (VSC) high voltage direct current (HVDC)[2] systems, which are now identified as the backbone technology for the moving large amounts offshore wind to shore. The technology was in its infancy fewer than 20 years ago. The Cross-Sound Cable project was installed between Long Island and Connecticut in 2003 with a capacity of 330MWs at a voltage of +/- 150kV. Today, VSC HVDC systems with capacities of 1,100 MWs at a voltage of +/- 320kV are readily available and are the go-to choice for the backbone offshore wind network planners envision for moving gigawatts of offshore wind to shore. Funds to be made available through the Infrastructure Investment and Jobs Act and other federal and state programs for innovative technologies such as VEIR's will help to shorten the time in which innovative technologies come to market. Plans made to change and upgrade the regional electric grid should give serious consideration to new technologies and how they can help, as well as allocating a portion of funding to demonstrate and accelerate deployment of innovative technologies.

ITEM 2 "…significant landside upgrades will be necessary to enable interconnection of additional offshore wind…"

Siting transmission is difficult, especially if new or expanded rights of way are required. There are technologies, such as grid enhancing technologies, carbon core conductors, and next generation

[2] The first voltage source converter (VSC) HVDC system was put into service in 1999 in Sweden.

superconductors, which can make better use of existing rights of way. The ability of a VEIR 115kV transmission line to move the same amount of capacity as a conventional 345kV line without increasing tower height or expanding right of way should ease siting and permitting challenge associated with taller towers and right of way expansions. Public opposition and permitting delays add significant cost to projects, as well as delaying the urgent action needed to reduce greenhouse gas emissions. Existing corridors are often in the most congested and urbanized areas of the region, including environmental justice communities, where the burden of existing large-scale infrastructure is already heavy. Technologies that provide equitable solutions and temper public opposition are important to support in their role to help to meet the broader energy vision for all New Englanders.

ITEM 3 "identify potential POIs for renewable energy resources, including offshore wind."

Former coal and nuclear plant sites located along the coast, where fuel delivery and once through cooling historically provided advantages, are the low hanging fruit for points of interconnection. The 345kV lines that delivered the plants' generation to load can now be used for the integration of offshore wind, but there are not enough of those sites to support the projected need. There are locations where 115kV line corridors also extend close to the coast. One example is a former coal plant site in Somerset, Massachusetts on the Taunton River upriver from where it joins Mount Hope Bay. The site has room for the siting of an HVDC converter facility but the transmission line that connects to the location is just 115kV, which is too small to handle 1,100 MWs of capacity that would come to shore via a +/- 320kV DC transmission line. Upgrading the 115kV line to a 345kV line in order carry the additional capacity would likely face fierce public opposition unless 1,100 MWs could be transmitted at the 115kV voltage. The superconducting technology VEIR is developing would enable use of the 115kV voltage to transmit the 1,100 MWs of offshore wind. Applied along the New England coast the availability of the technology

will significantly increase the number of potential points of interconnection that could be used to integrate offshore wind.

CONCLUSION

I thank you again for the opportunity to provide information for the Regional Transmission Initiative and urge you to consider, support, and incorporate in your planning emerging technologies, such as VEIR's superconducting transmission lines, which will become available for use within the lifespan of your planning cycle.

Sincerely,

Stephen Conant
VP for Commercial