

Icebreaker Wind Supply Chain Open House





Welcome

Responsible for Icebreaker Wind



Fred. Olsen Renewables USA

Our Supply Chain Development Partners



Emerald Cities
CLEVELAND
America empowered.



Build an offshore wind industry in Northeast Ohio to create jobs and generate clean energy locally

- Community-driven initiative dating back to 2004
- LEEDCo formed in 2009 to pursue the vision
 - 1st step ⇒ build a demonstration project
 - Blaze the trail to attract the private sector
 - Tremendous support from City of Cleveland – Ashtabula, Cuyahoga, Erie (PA), Lake, Lorain Counties – Cleveland Foundation - DOE - US Delegation Members - environmental groups – labor - lakefront communities - and others
- LEEDCo achieved significant progress in development of Icebreaker Wind project with DOE funding and local funding
- Attracted the interest and investment of Fred. Olsen Renewables
- Now in the process of transitioning development and construction to Fred. Olsen Renewables USA
 - Transition to be completed January 2017



Fred. Olsen Renewables

Fred. Olsen Renewables (FOR), based in Oslo, Norway, builds, owns and operates renewable energy projects. Main focus is wind power and the first investment was made back in 1996. Significant efforts have been made in developing green field projects. The company's first large-scale wind farm, Crystal Rig (Scotland) commenced operation in 2003.

Total generation capacity of 582.1 MW

- Six operating onshore wind farms in Scotland (432.8 MW)
- One operating onshore wind farm in Norway (71.3 MW)
- One operating onshore wind farm in Sweden (78 MW)

Onshore projects under construction

- Crystal Rig III (14 MW) in Scotland with expected completion in 4Q 2016
- Windy Standard II (61.5 MW) in Scotland with expected completion in 4Q 2017

Permitted and under development

- 856 MW permitted onshore in France, Sweden and Norway
- Approx. 500 MW permitted & under development offshore Ireland
- Development pipeline of 690 –1,120 MW onshore in Norway, Sweden, France and UK



Icebreaker Wind

6 Vestas V126-3.45 turbines

8 – 10 miles offshore

Water depth \approx 60 feet

20.7 MW capacity

Power for 7,000 homes

Mono Bucket foundations

Grid connection at CPP
Lake Road substation

Port of Cleveland
staging & assembly site

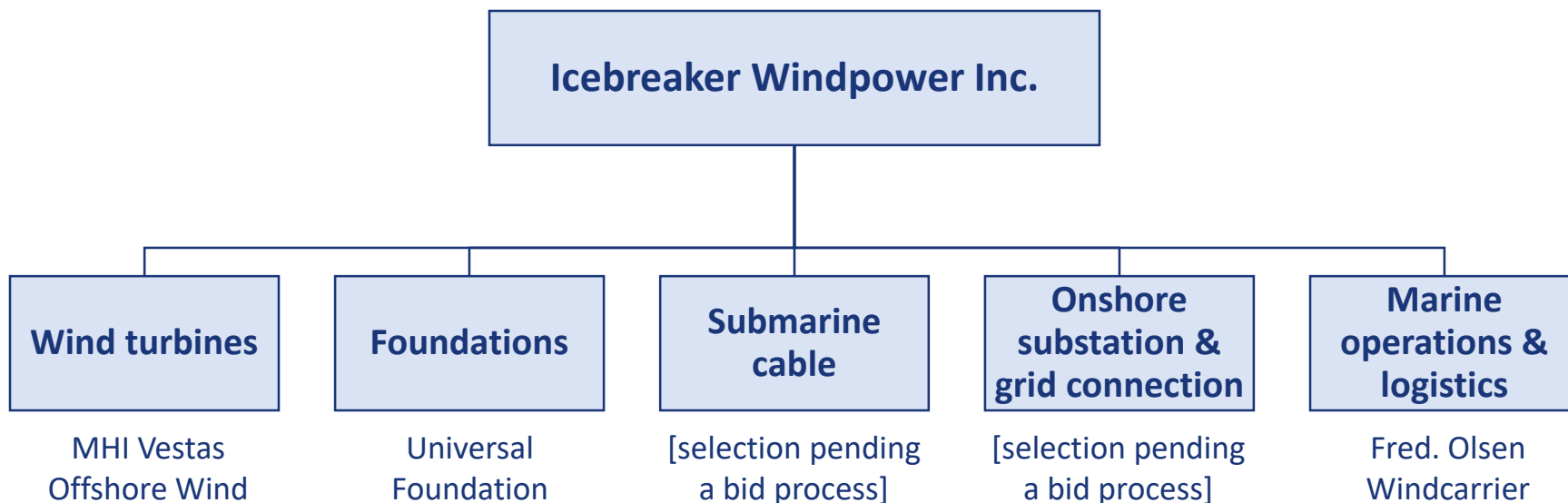
Construction planned to
begin in 2018





5 main contracts planned for construction of Icebreaker Wind

Lump Sum EPC(IC) basis: Contractor will be responsible for Engineering, Procurement, Construction, Installation and Commissioning





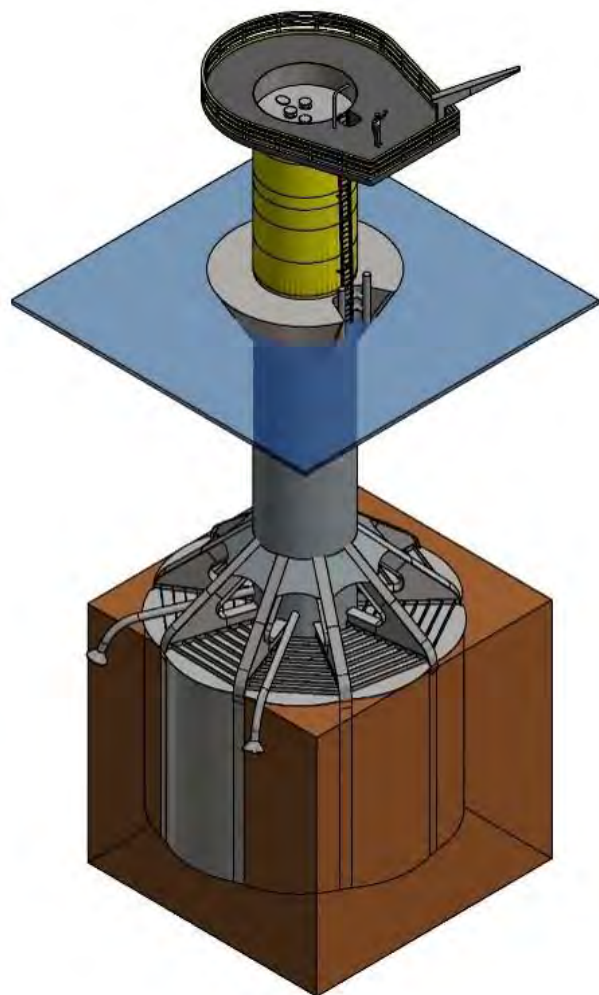
Turbines contract

- Main contractor:
 - MHI Vestas Offshore Wind
- Turbine engineering, supply, delivery, support of installation, and commissioning
- Staging and pre-assembly at the Port of Cleveland prior to installation on site
- Approximate specs
 - Rotor diameter: 413 ft (126 m)
 - Hub height (above water): 272 ft (83 m)
 - Overall height (above water): 479 ft (146 m)





Foundations contract



- Main contractor:
 - Universal Foundation
- Mono Bucket: one-piece “suction bucket” steel structure
- Approximate specs
 - 450 tons
 - 15 ft. shaft diameter – 55 ft. bucket diameter
 - 120 ft. overall length – 20 ft. skirt length
- Engineering, fabrication, delivery, support of installation, and commissioning
- Foundations will be fabricated in US
 - Fabrication subcontract will be awarded based on a competitive bid process



Submarine cable contract

- Main contractor: to be selected through competitive bid process
- Engineering, supply, delivery, installation, and commissioning of the submarine cable
- Horizontal drilling of cable conduit under harbor from Lake Road substation to north of breakwater
- Cable laying and burial; pull-in operation at substation and turbines





Onshore substation and grid connection contract

- Main contractor: to be selected through competitive bid process
- Supply and construction of new Icebreaker Wind onshore substation and grid connection at CPP's Lake Road Substation
- Design, supply of equipment, civil works including removal of abandoned structures, installation, testing, commissioning and start-up





Marine operations and logistics contract



- Main contractor:
 - Fred. Olsen Windcarrier
- All marine operations including provision of vessels, barges, cranes, storage facilities, etc.
- Port of Cleveland will be the staging port for turbine components and potentially for assembly & completion of foundations



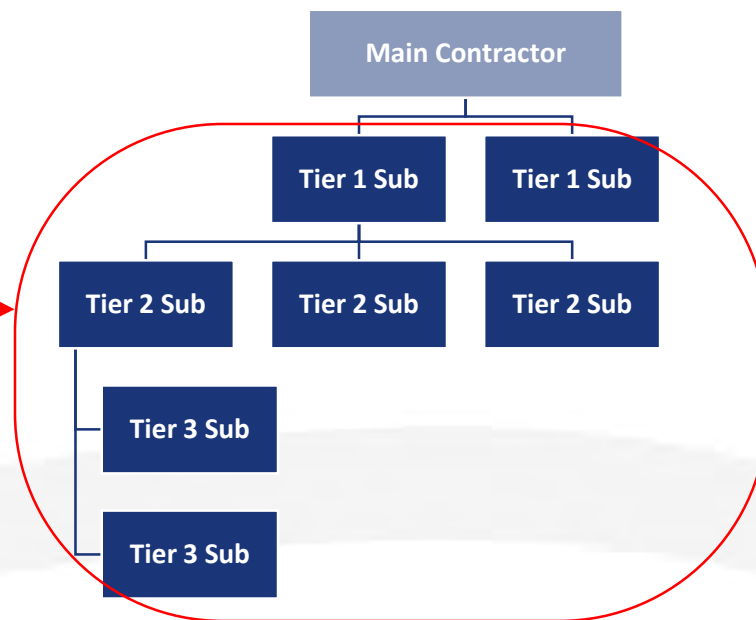
Operation and Maintenance

- Windfarm shall be operational for 25 years
- Long term maintenance of turbines
 - **MHI Vestas Offshore Wind**
- Inspection & maintenance of turbine foundations
 - TBD
- Inspection & maintenance of onshore substation
 - TBD
- Emergency preparedness
 - TBD
- Crew transfer services
 - TBD

Local opportunities

- Icebreaker Wind will include local content and MBE/FBE/SBE requirements in the five main contracts
- The five main contractors will be the main source of local and MBE/FBE/SBE opportunities

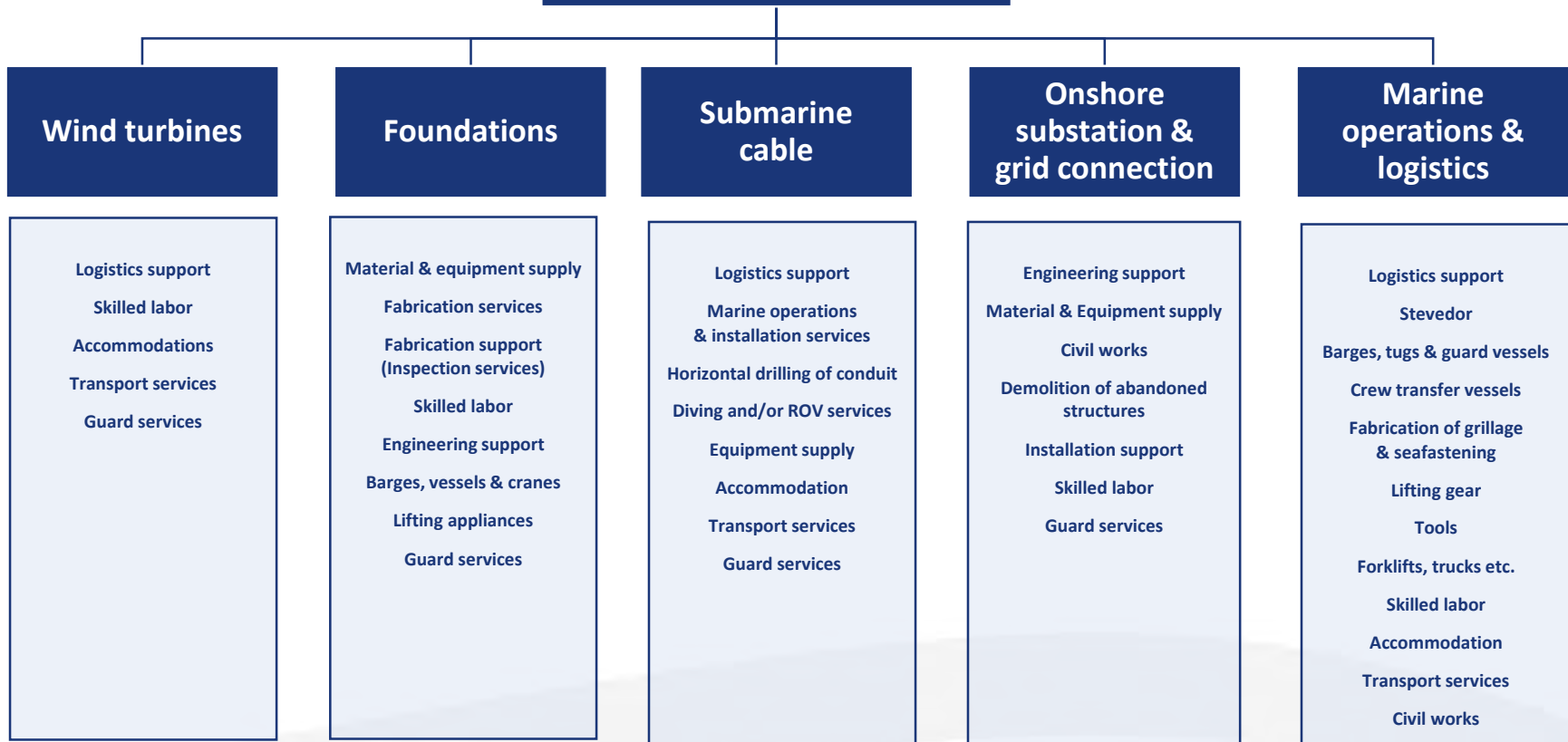
- Opportunities are at multiple levels of the supply chain





Local opportunities

Icebreaker Wind Project Management Team





How do you participate?

1. You have to get listed in our directory
2. We include MBE/FBE/SBE and local requirements in the bid packages and main contracts
 - Local directory will be provided to bidders/main contractors
 - If you're not in the directory – they may not find you
3. You will be contacted by main contractors/bidders
 - You will have to be qualified by them
4. You must respond promptly and adequately to requests from the main contractors/bidders
 - We can provide some assistance to help you respond

TIMING: 1st and 2nd Quarter 2017 depending on the contract



Next steps

- Get listed in the directory
 - Get listed in the directory
 - Get listed in the directory
- We'll keep you informed throughout the contracting process
 - And send you a link to this presentation after the event
- If you have any questions along the way, engage with us
 - GLWN: Dee Holody, dee@glwn.org, (216) 920-1959
 - Emerald Cities: SeMia Bray, sbray@emeraldcities.org, (216) 682-5349
- Please spread the word to other local companies