Northeast Regional Ocean Council (NROC)

Bringing Offshore Wind Energy to Shore: How its Done and Stakeholder Considerations

David Slee 2020
Bringing Offshore Wind Energy to Shore: How its Done and Stakeholder Considerations

Where are we headed?

How do we scale?
How Many Cables for 1200MW?

- Blocks of perhaps 1200MW generation desired
- Transmission onshore network is sparse
- AC submarine cable critical length shortens with increased voltage for greater capacity
- 3 Cables for AC; 1 bundle for DC
Two Phases of Development?

- Coal, Oil & Nuclear generation coming off the network faster than expected
- Phase 1: Swap existing capacity for offshore wind 1:1
Two Phases of Development?

- Energy efficiency policies not working fast enough so we also need new generating capacity
- Phase 2: Reinforce the network for new generation and resilience (in case storage doesn’t happen fast enough)
- Difficult to do this on land, so build an additional transmission network at sea – make a “ring-main”
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Cabling Challenges
Largest Challenge: Surf Zone
High Energy Environment, Seasonal

- Offshore
- Nearshore Zone
- Inshore
- Foreshore
- Subaerial Beach (swell)
- Subaerial Beach (storm)
- Backshore
- Berm
- Beach Face
- Swell (summer) Profile
- Storm (winter) Profile
- Sea Cliff (or Dune)
- Low Water
- Bar
- Trough
- Bar
US Not Immune to Problems

Offshore Wind Cable Exposed at Block Island Beach

May 24, 2019

As summer approaches on Block Island, the undersea electric cables from the nearby offshore wind facility will have a presence at one of New Shoreham’s most popular beaches.

The power line from the five-turbine Block Island Wind Farm reaches shore at Fred Benson Town Beach and leaves the island for Narragansett at Crescent Beach to the north. But keeping portions of the cable buried at Crescent Beach has been a struggle.
“When All You Have is a Hammer…

...Every Problem Looks Like a Nail”
Horizontal Directional Drilling
Jet Plow
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Can We Do Something Different?
Tracked ROVs
Tracked Tractors
Efficient Soil Fluidization
Efficient Soil Fluidization
Displacement Plow
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The Deep Burial Compromise
Deep Burial Desires & Pathologies

Context:
- 2-3’ of quality cover is probably enough to protect cables from fishing gear
- 6’ of cover adequate for most purposes, unless seabed is mobile or large anchors are being dragged

Deeper Burial:

Pros:
- Less EMF at seabed surface
- Less temperature rise at seabed surface (DE 2K)
- Lower likelihood of anchor strike and/or drag doing damage (e.g. Panamax vessels)

Cons:
- Greater sediment release
- Larger disturbed zone
- Difficult to find/repair faulty cables when deep
- Enormous and rare construction equipment required
- Greater CO₂ from vessels in construction
ACP-2: Only 10’ burial but it is a displacement-plow with 15’ MBR cable path.
Burial Depth “Arms Race”
Consequences

18'
CBRA2015 is a valuable, consistent approach, accepted by EU stakeholders. Focusses on prevalent conditions offshore. Hazard identification and probabilistic risk assessment methodology remains sound.

However:
- Needs calibration for character of US threats.
- Would benefit by expanding to include estuarine conditions and threat profiles.
- Logical if this were to be led by USACE collaborating with developers.
- Can we reduce 15’ requirement?
- Define “Repair Zones”? 

Consenting: ”PDE” – Project Design Envelope
- Focus on the sensitivity of the receptors, not the type of tool.