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Floating Offshore Wind's Potential Examined at Summit

A rendering shows how a floating offshore wind farm might look. | NREL

Speakers Focus on Need to Build Infrastructure, Scale up

By John Cropley

The difficult prospect of building a new industry rapidly and well with few past examples for guidance was front and center on Day 2 of the U.S. Department of Energy's Floating Offshore Wind Shot Summit. Thursday's sessions ranged from developing technology to cutting costs to being considerate of the ocean's ecosystems and other users. (See related story for Day 1 coverage, *DOE Launches West Coast OSW Transmission Study*.)

One set of panelists examined the question of whether to start building floating offshore wind (FOSW) farms now with the imperfect technology that exists today, or wait years until it can be improved, if not perfected. The consensus was that it needs to be done now, if not to meet President Biden's 15-GW-by-2035 goal, then because of the critical need to address global warming now, not later. But the first generation of floating wind installed and the transmission infrastructure to support it need to be future-compatible, several panelists said.

Factoring in the priorities of the Biden administration and the numerous stakeholders represented by speakers Thursday, the scale of the challenge becomes apparent: These floating wind farms need to be built relatively soon by a well paid unionized workforce that does not exist, drawing on a supply chain that does not exist, using U.S.-built vessels that do not exist, without harming any ecosystems, while ensuring that disadvantaged communities are the first to benefit from all aspects of the process. And the projected cost of electricity that they will produce has to drop by 70%.

Build, Research or Both?

Mike Olsen of the U.S. Department of Energy's Advanced Research Projects Agency - Energy (ARPA-E) said an informal conversation at the agency gradually centered on one of the central considerations to FOSW planning: "Should we use existing technology to do this, or should we wait 10, 15 years to let technology advance to the point where we can get there more efficiently?"

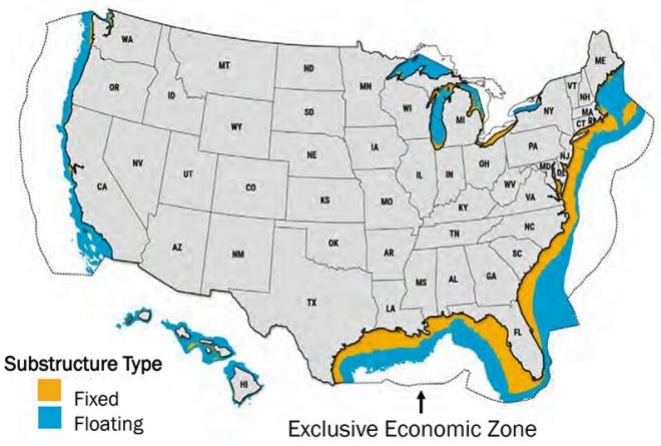
Others have raised such questions about clean-energy goals set out by various state and federal leaders, he said. So he threw it out again: "Do we continue to invest in new innovations to reach those goals, or do we take existing, proven technologies and scale them so that we can reach economies of scale?"

Aaron Smith, of floating wind firm Principle Power, said it must be both. "You can't wait to have technology that is absolutely perfect, representing a mature industry," he said. "Also, we have technology now that is suitable for deploying commercial-scale floating wind farms that get us on the path to a full cost parity with the other costs of generation." Developing offshore wind is in many ways an effort to successfully marry parts of the onshore wind and offshore oil and gas industries, all of which have a decades-long record of success, he added.

Leif Delp of Equinor said the continuing drive to make bigger and more powerful turbines is important. "The scale of the turbine is really the main mover for reducing the cost, so we need bigger turbines for sure." That said, there is likely a size beyond which turbines will be too expensive to install, operate and maintain, Delp added, because of the cost of maintenance.

Adrienne Downey, of floating wind developer Hexicon, said there just isn't time to wait for new and better technology. "I don't think we have the luxury of waiting for a cost decline," she said, "first and foremost because of the existential crisis of climate change; and second, the cost decline is not going to happen unless we do the hard work of deployments, working through the technology advancements, doing both simultaneously."

Downey has previously compared floating wind to the Ford Model T, which became the first affordable automobile through efficient mass production, and she repeated the analogy Thursday. Supply chain and infrastructure growth are critical, along with cutting costs and boosting yield, she said. "We need to look at this as an ecosystem; it's the scale that matters." Downey said the solar and onshore wind industries overcame their growing pains by focusing on workhorse models that could be scaled and serialized.



About two thirds of potential wind power development areas off the U.S. coast are in water too deep to use fixed-bottom turbines. | *NREL*

Habib Dagher, executive director of the University of Maine's Advanced Structures & Composite Center, is managing a team of 45 engineers working toward his state's goal of building out offshore wind — which, due to the depth of the Gulf of Maine, will need to rely on floating technology.

The technology is coming into place and the state is seeking permission to place a small-scale research array to test it. "We have a climate crisis that we're in, and therefore we need to move forward now with the technologies that we have," Dagher said. "At the same time, nobody can put technology in a box; we're going to continue to innovate."

Maine's goal is to not only decarbonize its electric grid but to create a center of innovation for the nascent floating wind industry, and to build some of the components locally. This attempt to vector benefits to local communities is central to the idea of equity in the energy transition, Dagher said.

The concrete hull technology Maine has developed for floating offshore turbines is an adaptation of technologies used to build bridges for the last 40 years, Dagher said, and it can be fabricated locally.

"Essentially, we're turning bridge builders into hull builders," he said, "and what that does is allows communities across the country and the world to actually reap the benefits of producing these technologies locally."

Ralph Torr of Offshore Renewable Energy Catapult said the technical and economic analysis his firm has done for a group of floating wind projects showed that technology development would be important in the long term.

"Innovation is important," he said, but "in the short- and medium-term, it's actually the scale of deployment and ramping up strong, steady growth that will really allow cost reduction."

Learning rates are important, Torr said, and it is an unsafe assumption that the industry will learn as much and as quickly as possible just through a flurry of construction. "The early projects are going to play a key role in forming learning within the sector as well," he said.

"So I guess here from the U.K., looking across the U.S., I just think it's really important that you guys create these mechanisms that allow the technology to develop as the project develops to share learning and make sure the industry can grow in a strong but sustainable way."

Also Noted

Other points made by speakers Thursday:

- Joel Cline of the National Ocean and Atmospheric Administration said improvements in forecasting — focused in windows of space and time as close as 3 km and 15 minutes — will boost the efficiency of offshore wind operations. But knowledge about the atmosphere over the ocean still is not as broad as over land.
- Georges Sassine of the New York State Energy Research and Development Authority said New York has begun work to create over the next two years a new offshore master plan that will include floating wind turbines. New York currently has more gigawatts of offshore energy in its development portfolio than any other state, but all of it is fixed-bottom turbines.
- Mario Garcia-Sanz of ARPA-E said the floating wind industry will have to abandon sequential planning; the many factors involved in the operation of a floating turbine need to be co-designed.
- Sassine and Garcia-Sanz said public funding is indispensable at this point. Such investments are too risky for the private sector, Garcia-Sanz said. The private sector is good at adopting and scaling proven technology, Sassine said, but government can play a key role in bringing the technology to market-ready status.