

A photograph of an offshore wind logistics facility. In the foreground, a paved pier with white directional arrows and bollards leads to a body of water. In the background, a large industrial yard is filled with numerous blue cranes and structures, likely for assembling and maintaining wind turbine components. The sky is clear blue with some light clouds. A white text box with a green border is overlaid on the top left of the image.

Offshore Wind Logistics brief report 7
- *Consolidation in the offshore wind industry with a focus on logistics related mergers and acquisitions*

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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 through December 2019 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.

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1. Introduction

This *Offshore Wind Logistics brief report* is the seventh 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 seventh brief report in the series looks at consolidation in the offshore wind industry with focus on mergers and acquisitions in the offshore wind logistics market segment.

2. Consolidation in the offshore wind industry

Although the offshore wind industry is less than 30 years old, it has undergone consolidation since 2009 through mergers and acquisitions and various strategic alliances within and across its supply chains and life-cycle phases.

2.1. Drivers of consolidation in the offshore wind industry

Several factors explain the consolidation in the offshore wind industry and some of the overall drivers are listed in Table 1 below.

Table 1: Some key factors driving consolidation in the offshore wind industry

Driver	Rationale	Effect
Pressure to reduce the offshore wind leveled cost of energy	Profit margins have been declining as governments in established offshore wind markets in Europe shift from generous subsidy regimes to intensely competitive auction-based systems.	Several companies in the supply chains, especially small- and medium-sized companies, have merged, been acquired, retreated from the market or gone bankrupt.
Emergence of new markets	The decreasing leveled cost of energy of offshore wind has encouraged governments outside Europe to adopt offshore wind. These governments typically link localization of the offshore wind supply chains to offshore wind development incentives.	To meet local content requirements, established European offshore wind companies partner with or acquire stakes in local companies in the new offshore wind market countries. They also do so to overcome cultural differences and investment risk.
Market access and market growth	Growth of offshore wind in Europe has attracted new entrants, especially into the developer space, leading to a saturated market.	Leading European offshore wind companies are looking to new markets outside Europe where entry is nearly impossible without partnering or acquiring local companies.
Geographical market diversification	Offshore wind markets are cyclical, especially at country level. Companies hedge against downturns in one country by catering to various offshore wind market countries.	A company strong in one offshore wind market or region but weak in another offshore wind market or region will acquire or merge with a company that is strong or has complementary strengths in the other offshore wind market.
Technology or expertise access	European companies diversifying into the offshore wind industry from industries such as oil & gas or dredging as well as companies in new offshore markets outside Europe lack the offshore wind technology or track record to compete effectively.	Such companies, including established offshore wind companies seeking to expand their product portfolios, partner, merge, or acquire companies which have superior technology or track record.
Supply chain bottlenecks	Factors such as exponential cyclical market growth and increases in average offshore wind farm size, water depth, and turbine size have outpaced the capacity of existing supply chains.	In such cases, supply chain lead companies have acquired their respective suppliers to secure their supply chains.
Demand for fewer supplier interfaces	New offshore wind farm developers with limited offshore wind development experience and preference for single and hybrid contracting strategies.	The supply chain has been encouraged to consolidate and offer one-stop solutions.

Source: Panticon, based on various sources

2.2. Examples of consolidation in the offshore wind industry

This section provides examples of the consolidation which has taken place in the offshore wind industry based on the drivers of the industry consolidation outlined above.

2.2.1 Offshore Wind Farm Developers

As the main supply chain lead in the offshore wind industry, **Offshore Wind Farm Developers** are the first to feel the pressure to reduce the offshore wind levelized cost of energy. This pressure then trickles down to the rest of the supply chain, primarily the other supply chain lead companies, namely **Offshore Wind Turbine Manufacturers** and **Equipment, Procurement, Construction & installation** companies. Below are examples of consolidation in China, the USA, and Europe.

Table 2: Examples of consolidation - Offshore Wind Farm Developers

Event	Year	Rationale
China Three Gorges (China)		
State-owned China Three Gorges (CTG) acquired a 29% stake in offshore wind farm developer China Power New Energy Development (China).	2011	Diversification beyond hydropower to offshore wind.
CTG acquired a 23.1% stake in Energias de Portugal (Portugal).	2011	Access to European wind markets and other global energy generation and distribution assets.
CTG takeover bid for Energias de Portugal eventually blocked by shareholders.	2019	Access to European wind markets and other global energy generation and distribution assets.
CTG completed the acquisition of a 10% stake from EDP Renewables (Spain) in the 950 MW Moray East offshore wind farm in Scotland.	2019	Access to European offshore wind markets.
China Guodian (China)		
State-owned companies China Shenhua Group (China's largest coal producer) and China Guodian (China's largest offshore wind developer) merged to form CHN Energy .	2017	Part of the Chinese government's plans to create national champions able to compete globally.
Ørsted (Denmark)		
State-owned Ørsted made a return into onshore wind when it acquired developer Lincoln Clean Energy (USA), Ørsted Onshore since November 2019.	2018	Access to new market.
Ørsted acquired successful local developer Deepwater Wind (USA).	2018	Access to market; prior to acquisition, Ørsted had unsuccessfully participated in solicitations off the East Coast of the USA.
Mitsubishi Corporation (Japan)		
Japan's largest trading house, Mitsubishi Corporation , and utility Chubu Electric Power (Japan) acquired 80% and 20% shares, respectively, in integrated and Independent utility Eneco (Netherlands)	2019	Eneco seeking resources to finance long-term investments in sustainable energy projects within and outside Europe; Mitsubishi and Chubu Electric enhancing access to European offshore wind and other renewables know-how and markets

Source: Panticon, based on various sources

The consolidation picture in Europe is different, largely thanks to the prevalence of developers with little offshore wind development who rely on **Equipment, Procurement, Construction & installation** companies (Section 3.2).

2.2.2 Grid Operators

Players in this segment are few and mostly state-owned. However, **Grid Operators** are open to mergers & acquisitions and strategic alliances due to expertise sharing (track record) as well as financial considerations (i.e., investment in new or smart infrastructure that accommodates renewable energy's intermittency). An example is **State Grid's** (China) 2018 attempt to acquire a 20% stake from infrastructure fund **IFM Investors** (Australia) in **50Hertz** (Germany), one of four grid operators in Germany. The bid was unsuccessful due to political backlash and the stake was eventually bought by German state-owned bank **KfW**. **IFM Investors** and grid operator **Elia** (Belgium) had acquired **50Hertz**, 40% and 60% shares, respectively, from **Vattenfall AG Europe** in 2010.

2.2.3 Offshore Wind Turbine Manufacturers

There were up to 30 **Offshore Wind Turbine Manufacturers** outside of China at the end of 2009. At the end of 2019, there were only five **Wind Turbine Manufacturers** outside of China – **Siemens Gamesa**, **MHI Vestas**, **GE Renewable Energy**, **Senvion**, and **Doosan**. Table 3 below lists some examples of consolidation worldwide.

Table 3: Examples of consolidation - Offshore Wind Turbine Manufacturers

Event	Year	Rationale
Suzlon (India)		
Suzlon acquired an 87.1% stake in REpower (renamed Senvion in 2014) (Germany); stake eventually raised to 100% in 2011.	2007	Access to offshore wind technology in anticipation of a take-off in home market India.
Private equity company Centerbridge Partners (USA) acquired Senvion from Suzlon .	2015	Financial challenges, and delays in adoption of offshore wind in home market, India, made Suzlon sell Senvion .
Senvion filed for insolvency.	2019	Faced financial challenges, partly driven by dominance of two other offshore wind turbine manufacturers.
Siemens Gamesa (Germany/Spain) acquired Senvion's European onshore wind service business, including a blade manufacturing plant in Portugal.	2019	Part of Siemens Gamesa's plans to diversify its business portfolio and geographical exposure to sourcing from Asia.
Goldwind (China)		
Goldwind acquired a 70% stake in Vensys Energy (Germany), a pioneer in permanent direct-drive wind turbine technology.	2008	Access to technology. Acquisition a culmination of a wind turbine design licensing agreement from 2003.
XEMC (China)		
XEMC acquired turbine technology developer Darwind Holding (Netherlands).	2009	Access to technology. At the time, Darwind had a 2MW direct-drive turbine in its portfolio and a 5MW turbine under development
GE (USA)		
GE made its initial entry into offshore wind by acquiring ScanWind (Norway)	2009	Access to technology. ScanWind had developed a 4 MW direct-drive wind turbine which GE installed off Sweden in 2011.
GE acquired Alstom's (France) power and grid business including the wind turbine manufacturing business, now GE Renewable Energy .	2015	Access to technology.
Vestas (Denmark) and Mitsubishi Heavy Industries (Japan)		
Vestas and Mitsubishi Heavy Industries formed a joint-venture, MHI Vestas .	2014	Vestas was seeking a partner to help finance development of its V164 offshore wind turbine while Mitsubishi Heavy Industries sought access to technology.

Areva (France), Gamesa (Spain) and Siemens Wind Power (Denmark/Germany)		
Areva and Gamesa formed a 50%-50% offshore wind joint-venture Adwen .	2014	Pooling resources together to develop new offshore wind turbines.
Adwen was short-lived when Siemens Wind Power and Gamesa merged to form Siemens Gamesa . Later in 2017, Areva sold its 50% stake in Adwen to Siemens Gamesa .	2017	Siemens Wind Power was seeking to diversify its markets while Gamesa (Spain) was seeking to fast-track its entry into offshore wind.

Source: Panticon, based on various sources

2.2.4 Offshore Wind Turbine Component Manufacturers – Blades

This segment has been characterised by **Offshore Wind Turbine Manufacturers** acquiring their suppliers, primarily to access technology or secure their supply chains. Table 4 below lists some examples of consolidation.

Table 4: Examples of consolidation - Offshore Wind Turbine Component Manufacturers: Blades

Event	Year	Rationale
Senvion (Germany)		
Offshore wind turbine manufacturer Senvion and blades manufacturer SGL Rotec GmbH (Germany) formed a 51%-49% joint-venture, PowerBlades GmbH .	2007	Pooling resources together to produce rotor blades for wind turbines.
Senvion acquired the remaining 49% stake from SGL Rotec .	2012	To secure supply chain.
Senvion acquired wind turbine blade manufacturer Euros Group (Germany/Poland).		To help accelerate entry into new markets and reduce costs.
Onshore blade manufacturer TPI Composites (USA) acquired a 20-person team of Euros Group (Germany/Poland) engineers from Senvion .	2019	To enhance capabilities in blade manufacturing. TPI Composites is yet to enter the offshore wind industry.
GE (USA)		
Offshore wind turbine manufacturer GE acquired offshore wind turbine blade design specialist Blade Dynamics (UK).	2015	Access to technology.
GE acquired global leading independent offshore wind turbine blade manufacturer LM Wind Power (Denmark) from private equity company Doughty Hanson (UK) (DH Private Equity Partners since May 2017).	2017	Access to technology.

Source: Panticon, based on various sources

Following the April 2017 acquisition of **LM Wind Power** by **GE Renewable Energy**, independent offshore wind blade suppliers no longer exist in markets outside China.

2.2.5 Selected Balance of Plant Component Manufacturers

This section provides examples of consolidation among selected *Balance of Plant* component manufacturers.

2.2.5.1 Fixed Foundations

Fixed foundations are undifferentiated products and the segment has seen a number of suppliers go insolvent or acquired in the European offshore wind market. Table 5 lists some examples.

Table 5: Examples of consolidation - Offshore Balance of Component Manufacturers: Fixed Foundations

Event	Year	Rationale
Eiffage (France)		
Eiffage acquired Smulders, Iemants, Willems and Spomasz from Smulders Group (Netherlands).	2013	To strengthen Eiffage 's position in the European offshore wind industry.
Bladt Industries (Denmark)		
Bladt Industries and EEW (Germany) formed a joint-venture Offshore Structures (Britain) Limited (UK).	2014	To serve the UK offshore wind market.
Offshore Structures (Britain) Limited acquired TAG Energy Services (UK).	2014	TAG Energy Services had filed for bankruptcy.
Bladt Industries transferred its shares in Offshore Structures (Britain) Limited to EEW .	2017	Part of an overall settlement of several outstanding commercial issues.
Bladt Industries and Century Wind Power (Taiwan) formed a joint-venture, Century Bladt Foundation Co., Ltd.	2018	To bring mature European fabrication technology to the Taiwanese offshore wind market.
Weserwind (Germany)		
Weserwind filed for bankruptcy.	2015	Slowdown in the German wind industry partly caused by delays in delivering offshore grid connections.
Nordseewerke GmbH (Germany)		
Nordseewerke GmbH filed for bankruptcy. In 2015, it was acquired by private equity company Beaufort Capital (Germany) and renamed Nordseewerke Emden Shipyard .	2015	Slowdown in the German wind industry partly caused by delays in delivering offshore grid connections.
Nordseewerke Emden Shipyard filed for insolvency and was subsequently acquired by shipbuilding group Fosen Yard (Norway).	2018	Slowdown in Germany's offshore wind market.
Titan Wind Energy (China)		
Tower and foundation manufacturer Ambau (Germany) filed for insolvency. Its facility in the coastal town of Cuxhaven was acquired by tower manufacturer Titan Wind Energy .	2019	Continued slowdown in Germany's offshore wind market. Titan Wind Energy marked its entry into the offshore wind foundation market.

Source: Panticon, based on various sources

However, as the offshore wind markets expand within and outside Europe, post-2020 demand is picking up and attracting new entrants. Italian oil services company **Saipem** has organically diversified into the bottom-fixed jacket foundations segment clinching supply deals in 2019 for two offshore wind projects in Taiwan and Scotland.

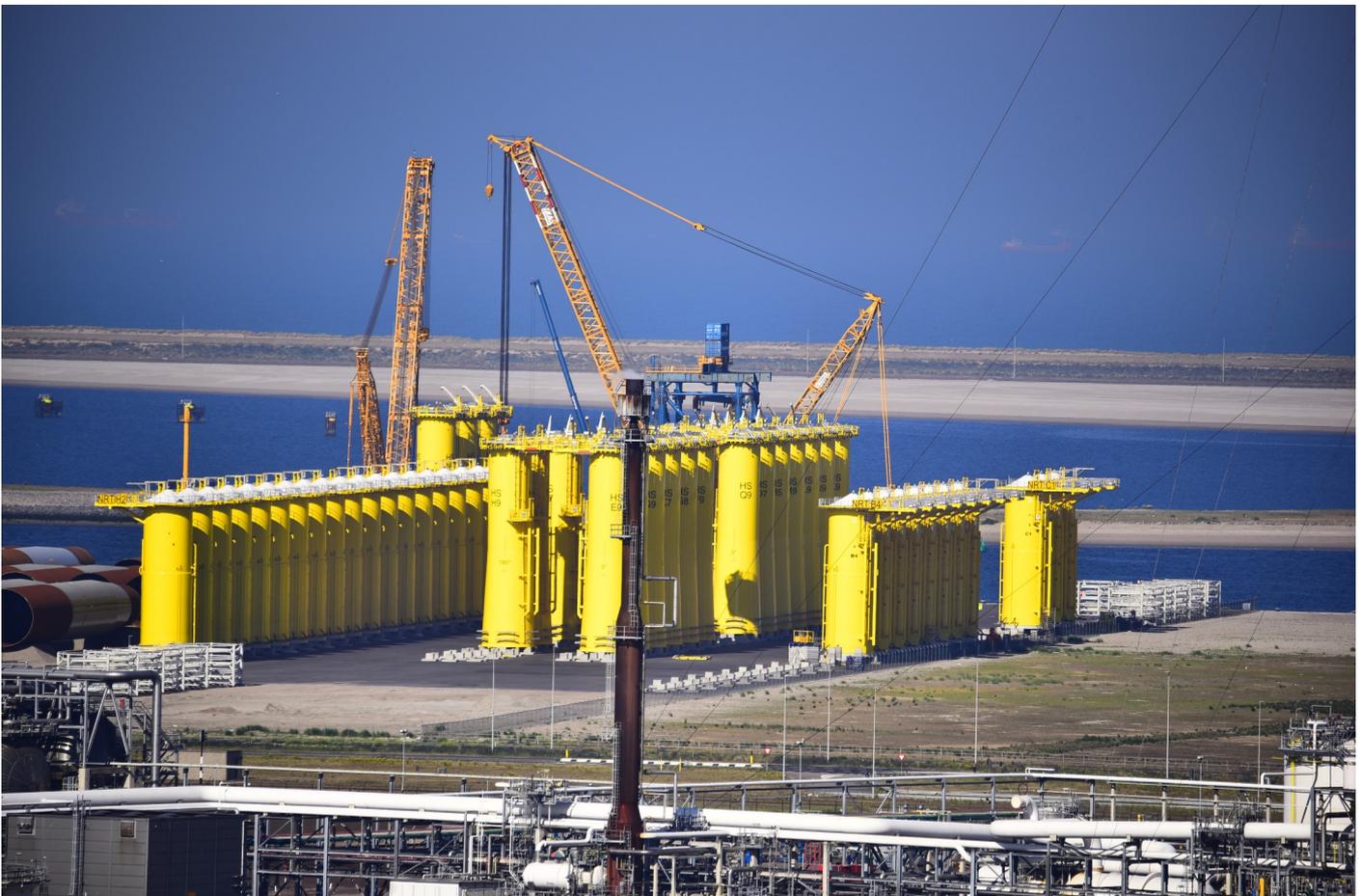
2.2.5.2 Floating Foundations

Floating foundations is an emerging segment of the offshore wind industry expected to take off at the start of the 2020s. Nonetheless, consolidation is already taking place primarily driven by technology access and market access in promising floating offshore markets such as Japan, South Korea and the West Coast of the USA. Particularly, it has attracted companies from the oil & gas industry with expertise that is familiar to floating foundations such as mooring systems and dynamic cables. Floating foundations present a new set of challenges (e.g., whether repairs should be done on-site, or turbines should be towed to port during the *Operations & Maintenance* offshore wind life-cycle phase) as well as opportunities for the offshore wind industry. Table 6 below lists some examples of acquisitions in this segment.

Table 6: Examples of acquisitions

Event	Year	Rationale
Navantia (Spain)		
State-owned shipbuilding company Navantia and wind tower and foundation company WINDAR Renovables (Spain) formed a joint-venture, Navantia-Windar .	2015	To pool resources together in manufacture of offshore wind foundations including floating foundations. In 2015, the joint-venture secured a deal from Equinor (Norway) to supply five spar-type floating foundations for the Hywind project.
Shell (Netherlands/UK)		
Cobra Concesiones (Spain) acquired majority shares in EOLFI Greater China from Eolfi (France), a floating wind specialist renewable energy developer.	2017	Market access. Earlier in 2012, Eolfi set up EOLFI Greater China in Taiwan to develop five 500MW floating offshore wind projects. However, the 500MW project was not successful in the two rounds for the 5.5GW offshore wind capacity awarded in Taiwan.
Floating multi-turbine platform designer Hexicon (Sweden) and integrated service provider COENS Co Ltd (South Korea) formed a joint-venture CoensHexicon Co. Ltd .	2018	Market access for Hexicon , technology access for COENS Co Ltd . In 2019, Shell entered a joint development agreement with CoensHexicon Co. Ltd to build and operate a floating offshore wind project in South Korea.
Shell and Innogy (Germany) acquired 33% stakes each in Stiesdal Offshore Technologies' (Denmark) <i>TetraSpar</i> floating concept.	2018	Technology access for Shell and Innogy .
Shell doubled its stake in the <i>TetraSpar</i> floating concept to 66%.	2019	Technology access
Shell acquired Eolfi .	2019	Diversification into offshore wind and other renewables. Technology access.
Aker Solutions (Norway)		
Aker Solutions acquired a 5% stake in floating wind power technology company Principle Power Inc. (USA).	2018	Market and technology access.
Aker Solutions and EDP Renewables (Spain) acquired a stake in Korea Floating Wind Power from project developer WindPower Korea .	2019	Market access and technology access.

Source: Panticon, based on various sources



3. Consolidation in offshore wind industry logistics

The research identified offshore wind logistics as contributing 18% of the offshore wind levelized cost of energy. The research also defined offshore logistics along a spectrum of 11 dimensions across the entire life-cycle of an offshore wind farm. There are a myriad of companies providing such services, mostly as a package of services not exclusively restricted to logistics. This chapter highlights the mergers and acquisitions of some of such companies.

3.1. Equipment, Procurement, Construction and installation companies

Companies in this segment are primarily active in the *Installation & Commissioning* and, increasingly, the *Operations & Maintenance* life-cycle phases. However, they have taken a more integrated approach and are making inroads into the *Development & Consent* and *De-commissioning* life-cycle phases. Table 7 below lists some examples.

Table 7: Examples of consolidation - Equipment, Procurement, Construction and installation

Event	Year	Rationale
Shanghai Zhenhua Heavy Industries (China)		
Shanghai Zhenhua Heavy Industries , or ZPMC (a subsidiary of state-owned China Communications Construction Company (China), formed a 50%-50% joint-venture, Jiangsu Longyuan Zhenhua Marine Engineering Co., Ltd , with Jiangsu Longyuan Offshore Wind Power (ultimately a subsidiary of state-owned CHN Energy).	2012	Securing supply chain for developer China Longyuan Power Group , a subsidiary of CHN Energy .
Shanghai Zhenhua Heavy Industries acquired a 1% stake in state-owned Cosco Shipping Holdings (China).	2019	To expand Shanghai Zhenhua Heavy Industries' port equipment and other maritime businesses.
Van Oord (Netherlands)		
Van Oord acquired the offshore activities (including staff) of Ballast Nedam Offshore (Netherlands)	2014	Expertise and track record access.
Van Oord acquired the offshore wind activities of Bilfinger Marine & Offshore Systems GmbH (Germany).	2016	Expertise and track record access.
Van Oord acquired the main assets (including a base in the UK) of specialist offshore wind installation contractor MPI Offshore (UK) from Vroon Group .	2018	Expertise, track record and market access.
Jan de Nul (Belgium)		
Jan de Nul acquired jack-up crane vessel <i>Vidar</i> from construction group Hochtief (Germany).	2015	Expertise access towards offering an all-in solution to the offshore market.
Jan De Nul acquired part of the offshore business (including jack-up vessel <i>MPI Discovery</i> , since renamed <i>Taillevent</i>) of MPI Offshore from Vroon Group .	2018	Expertise access.
DEME Offshore (Belgium)		
GeoSea (a subsidiary of DEME Group) (Belgium) acquired the offshore assets from construction group Hochtief .	2015	Expertise access, i.e. assets included two jack-up vessels.
DEME Group formed a joint-venture, Guangzhou COSCOCS-DEME New Energy Engineering , with state-owned COSCO (China) in China.	2016	Market access.
GeoSea acquired A2Sea (Denmark) from Ørsted and Siemens Wind Power (now Siemens Gamesa).	2017	Expertise access, i.e. to expand its installation capabilities.
GeoSea acquired majority shares in G-tec (Belgium), whose services portfolio includes geotechnical and geological, marine geophysical, environmental survey and engineering services.	2017	Expertise access, i.e. to reinforce its integrated service offerings.
DEME Group formed a joint-venture, CSBC-DEME Wind Engineering Co. Ltd , with state-owned CSBC in Taiwan.	2017	Market access.
DEME Group integrated its four subsidiaries GeoSea , Tideway , A2Sea , and EverSea into DEME Offshore .	2019	To provide full engineering, procurement, construction, and installation contracts.

Boskalis (Netherlands)		
Boskalis acquired the offshore-related activities from Volker-Wessels (Netherlands). The assets included three companies VBMS, Stemat and Volker Stevin International .	2016	Expertise access, i.e. the three companies' capabilities include offshore cable installation, floating equipment, construction of offshore foundations and maritime constructions.
Boskalis acquired all shares of the Gardline Group (UK) whose main activities include marine geophysical surveys, offshore geotechnical services and environmental surveys.	2017	Expertise access, i.e. strengthening portfolio in the <i>Development & Consent</i> life-cycle phase.
Boskalis acquired the offshore cable installation activities and assets of Bohlen Doyen from SPIE SAG Group (Germany).	2018	Expertise access.

Source: Panticon, based on various sources

3.2. Non-Equipment, Procurement, Construction and installation marine contractors

3.2.1 Foundation and Turbine installation, and Operations & Maintenance

This segment requires high investments in vessels as well as a good track record. Increased turbine size, foundation size and water depth as offshore wind farm sites moved farther offshore called for more investments in vessel upgrades or new-build. This resulted in consolidation as financially strong companies from other industries like oil & gas and dredging acquired relatively smaller players with strong track record. Other companies, e.g. **Ballast Nedam, Hochtief, Technip (TechnipFMC since 2016)**, simply divested their offshore wind businesses and exited the market. Table 8 below lists some examples.

Event	Year	Rationale
Fred Olsen (Norway)		
Fred Olsen acquired Natural Power (UK) whose service portfolio includes environmental impact assessments, environmental surveys, resource and metocean assessment, as well as construction services management.	2000	Expertise access, i.e. service portfolio expansion.
Natural Power acquired Zephir (UK), a supplier of wind lidars.	2007	Expertise access, i.e. service portfolio expansion.
Fred Olsen acquired a majority stake in Global Wind Services (Denmark).	2009	Capacity expansion, i.e. service portfolio expansion.
Global Wind Services acquired all offshore and blade activities from bankrupt Total Wind (Denmark), taking over ongoing projects, customer contracts and employees.	2018	Expertise and market access.
Fred Olsen agreed with Seafox International Group (Singapore) to acquire a 51% stake in jack-up vessel <i>Seafox 5</i> .	2018	Capacity expansion, i.e. to expand its existing fleet of installation vessels.
Fred Olsen acquired a 50% stake in logistics service provider United Wind Logistics (Germany).	2019	Expertise access, i.e., consolidating services portfolio in <i>Installation & Commissioning</i> and <i>Operations & Maintenance</i> life-cycle phases.
Swire Group (Singapore)		
Swire Group acquired installation start-up Blue Ocean Ships (Denmark) to form Swire Blue Ocean .	2010	Investment opportunity in growing industry (Swire Group). Blue Ocean Ships was seeking financial and organisational backing to invest in newer assets capable of serving the

Table 8: Examples of consolidation - Foundation and Turbine installation, and Operations & Maintenance marine contractors

Seajacks International (UK)		
Marubeni Corporation (Japan) and Innovation Network Corporation of Japan acquired jack-up vessel operator Seajacks International from private equity company Riverstone (USA).	2012	Expertise access for Marubeni , i.e. access to Europe's offshore wind installation know-how for later deployment in Japan and rest of Asia.
Mistui O.S.K. Lines (Japan) acquired a minority stake in Seajacks.	2017	Investment opportunity.
MPI Offshore (UK)		
MPI Offshore acquired a jack-up vessel, <i>Victoria Mathias</i> , renamed <i>MPI Enterprise</i> , from Offshore Wind Farm Developer RWE Innogy (Germany).	2015	RWE Innogy exited the offshore wind installation segment. RWE subsidiary, Offshore Logistics Company , chartered for five years its other jack-up vessel, <i>Friedrich Ernestine</i> renamed <i>M/V Torben</i> , and again to <i>Tuo Peng</i> , to joint-venture company ZPMC Profundo Wind Energy (China).
Subsea 7 (UK/Norway)		
Subsea 7 acquired the other 50% stake in Seaway Heavy Lifting (Netherlands) from its joint-venture partner K&S Baltic Offshore (Cyprus).	2017	Part of plans to increase participation in heavy lifting and <i>De-commissioning</i> .

Source: Panticon, based on various sources

3.2.2 Subsea Cables Manufacturers and Cable installation

The subsea cables manufacturing segment, though standardised, is characterised by innovation (high voltage cables) and need for scale. The cable installation segment has been characterized by cable manufacturers acquiring cable installation vessels as they seek tighter control over the supply chain and enhanced cost reduction opportunities. In addition, they are responding to demand from **Offshore Wind Farm Developers** and **Grid Providers** who, in general, prefer integrated product and service solutions. Besides the cable manufacturers, the non-cable manufacturers are typically **Equipment, Procurement, Construction & installation** companies (see section 3.1 above) which have acquired other companies. Table 9 below lists some examples.

Table 9: Examples of consolidation - Subsea Cables Manufacturers and Cable installation

Event	Year	Rationale
Nexans Group (France)		
Nexans Group acquired cable-laying vessel <i>C/S Skagerrak</i> from Bourbon Cable AS (Norway/France).	2006	Expertise access, i.e. towards providing integrated solutions.
Nexans Group acquired a controlling interest in cable kits manufacturer and supplier BE CableCon (Denmark).	2018	Expertise access, i.e., to reinforce its portfolio of activities and accelerate growth in renewable energy business segment.
A2Sea (Denmark)		
A2Sea , then a joint-venture between DONG Energy (now Ørsted) and Siemens Wind Power (now Siemens Gamesa) acquired a 29% stake in cable installation company CT Offshore (Denmark). The stake was increased to 67% in 2012.	2011	Secure supply chain for joint-venture majority owner, developer Ørsted .
A2Sea divested from CT Offshore to focus on foundation and turbine installation.	2016	CT Offshore did not keep up with investments in new assets.
Prysmian Group (Italy)		
Prysmian Group acquired AS Draka Group (Netherlands).	2011	Expertise access and capacity expansion.
Prysmian Group acquired subsea cable installation, repair and maintenance company Global Marine Energy (UK) from Global Marine Systems (UK).	2012	Expertise access and ability to offer turnkey solutions.
Prysmian Group acquired another competitor, General Cable (USA), from General Cable Corporation.	2018	Capacity expansion and market access.

Global Marine Systems (UK)		
Global Marine Systems* acquired a majority interest in construction and <i>Operations & Maintenance</i> services provider CWind (UK).	2016	Expansion of service portfolio.
Global Marine Systems acquired the trenching and cable lay services business of Fugro (Netherlands).	2017	Expansion of service portfolio.
NKT (Denmark)		
NKT acquired ABB HV Cables from ABB Group (Switzerland) in including ABB HV Cables' investment in a new cable-laying vessel.	2017	Expertise access, i.e. towards providing integrated solutions.
JDR Cables (UK)		
TFKable Group (Poland) acquired JDR Cables .	2017	Strategic investment opportunity.
Subsea 7 (UK/Norway)		
Subsea 7 acquired sub-sea cable installation and repair and maintenance company Siem Offshore Contractors (Germany), renamed Seaway Offshore Cables .	2018	Expertise access, i.e., part of Subsea 7's plans to enhance its service portfolio across the entire life-cycle.

***Global Marine Systems** made a return to the offshore wind cable installation market in 2015 following **Prysmian Group's** charter of cable installation vessel *C/S Sovereign* for the Wikinger offshore wind farm job.

Source: Panticon ,based on various sources

3.3. Logistics service providers

Pure-play logistics service providers have been consolidating via acquisitions and, to a large extent, joint-ventures to access new markets as well as expand their service offerings. Some examples are listed in Table 10 below.

Table 10: Examples of consolidation - Logistics service providers

Event	Year	Rationale
Mammoet (Netherlands)		
KR Wind , a 50%-50% joint-venture formed in 2002 between Mammoet and cranes company Kranløft Danmark (part of Enggaard Group (Denmark)), acquired trucking company Brande Maskintransport (Denmark).	2008	Expertise access and market entry into wind industry.
Mammoet acquired the other 50% shares in KR Wind .	2011	Capacity expansion, i.e., to increase Mammoet's focus on global offshore wind.
Mammoet , now the largest crane company in the world, acquired heavy lift specialist ALE (UK), the third largest crane company in the world.	2019	Capacity expansion, i.e., to enhance its global leadership in provision of heavy lift and heavy transport solutions.
ALE and Giant Taiwan (Taiwan) formed a joint-venture, ALE-Giant , to oversee transportation of offshore wind foundations and development of new storage facilities in Taiwan.	2019	Market access and local content requirement for ALE . Expertise access for Giant Taiwan .
Buss Offshore Solutions (Germany)		
Three German logistics companies Bernhard Schulte Offshore , EMS Maritime Offshore and SSC Wind formed an offshore wind service joint-venture formed WINDEA Offshore .	2011	Expertise access, i.e., collaborating complementary services to offer integrated solutions
Terminals and logistics services company Buss Offshore Solutions became a shareholder of WINDEA Offshore .	2018	Expertise access, i.e., collaborating complementary services to offer integrated solutions.
Buss Offshore Solutions and logistics services provider IDEA Groupe (France) formed a joint-venture, Buss IDEA Offshore .	2019	Expertise and market access, i.e., to provide comprehensive logistics services to France's emerging offshore wind market.
Buss Offshore Solutions acquired SSC Wind .	2019	Expertise access and capacity expansion, i.e., to expand its services in the offshore and onshore wind markets.
Ziton (Denmark)		
Private equity company BWB Partners (Denmark) invested in Ziton (DBB Jack-Up Services until in 2016). It went on to acquire a jack-up vessel, <i>Wind Pioneer</i> , from Hyundai (South Korea) in 2012.	2012	Investment opportunity; Ziton dominates the offshore wind <i>Operations & Maintenance</i> services segment and has framework agreements with the leading supply chain lead companies in Europe.

DSV Air & Sea (Denmark)		
DSV, DSV Panalpina since 2019, acquired the entire share capital of logistics company Seatainers Group (Denmark) whose companies included Baltship , a provider of warehousing/logistics solutions and road, air and sea freight services.	2013	Expertise access, i.e., to strengthen its market position, competitiveness, and logistics service scope.
SeaReenergy (Germany)		
Offshore service provider SeaReenergy , a supplier of engineering, marine services, <i>Quality, Health, Safety & Environment Management</i> , and offshore professionals for <i>Installation & Commissioning</i> and <i>Operations & Maintenance</i> of offshore wind farms and platforms, acquired Con4Mare , a specialist in marine warranty surveys.	2016	Expertise access and capacity expansion, i.e., to expand services across entire life-cycle and provide integrated solutions.
SeaReenergy acquired offshore wind engineering and permit specialist Elbe-1 (Germany).	2019	Expertise access and capacity expansion, i.e., to expand services across entire life-cycle and provide integrated solutions.
Blue Water Shipping (Denmark)		
Logistics service provider Blue Water Shipping and Bremer Reederei E&B (Germany) formed a joint-venture Blue Water BREB GmbH .	2017	Market and expertise access, i.e., to provide a wide range of logistics and logistics-related services, including port agency, stevedoring, loading, discharging, storage and transport, for the German offshore wind industry.
Wilhemsen Ship Management (Norway)		
Wilhemsen Ship Management acquired a 50% stake in Nor-Sea Wind (Norway) and its subsidiaries.	2019	Expertise access, i.e., to expand services across entire life-cycle and provide integrated solutions.
Boskalis (Netherlands)		
Boskalis and Hwa Chi Construction Co (Taiwan) formed a joint-venture, Boskalis HwaChi Offshore Wind Taiwan Co. Ltd.	2019	Market access, expertise access and local content requirement, i.e. to transport and install offshore foundations at developer Copenhagen Infrastructure Partners ' two wind farms in Taiwan.

Source: Panticon, based on various sources



4. Conclusion

The offshore wind industry has experienced accelerated consolidation since 2009. Such consolidation has taken place across all the life-cycle phases of an offshore wind farm. Key drivers have included the pressure to reduce the offshore wind levelized cost of energy, emergence of new markets, technology or expertise access, need to diversify geographical markets, market access and growth, supply chain bottlenecks, demand for fewer supplier interfaces, and increase in average offshore wind farm size, water depth, and turbine size. These drivers summararily point to reduction of the offshore wind levelized cost of energy. Because offshore wind logistics accounts for 18% of offshore wind levelized cost of energy, its role is crucial in this regard. Going forward, industry consolidation will continue as supply chain lead companies, in their quest to reduce costs, demand an integrated view of offshore wind logistics across the entire offshore wind farm lifespan.

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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.

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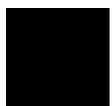
At Panticon, we are particularly strong in the Offshore Wind and Logistics sectors within our three core disciplines of **Strategic Management Advisory**, **Mergers & Acquisitions**, and **Market Intelligence**. We are mainly focusing on the business side to improve our clients' performance, create value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

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