Offshore Wind Logistics brief report 8

- Organization of Logistics as part of an Offshore Wind Supply Chain Lead Company's Strategic Management

Supporting organizations

Funding partners

This *Offshore Wind Logistics brief report 7* is part of a series of brief industry-focused reports on the key conclusions from the global wind energy shipping and logistics PhD research project. The reports have been crafted by the Panticon team during the months of January 2019 through January 2020 in order to crystalize the main findings from the academic research project in a non-academic language and style which would support industry in implementing the key changes proposed as a result of the PhD research project. The report has been created primarily based on the PhD research project output, i.e. the PhD thesis and the academic publications produced by Thomas Poulsen during the PhD research project. Where necessary, additional data sources have been utilized as well in order to ensure that the findings are relevant and up-to-date (see Reference section).

The report contains forward-looking statements, which by their very nature, address matters that are, to different degrees, uncertain as they pertain to the future. These, or any other uncertainties, may cause the actual future results to be materially different than those expressed in the forward-looking statements as contained within this report. At Panticon we do not undertake to update our forward-looking statements, nor do we assume any liability for actions or dispositions made by firms, organizations, and/or individuals based on information contained in this report.

Panticon is particularly strong in the Offshore Wind and Logistics sectors within the three core disciplines of Strategic Management Advisory, Mergers & Acquisitions, and Market Intelligence.

This report has been sponsored by Den Danske Maritime Fond (grant 2018-144) as well as by Panticon.

ISBN 978-87-93809-17-8

The Report authors: Victor Musuku

Thomas Poulsen

Report information: Report release version: 1.0

Release date: February, 2020

This report has been produced by:

Panticon | Vivede Møllehuse 15, 4640 Faxe, Denmark

Web: www.panticon.com | Email: info@panticon.com

Table of contents

1. Introduction 5

2. Significance of Offshore Wind Logistics in Strategic Management 5

3. How logistics was organized 5

4. Organization of offshore wind logistics among supply chain lead companies 6

4.1. Offshore Wind Farm Developer: Ørsted 6

4.2. Offshore Wind Marine Contractor and Logistics Service Provider: Jiangsu Longyuan Zhenhua Marine Engineering Co., Ltd 9

4.2.1. Joint Venture Partner: Jiangsu Longyuan Offshore Wind Power 9

4.2.2. Joint Venture Partner: Shanghai Zhenhua Heavy Industries Company (ZPMC) 9

4.2.3. Jiangsu Longyuan Zhenhua Marine Engineering joint-venture after 2014 10

4.3. Logistics Service Provider: China COSCO Shipping Corporation 10

5. Organization of offshore wind logistics among supply chain lead companies – Going forward 11

6. Conclusion 14

References 15

About Thomas Poulsen 16

What we do at Panticon 17

1. Introduction

This *Offshore Wind Logistics brief report* is the last in a series of eight short industry-focused reports. The goal of the *brief reports* is to make the latest research in the market for logistics within the global offshore wind industry more accessible and usable for a wide range of constituencies on a global basis. The *brief reports* can be read consecutively or individually.

This *eighth brief report* in the series looks at how supply chain lead companies in the offshore wind industry organize offshore wind logistics as part of their strategic management. This includes how the supply chain companies set up their logistics departments and whether or not they internalize logistics services and assets.

2. Significance of Offshore Wind Logistics in Strategic Management

Logistics is a critical function of many companies. Therefore, a logistics strategy is a subset of the overall company strategic management direction. How a logistics strategy is executed has direct and profound impact on how the company is organized in terms of logistics. This is also true for the offshore wind industry.

The offshore wind industry is a relatively new industry, less than 30 years old. Annual global capacity installations only exceeded one giga-Watt as recent as 2010 while annual offshore wind turbine unit installations went just beyond 200 turbines that year. Until then, the offshore wind industry did not have critical mass of project management, volumes, or supply chain. In addition, geographically, Europe accounted for nearly 95% of the cumulative installed capacity at end of 2010 with the remainder mostly in China. Therefore, prior to 2010, the offshore wind logistics segment received insignificant strategic focus among the companies involved in the offshore wind industry. Compared to other industries such as retail, automotive, and life-sciences, logistics in the offshore wind industry was not organized in a streamlined manner.

3. How logistics was organized

The global wind energy shipping and logistics PhD research project conducted case studies across several companies to identify the role of logistics in offshore wind and how it was organized. The overall findings from supply chain lead companies are presented to show how logistics, from a strategic perspective, was organized up to 2016 where the period of the research was concluded.

- Unlike supply chains in other established industries, supply chain lead companies in the offshore wind industry did not yet have dedicated logistics departments or competence centres. This made it difficult to perform a holistic logistics-related analysis across the life-cycle phases of an offshore wind farm. It follows that synergies within a single supply chain lead company's, i.e. an

Offshore Wind Farm Developer, portfolio of various offshore wind farms at different stages of the life-cycle were difficult to realize.

- Departments in supply chain lead companies were organized in such a way that each had a particular life-cycle phase focus. This meant that logistics was not viewed holistically across all life-cycles throughout the cradle-to-grave lifespan of an offshore wind farm. Staff in respective departments worked in silos, thereby missing out on the cost-cutting opportunities that an entire lifespan perspective offered. For example, economies of scale could be realized by optimising both assets and processes across all the life-cycle phases of an offshore wind farm. These would include logistics activities across a portfolio of offshore wind farms in operation, under construction, as well as under development.
- The offshore wind market was expected to internationalize beyond Europe to Asia and the Americas. Supply chain lead companies were looking at ways to organize their departments in an easily transferable or adaptable way to the new offshore wind markets. In addition, the significant growth opportunities for offshore wind development called for a need to accelerate the professionalization of the skills and competences of personnel across all the life-cycle phases of the offshore wind farm.
- A research and development centre focus on logistics was lacking despite logistics being an area in need of innovation due to the fast-paced changes required to upscale transport equipment, assets, and handling to match the evolution of *Wind Turbines, Wind Turbine Components*, and *Balance of Plant Components*.
- Logistics makes up 18% of the offshore wind levelized cost of energy. Therefore, the logistics domain provides significant opportunities to reduce the overall levelized cost of energy of offshore wind. However, the levelized cost of energy models and calculators at the time did not isolate logistics as a stand-alone horizontal cost item of the offshore wind farm life-cycle.

4. Organization of offshore wind logistics among supply chain lead companies

The organization of offshore wind logistics in supply chain lead companies (or companies linked to supply chain lead companies) before and after 2016 varies significantly. The three examples included in what follows here, one from Europe and two from China, illustrate the differences. The three companies were subjected to deep scrutiny as part of the global wind energy shipping and logistics PhD research project.

4.1. Examples of consolidation in the offshore wind industry: Ørsted

Danish state-owned utility **DONG Energy** (now **Ørsted** since 2017) is the world's largest developer of offshore wind farms with a portfolio of projects in Europe, Asia and the Americas. It is an offshore wind pioneer and constructed the world's first offshore wind farm in 1991 which it decommissioned in 2017.

Ørsted typically pursues a multi-contracting procurement strategy, including logistics. Between 2009 and 2012, it made acquisitions in assets to, primarily, secure its installation supply chain against perceived supply chain bottlenecks (Table 1).

Table 1: Examples of Ørsted's attempts to secure its installation supply chain

Event	Year	Rationale
Ørsted acquired Danish shipping and wind turbine installation company **A2Sea**. At the time, **A2Sea** accounted for 60% of installed offshore wind turbines globally.	2009	**A2Sea** had been strapped for cash and was unable to keep up with investments in the expensive new generation installation vessels demanded by the growing offshore wind turbine and foundation sizes. Shortly after acquisition, **Ørsted** infused cash into **A2Sea** and ordered two new-build vessels from **China COSCO Shipping.**
Ørsted convinced its preferred offshore wind turbine supplier, Denmark-based **Siemens Wind Power** (now **Siemens Gamesa** since 2018 and headquartered in Spain), part of the German industrial conglomerate **Siemens AG**, to acquire a 49% stake in **A2Sea**.	2010	**Siemens Gamesa** had been awarded two ground-breaking offshore wind turbine supply deals by **Ørsted** in 2009 and in 2012, totaling up to 3.6GW. **Siemens Gamesa** sold the wind turbines to **Ørsted** fully installed and commissioned wherefore the contracting of **A2Sea** installation vessel assets was effectively the responsibility of **Siemens Gamesa**.
A2Sea acquired a 30% stake in Danish offshore cable installation company **CT Offshore**.	2010	**Ørsted** securing its cable installation supply chain.
A2Sea increased its share in **CT Offshore** to 68%.	2012	**Ørsted** securing its cable installation supply chain.

Source: Panticon, based on various sources

The offshore wind industry was not welcoming of the **A2Sea** joint-venture which was, in effect, a Private -Public Partnership, i.e., between state-owned **Ørsted** and major industrial conglomerate **Siemens AG**. It was perceived to distort competition in the installation and logistics market in general and to disadvantage smaller pure-play wind energy companies, e.g. turbine manufacturer **Vestas Offshore** (**MHI Vestas** since 2014) as well as independent shipping and logistics service providers which lacked the resources to take control over logistics and marine assets as well as processes.

Nonetheless, investments in the **A2Sea** joint-venture, particularly vessels, did not keep up with the demands of the fast-evolving offshore wind industry and the perceived bottlenecks in the market were alleviated by investments from other parties. Attempts to sell **A2Sea** in 2014 and 2016 were unsuccessful. Meanwhile, in 2016, **A2Sea** shut down the operations of **CT Offshore**, citing a lack of new contracts as well as equipment that was not up to date with prevailing cable installation requirements in the industry. Several of **A2Sea's** installation vessel assets were sold or disposed of. In 2017, **A2Sea**, with all its remaining assets, was eventually sold to Belgian ***Equipment, Procurement, Construction & installation*** company **GeoSea** (now **DEME Offshore** since 2019).

Despite the divestment, **Ørsted's** multi-contracting procurement strategy, including procurement of logistics services, is such that it seeks a high degree of control over its supply chain. Increasingly, **Ørsted** is challenging the traditional contracting scopes as it attempts to make contracts across a portfolio of offshore wind farms, adopt the latest technologies, and be open to new ways of doing business in new offshore wind markets outside Europe where logistics investments may be required. The examples in Figure 1 illustrate how **Ørsted** is pushing new boundaries in contracting.

Figure 1: Examples of how Ørsted is pushing new boundaries in contracting

Taiwan — Collaborating with local companies in new markets to create preferred supliers and meet localization requirements

2017: **Ørsted** signed a memorandum of understanding with **Woen Jinn Harbour Engineering** (Woen Jinn) (Taiwan) to make **Woen Jinn** preferred offshore cable installation partner for **Ørsted's** four offshore wind farms in Taiwan.

2018: **Ørsted** awarded **Woen Jinn** a contract for inter-array cable installation at the four offshore wind farms including a special financial support arrangement to allow Woen Jinn to invest in a new cable installation vessel.

2019: **Woen Jinn** withdrew from the contract, citing financial concerns.

USA — Investing in local port infrastructure in new markets to meet localization requirements

2018: Following acquisition of offshore wind farm developer **Deepwater Wind** (USA), **Ørsted** committed to investing at least USD 15 million to upgrade Port of New London, Connecticut, for use as construction port for the 200MW Revolution Wind offshore wind farm.

2019: **Ørsted** revealed plans to create jobs in Connecticut by contracting a Connecticut-based vessel manufacturer to construct a crew transfer vessels for the project.

UK — ***Offshore Wind Farm Developer***, and not ***Offshore Wind Turbine Manufacturer***, contracting turbine installation contractor

2019: **Ørsted** awarded **DEME Offshore** (Belgium) a contract for transport and installation of 165 foundations and wind turbines at the 1.4 GW Hornsea Two offshore wind farm in the UK. In Europe, the industry norm is that the turbine manufacturer, and not the offshore wind farm developer, awards the wind turbine installation contract to an installation vessel.

Europe — Long-term contract with regional scope

2019: **Ørsted** awarded **WIND** (Netherlands) a 20-year framework agreement for the storage and onshore handling of all **Ørsted's** array cables and related accessories at **WIND**'s site in the Netherlands. The contract relates to the entire portfolio of **Ørsted** in Europe and covers all of **Ørsted's** current and future European offshore wind farms. This is the first long-term contract with a full portfolio scope seen in the area of logistics in offshore wind. This is the first long-term contract with a full portfolio scope seen in the area of logistics in offshore wind.

Global — Medium-term contract with global scope

2019: **Ørsted** awarded **Systematic** (Denmark) a five-year framework agreement in 2019 as supplier of the IT solution to provide marine coordination and offshore management during the *Installation & Construction* and *Operations & Maintenance* life-cycle phases of **Ørsted** offshore wind farms in Denmark, the USA, Germany, the Netherlands, the UK and Taiwan.This contract is unique in the offshore wind industry as it cuts across global geographies as well as the two main life-cycle phases of **Ørsted's** entire offshore wind farm portfolio.

Hybrid-powered vessels — "Greening" of supply chain including shipping and logistics

2019: **Ørsted** contracted **CWind** (UK) for the delivery of a hybrid-powered surface effect ship (the first such vessel in the world) for the Borssele 1 & 2 offshore wind project in the Netherlands. The application of hybrid vessels with a more sustainable propulsion marked a new trend in attempting to make offshore wind shipping and logistics more sustainable and greener going forward.

Source: Panticon, based on various sources

4.2. Offshore Wind Marine Contractor and Logistics Service Provider: Jiangsu Longyuan Zhenhua Marine Engineering Co., Ltd

Jiangsu Longyuan Zhenhua Marine Engineering Co., Ltd was formed in 2010 to provide logistics as well as engineering, procurement, construction, and installation services for foundations and cables for developer **Jiangsu Longyuan Offshore Wind Power**. It is a 50%-50% joint-venture between **Jiangsu Longyuan Offshore Wind Power** and **Shanghai Zhenhua Heavy Industries Company** (ZPMC), two leading companies in China's offshore wind market and industry.

4.2.1 Joint Venture Partner: Jiangsu Longyuan Offshore Wind Power

Jiangsu Longyuan Offshore Wind Power is the Jiangsu province subsidiary of state-owned **China Longyuan Power Group**. **China Longyuan Power Group** is the world's largest owner and operator of wind farms. At the same time, it is the largest developer and operator of offshore wind farms in China where it typically applies the multi-contracting procurement strategy. Its other notable wind industry-related subsidiary is **United Power**, a leading Chinese wind turbine manufacturer. **China Longyuan Power Group** has been a subject of two major consolidations (Table 2).

Table 2: Some key expansion and consolidation events by China Longyuan Power Group

Event	Year	Rationale
China Longyuan Power Group was put under state-owned **China Guodian Corporation**.	2002	Part of the Chinese government's power market reforms in 2002 to decouple **State Power Corp of China** into five power generating companies and two grid companies.
China Guodian Corporation merged with state-owned coal power giant **Shenhua Group** to form **China Energy Investment Corporation (CHN Energy**).	2017	Merger a part of the Chinese government's plan from 2003 to create national champions that can compete globally and the subsequent restructuring of state-owned assets in 2017-2018.

Source: Panticon, based on various sources

4.2.2 Joint Venture Partner: Shanghai Zhenhua Heavy Industries Company (ZPMC)

ZPMC, Zhenhua Port Machinery Co. until 2009, is a major Chinese heavy industries company engaged in a wide range of local Chinese as well as global activities including construction of cranes (it is the world's largest maker of port/gantry cranes), shipbuilding, and offshore construction projects.

ZPMC is a subsidiary of state-owned enterprise **China Communications Construction Company** (CCCC), China's largest infrastructure builder. Through its subsidiaries such as **CCCC First Harbor Engineering**, **CCCC Third Harbor Engineering**, **CCCC Fourth Harbor Consultants**, **CCCC Engineering Vessel**, and **ZPMC**, **CCCC** accounted for more than 60% of offshore wind installation in China by end of 2018. **CCCC Third Harbor Engineering** built China's first commercial offshore wind farm, the 102MW Donghai Bridge, in connection with the Shanghai 2010 World Expo. In 2017, **CCCC** was reportedly seeking to either acquire or partner with an offshore wind turbine manufacturer from either China or Europe. Table 3 shows some of **ZPMC's** key expansion events.

Table 3: Some key expansion and consolidation events by ZPMC

Event	Year	Rationale
ZPMC listed on the Shanghai Stock Exchange. State-owned companies became the main shareholders with **CCCC** later emerging as the controlling shareholder.	2000	To attract investment for further expansion of company's activities.
ZPMC's subsidiary, **Shanghai Zhenhua Shipping Co. Ltd**, and compatriot privately-owned **Profundo Offshore Contractor Ltd** formed a joint-venture, **ZPMC Profundo Wind Energy Co., Ltd.**	2014	To launch state-of-the art offshore wind turbine installation vessels and related technology in Asia.
ZPMC acquired a 1% stake in container shipping and terminals company **COSCO Shipping Holdings**, a subsidiary of **COSCO Shipping Corporation Limited**.	2019	**ZPMC** intends to benefit from **Cosco Shipping Holdings**' influence on major port operators globally.

Source: Panticon, based on various sources

4.2.3 Jiangsu Longyuan Zhenhua Marine Engineering joint-venture after 2014

China's 12th Five Year Plan installation targets for offshore wind by the end of 2015 were not met. As a result, several centrally controlled state-owned enterprises were tasked with speeding up offshore wind construction projects from 2014 and beyond. These centrally controlled state-owned enterprises went about organizing themselves in different ways.

The **Jiangsu Longyuan Zhenhua Marine Engineering** joint-venture quickly became a leading player in the Chinese offshore wind industry. This was thanks to **China Longyuan Power's** strong pipeline of offshore wind farm projects and **CCCC's** experience and resolve to engineer, procure, construct, and install the offshore wind projects. As such, **China Longyuan Power** awarded many contracts to the **Jiangsu Longyuan Zhenhua Marine Engineering** joint-venture while **ZPMC** was contracted to deliver offshore wind foundations, offshore wind farm construction and support vessels to the joint-venture. In 2016, **Jiangsu Longyuan Zhenhua Marine Engineering** ordered an offshore wind turbine installation vessel with 2000-ton lifting capacity from **ZPMC** for delivery in 2018. Two years later, it ordered another vessel, with a lifting capacity of 2500 tons, bringing the number of such vessels it has ordered from **ZPMC** to a total of four.

CHN Energy continues to rely on **Jiangsu Longyuan Zhenhua Marine Engineering** to maintain offshore wind market leadership for its **China Longyuan Power** subsidiary. Thus, the size of **China Longyuan Power's** offshore wind logistics departments and personnel is not significant. This also applies to **CHN Energy's** developer competitors, primarily other state-owned companies, e.g. **State Power Investment Corporation** and **China Three Gorges**. The developers rely on services of the **Jiangsu Longyuan Zhenhua Marine Engineering** joint-venture or the joint venture's emerging competitors, e.g., **China Railway Major Bridge Engineering Group**, **Huadian Heavy Industry**, **Jiangsu Daoda Wind Equipment Technology**, **Nantong Ocean Water Conservancy Engineering**, **SPIC Jiangsu Electric Power**.

4.3. Logistics Service Provider: China COSCO Shipping Corporation

China COSCO Shipping Corporation, hereafter **China COSCO**, is a centrally controlled state-owned enterprise and is China's largest shipping company. It was formed in 2015 following the merger of **China Ocean Shipping** and **China Shipping** as part of the Chinese government's plan to create national champions that can compete globally.

China COSCO is engaged in different shipping and logistics activities across all wind farm life-cycle phases. It operates a shipyard business specialized in offshore vessel construction in Nantong, Jiangsu Province. The shipyard has constructed several wind turbine installation vessels deployed in Europe. Nearly all the next generation installation vessels ordered for the European offshore wind industry are being built at the Nantong Shipyard.

At the time of working on the **China COSCO** case study for the PhD thesis, offshore wind was not yet a corporate focus area for **China COSCO**. However, **China COSCO** was already engaged in various phases of the offshore wind farm lifespan especially the *Installation & Commissioning* life-cycle phase. In addition, **China COSCO's** container shipping and logistics divisions were engaged in the inbound-to-manufacturing supply chains, e.g. for wind turbine assembly, globally. The break-bulk division of **China COSCO** was involved in multi-purpose project vessel ownership as well as shipment of oversized wind turbine components within China and globally for onshore as well as offshore wind farms.

In the run up to 2015, **China COSCO** faced multiple challenges including a slowdown in global trade, overcapacity in the shipping industry, and increased competition from other global shipping companies which had been consolidating. Some of **China COSCO's** key growth moves are outlined in Table 4.

Table 4: Some recent key expansion and consolidation events by China COSCO Shipping Corporation

Event	Year	Rationale
China Ocean Shipping and **China Shipping** merge to form **China COSCO Shipping Corporation**.	2015	Merger a part of the Chinese government's plan from 2003 to create national champions that can compete globally.
COSCO Shipping Specialized Carriers Co., Ltd, a wholly-owned subsidiary of **China COSCO**, formed a joint-venture, **Guangzhou COSCOCS-DEME New Energy Engineering (**CDNE), with **GeoSea NV** (now **DEME Offshore** since 2019), the offshore marine engineering subsidiary of Belgian dredging and marine engineering company **DEME Group**. In 2017, **DEME Offshore** ordered installation vessel *Orion* for delivery in 2019 from the shipyard division of **China COSCO.**	2016	Development of offshore wind energy in China, including transportation of wind turbine equipment and installation of offshore wind turbines; Expertise access for **China COSCO**. **DEME Offshore** is a top ***Equipment, Procurement, Construction, & installation*** company with vast offshore wind experience from Europe especially in the *Installation & Commissioning* life-cycle phase; Market access for **DEME Offshore**; the Chinese offshore wind market is expected to boom post-2020.
China COSCO acquired Hong Kong-based **Orient Overseas International Limited**, the world's seventh largest container shipping line at the time and a subsidiary of **Orient Overseas Container Line**, effectively making **China COSCO** global number three in terms of container shipping market share.	2017	For **China COSCO:** to enhance global container shipping competitiveness, including the inbound-to-manufacturing supply chains, e.g. for wind turbines.

Source: Panticon, based on various sources

5. Organization of offshore wind logistics among supply chain lead companies – Going forward

The on-going drive to reduce the offshore wind levelized cost of energy means that supply chain lead companies will continue to organize their logistics personnel and departments accordingly. ***Offshore Wind Farm Developers, Grid Providers,*** and ***Offshore Wind Turbine Manufacturers*** will not substantially increase logistics personnel numbers or logistics department size. Rather, logistics

personnel and departments of ***Offshore Wind Farm Developers, Grid Providers***, and ***Offshore Wind Turbine Manufacturers*** will become nimble with focus on capabilities to efficiently delegate logistics tasks while minimising ownership of offshore logistics assets such as vessels. How logistics personnel or departments are organized will depend on the supply chain control level or tier level of the ***Offshore Wind Farm Developers, Grid Providers,*** and ***Offshore Wind Turbine Manufacturers***, with, e.g. Tier 1 ***Offshore Wind Farm Developers*** having more sizable logistics departments than Tier 4 ***Offshore Wind Farm Developers***. To the contrary, ***Engineering, Procurement, Construction, & installation*** companies, will expand their logistics departments and increase investments in logistics assets. Table 5 below outlines some key features of how the supply chain lead companies continue to organize offshore wind logistics.

Table 5: Organization of Offshore Wind Logistics by Supply Chain Lead Companies

General logistics approach	***Offshore Wind Farm Developers***	Focus on internal capabilities to efficiently delegate bundles of logistics tasks to experienced *logistics service providers* which have scale to take on substantial contracts, especially for the *Installation & Construction*, *Operations & Maintenance* and *De-commissioning* life-cycle phases.
	Grid Providers	Focus on internal capabilities to efficiently delegate logistics tasks to experienced ***logistics service providers*** on all four life-cycle phases.
	Offshore Wind Turbine Manufacturers	Focus on internal capabilities to efficiently delegate bundles of logistics tasks to experienced ***logistics service providers*** which have scale to take on substantial contracts for the *Installation & Construction*, and *Operations & Maintenance* life-cycle phases; e.g., in 2019, **Siemens Gamesa** awarded "pure play" ***logistics service provider*** **Blue Water Shipping** a contract to transport 83 wind turbines for four different offshore wind farms – three in the Europe and one in the USA.
	EPCi companies	Expansion of service offerings to all four life-cycle phases while outsourcing lower tier logistics tasks to other ***logistics service providers.***
Logistics personnel	***Offshore Wind Farm Developers***	Tap into pool of seasoned offshore wind logistics personnel of the experienced ***logistics service providers***. Tier 1 companies likely to hire logistics professionals while Tier 4 likely to hire executive -level logistics professionals from other Tier 1 supply chain lead companies.
	Grid Providers	Minimal, playing a high-level role in offshore wind logistics; Tap into pool of seasoned offshore wind logistics personnel of the experienced ***logistics service providers.***
	Offshore Wind Turbine Manufacturers	Minimal, playing a high-level role in offshore wind logistics; Tap into pool of seasoned offshore wind logistics personnel of the experienced ***logistics service providers.***
	EPCi companies	Increase in logistics personnel, e.g., via acquisition of experienced "pure play" ***logistics service providers*** or ***EPCi companies*** with strong offshore wind track record, to reflect focus on all four life -cycles.
Logistics assets	***Offshore Wind Farm Developers***	Minimal logistics asset ownership.
	Grid Providers	Minimal logistics asset ownership.
	Offshore Wind Turbine Manufacturers	Minimal logistics asset ownership.
	EPCi companies	Extensive asset ownership via acquisition of experienced "pure play" ***logistics service providers*** or ***EPCi companies*** or their assets, and investment in new assets, e.g. installations vessels, to reflect focus on all four life-cycles.
New offshore wind markets	***Offshore Wind Farm Developers***	High-level role in offshore wind logistics, e.g., facilitating offshore wind logistics personnel training in the new offshore wind market countries via collaboration with home country as well as host country institutions of learning; Rely on ***logistics service providers***, who typically have a global portfolio in other industries, to both meet local content requirements and reduce various new market risks.
	Grid Providers	N/A; ***Grid Providers*** are typically local state-owned utilities.
	Offshore Wind Turbine Manufacturers	High-level role in offshore wind logistics; Rely on ***logistics service providers***, who typically have a global portfolio in other industries, to both meet local content requirements and reduce various new market risks.
	EPCi companies	Partnerships with local "pure play" ***logistics service providers*** or ***EPCi companies*** to both meet local content requirements and reduce various new market risks.

Offshore wind logistics personnel / department	*Offshore Wind Farm Developers*	Significant for Tier 1 but Limited for Tier 4 companies.
	Grid Providers	Limited for Tier 1 and Very Limited for lower tiers.
	Offshore Wind Turbine Manufacturers	Moderate with little variation as segment is dominated by few companies, i.e. two in Europe while consolidation among Chinese players is expected.
	EPCi companies	Significant number of personnel in large logistics departments organized in an integrated manner both to reduce cost and to provide one stop solutions.

Source: Panticon, based on various sources

6. Conclusion

Before 2010 the size of the offshore wind market was not large enough to justify an entire life-cycle organization of logistics by supply chain lead companies. Logistics personnel and departments were in silos while investments in logistics-related assets such as specialized offshore wind turbine and foundation installation vessels were limited. However, the picture has changed favourably in a decade. As at end of 2019, markets have matured in Europe while project pipelines have become more voluminous and predictable as more countries adopt offshore wind. Early movers in the offshore wind industry, particularly state-owned companies or companies which partnered or partner with state-owned companies, stand to gain strong competitive advantage which may be sustained in the medium- to the long-term. As governments in both mature and new offshore wind markets continue to reduce subsidies to offshore wind, organization of logistics, both internally and externally, will continue to play a crucial role in supply chain lead companies' maintaining a competitive cost advantage vis-à-vis reducing the levelized cost of offshore wind energy.

References

1. berlingske.dk (Berlingske)
2. boskalis.com (Boskalis)
3. economist.com (The Economist)
4. ft.com (Financial Times)
5. maritimedanmark.dk (Maritime Danmark)
6. offshorewind.biz (offshoreWIND.biz)
7. orsted.com (Ørsted A/S)
8. panticon.com (Panticon)
9. Poulsen, T. (2018). Logistics in offshore wind. Aalborg Universitetsforlag. Ph.d.-serien for Det Ingeniør- og Naturvidenskabelige Fakultet, Aalborg Universitet https://doi.org/10.5278/vbn.phd.eng.00046
10. Poulsen, T. and Hasager, C. B. (2016): "How Expensive Is Expensive Enough? Opportunities for Cost Reductions in Offshore Wind Energy Logistics", Energies, 9 (6), 437; https://doi.org/10.3390/en9060437
11. Poulsen, T. and Hasager, C.B. (2017): "The (R)evolution of China: Offshore Wind Diffusion", Energies, 10 (12), 2153; https://doi.org/10.3390/en10122153
12. Poulsen, T.; Jensen, C.M.; Hasager, C.B. (2017): "The Role of Logistics in Practical Levelized Cost of Energy Reduction Implementation and Government Sponsored Cost Reduction Studies: Day and Night in Offshore Wind Operations and Maintenance Logistics", Energies, 10 (4), 464; https://www.mdpi.com/1996-1073/10/4/464
13. Poulsen, T. and Lema, R. (2017): "Is the supply chain ready for the green transformation? The case of offshore wind logistics", Renewable and Sustainable Energy Reviews, Volume 73, Pages 758-771; https://doi.org/10.1016/j.rser.2017.01.181
14. rechargenews.com (Recharge News)
15. reuters.com (Reuters)
16. tradewindsnews.com (Trade Winds News)
17. zpmc.com (Shanghai Zhenhua Port Machinery Co., Ltd.)

About Thomas Poulsen

Mr. Poulsen is a seasoned professional who has specialized in crafting strategy coupled with generating both tactical organic and strategic M&A driven growth for companies and organizations, mainly based on his experience in the shipping, transport, logistics, offshore wind, and supply chain industry. During his 30+ years in the business, Mr. Poulsen has lived in 8 countries namely his native Denmark, Indonesia (Jakarta), People's Republic of China (Shanghai), Singapore, Hong Kong (before hand-over to PRC), USA (New Jersey, California, and Florida), UK (London), and the United Arab Emirates (Dubai).

Abstract about Thomas Poulsen's PhD: Logistics in Offshore Wind

The PhD thesis is about offshore wind and focuses on logistics, broadly defined. As such, the research pertains to the offshore wind supply chain from the perspective of transportation and logistics tasks on land, through ports, at sea, and in the air. In addition, the research has dealt with logistics costs seen in relation to levelized cost of energy throughout the entire lifespan of an offshore wind farm project. The research has also dealt with the globalization of the offshore wind market, using China as the main example.

The results of the research have shown that logistics makes up a significant cost item within offshore wind. The results also revealed that it is important to organize logistics in an effective manner within those firms and organizations participating in the offshore wind industry. The eight academic articles which have been published as part of the PhD research project have been framed in the context of strategic management as well as the mergers & acquisition efforts forming part of the offshore wind industry as the market consolidation intensifies.

The research has been conducted in close collaboration with a series of leading offshore wind organizations and companies. The research was funded by Aalborg University and the Danish Maritime Foundation (Den Danske Maritime Fond) through grant number 2012-097.

What we do at Panticon

At Panticon, we are particularly strong in the Offshore Wind and Logistics sectors within our three core disciplines of **Strategic Management Advisory**, **Mergers & Acquisitions**, and **Market Intelligence**. We are mainly focusing on the business side to improve our clients' performance, create value in the long-term, and to create sustainable competitive advantages.

How we create value

- Tailor-made strategies
- Support M&A endeavours
- Share knowledge
- Analyse markets
- Advise our clients in every aspect of our three core disciplines


Sif


BMS
Heavy Cranes

Panticon
RELIABLE · EFFECTIVE · SUSTAINABLE

Panticon | Vivede Møllehuse 15, 4640 Faxe, Denmark
Web: www.panticon.com | **Email:** info@panticon.com