Baltic InteGrid
Integrated Baltic Offshore Wind Electricity Grid Development

Assessment of Baltic hubs for offshore transmission development

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Assessment of Baltic hubs for offshore transmission development

The primary aim of the project is to identify potential hubs for production, installation and service of components involved in offshore grid development.

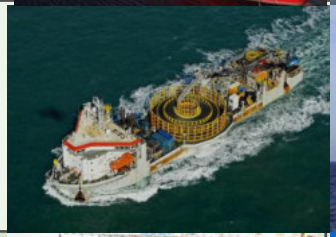
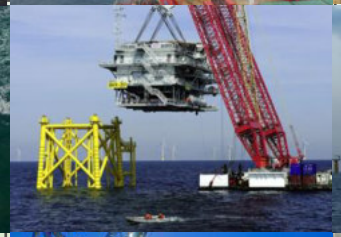
The objectives of the work are to:

- Define and describe the production, installation and service elements for offshore grid infrastructure.
- Describe the physical requirements for any infrastructure required for each of these elements.
- Develop a methodology to identify the most suitable ports in the Baltic Sea Region based on the physical infrastructure requirements and forecast and analysis of future offshore grid development in the area.
- Identify the most suitable sites, based on infrastructure requirements and future offshore wind energy deployment, for new hubs in the Baltic region to access this market.
- Provide recommendations on key sites, and a process to develop these sites based on the previous findings.

This presentation coves high-level conclusions and initial findings of work to date.

Offshore transmission development

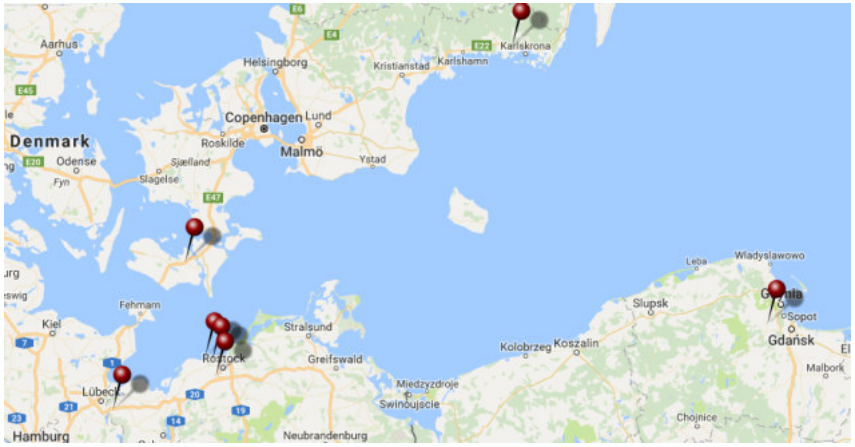
Assessment of Baltic port infrastructure

	Cables	Substation structure	Substation electrical
Supply			
Installation			
Service			

Cable supply

Assessment of Baltic port infrastructure

- Several cable suppliers already operate in the Baltic region including Nexans, NKT, Prysmian and TF Kabel
- Baltic market demand for cable supply is relatively small – ~370km cable for medium-term future Baltic projects
- Cable supply does not require a high specification port, although some dedicated infrastructure required for cable transport
- Ideally (but not critical) port is located close to customers
- Materials for a cable manufacturing facility (copper strand, cladding and extrusion material) can be transported by standard HGVs or by sea-borne containers
- Finished cable is spooled from the manufacturing facility directly onto a cable lay vessel or barge
- Due to bend radius restrictions, many cable facilities use spool tracking on the quayside which can extend via a gantry out into the sea.
- Current port infrastructure for cable supply is likely adequate



Location of cable suppliers in the south Baltic area

Port characteristic	Optimal requirement
Horizontal clearance	28m
Air draft	30m
Vessel draft	6m
Total area	90,000m^2
Quay length	125m

Substation structure supply

Assessment of Baltic port infrastructure

- Abundance of supply capacity across Europe combined with downturn in fabrication for oil & gas sector means supply chain risk is very low
- Baltic market demand for substation supply is small – ~8 topsides for future Baltic projects
- A high specification port with dedicated infrastructure such as heavy lift cranes is required
- Steel plate and other raw materials and supplies used in shipbuilding arrive by truck, rail, barge or ship.
- Conventional substations are typically lifted by a heavy-lift derrick and transported to the final site on a barge.
- A self-erecting substation platform is integrated into a barge and is therefore towed by tugs to its final location on its own hull.
- Current port infrastructure for substation structure supply is likely adequate

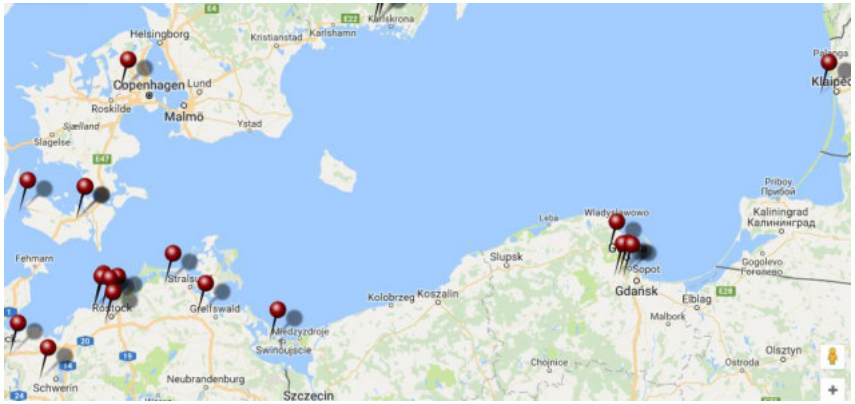
Location of topside suppliers in the south Baltic area

Activity	Vessel	Dry dock	Manufacture capability
Conventional substation	Heavy lift crane barge	Not required	30m x 25m x 20m structure 800t to 2,500t units Covered fabrication hall
Self-installing substation	Tugs for towing	50m length x 50m beam	As above with up to 75m tower legs

Substation electricals supply

Assessment of Baltic port infrastructure

- Owner-furnished equipment, primarily power electronics equipment, arrive by truck, rail barge, or ship to the substation structure fabrication yard
- Baltic market demand for substation electricals is small – ~8 topsides for future Baltic projects
- Supply of substation electricals does not require high specification port or dedicated infrastructure as most general cargo vessels if required can self-load and unload using onboard cranes.
- Electricals may possibly be exported through Baltic ports, however in small quantities
- Current port infrastructure for substation electricals supply is adequate



Location of electricals suppliers in the south Baltic area

Port characteristic	Optimal requirement
Horizontal clearance	28m
Air draft	35m
Vessel draft	5m
Quay length	200m

Cable installation

Assessment of Baltic port infrastructure

- Cable installers already operate in the Baltic region include Nexans and Bohlen & Doyen
- Baltic market demand for cable installation is relatively small – ~370km cable for medium-term future Baltic projects
- Does not require a high specification port, cable lay vessels have generally shallow draft and are usually self-loading
- Ideally port will be located close to grid landing point
- The primary opportunity for Baltic hubs will likely be in short-term cable storage, where current port infrastructure is adequate

Cable lay vessel Van Oord *Nexus*

Cable lay vessel principal particulars	
Length	75 to 145 m
Beam	18 to 32 m
Draft	6 to 9 m
Air draft	< 25 m

Substation structure installation

Assessment of Baltic port infrastructure

- There is generally no requirement to store substations prior to installation
- Installation carried out either by barge (self-installing substation) or by heavy-lift sheerleg crane vessel accompanied by feeder vessel carrying additional components (conventional substation)
- Some sheerleg vessels can only operate in relatively calm sea conditions and this may necessitate short-term storage space. A sheltered harbour close to development site would then be required
- Baltic market demand for substation installation is relatively small – ~8 substations for future Baltic projects

Sheerleg crane vessel *Oleg Strashnov*

Ocean service barge principal particulars	
Length	60 to 110 m
Beam	20 to 30 m
Draft	2.5 to 6 m
Air draft	Cargo dependent

Sheerleg crane vessel principal particulars	
Length	85 to 185 m
Beam	70 to 72 m
Draft	4 to 13 m
Air draft	20 to 50 m

Cable maintenance and service

Assessment of Baltic port infrastructure

- The primary opportunity for Baltic hubs will likely be in long-term cable storage and accommodation of vessels for cable survey and repair
- Baltic market demand for cable maintenance moderate– ~940km cable for current and future Baltic projects
- Does not require a high specification port as vessels for cable survey and repair are the same size or smaller than those used in cable installation. Vessels have generally shallow draft and are usually self-loading
- Ideally port will be located close to grid landing point
- Storage facilities require quayside infrastructure for hosting up to 9,000t of cable as well as specialist equipment for cable storage, loading and unloading

Cable lay barge *Cable Enterprise*

Cable lay barge principal particulars	
Length	75 to 145 m
Beam	18 to 32 m
Draft	6 to 9 m
Air draft	< 25 m

Substation structure and electrical maintenance and service

Assessment of Baltic port infrastructure

- Baltic region will require some infrastructure to accommodate large vessels used in major substation component replacement and repair
- Low demand for this activity. ~16 current and future substations with low major component failure rate
- Crew vessels required to access substation for structural and electrical maintenance and service
- Moderate demand for this activity that does not require a high specification port

Crew transfer vessel *Seacat Volunteer*

Crew transfer vessel principal particulars	
Length	20 to 30 m
Beam	8 to 12 m
Draft	1 to 3 m
Air draft	< 20 m

Next steps

Assessment of Baltic hubs for offshore transmission development

- Develop detailed coastal infrastructure requirements in transmission system production, installation and service
- Detailed review of existing Baltic infrastructure
- Detailed review of availability of additional Baltic infrastructure
- Identification of priority ports and assessment of suitability for transmission development

Conclusions and recommendations to cover:

- Strengths and weaknesses of supply chain
- Strengths and weaknesses of infrastructure
- Demand of new infrastructure
- Barriers to development

Thank you

For further information:

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