

Innovation Beneath the Waves - How Subsea Power Technology Can Reduce Cost and Risk

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Offshore wind is poised for rapid growth in Atlantic Canada, driven by exceptional wind resources and ambitious targets of several gigawatts of offshore wind in the coming decade. Achieving this goal requires innovations that reduce cost, ensure bankability and increase standardization. Subsea power equipment has emerged as a promising alternative to conventional topside transmission technology in this regard.

Subsea collectors allow inter-array cables to connect centrally to a star-point, rather than in daisy-chain layouts. This configuration can reduce overall cable lengths and cross-sections and improve maintainability. Subsea substations reduce equipment weight and ancillary systems by placing the high voltage transformers on the seafloor. Cooling is done naturally without rotating equipment involved, ensuring a robust and reliable solution. On a per MW basis, subsea substations deliver the same performance at 20% of the material weight of topside options while reducing maintenance needs and downtime.

Subsea power technology has been proven in the oil and gas industry, with more than 40 transformers delivered and operating since the 1990s. The technology gap around subsea connection systems is currently being closed, with the technology being qualified to TRL 6 (reference: EUR 27988) this year. The adaptation and further development of this technology from the oil and gas industry is a real example of how a cross-industry partnership has dealt with technological, commercial and regulatory barriers, as well as reducing cost and risk by going subsea.

This presentation will present the TRL journey of subsea power technology, findings related to cost efficiency compared to alternative technologies, the types of project and parameter envelopes that can benefit from subsea substation technology, as well as technological and regulatory barriers that the industry faces.