

Fact Sheet: Industrializing Offshore Wind Power Development

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- The least-cost final design used caissons (suction buckets), a jacket structure, 10 MW turbine, 69 kV array cables.
- The full assembly, from caissons to nacelle, is completed in port, partly commissioned, and stored for pickup. A crane vessel like the Gulliver picks the entire 2500 Tonne structure off the quay, anchors the structure to the vessel, carries to site, and places on the bottom in one operation.
- Participating contractors for this design have substantial experience with offshore wind power and/or offshore oil and gas. They were:
 - SPT Offshore designed suction buckets and foundation
 - Mammoet did all port operations, including assembly of complete turbine
 - CG Power Solutions designed 69 kV array cables
 - Weeks Marine estimated cost across vessel options
 - Clipper Marine provided 10 MW turbine loads and some deployment ideas
- Complete assembled structure is almost 2500 metric tonnes
 - On-shore lifts are much lighter, one component at a time
 - Entire structure is moved by SPMTs (Self-propelled modular transporters)
 - Shear-leg crane vessel lifts entire structure off port, steams to site
 - Designed for 10 MW turbine, also would work on turbines from 3 to 20 MW
- Site installation
 - Lower from crane vessel to bottom
 - Pumps draw suction bucket into bottom
 - No jack-up vessel needed
 - Large, costly vessel on site for less than one day
- Advantages
 - Lower-cost installation vessel, spending less time at sea per turbine
 - Overall capital cost reduction of 37% from today's typical installation
 - Faster installation enables 1 GW per year deployment from port with laydown area of 50-80 ha (120-210 acre)
 - No pile-driving sound impact on marine mammals
 - No unscheduled downtime for mammal passage
 - No test boring at each site, CPT sufficient for 10m caisson depth
- Amenable to further reduce cost beyond that estimated here:
 - Scales to 20 MW turbine with minimal equipment changes,
 - Further commissioning in port,
 - Co-location of component fabrication and assembly,
 - Substantial further industrialization of assembly.