Global Specialist Offshore Support Vessel Market Overview

IMCA
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Prepared by IMCA

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Contents:

Glossary of Abbreviations Used

- LVC: Light Construction Vessel
- WTIV: Wind Turbine Installation Vessel
- SOV: Service Operations Vessel
- BIMCO: Baltic and International Maritime Council
- STCW: The International Convention on Standards of Training, Certification and Watchkeeping for Seafarers
- DP: Dynamic Positioning (Typically using satellites, laser, or other forms of reference systems)
- FIV: Foundation Installation Vessel
- CTV: Crew Transfer Vessel

1 Introduction

This document identifies the global fleet of specialist offshore support vessels which are used in offshore oil and gas and offshore wind energy construction markets. It also identifies which of this fleet are U.S. coastwise compliant and non-coastwise compliant.

The vessels have been split into the following categories:

- Light Construction Vessels (LCVs)
- Heavy Construction Rigid Pipelay and Flexlay/Cable lay vessels
- Heavy Lift Vessels / Foundation installation Vessels (FIVs)
- Seismic, Survey and Geotechnical Vessels
- Wind Turbine Installation Vessels (WTIVs)
- Service Operations Vessels (SOVs)

Vessel requirements for each category were developed based on discussions with marine contractors and vessel captains, literature review, and review of equivalent industries. Individual companies may apply different criteria based on their own preferences or specific circumstances.

2 Global specialist offshore support vessel market

2.1 General overview

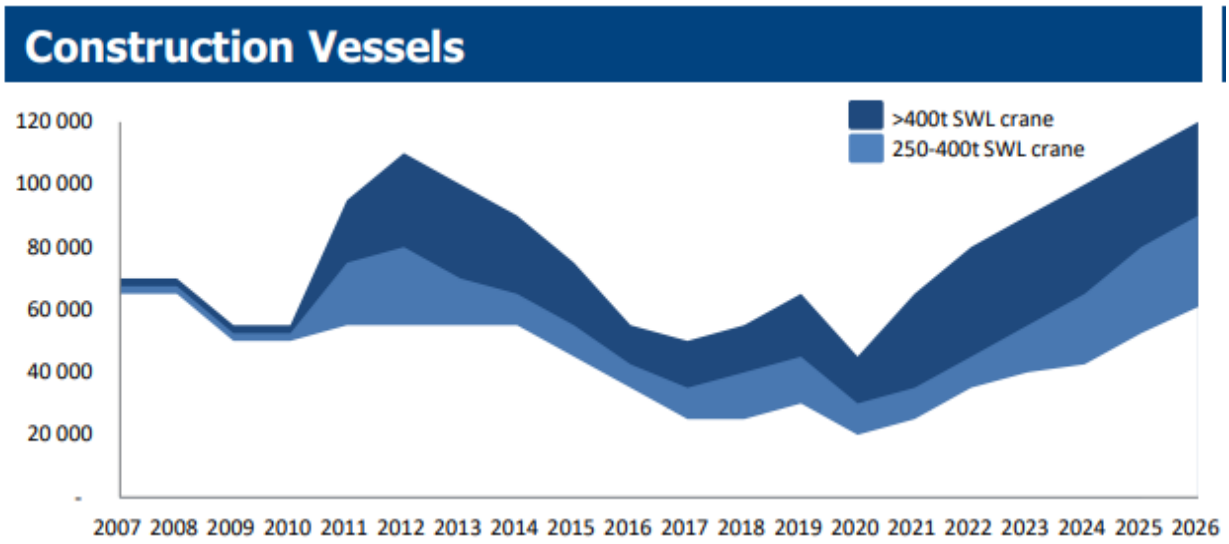
Offshore oil and gas construction in deepwater and offshore wind facilities installation is technically challenging and is associated with more demanding vessel functionality such as dynamic positioning, increased lifting capacity and other complex industrial installation tools and processes. This document provides updated information on the main categories of specialist offshore construction vessels expected to operate off the U.S. coast. It is a misnomer that the mere existence of foreign flagged vessels in U.S. waters is a violation of the Jones Act. Foreign flagged vessels perform several valuable services for the oil and gas and offshore wind markets that have nothing to do with the Jones Act; including deep water construction work, pipelay, heavy lift, foundation installation, cable installation, piling and wind turbine installation and a myriad of other construction and maintenance activities that do not involve transportation.

2.2 Market Dynamics

Over the last 6 years the oil and gas sector has been in recession due to low commodity prices. Numerous vessels migrated to the offshore wind market and many older assets were scrapped. Virtually no new specialist oil and gas vessels were built. Conversely the offshore wind sector in Europe has expanded hugely and many new vessels have been built and or placed on order.

It must be noted that the contractual and financial risks have proven to be significantly higher in the offshore wind energy market and the whole supply chain has suffered during the evolution of the market. Consequently, due to the current high oil and gas prices many of the vessels which had left the oil and gas markets are now returning as margins are higher and risks lower than in offshore wind.

The offshore wind sector is also expanding rapidly in Asia and several vessels have moved there permanently. The outcome of these market dynamics is that vessel owners and contractors are choosing to work where margins are higher, and risks and national barriers are lower. While a number of new specialist vessels are being built for the offshore wind market, the lead time and cost of these vessels is increasing markedly due to inflationary pressures in the global economy. The rates for specialist offshore vessels are now increasing rapidly especially in certain sectors of the U.S. offshore market.



Source: Fearnley Offshore Supply Subsea Market Update April 2022

Likewise, during the downturn offshore crews migrated to other industries and many retired. The offshore marine industry is now struggling to find talent to crew the current fleet and the new vessels being built. Working offshore and spending significant time away from home, often in other different parts of the world, is simply not seen as an attractive opportunity for many workers today who increasingly value and prioritize their work/life balance. The latest Seafarer Workforce Report from BIMCO and the International Chamber of Shipping warns that the industry must significantly increase training and recruitment levels if it is to avoid a serious shortage in the total supply of officers by 2026. Given the growing demand for STCW certified officers, the Report predicts that there will be a need for an additional 89,510 officers and 34,330 ratings by 2026 to operate the world merchant fleet. The U.S. is acutely short of mariners today let alone in the years to come.

2.3 Light Construction Vessels (LCVs)

This category includes a number of generic vessel types, including those that support the light and medium construction activities during the installation of offshore oil and gas and offshore wind facilities. LCVs often play supporting or secondary roles, which reflects the commodity markets they can access.

LCVs are often configurable for a wide range of potential activities and can be mobilised with different mission equipment according to the needs of the contractor. This category includes vessels which are capable of supporting activities such as:

- Underwater robotic vehicle operations
- Manned diving
- Bubble curtain operation during piling
- Small scale Control umbilical installation and repair
- Jumper and flying lead installation
- Small scale Cable installation and repair

The basic requirements for a light construction vessel include:

- Station keeping of DP2 or greater
- Minimum of 100T crane capacity in single fall mode
- Minimum crane working depth of 1,000m.

Although many LCVs look like enlarged platform supply vessels (PSVs), they are provided with accommodation and appropriate certification for carrying industrial workers, power supplies capable of feeding installation equipment, and will be equipped with a crane capable of supporting construction and deploying systems and equipment overboard.

LCVs suitable for supporting their intended activities in water depths of 3,280ft/1,000m or greater will be equipped with minimum of 100T crane capacity and 3,280ft/1,000m wire[3].

The current number of US coastwise and non-US coastwise LCVs with a crane capacity of >100T and >1000m wire, are shown in Figure 1. It can be seen that while there is a small number of US coastwise vessels the majority of the world's fleet is non-US coastwise. The list of U.S. coastwise vessels is contained in attachment 1. The list of non-US Coastwise LCV's is contained in attachment 2. While there are non-US coastwise LCVs that can perform this work, surveys of the GOM in the last few years show that for the most part, subject to crane capacity limits, foreign flag vessels performing work in the GOM are owned by Jones Act vessel owners such as Chouest and Hornbeck.

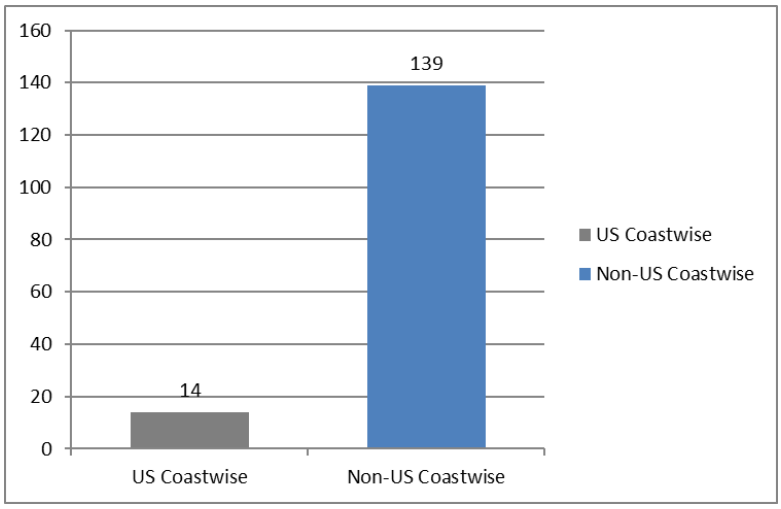


Figure 1 – Breakdown capable light construction vessels (>100T crane capacity; >1000m wire)

2.4 Heavy Construction Rigid Pipelay and Flexlay/Cable lay vessels

This category includes a number of vessels that support the installation of rigid steel pipelines and flexible lines in deepwater and harsh offshore environments. There are several methods in use for installing, principally:

- J-Lay – used to install rigid pipelines in very deep water. Pipe is upended and welded to the seagoing pipe in a near vertical ramp, the angle of which is adjusted so that it is in line with the pipe catenary to the seabed. This method minimises pipe bending.

Saipem "FDS2" J Lay vessel with 2000T of vertical pipe tension capability.

- S-Lay – pipe joints are welded together onboard the vessel in a horizontal production line, a support structure or "stinger" supports the pipe as it leaves the vessel to control the radius as it bends towards the seabed. This method offers a high rate of laying pipelines and is mainly found in shallow to intermediate water depths, although the method can also be used in deepwater by some of the newer and larger large vessels.

Alsea's "Solitaire" S-Lay Vessel with over 1050T of pipe tension capacity and 22,0000T of pipe storage.

- Reel Lay – long pipe segments are welded, tested, and coated onshore and then spooled onto a large, usually vertically oriented pipe reel, in one continuous length. Once the reel-lay vessel is in position, the pipe is unspooled, straightened, and then lowered to the seabed as the vessel moves forward on DP. This offers a high production rate and high-quality assurance as the welds are quality checked onshore before loading. A fabrication spool base (onshore construction yard on the coast) is required onshore.

TechnipFMC "Deep Energy" Reel Lay vessel with 5600T of pipe product storage capacity

- FlexLay/Cable lay – flexible pipe, umbilicals or electrical cables are manufactured onshore in a specialist factory and then reeled onto portable reels or carousels onboard the flexlay vessel. Once the flexlay vessel is in position the product is lowered to the seabed in a controlled manner using either a vertical or horizontal lay system while the vessel follows the intended route using its dynamic positioning system. These flexible products can be fragile and are easily damaged unless strict handling and installation procedures are followed which requires very experienced technicians and vessel crew. Insurance for this type of activity is becoming very expensive or not available due to the potential for damage claims.

Aker "Connector" flexlay vessel with 7000T of storage.

Some specialist vessels can operate in a number of the above modes, offering a multi-lay capability which optimizes the lay system used according to specific product requirements. Rigid pipelayers may be very large vessels and are often provided with large cranes to undertake platform construction and decommissioning activities when not laying pipe.

Pipelayers suitable for deepwater operation[4] will be provided with:

- Station keeping of DP2 or greater
- Minimum of 100T top tension (although 300T is typical)
- Minimum of 1000T pipe carrying capacity (although 5000T is typical)

There are no US-coastwise qualified specialist vessels with these capabilities, thereby severely limiting their ability to serve deepwater oil and gas and offshore wind developments in US waters. Dynamic positioning is essential, as it is not practical to use traditional anchors for positioning, and the accuracy of position keeping is not achievable using a conventional propulsion system. When operating in deepwater and ultra- deepwater, high pipe tension capabilities are required.

Non-U.S. coastwise qualified vessels have long been a staple in the development of US offshore oil and gas field development projects and have an unparalleled track record of safe and environmentally friendly operations. This is the result of many years of highly skilled asset management, design expertise, and leveraging experience gained from global operations.

The nature of this market is that projects are typically undertaken on a lump sum or fixed price basis, with the contractor bearing considerable operational and financial risks.

As seen in figure 2 there are no coastwise vessels capable of this type of work. The corresponding list of vessels is contained in attachment 3

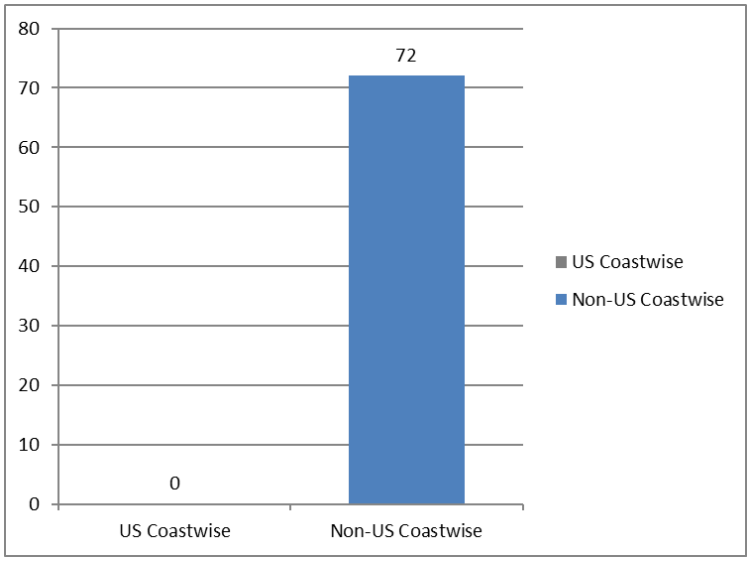


Figure 2 – Breakdown of Heavy Construction Rigid Pipelay and Flexlay/Cable lay vessels

2.5 Heavy Lift Vessels / Foundation Installation Vessels (FIV's)

This category includes various self-propelled and non-self-propelled heavy lift vessels. These vessels are used for lifting and installing large structures and equipment in harsh environments. In oil and gas these structures are typically oil and gas foundation structures (known as jackets) and topside structures with weights in excess of 10,000T. In offshore wind these vessels are often called Foundation Installation Vessels or FIV's.

The transformer substations required to enable the transmission of power back to the shore have lift weights of over 12,000T requiring the lifting capacity of the largest international crane vessels in the world. These vessels have a capital build cost today of over $1.5Bn. The demand for such vessels can be seen in Equinor and BP's recent award of a multi-year contract to Heerema Marine Contractors (a Netherlands based company) to strategically book future availability.

HMC "Sleipner" installing a substation using its twin 10,000T cranes in tandem

These vessels also perform piling operations with modern monopiles in offshore wind reaching weights of over 2000T and lengths of over 300 feet. To safely handle such structures many vessels are fitted with specialist automated handling systems that are required to be operated and maintained by highly skilled technicians. The same vessels are also used to recover the facilities at the end of the asset's life.

The work is almost always carried out using dynamic positioning without anchors due to the water depth and number of times that repositioning is required. Manoeuvring such large assets close to existing assets requires very high-end navigational and operational skills which can only be acquired on the vessel itself over many years.

DEME "Orion" installing 360ft long piles weighing over 2000T with its 5000T crane and tailor-made motion compensated pile handling system

For the purpose of this report a heavy lift vessel is considered one provided with a crane of at least 1,000T lifting capacity.

Heavy lift/FIV's may take many forms, including both semi-submersible and conventional ship-shaped hull forms.

This market shares similar characteristics to heavy construction market with the fixed price contracting model.

The basic requirements for a deepwater heavy lift vessel include:

- Station keeping of DP2 or greater;
- Minimum of 2,000T crane capacity;
- Minimum of 300ft hook height;
- Minimum of 120ft working radius.

As seen in figure 3 there are no coastwise vessels capable of this type of work. The corresponding list of vessels is contained in attachment 4

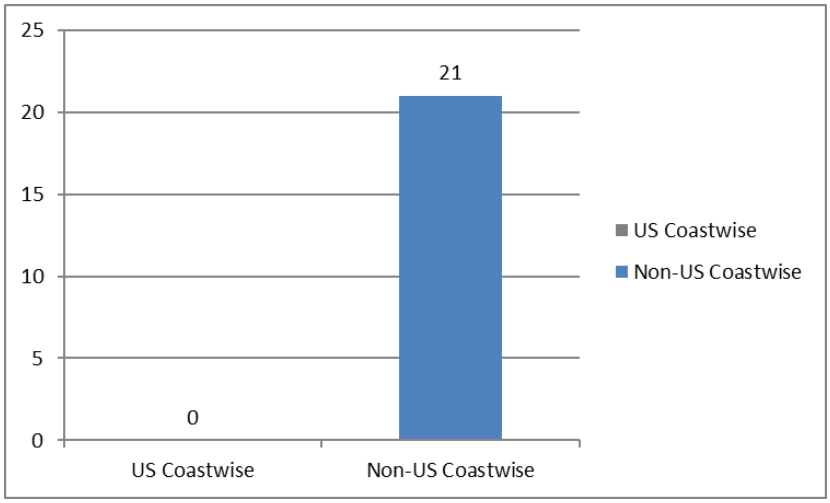


Figure 3 – Breakdown of coastwise and non-coastwise qualified heavy lift vessels

2.6 Seismic Survey / Geotechnical

These vessels are equipped with specialised equipment to collect data needed to characterise the seafloor and underlying geologic formations. Some basic features for a deepwater seismic survey vessel/geotechnical vessel include:

- Large moonpool based geotechnical drilling rig centrally mounted in the ship
- Echo sounder equipment – multi beam, single beam, or side scan;
- Hull transducer;
- Acoustic positioning equipment;
- Hydrophone streamers;
- Seismic sound source arrays (air guns) with appropriate compressors;
- Sound velocity profiling equipment;
- Magnetometer equipment and gravity sensing equipment;
- Antennas and below-decks equipment for satellite positioning;
- Motion reference units – means to detect heave, pitch, and roll;
- A-frame and/or back deck space for storage and deployment and recovery of subsea equipment;
- DP capability.

These vessels perform scientific operations often at great water depths in harsh conditions. The highly sophisticated equipment needs to be operated by highly skilled technicians. The samples recovered require to be handled and analysed by geotechnical scientists and engineers with professional qualifications and years of experience as the whole field design depends on the quality of data identified.

Fugro Voyager, 270ft long DP2 vessel fitted with 10,000ft water depth heave compensated seabed coring tower

Figure 4 shows the global and coastwise qualified deepwater capable survey/seismic and geotechnical vessel fleet. While there are a small number of coastwise vessels it can be seen that the majority of the worlds fleet is non coastwise. The corresponding list of vessels is contained in attachments 5 & 6. In the U.S. the reason foreign flag vessels are often picked is because there are not enough experienced U.S. crew to man these vessels and under current law no foreign citizens are allowed to work aboard a U.S. vessel.

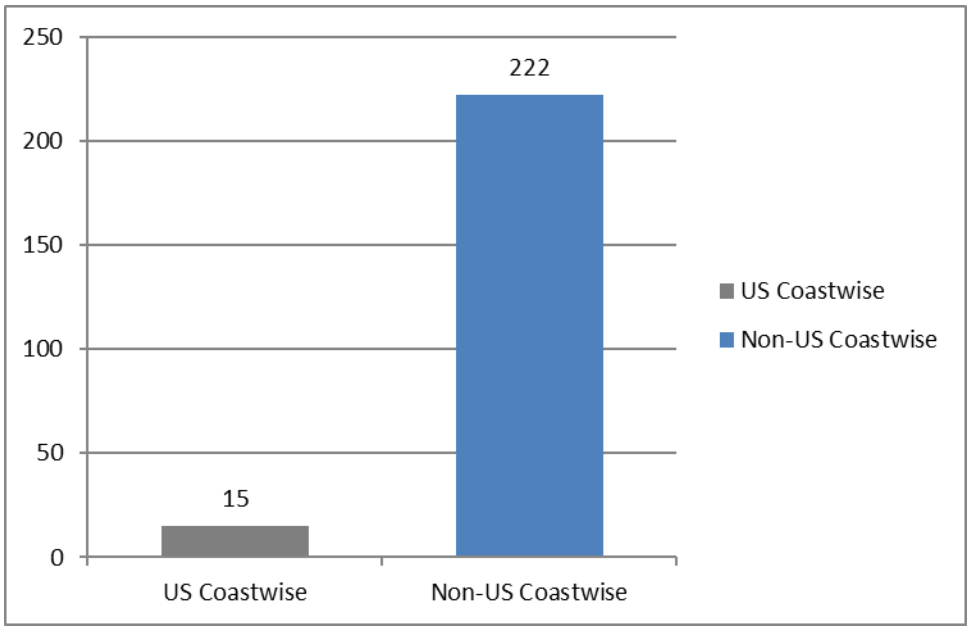


Figure 4 – Breakdown of coastwise and non-coastwise qualified seismic survey/geotechnical

2.7 Wind Turbine Installation Vessels (WTIV)

WTIV are used exclusively in the offshore wind market to install turbines, blades, and towers. These have the following main characteristics:

- Self-propelled
- Dynamically positioned class 2 (DP2)
- Self-elevating jack-up
- Capable of carrying multiple turbines, blades and towers
- Have permanent very large cranes capable of lifting turbines and blades to heights of at least 500 ft

Due to the constant increase of turbine sizes and water depths, these vessel requirements have constantly grown in size to the extent that the earlier generation of design have become technically obsolete. Consequently, they have traded down to offshore maintenance and support roles, often for the wind farms they have previously installed.

These vessels are highly sophisticated, and purpose built to perform very complex lifting of large and fragile equipment at great heights. Significant and critical handling of these complex structures needs to be carried out by highly trained specialists. Much of the work involves the use of sophisticated tooling and equipment by these technicians, often at great heights and in enclosed spaces. The vessels are significantly larger and more complex than traditional Gulf of Mexico “Lift Boats”. They are also different to Oil and Gas jack up drilling rigs in that they have to perform continuous moves on a much more frequent basis as each wind turbine is installed. This involves DP manoeuvring and jacking up and down in congested work areas.

Seajacks “Scylla” installing blades using its 1,500 T crane

The latest generation of WTIV's typically are able to work in water depths of more than 200 ft and have cranes over 2000T lifting capacity and boom lengths in excess of 300ft. For the purpose of this report only vessels with cranes of over 1500T have been considered.

Offshore technician working on wind turbine 300ft above sea level

Only one Jones Act WTIV has been ordered and is currently under construction at Keppel Fels in Brownsville Texas. The vessel was ordered by Dominion Energy (a U.S. Developer) to ensure availability for Dominion's own development projects. The initial estimated cost of this vessel was $500 million, and delivery was scheduled for 2024. Market sources indicates that the out turn cost will be in excess of $600million and the vessel will be at least one year late. Many new WTIV's are under construction in other parts of the world. Equivalent vessels being built in Asia have a build cost in the order of $300 to $350M.

When working offshore, on coastwise WTIV's will be kept supplied with the wind turbine components by U.S. coastwise tugs and "feeder barges" to ensure compliance with the Jones Act.

WTIV's are typically chartered by the developer or the OEM on a day rate basis for use on a specific project. Most international vessels are based in Europe and move from region to region according to market demand.

Figure 5 shows the breakdown between the global coastwise and non-coastwise fleet. The corresponding list of vessels is contained in attachment 7.

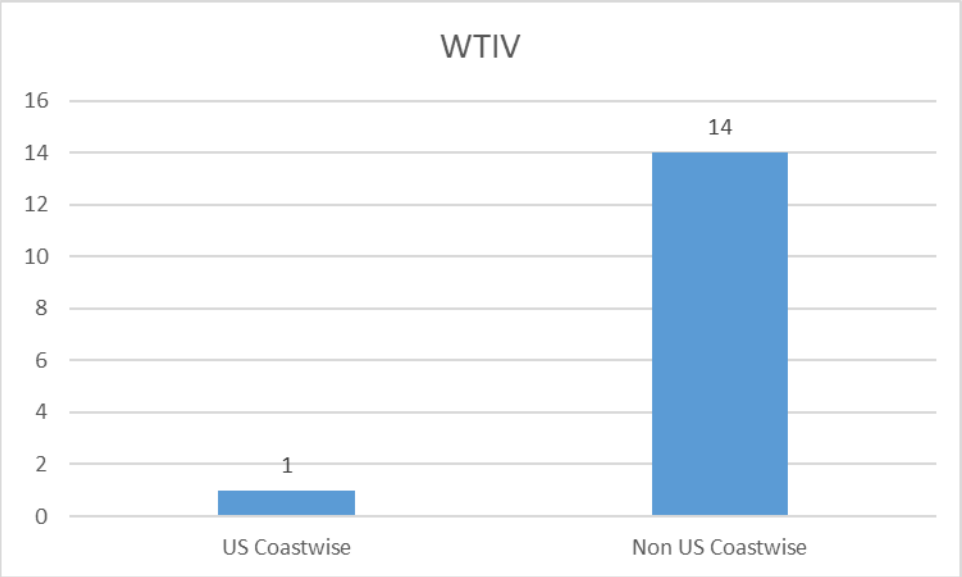


Figure 5 – Breakdown of coastwise and non-coastwise qualified WTIV

2.8 Service Operations Vessels (SOVs)

SOVs are used to support life of field survey and maintenance/repair. They effectively accommodate and support all the technical crews needed to commission and maintain the wind turbines in the field. They are typically 200 to 300ft long, dynamically positioned and fitted with walk to work gangways and small, specialist, but highly manoeuvrable cranes to lift equipment onto the turbines. The vessels are typically chartered on a multi-year day rate basis and remain in the same location for many years. SOV's can be built by converting LCV's but typically today they are all purpose built newbuilds. In Europe, a standard specification of SOV is beginning to emerge.

SOV transferring workers and equipment to offshore wind turbine.

Many new SOVs are under construction around the world. Only 2 contracts for newbuild U.S. Coastwise SOVs have been placed to date. The build price for a US coastwise vessel is currently in the order of over $100 million compared to $50 to $60M in international markets.

Figure 6 shows the breakdown between the global coastwise and non-coastwise fleet. The corresponding list of vessels is contained in attachment 8.

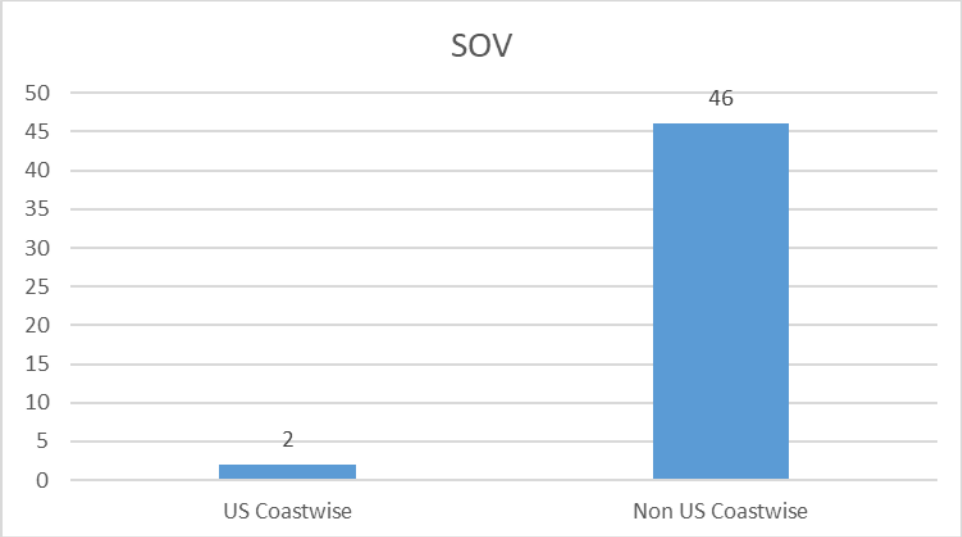


Figure 6 – Breakdown of coastwise and non-coastwise qualified SOV

3 Conclusions

The demand for all categories of offshore construction vessels is growing significantly and is starting to outstrip supply in certain areas. Rates are increasing rapidly, and vessel owners/contractors are selecting only the most favourable regions and projects to work.

Specialist offshore construction vessels are critical to the security of supply of deepwater oil and gas in the U.S. GOM. Similarly, without access to international specialist construction vessels President Biden's objective of 30GW of offshore wind by 2030 will not be possible. In heavy construction rigid pipelay, flexlay/cable lay and heavy lifting there are no US coastwise vessels capable of performing the work and none being built. In offshore wind there are no coastwise Heavy lift vessels nor cable installation vessels capable of performing the required work today and none planned to be built. Only one U.S coastwise WTIV has been ordered and largely due to the global market use of this type of specialist vessel and the costs to build one in the U.S. that would be limited to only U.S. work, it is unclear if there will be more orders.

In the LCV market, developers are for the most part deploying U.S. vessels even though foreign vessels can perform this work. For the most part the foreign LCVs that are being deployed are owned by Jones Act owners and operators.

In the Survey/Seismic/Geotechnical segments while there are a small number of coastwise vessels existing or being built this is unlikely to fulfil demand. In addition, decisions as to whether use a foreign or U.S. vessel are often driven by global need and availability and the lack of experienced U.S. scientific personnel to crew these vessels and under current law no foreign citizens are allowed to work aboard a U.S. vessel.

The huge demand for U.S. mariners, crew, and technicians to safely operate these vessels is materially undersupplied and there are not enough training programs and other initiatives underway to resolve this in the short term. This will be particularly true for the emerging SOV market because this work must be accomplished by coastwise qualified vessels requiring all U.S. crew. Similarly, while not specifically categorized in this report, the offshore wind market should drive the need for coastwise CTVs and thus the demand for more qualified mariners.

Attachment 1: List of Coastwise LCV's

Name	Type Group	Year Built	LOA (m	Breadth (m)	Gear 1 SWL t	Gear 1 Type	DP Class
Ocean Evolution	Construction Support	2018	107.59	22.00	250	Crane, Subsea	DP2
Paul Candies	Construction Support	2018	102.00	20.60	250	Crane, Subsea	DP2
Harvey Blue-Sea	Construction Support	2017	103.70	22.30	250	Crane, Subsea	DP2
Harvey Sub-Sea	Construction Support	2017	103.70	22.30	250	Crane, Subsea	DP2
HOS Warland	Construction Support	2016	92.05	23.16	250	Crane, Subsea	DP2
HOS Woodland	Construction Support	2016	92.05	23.16	250	Crane, Subsea	DP2
Holiday	Construction Support	2010	87.78	20.12	250	Crane, Subsea	DP2
Harvey Deep Sea	Construction Support	2013	94.00	19.51	165	Crane, Subsea	DP2
Grant Candies	Construction Support	2008	89.25	18.00	165	Crane, Subsea	DP2
C-Installer	Construction Support	2014	97.13	20.12	152	Crane, Subsea	DP2
HOS Bayou	Construction Support	2014	92.05	19.51	150	Crane, Subsea	DP2
Cade Candies	Construction Support	2011	94.30	20.00	150	Crane, Subsea	DP2
Ross Candies	Construction Support	2009	94.30	20.00	125	Tower, Module Handling	DP2
Chloe Candies	Construction Support	2006	84.70	18.00	100	Crane, Subsea	DP2

Attachment 2 International LCV's

Name	Type Group	Year Built	LOA (r	Breadth (m)	Gear 1 SWL t	Gear 1 Type	DP Clas
Fortitude	Construction Support	2018	151.00	32.00	900	Crane, Subsea	DP3
Normand Maximus	Construction Support	2016	177.90	33.00	900	Crane, Subsea	DP3
Skandi Africa	Construction Support	2015	160.90	32.00	900	Crane, Subsea	DP3
Maersk Inventor	Construction Support	2018	137.60	27.00	400	Crane, Subsea	DP3
Maersk Implementer	Construction Support	2018	137.60	27.00	400	Crane, Subsea	DP3
Maersk Installer	Construction Support	2017	137.60	27.00	400	Crane, Subsea	DP3
Maersk Involver	Construction Support	2017	137.60	27.00	400	Crane, Subsea	DP3
Island Venture	Construction Support	2016	159.80	28.00	400	Crane, Subsea	DP3
Q5000	Construction Support	2015	106.98	70.10	400	Crane, Subsea	DP3
Viking Neptun	Construction Support	2015	145.60	31.00	400	Crane, Subsea	DP3
Normand Vision	Construction Support	2014	156.70	27.00	400	Crane, Subsea	DP3
Hai Yang Shi You 286	Construction Support	2014	140.75	29.00	400	Crane, Subsea	DP3
Connector	Construction Support	2011	156.90	32.00	400	Crane, Subsea	DP3
North Sea Giant	Construction Support	2011	153.60	30.60	400	Crane, Subsea	DP3
Aker Wayfarer	Construction Support	2010	156.90	27.00	400	Crane, Subsea	DP3
HOS Iron Horse	Construction Support	2009	131.70	22.00	400	Crane, Subsea	DP3
Skandi Acergy	Construction Support	2008	157.00	27.00	400	Crane, Subsea	DP3
Seven Pegasus	Construction Support	2008	133.00	22.00	400	Crane, Subsea	DP3
Boa Sub C	Construction Support	2007	138.50	30.60	400	Crane, Subsea	DP3
Proteus	Construction Support	2002	132.95	22.00	400	Crane, Subsea	DP3
Normand Sentinel	Construction Support	2015	142.60	25.00	350	Crane, Subsea	DP3
Normand Navigator	Construction Support	2015	142.60	25.00	350	Crane, Subsea	DP3
Azteca	Construction Support	2003	140.53	22.00	325	Crane, Subsea	DP3
Oceanic	Construction Support	2016	128.50	25.00	300	Crane, Subsea	DP2
Normand Cutter	Construction Support	2001	127.50	27.00	300	Crane, Subsea	DP2
Athena	Construction Support	2013	111.20	25.00	275	Crane, Subsea	DP3
Island Victory	Construction Support	2020	123.40	25.00	250	Crane, Subsea	DP2
MPV Everest	Construction Support	2017	141.75	30.00	250	Crane, Subsea	DP3
Siem Helix 2	Construction Support	2016	158.59	31.00	250	Crane, Subsea	DP3
Siem Helix 1	Construction Support	2016	158.59	31.00	250	Crane, Subsea	DP3
Grand Canyon III	Construction Support	2016	127.75	25.00	250	Crane, Subsea	DP3
Hai Yang Shi You 287	Construction Support	2016	124.50	25.00	250	Crane, Subsea	DP3
Grand Canyon II	Construction Support	2015	127.75	25.00	250	Crane, Subsea	DP3
Orient Constructor	Construction Support	2014	115.40	22.00	250	Crane, Subsea	DP2
Normand Jarstein	Construction Support	2014	117.00	22.00	250	Crane, Subsea	DP2
African Inspiration	Construction Support	2014	113.00	22.04	250	Crane, Subsea	DP2
Pride	Construction Support	2014	130.00	28.00	250	Crane, Subsea	DP3
Normand Frontier	Construction Support	2014	120.85	23.00	250	Crane, Subsea	DP2
Siem Spearfish	Construction Support	2014	120.80	23.00	250	Crane, Subsea	DP2
Siem Stingray	Construction Support	2014	120.80	23.00	250	Crane, Subsea	DP2
Siem Day	Construction Support	2013	120.80	22.00	250	Crane, Subsea	DP2
Siem Barracuda	Construction Support	2013	120.80	22.00	250	Crane, Subsea	DP2
Hai Yang Shi You 289	Construction Support	2013	120.80	26.10	250	Crane, Subsea	DP2
Olympic Ares	Construction Support	2013	115.40	22.00	250	Crane, Subsea	DP2
Normand Jarl	Construction Support	2013	107.60	22.00	250	Crane, Subsea	DP2
Grand Canyon	Construction Support	2012	127.75	25.00	250	Crane, Subsea	DP3
Island Intervention	Construction Support	2011	120.20	25.00	250	Crane, Subsea	DP3
Skandi Vitoria	Construction Support	2010	142.20	27.00	250	Crane, Subsea	DP3
Skandi Santos	Construction Support	2009	120.70	23.00	250	Crane, Subsea	DP3
Ariadne	Construction Support	2009	130.00	25.00	250	Crane, Subsea	DP3
Sapura Constructor	Construction Support	2008	117.60	22.00	250	Crane, Subsea	DP2
Skandi Seven	Construction Support	2008	120.70	23.00	250	Crane, Subsea	DP3
Olympic Challenger	Construction Support	2008	105.90	21.00	250	Crane, Subsea	DP2
Boa Deep C	Construction Support	2003	119.30	27.32	250	Crane, Subsea	DP3
Skandi Neptune	Construction Support	2001	104.20	24.00	250	Crane, Subsea	DP2
Island Enforcer	Construction Support	2010	122.40	23.03	200	Crane, Subsea	DP3
Maersk Nomad	Construction Support	2009	90.15	22.20	200	Crane, Subsea	DP2
Edda Fjord	Construction Support	2002	98.16	22.00	200	Crane, Subsea	DP2
Nordica	Construction Support	1994	116.00	26.03	160	Crane, Subsea	DP2
Fennica	Construction Support	1993	116.00	26.00	160	Crane, Subsea	DP2
Subsea Responder IV	Construction Support	2007	86.00	18.00	153	Crane, Subsea	DP2
Normand Superior	Construction Support	2017	98.10	21.50	150	Crane, Subsea	DP2
Surf Allamanda	Construction Support	2015	100.20	21.00	150	Crane, Subsea	DP3
Normand Ocean	Construction Support	2014	107.60	22.00	150	Crane, Subsea	DP2
Bourbon Evolution 804	Construction Support	2014	100.20	21.00	150	Crane, Subsea	DP3
Bourbon Evolution 805	Construction Support	2014	100.20	21.00	150	Crane, Subsea	DP3
Bourbon Evolution 806	Construction Support	2014	100.20	21.00	150	Crane, Subsea	DP3
Bourbon Evolution 807	Construction Support	2014	100.20	21.00	150	Crane, Subsea	DP3
Rem Inspector	Construction Support	2013	110.00	22.00	150	Crane, Subsea	DP2
Dina Star	Construction Support	2013	93.80	20.00	150	Crane, Subsea	DP2

Attachment 2 Continued: List of International LCV's

Name	Type Group	Year Built	LOA (n	Breadth (m)	Gear 1 SWL t	Gear 1 Type	DP Clas
Olympic Taurus	Construction Support	2012	93.80	20.00	150	Crane, Subsea	DP2
Bourbon Evolution 802	Construction Support	2012	100.20	21.00	150	Crane, Subsea	DP3
Argo	Construction Support	2011	110.60	20.00	150	Crane, Subsea	DP2
Havila Subsea	Construction Support	2011	98.00	19.80	150	Crane, Subsea	DP2
Deep Cygnus	Construction Support	2009	122.40	22.00	150	Crane, Subsea	DP2
Normand Subsea	Construction Support	2009	113.05	24.00	150	Crane, Subsea	DP2
Skandi Constructor	Construction Support	2009	120.20	25.00	150	Crane, Subsea	DP3
Lamantin	Construction Support	2008	95.00	20.50	150	Crane, Subsea	DP2
Volantis	Construction Support	2008	106.60	22.00	150	Crane, Subsea	DP2
Simar Esperanca	Construction Support	2008	103.70	19.70	150	Crane, Subsea	DP2
Island Wellserver	Construction Support	2008	116.00	25.00	150	Crane, Subsea	DP3
REM Saltire	Construction Support	2008	111.00	24.00	150	Crane, Subsea	DP2
Subtech Swordfish	Construction Support	2007	98.75	19.70	150	Crane, Subsea	DP2
Olympic Triton	Construction Support	2007	95.00	20.50	150	Crane, Subsea	DP2
Parcel Dos Meros	Construction Support	2005	92.95	19.70	150	Crane, Subsea	DP2
Global Orion	Construction Support	2002	91.05	19.70	150	Crane, Subsea	DP2
Aethra	Construction Support	1999	94.10	22.03	150	Crane, Subsea	DP2
Boka Atlantis	Construction Support	2011	115.40	22.00	140	Crane, Subsea	DP2
Boka Da Vinci	Construction Support	2011	115.40	22.00	140	Crane, Subsea	DP2
Skandi Salvador	Construction Support	2009	105.90	21.00	140	Crane, Subsea	DP2
ADV Ocean Protector	Construction Support	2007	105.90	21.00	140	Crane, Subsea	DP2
Fugro Etive	Construction Support	2007	92.95	19.70	140	Crane, Subsea	DP2
Blue Pioneer	Construction Support	2006	95.00	20.50	140	Crane, Subsea	DP2
Normand Fortress	Construction Support	2006	92.95	19.70	140	Crane, Subsea	DP2
Seven Viking	Construction Support	2013	106.50	24.50	135	Crane, Subsea	DP2
Island Pride	Construction Support	2014	103.30	21.00	130	Crane, Subsea	DP2
Island Frontier	Construction Support	2004	106.20	21.03	130	Crane, Subsea	DP3
Topaz Tangaroa	Construction Support	2019	98.10	20.00	120	Crane, Subsea	DP2
Boka Tiamat	Construction Support	2019	98.10	20.00	120	Crane, Subsea	DP2
POSH Pintail	Construction Support	2018	89.00	21.00	120	Crane, Subsea	DP2
POSH Elegance	Construction Support	2016	88.00	20.00	120	Crane, Subsea	DP2
Posh Enterprise	Construction Support	2015	88.00	20.00	120	Crane, Subsea	DP2
Jascon 55	Construction Support	2013	78.00	20.00	120	Crane, Subsea	DP2
Parcel Do Bandolim	Construction Support	2007	91.10	19.00	110	Crane, Subsea	DP2
Peridot	Construction Support	2005	91.10	19.00	110	Crane, Subsea	DP2
Puerto Real	Construction Support	2021	85.00	20.40	100	Crane	DP2
Rawabi 502	Construction Support	2019	90.00	23.00	100	Crane, Subsea	DP2
Safeen Prince	Construction Support	2018	86.00	20.00	100	Crane, Subsea	DP2
Skandi Vinland	Construction Support	2017	93.10	20.00	100	Crane, Subsea	DP2
Rawabi 501	Construction Support	2017	90.00	23.00	100	Crane, Subsea	DP2
Nor Naomi	Construction Support	2017	86.00	20.00	100	Crane, Subsea	DP2
Paul A. Sacuta	Construction Support	2017	91.20	22.00	100	Crane	DP2
Posh Endeavour	Construction Support	2015	88.00	20.00	100	Crane	DP2
Tehuana	Construction Support	2015	85.00	22.00	100	Crane	DP2
Mashhor Princess	Construction Support	2015	85.00	23.00	100	Crane	DP2
Nordic Prince	Construction Support	2014	75.55	19.20	100	Crane, Subsea	DP2
Maridive 603	Construction Support	2014	77.80	17.60	100	Crane	DP2
Posh Endurance	Construction Support	2014	88.00	20.00	100	Crane	DP2
Olympic Orion	Construction Support	2012	93.80	20.00	100	Crane, Subsea, (optional)	DP2
Hercules	Construction Support	2012	93.50	19.70	100	Crane, Subsea	DP2
Sapura Jane	Construction Support	2011	78.00	20.00	100	Crane, Subsea	DP2
Constructor	Construction Support	2010	76.00	18.00	100	Crane, Subsea	DP2
Normand Tonjer	Construction Support	2010	95.30	21.00	100	Crane, Subsea	DP2
NPCC Al Maryah	Construction Support	2010	78.11	20.00	100	Crane, Subsea	DP2
Normand Baltic	Construction Support	2010	94.90	20.00	100	Crane, Subsea	DP2
Horizon Enabler	Construction Support	2010	96.25	20.00	100	Crane, Subsea	DP2
NG Worker	Construction Support	2009	88.80	16.12	100	Crane, Subsea	DP2
Normand Poseidon	Construction Support	2009	93.96	19.70	100	Crane, Subsea	DP2
Siem Marlin	Construction Support	2009	93.60	19.70	100	Crane, Subsea	DP2
Siem Dorado	Construction Support	2009	93.60	19.70	100	Crane, Subsea	DP2
Edda Flora	Construction Support	2008	95.00	20.00	100	Crane, Subsea	DP2
Edda Fauna	Construction Support	2007	108.70	23.00	100	Crane, Subsea	DP2
Normand Commander	Construction Support	2006	92.95	19.70	100	Crane, Subsea	DP2
Normand Mermaid	Construction Support	2002	90.10	20.50	100	Crane, Subsea	DP3
Topaz Captain	Construction Support	2001	84.00	18.80	100	Crane, Subsea	DP2
Oceanicasub VI	Construction Support	2001	89.40	18.80	100	Crane, Subsea	DP2
Topaz Commander	Construction Support	1999	94.00	18.80	100	Crane, Subsea	DP2
Subsea Viking	Construction Support	1999	103.00	22.00	100	Crane, Subsea	DP3
Tarasco	Construction Support	1976	86.25	18.30	100	Crane	DP2

Attachment 3: List of Pipelay and Flexlay vessels

Name	Operator	DP	LOA (m	Beam (	Pipe carrying capacity (>1000mT)	Top Tension (>100mT)	Flag
Audacia	Allseas Marine Cont	DP3	225	32	14000	525	Panama
Lorelay	Allseas Marine Cont	DP3	183	26	8200	165	Panama
Pioneering Spirit	Allseas Marine Cont	DP3	382	124	27000	2000	Malta
Solitaire	Allseas Marine Cont	DP3	300	41	22000	1050	Malta
Atalanti	Assodivers	DP2	97	31	4500	10	Cyprus
Atlantic Carrier	Atlantic Mar Av	DP2	81	18	UNK	UNK	Liberia
Ndeavor	Baggermaat Boskalis	DP2	99	30	5000	15	Cyprus
Ndurance	Baggermaat Boskalis	DP2	99	30	5000	15	Cyprus
Sampson	CarVal Investors	DP3	180	32	UNK	UNK	Panama
Amazon	McDermott Intl	DP2	199	32	0	0	Gibraltar
Skandi Africa	DOF Subsea	DP3	161	32	3500	650	Bahamas
Responder	KT Submarine	DP2	106	20	3000	20	South Korea
Maersk Connector	Maersk Supply	DP2	138	28	7000	30	Danish Int'l
Maersk Recorder	Maersk Supply	DP2	106	20	7000	20	Danish Int'l
DLV 2000	McDermott Intl	DP3	182	39	UNK	450	Panama
Lay Vessel 108	McDermott Intl	DP2	134	27	3400	150	Malta
Lay Vessel North Ocean 105	McDermott Intl	DP2	132	27	2500	400	Malta
North Ocean 102	McDermott Intl	DP2	134	27	6000	330	Malta
Nexans Skagerrak	Nexans	DP2	100	32	7000	20	Norway
North Sea Atlantic	North Sea Shpg	DP3	144	27	4000	0	Malta
DLS-4200	NPCC	DP2	197	43	UNK	439	U.A.E.
Aura	NSW	DP2	102	25	5000	15	Finland
Sia	NT Offshore	DP2	78	16	UNK	UNK	Danish Int'l
Subaru	NTT	DP2	123	21	3600	20	Japan
Top Coral do Atlantico	Odebrecht	DP2	150	30	4000	550	Bahamas
Top Estrela do Mar	Odebrecht	DP2	146	30	4000	550	Bahamas
Pierre de Fermat	Orange Marine	DP2	100	22	2300	40	France
Edda Freya	Ostensjo Rederi AS	DP3	150	27	3000	150	Norwegian Int'l
Cable Enterprise	Prysmian	DP2	125	32	UNK	UNK	United Kingdom
Giulio Verne	Prysmian	DP2	129	32	7000	5	Italy
Saipem Constellation	Saipem	DP3	178	46	7300	800	Bahamas
Castorone	Saipem	DP3	330	39	UNK	750	Bahamas
Saipem 7000	Saipem	DP3	198	87	6000	750	Bahamas
Saipem FDS	Saipem	DP3	163	30	1500	550	Bahamas
Saipem FDS-2	Saipem	DP3	184	32	6000	2000	Bahamas
Sapura 3000	SapuraKencana	DP2	151	38	4500	400	Malaysia
Sapura Diamante	SapuraKencana	DP2	146	30	4000	550	Panama
Sapura Esmeralda	SapuraKencana	DP2	135	24	4000	550	Brazil
Sapura Topazio	SapuraKencana	DP2	146	30	4000	550	Panama
Sapurakencana 1200	SapuraKencana	DP3	154	35	7000	520	Panama
Sapurakencana 3500	SapuraKencana	DP3	156	45	7000	390	Panama
Siem Aimery	Siem Offshore	DP2	95	22	UNK	UNK	Norway
Normand Maximus	Solstad Offshore	DP3	178	33	9000	550	Norwegian Int'l
Normand Oceanic	Solstad Offshore	DP3	157	27	3000	150	Norway
Normand Seven	Solstad Offshore	DP3	130	28	2100	300	Norway
Normand Vision	Solstad Offshore	DP3	157	27	3000	150	Norway
Stemat Spirit	Stemat	DP2	90	28	4600	10	Netherlands
Seven Champion	Subsea 7	DP2	142	40	6400	200	Singapore
Seven Arctic	Subsea 7	DP3	162	32	7000	600	Isle of Man
Seven Borealis	Subsea 7	DP3	182	46	3150	937	Bahamas
Seven Condor	Subsea 7	DP2	143	23	1600	230	Liberia
Seven Cruzeiro	Subsea 7	DP2	146	30	4000	550	Isle of Man
Seven Eagle	Subsea 7	DP2	138	20	1200	90	Liberia
Seven Mar	Subsea 7	DP2	145	27	3200	340	Isle of Man
Seven Oceans	Subsea 7	DP2	157	28	3800	450	Isle of Man
Seven Pacific	Subsea 7	DP2	133	24	2500	260	Isle of Man
Seven Phoenix	Subsea 7	DP2	130	28	2400	360	Isle of Man
Seven Rio	Subsea 7	DP2	146	30	4000	550	Isle of Man
Seven Seas	Subsea 7	DP2	153	28	2900	430	Isle of Man
Seven Sun	Subsea 7	DP2	146	30	4000	550	Isle of Man
Seven Waves	Subsea 7	DP2	146	30	4000	550	Isle of Man
Seven Vega	Subsea 7	DP3	150	33	5600	600	Isle of Man
Seven Navica	Subsea 7	DP2	108	22	2200	200	Isle of Man
Apache II	Technip Offshore UK	DP2	138	27	2650	184	Bahamas
Deep Blue	Technip Offshore UK	DP2	207	32	5600	550	Bahamas
Deep Energy	Technip Offshore UK	DP3	195	31	5600	450	Bahamas
Deep Pioneer	Technip Offshore UK	DP2	157	29	3000	350	Marshall Is.
Global 1200 (G 1200)	Technip Offshore UK	DP2	162	38	3500	500	Vanuatu
Timas 1201	Timas	DP2	162	38	4000	640	Vanuatu
Topaz Installer	Topaz Energy	DP2	86	24	3600	20	Marshall Is.
CS Vega	TranSM	DP2	74	13	UNK	UNK	Philippines
Nexus	Van Oord	DP2	126	28	5000	40	Netherlands

Attachment 4: List of Heavy Lift Vessels

Name	LOA (m	Breadth (m)	Lift Capacity (	DP Class
Pioneering Spirit	382.00	124.00	48,000	DP3
Oceanic 5000	196.92	48.03	4,400	DP2
Bokalift 2	231.34	36.00	4,000	DP3
Bokalift 1	216.70	42.98	3,000	DP2
Nor Goliath	180.00	32.00	1,600	DP3
Orion	216.48	49.00	5,000	DP3
Thialf	201.60	88.40	14,000	DP3
Aegir	210.00	46.20	4,000	DP3
Balder	154.00	86.00	3,629	DP3
Derrick Barge 50	151.50	46.00	3,991	DP2
DLV 2000	184.00	38.60	2,000	DP3
Saipem 7000	198.00	87.00	14,000	DP3
Saipem Constellation	178.00	46.00	3,000	DP3
Saipem 3000	162.00	38.00	2,177	DP3
Saipem FDS-2	183.60	32.20	1,000	DP3
Sapura 3500	156.50	44.80	3,500	DP3
Sapura 3000	151.00	38.00	3,000	DP3
Sapura 1200	153.60	35.00	1,200	DP3
Gulliver	108.00	49.00	2,000	DP2
Seaway Strashnov	183.00	47.00	5,000	DP3
Seven Borealis	182.20	46.20	5,000	DP3

Attachment 5: List of Coastwise Survey, Seismic, Geotechnical Vessels

Name	Type	Type Class	Year Built	LOA (r	Breadth (m)
Sea Scout	Multi-Role Survey	Multi-Role	2012	40.90	10.80
Ms. Cordelia	Multi-Role Survey	Multi-Role	2007	42.67	11.58
Fugro Enterprise	Geophysical Survey	Seismic/Geophysical	2007	51.83	12.20
Sea Venture	Multi-Role Survey	Multi-Role	2005	106.22	21.34
Nathaniel B Palmer	Multi-Role Survey	Multi-Role	1992	94.03	18.29
Albequerque	Geophysical Survey	Seismic/Geophysical	1982	40.26	9.75
Deep Stim III	Geophysical Survey	Seismic/Geophysical	1982	72.69	13.41
Suncoaster	Oceanographic Survey	Hydrographic / Oceanographic	1980	31.65	7.45
Bellows	Multi-Role Survey	Multi-Role	1979	24.68	6.10
Bold Horizon	Multi-Role Survey	Multi-Role	1978	48.77	10.97
Hispaniola	Multi-Role Survey	Multi-Role	1976	36.58	7.09
Longhorn	Oceanographic Survey	Hydrographic / Oceanographic	1971	28.63	7.32
Phaedra	Multi-Role Survey	Multi-Role	1966	53.35	9.76
Blazing Seven	Multi-Role Survey	Multi-Role	1965	36.58	8.23
OSS 2	Multi-Role Survey	Multi-Role	1960	89.05	14.07

Attachment 6: International Survey, Seismic, Geotechnical vessels

Name	Type	Year Built	LOA (n	Breadth (m)
Abou el Barakat al Barbari	Multi-Role Survey	1969	63.50	11.89
ACC Mosby	Multi-Role Survey	1980	47.24	10.01
Achilleas	Multi-Role Survey	1964	32.01	7.62
AG Geodrill	Geophysical Survey	2016		11.80
Akademik	Multi-Role Survey	1979	54.79	9.82
Akademik Aleksandr Karpinskiy	Geophysical Survey	1984	104.50	16.03
Akademik Golitsyn	Multi-Role Survey	1984	71.61	12.83
Akademik Lazarev	Seismic Survey	1987	81.87	14.80
Akademik M. A. Lavrentyev	Multi-Role Survey	1984	75.47	14.71
Akademik Nemchinov	Seismic Survey	1988	84.40	14.80
Akademik Oparin	Multi-Role Survey	1985	75.50	14.69
Akademik Primakov	Seismic Survey	1999	93.20	23.00
Alkor	Multi-Role Survey	1990	54.59	12.50
Almostakshif	Multi-Role Survey	2019	55.60	11.96
Altair	Multi-Role Survey	1962	63.00	11.37
Amazon Conqueror	Seismic Survey	2015	126.00	28.00
Amazon Warrior	Seismic Survey	2014	126.00	28.00
Aquarius	Multi-Role Survey	1977	77.01	11.75
Aranda	Multi-Role Survey	1989	59.20	13.80
Argo	Multi-Role Survey	1985	32.39	7.92
Artemis Angler	Seismic Survey	1998	66.00	14.00
Artemis Arctic	Seismic Survey	1999	74.34	18.00
Artemis Odyssey	Multi-Role Survey	2005	72.80	16.00
Atlas 1	Oceanographic Survey	1982	43.62	10.97
Aurelia	Oceanographic Survey	1988	53.70	10.50
Aurora Dubai	Multi-Role Survey	1990	94.91	20.30
Barbaros Hayreddin Pasa	Seismic Survey	2011	84.20	17.00
Bavenit	Geophysical Survey	1986	86.09	17.00
Bei Diao 996	Multi-Role Survey	2022	99.80	32.00
Benledi 1888	Multi-Role Survey	1964	32.01	7.62
BGP Challenger	Seismic Survey	2008	55.00	13.80
BGP Explorer	Seismic Survey	2008	64.00	16.00
BGP Prospector	Seismic Survey	2011	100.10	24.00
Bin Hai 527	Multi-Role Survey	2009	55.50	14.00
Binh An Research	Multi-Role Survey	2016	44.00	11.00
Black Oyster	Multi-Role Survey	1983	29.37	8.06
Bon Accord	Multi-Role Survey	1969	38.67	8.61
Caspian Kyra	Multi-Role Survey	1970	36.00	7.00
Chang He Hai Yang	Multi-Role Survey	2016	100.60	23.00
Chuang Xin Yi	Multi-Role Survey	2016	48.70	9.00
Concept	Multi-Role Survey	1981	67.36	13.03
Confidante	Hydrographic Survey	1989	28.40	7.30
Da Yang Yi Hao	Multi-Role Survey	1984	104.50	16.00
Diabaz	Multi-Role Survey	1983	53.74	10.71
Dong Fang Kan Tan No. 1	Geophysical Survey	2007	65.82	13.80
DP Star	Geophysical Survey	1971	45.15	9.20
Eagle Explorer	Seismic Survey	2008	93.96	19.00
EGS Surveyor	Multi-Role Survey	1968	47.15	8.80
EGS Ventus	Geophysical Survey	1977	49.80	9.60
Endeavour	Multi-Role Survey	1966	56.55	11.00
Endeavour	Multi-Role Survey	1965	71.83	11.76
Falkor	Multi-Role Survey	1981	82.90	13.00
Fen Dou Wu Hao	Seismic Survey	1979	68.44	10.00
Flamboyan	Multi-Role Survey	1983	39.00	9.53
Flat Holm	Multi-Role Survey	1976	23.30	8.00
Fugro Brasilis	Geophysical Survey	2013	65.71	14.00
Fugro Equator	Geophysical Survey	2012	65.74	14.00
Fugro Frontier	Hydrographic Survey	2014	53.69	12.50
Fugro Galaxy	Geophysical Survey	2011	65.56	14.00
Fugro Helmert	Multi-Role Survey	2013	41.53	9.80
Fugro Mapper	Geophysical Survey	2010	48.00	11.00
Fugro Mercator	Multi-Role Survey	2003	42.35	10.10
Fugro Meridian	Geophysical Survey	1982	72.50	13.80
Fugro Pioneer	Hydrographic Survey	2014	53.70	12.50
Fugro Scout	Multi-Role Survey	2015	82.94	19.79
Fugro Searcher	Geophysical Survey	2010	65.68	14.00
Fugro Synergy	Geophysical Survey	2009	103.70	19.70
Ganga Dolphin	Multi-Role Survey	1982	39.00	8.59
Gelendzhik	Multi-Role Survey	1989	104.50	16.03

Attachment 6 Continued: International Survey, Seismic, Geotechnical vessels

Name	Type	Year Built	LOA (r	Breadth (m)
Geo Coral	Seismic Survey	2010	108.30	24.00
Geo Energy	Geophysical Survey	2004	72.20	16.00
Geo Explorer	Multi-Role Survey	1967	74.83	12.40
Geo Focus	Multi-Role Survey	2012	34.50	7.83
Geo Ocean IV	Multi-Role Survey	1989	41.90	9.10
Geofizik	Geophysical Survey	1983	55.60	9.32
Geofizik-2	Geophysical Survey	1985	48.27	6.51
Geolog Dmitriy Nalivkin	Seismic Survey	1985	71.60	12.60
Geophysic-1	Geophysical Survey	1989	49.92	10.65
Geophysic-2	Geophysical Survey	1989	55.77	9.51
Geoquip Saentis	Multi-Role Survey	2005	80.50	18.00
Geotin 3	Geophysical Survey	2012	41.10	9.00
Geotin I	Geophysical Survey	1998	31.00	8.50
Geotin II	Geophysical Survey	2009	44.03	9.00
Grand Nord	Multi-Role Survey	1975	56.34	11.00
Hae Yang 2000	Oceanographic Survey	1995	89.21	14.00
Hai Bao Liu Hao	Seismic Survey	2010	47.90	8.80
Hai Bao Qi	Seismic Survey	2013	48.90	9.00
Hai Bao San Hao	Multi-Role Survey	1995	38.00	8.00
Hai Bao Wu Hao	Seismic Survey	2007	45.15	8.40
Hai Yang Di Zhi Ba Hao	Geophysical Survey	2017	88.00	20.40
Hai Yang Di Zhi Liu Hao	Geophysical Survey	2010	106.00	17.40
Hai Yang Di Zhi Shi Er Hao	Geophysical Survey	1978	86.64	14.03
Hai Yang Di Zhi Shi Hao	Geophysical Survey	2017	75.80	15.40
Hai Yang Shi You 708	Geophysical Survey	2011	105.66	23.39
Hai Yang Shi You 718	Seismic Survey	2001	79.80	18.00
Hai Yang Shi You 720	Seismic Survey	2011	107.40	24.00
Hai Yang Shi You 721	Seismic Survey	2014	107.40	24.00
Hai Yang Shi You 751	Seismic Survey	2016	66.80	15.00
Hai Yang Shi You 760	Seismic Survey	2015	84.80	18.40
Hai Yang Shi You 791	Multi-Role Survey	2018	65.20	14.00
Hai Yang Yi Hao	Multi-Role Survey	1973	104.20	13.73
Hakuho Maru	Oceanographic Survey	1988	100.00	16.20
Hakurei	Seismic Survey	2012	118.30	19.00
Horizon Surveyor	Geophysical Survey	2002	40.19	10.00
Hydrographer Presbitero	Hydrographic Survey	1998	53.50	12.00
Hydrographer Ventura	Multi-Role Survey	1998	53.50	12.00
Impuls	Geophysical Survey	1982	41.05	8.15
Indicator	Multi-Role Survey	1944	30.80	9.17
Inspector II	Multi-Role Survey	1963	39.92	7.85
Investigator	Multi-Role Survey	1981	59.42	14.01
Ivan Petrov	Multi-Role Survey	1989	49.90	10.02
Ivero	Multi-Role Survey	1982	34.40	9.01
James Cook	Multi-Role Survey	2006	89.20	18.60
Jean Charcot	Multi-Role Survey	1965	74.50	14.10
Jin Ping	Multi-Role Survey	1980	104.20	13.73
K. Piri Reis	Multi-Role Survey	1978	34.73	8.00
Kaiko Maru No 12	Multi-Role Survey	1973	47.38	9.30
Kairei	Multi-Role Survey	1997	106.03	16.00
Kairos	Multi-Role Survey	1974	36.78	7.19
Kajib	Multi-Role Survey	1994	38.00	8.50
Kan 407	Geophysical Survey	1981	54.96	11.60
Kanysh Satpayev	Multi-Role Survey	2014	46.40	13.00
Karu	Oceanographic Survey	1994	38.00	10.00
Keifu Maru	Oceanographic Survey	2000	81.39	13.40
Kern	Multi-Role Survey	1991	55.76	9.51
Kimberlit	Geophysical Survey	1985	53.74	10.71
Kommandor	Multi-Role Survey	1986	68.51	11.51
Laura Bassi	Multi-Role Survey	1995	80.00	17.00
Mammad Suleymanov	Seismic Survey	1986	45.68	9.47
Maria S. Merian	Multi-Role Survey	2006	94.76	19.20
Maritime Albatross	Multi-Role Survey	1985	89.45	13.22
Mintaka I	Multi-Role Survey	1978	40.17	9.28
Miss Rankin	Multi-Role Survey	1976	21.95	7.47
MNG Flattery	Multi-Role Survey	1965	52.10	11.18
MNG Grenville	Hydrographic Survey	1974	57.91	10.19
MTA Sismik I	Geophysical Survey	1942	55.75	8.87
Nan Hai 503	Geophysical Survey	1979	75.88	15.00
Nawigator XXI	Multi-Role Survey	1998	60.29	10.47

Attachment 6 Continued: International Survey, Seismic, Geotechnical vessels

Name	Type	Year Built	LOA (r	Breadth (m)
Ocean Geograph	Hydrographic Survey	2007	70.00	14.60
Ocean Invincible	Seismic Survey	2008	66.40	13.00
Ocean Pearl	Seismic Survey	1997	106.61	18.00
Ocean Reliance	Multi-Role Survey	1988	85.36	14.00
Ocean Stalwart	Multi-Role Survey	1984	68.28	13.11
Ocean Vantage	Multi-Role Survey	1985	68.00	16.08
Oceanic Sirius	Seismic Survey	2011	106.00	24.00
Oceanic Vega	Seismic Survey	2010	106.00	24.00
Odin Finder	Multi-Role Survey	1970	50.00	9.00
OGS Explora	Geophysical Survey	1973	72.64	11.82
OPC Defender	Multi-Role Survey	1976	65.50	12.20
Optimus Prime	Multi-Role Survey	1986	79.70	18.01
Oruc Reis	Seismic Survey	2017	86.66	19.00
Petrel Explorer	Multi-Role Survey	2008	80.35	16.40
Philia	Multi-Role Survey	1986	26.10	7.25
Polarex	Multi-Role Survey	1992	46.80	11.39
Poseidon-1	Multi-Role Survey	2015	78.00	20.40
Potanino	Multi-Role Survey	1985	33.97	7.09
Professor Bogorov	Hydrographic Survey	1976	68.76	12.43
Professor Vladimir Kuznetsov	Multi-Role Survey	1993	31.85	6.90
PXGEO 2	Seismic Survey	2013	100.10	24.00
Ramform Atlas	Seismic Survey	2014	104.20	48.99
Ramform Hyperion	Seismic Survey	2017	104.20	70.00
Ramform Sovereign	Seismic Survey	2008	102.20	26.80
Ramform Tethys	Seismic Survey	2016	104.21	70.00
Ramform Titan	Seismic Survey	2013	104.20	48.99
Ramform Vanguard	Seismic Survey	1999	86.20	39.60
Resq People	Multi-Role Survey	1951	38.58	7.20
RPS Explorer	Geophysical Survey	1984	49.99	9.43
RS Sentinel	Multi-Role Survey	1971	68.25	13.41
Sagar Sukti	Hydrographic Survey	1989	23.50	6.50
Sanco Atlantic	Seismic Survey	1987	91.30	17.40
Sanco Spirit	Seismic Survey	2009	86.50	16.00
Sanco Star	Seismic Survey	2008	80.00	16.00
Sanco Sword	Seismic Survey	2014	96.15	21.50
Sar Fame	Seismic Survey	1995	71.70	15.80
Schall	Multi-Role Survey	1962	49.15	7.23
Seabulk Fulmar	Multi-Role Survey	1968	57.78	11.43
Senckenberg	Multi-Role Survey	1976	29.71	7.40
Seward Johnson	Oceanographic Survey	1984	62.10	10.97
Shen Kuo	Multi-Role Survey	2018	63.00	23.00
Sheng Kan 208	Geophysical Survey	2012	63.80	12.00
Sheng Li 705	Seismic Survey	2010	48.13	9.50
Shi Yan 1	Multi-Role Survey	2008	60.90	26.00
Shi Yan 2	Geophysical Survey	1980	68.44	10.00
Shi Yan 3	Oceanographic Survey	1981	104.21	13.77
Sindhu Sadhana	Multi-Role Survey	2013	80.00	18.00
Skat	Hydrographic Survey	1982	29.37	8.06
SS Barakuda	Multi-Role Survey	1982	38.99	8.50
Strait Hunter	Hydrographic Survey	1972	59.50	10.19
Strait Signet	Multi-Role Survey	1967	36.00	8.50
Sviyaga	Multi-Role Survey	1985	125.15	16.95
SW Diamond	Seismic Survey	1993	80.60	14.80
SW Empress	Seismic Survey	2015	112.60	21.50
SW Tasman	Seismic Survey	2010	88.80	19.00
SW Thuridur	Seismic Survey	2010	92.00	21.00
SW Vespucci	Seismic Survey	2010	88.80	19.00
Tamhae II	Seismic Survey	1996	64.40	15.00
Tan Suo Yi Hao	Multi-Role Survey	1984	94.45	17.90
Tango I	Multi-Role Survey	1969	50.30	10.98
Tansa	Seismic Survey	2009	102.20	26.80
The Explorer	Geophysical Survey	1979	114.40	19.60
Trias	Multi-Role Survey	1984	71.40	16.00
Tuxpan	Hydrographic Survey	1963	49.68	10.14
Veritas Viking	Seismic Survey	1998	93.40	22.00
Vigilant	Multi-Role Survey	1982	71.40	11.60
Ville de'Abidjan	Multi-Role Survey	1966	38.31	8.69
Vyacheslav Tikhonov	Seismic Survey	2011	84.20	17.00
Windalia	Multi-Role Survey	1967	27.67	8.23
Xiang Yang Hong 03	Multi-Role Survey	2016	99.80	17.80
Xiang Yang Hong 06	Multi-Role Survey	1993	91.00	14.70
Xiang Yang Hong 08	Multi-Role Survey	2008	54.80	8.80
Xiang Yang Hong 10	Multi-Role Survey	2014	93.00	17.40
Xiang Yang Hong 14	Multi-Role Survey	1981	110.99	15.20
Xiang Yang Hong 21	Multi-Role Survey	1976	79.80	11.60
Xiang Yang Hong 51	Multi-Role Survey	1972	74.00	10.00
Xiang Yang Hong 58	Multi-Role Survey	1996	71.40	10.20
Xiang Yang Hong 7	Multi-Role Survey	1974	74.00	10.00
Xin Shi Jian	Oceanographic Survey	1969	94.73	14.00
Yuzhmorgeologiya	Geophysical Survey	1985	104.50	16.03
Zephyr 1	Seismic Survey	1987	81.85	14.80
Zhang Jian	Multi-Role Survey	2016	97.55	17.80
Zhi Hai	Multi-Role Survey	2021	70.20	13.00
Zohrab Veliyev	Multi-Role Survey	1985	53.74	10.71

Attachment 7: Wind Turbine Installation Vessels

Vessel Name	Owner	Build Year	Flag Country	Max Crane C
AEOLUS	Van Oord	2014	Netherlands	1600
BOLD TERN	Fred Olsen & Co	2013	Malta	1600
CADELER 1	Cadeler	2024	Denmark	2000
CADELER 3	Cadeler	2025	Denmark	2000
CADELER 2	Cadeler	2025	Denmark	2000
CHARYBDIS	Dominion Energy	2023	USA	2200
ENETI 2	ENETI	2025	TBC	2600
ENETI 1	ENETI	2024	TBC	2600
HAVFRAM WTIV	Havfram	2024	TBC	2500
INNOVATION	DEME	2012	Germany	1500
Maersk Newbuild 1	Maersk Supply Service	2025	Denmark	2500
SEAJACKS SCYLLA	ENETI	2015	Panama	1500
SEAWAY VENTUS	Seaway 7	2023	TBC	2500
VOLE AU VENT	Jan De Nul	2013	Luxembourg	1500
VOLTAIRE	Jan De Nul	2022	Luxembourg	3000

Attachment 8: SOV's

Vessel Name	Owner	Flag Country	Length	Beds	DP-level
ACTA AURIGA	Acta Marine	Netherlands	93	120	DP2
ACTA CENTAURUS	Acta Marine	Netherlands	93	120	DP2
ACTA ORION	Acta Marine	Netherlands	108	98	DP2
BIBBY WAVEMASTER 1	Bibby Marine Services	United Kingdom	90	105	DP2
BIBBY WAVEMASTER HORIZ	Bibby Marine Services	United Kingdom	90	60	DP2
DP GEZINA	Chevalier Floatels Bv	Bahamas	70	104	DP2
GROENE WIND	DEME	Belgium	62	24	DP2
EDDA BREEZE	Edda Wind	Norway	88	120	DP2
EDDA BRINT	Edda Wind	Norway	83	60	DP2
EDDA MISTRAL	Edda Wind	Norway	81	60	DP2
EDDA PASSAT	Edda Wind	Norway	82	62	DP2
EDDA TBN 257	Edda Wind	Norway	88	120	DP2
EDDA TBN 258	Edda Wind	Norway	88	120	DP2
EDDA TBN 416	Edda Wind	Norway	83	60	DP2
EDDA TBN 490	Edda Wind	Norway	88	120	DP2
EDDA TBN 491	Edda Wind	Norway	88	120	DP2
EDDA TBN 492	Edda Wind	Norway	88	120	DP2
EDDA TBN 503	Edda Wind	Norway	88	120	DP2
ECO EDISON	Edison Chouest	USA	79	60	DP2
TBC	Edison Chouest	USA	79	60	DP2
ESVAGT ALBA	Esvagt A/S	Denmark	71	60	DP2
ESVAGT ALBERT BETZ	Esvagt A/S	Denmark	63	36	DP2
ESVAGT DANA	Esvagt A/S	Denmark	89	42	DP2
ESVAGT FARADAY	Esvagt A/S	Denmark	84	60	DP2
ESVAGT FROUDE	Esvagt A/S	Denmark	84	60	DP2
ESVAGT HAVELOK	Esvagt A/S	Denmark	71		DP2
ESVAGT MERCATOR	Esvagt A/S	Denmark	59	36	DP2
ESVAGT NJORD	Esvagt A/S	Denmark	84	58	DP2
ESVAGT SCHELDE	Esvagt A/S	Denmark	71	58	DP2
IWS SOV 1	IWS Fleet	TBC	90	120	DP2
IWS SOV 2	IWS Fleet	TBC	90	120	DP2
WIND OF CHANGE	Louis Dreyfus Armateurs	France	83	90	DP2
WIND OF HOPE	Louis Dreyfus Armateurs	France	84	90	DP2
NORTH STAR SOV 1	North Star Renewables	TBC	78	60	DP2
NORTH STAR SOV 2	North Star Renewables	TBC	78	60	DP2
NORTH STAR SOV 3	North Star Renewables	TBC	78	60	DP2
NORTH STAR SOV 4	North Star Renewables	TBC	78	60	DP2
REM ENERGY	REM Offshore	Singapore	90		DP2
REM NEW CSOV 1 TBN	REM Offshore	TBC	85	120	DP2
REM NEW CSOV 2 TBN	REM Offshore	TBC	85	120	DP2
GLOMAR WAVE	Rovco (GloMar)	Panama	66	60	DP2
SEAWAY MOXIE	Seaway 7	United Kingdom	74	60	DP2
NORSIDE SUPPORTER	Vestland Offshore	Bahamas	90	60	DP2
VESTLAND CYGNUS	Vestland Offshore	Bahamas	86	134	DP2
KROONBORG	Wagenborg	Netherlands	79	44	DP2
WINDEA JULES VERNE	Windea Offshore	Gibraltar	93	90	DP2
WINDEA LA COUR	Windea Offshore	Germany	88	109	DP2
WINDEA LEIBNIZ	Windea Offshore	Germany	88	109	DP2