

Learning from the Experts Webinar Series

Offshore Wind Vessels – Constraints and Opportunities



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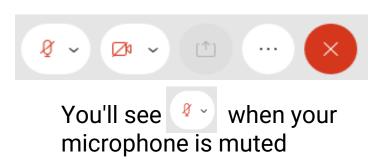
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Learning from the Experts

This webinar series is hosted by NYSERDA's offshore wind team and features experts in offshore wind technologies, development practices, and related research.

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Offshore Wind Vessels Constraints & Opportunities

OSV

Clarksons Offshore & Renewables
June 2025



Agenda



- 1. Introduction
- 2. U.S. Offshore Service Vessels
- 3. Subsea & Wind Farm Vessels
- 4. Closing Remarks



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Executive Summary

NEW YORK STATE NYSERDA

- 1. Down but not Out niche opportunities still exist.
- 2. Ships Act v Aging U.S. Fleet it is viable?
- 3. Short term v Long-term investment opportunities focus on areas that still need **support** (construction v O&M phases)
- 4. U.S. "firsts" (SOV, WTIV, etc).
- 5. 2025 More OSVs working on East Coast than **ever before**.
- 6. Lack of East Coast "spot market" and contingency.
- 7. Conversions cost v opportunity v USCG
- 8. Equipment and **new** technologies.



Source: Clarksons Research



U.S. Flagged Vessels that Worked in Offshore Wind in 2024





Sources: VesseFinder, MarineTraffic





OSV Market and U.S. Wind Developments



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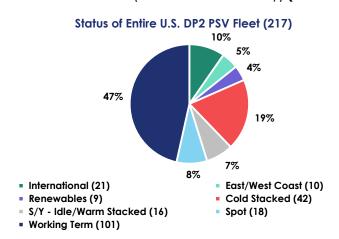
U.S. DP2 PSV Fleet



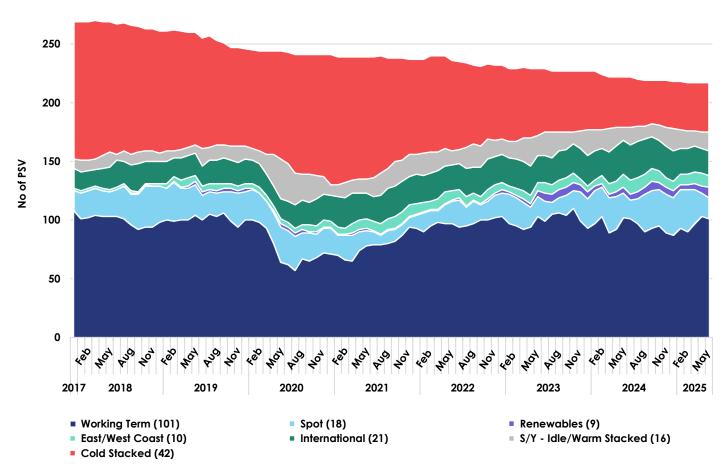


Comments

- 42 DP2 PSV remain stacked (~19% of the total fleet)
- Largest cold stacked PSVs are 272ft
- Stacked fleet decreased by 70 vessels since Dec 2020
- Lowest point for # of stacked vessels Sept 2024
- Since Dec 2020 fleet size decreased by 24 vessels
- From Jan 2024 fleet size decrease by 10 vessels.
- Average duration in cold stack > 9 years
- 21 Working Internationally ~ 10%
- 9 Renewables ~3% (fluctuates seasonally) (All-time High)



Historical Status of Entire U.S. DP2 PSV Fleet (217)



Decline in DP2 PSV Fleet: 11 Scrapped - 58 Reflagged - 20 Conversions still US Flagged

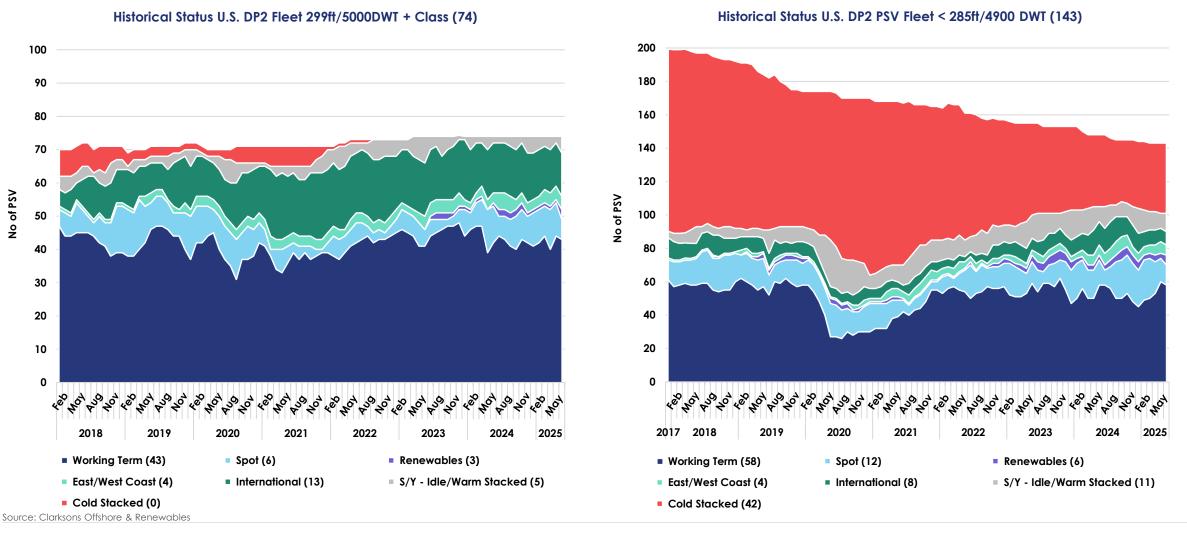


Source: Clarksons Offshore & Renewables

Dose Size Matter? Apparently so, According to the U.S. DP2 PSV Fleet!



Larger vessels continually outperforming smaller counterparts (No large DP2 U.S. PSVs are stacked)



U.S. PSV Rates Correlation to Oil Price

WTI Correlation - Few Exceptions Deepwater Moratorium, Post Covid High Inflation

Historically Strong Correlation to Oil Price

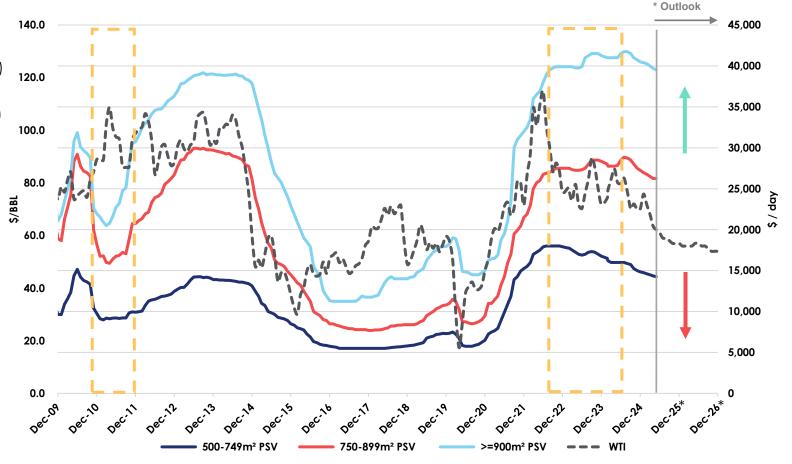
Market Disruptions.

Other Factors:

- Macondo/Deepwater Horizon Blowout (April 20, 2010)
- Deepwater Moratorium May- Oct 2010
 - (First permit Approved Feb 2011) (9 months after start)
- COVID March 2020
- High Inflation 2021-2023 peaking at 8% in 2022
- Russia-Ukraine War (Feb 24, 2022)
- Strategic Petroleum Reserve (SPR) Release ~180 mil bbls ~ 1 mil bbls per day (March 31, 2022)
- Offshore Wind 6 month pause in federal permits (Jan 20, 2025)
- US Environmental Protection Agency (EPA) revoking permits Atlantic Shores Empire Wind etc.

Major Hurricanes:

- Katrina & Rita 2005, (major offshore dammage)
- Ike 2008
- Harvey 2017
- Laura, Delta, & Zeta 2020
- Ida August 2021 (Cat 4 direct hit to Port Fourchon)



Source: U.S. Energy Information Administration and CRSL



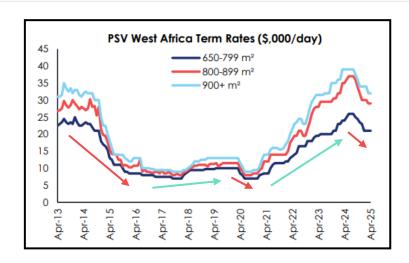
Global / Rates for PSVs & AHTS

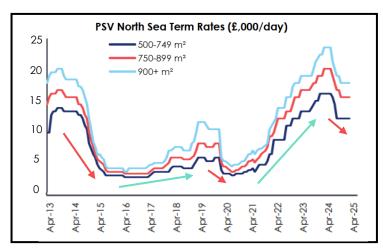


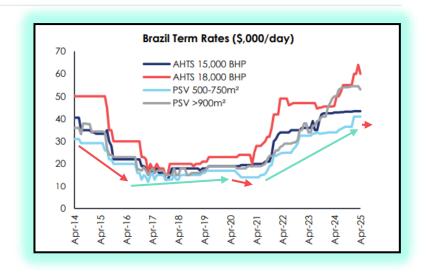


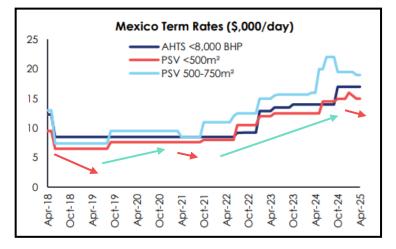
Term Rates - Global

- PSV Rates typically recovered from ~2017 until a covid related pullback in 2020. Post-COVID rates have predominantly been on an upward trajectory, PSV term rates in nearly all regions pushed into new all time highs.
- In summer of 2024 rates generally hit peak level(s) thereafter most regions saw a rates decreasing. Brazil was only major market not following this trend as continued growth in demand sustained rates.
- South America & West Africa have recently seen a decrease in demand and increased vessel availability (lower utilization) resulting in a downward rate trajectory over the near term.
- Mexico Term rates experienced a slower recovery in comparison to other regions primarily fueled by Pemex's budget limits on tenders (many went unawarded) PEMEX rate structure adjustments tend to lag market conditions and as a result we would expect a downward trend to be delayed when compared to other markets; IOCs operating in deepwater typically require 900m2 class PSVs and charter these vessels at rates comparable to USGOM.











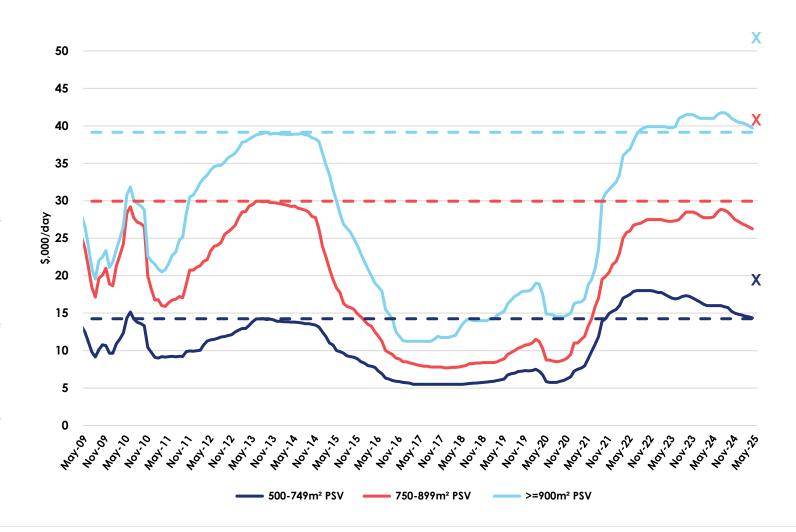


PSV Term Rates

Inflation Adjusted Rates vs Actual Rates

U.S. PSV Historical Term Rates

- In the U.S. GOA, the current term rates have generally surpassed the previous peak levels observed in 2013, without accounting for inflation
- Inflation adjusted rates from the peak levels in ~August 2013 would equal the below rates in 2025
 - >=900m2 PSV = \$53,707
 - 750-899m2 PSV = \$41,081
 - 500-749m2 PSV = \$19,546
 - These Inflation Adjusted Rates are represented by the 'X's in the chart to the right
 - Cumulative U.S. Inflation during this period ~ 35%
- All the inflation adjusted day rates are higher than the current rates seen in the market. Part of the reason why we are trading below inflation adjusted rates, is due to debt/Capex reductions, as a result of restructuring during the prolonged downturn.
- Inflation adjusted rates are closer to what would be needed for newbuild replacement tonnage to be commercially viable.
- Newbuild vessels would need to command higher rates to justify CAPEX.
- Steel tariffs? Cost have jumped in tandem for US steel suppliers. Temporary Issue ???



Sources: Clarksons Offshore and Renewables



Shipyards in the U.S. Delivered DP2 PSVs Years Ago.

Aging fleet with older vessels stacked - Average Age of Active fleet >14 years old

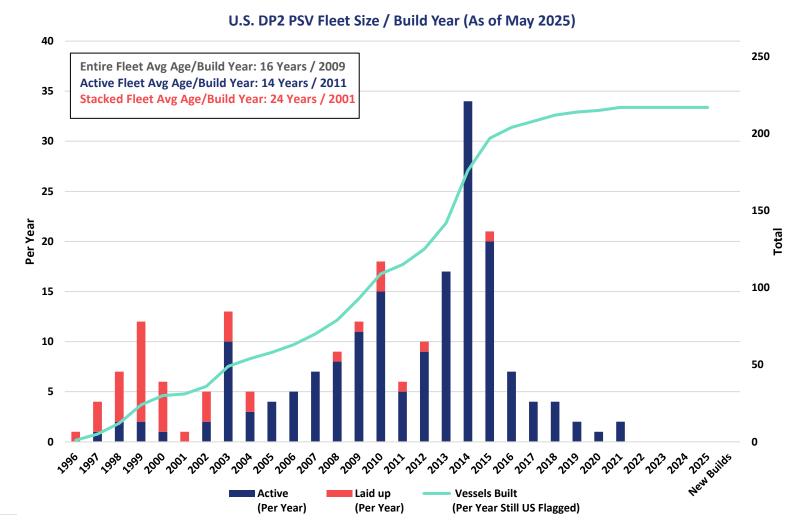


Age profile US DP2 PSV fleet

- Youngest U.S. DP2 PSV still in cold stack is 10 years old
- Largest PSV in stack is are 272ft PSVs
- Newbuilds delivered 2017 and afterwards were legacy orders, that were slowly built, given market dynamics at the time. As a result, by the time some of the vessels were delivered the designs were a decade old
- Within the U.S. no newbuild PSVs are on order, however there are about 35 globally

Managing with aging fleet:

- Age requirements likely being adjusted to reflect aging fleet by end of 2025 only 13 U.S. DP2 PSVs will be less than 10 years old
- Some vessels are undergoing life extensions, upgrading systems these vessels tend to be contracted at lower rates but on term contracts to justify expenditures
- Some vessels have also been enhanced: lengthened by stern additions or midbody inserts and some DP 1 vessels upgraded to DP2
- Existing tonnage experiencing higher maintenance cost and increased downtime/DFR



Source: Clarksons Offshore & Renewables; ABS & Lloyds Class Records

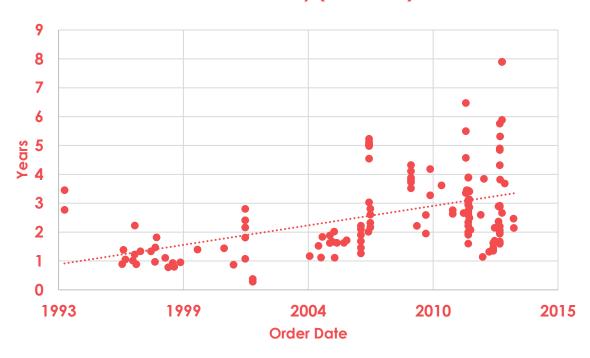


U.S. Medium & Large PSVs, Order and Steel Cutting Times to Delivery

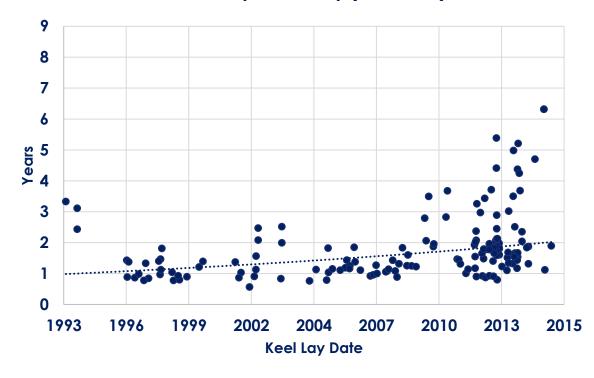
Increasing build durations



Order – Delivery (3.2 Years)



Keel Lay – Delivery (2.1 Years)



- As Vessels have increased in size and become more complicated to build delivery times have increased
- Major shipyard consolidation over the last 5 years
- The existing fleet of DP2 PSVs were build at 8 different shipyards (groups) >61% at Chouest controlled yards Bollinger

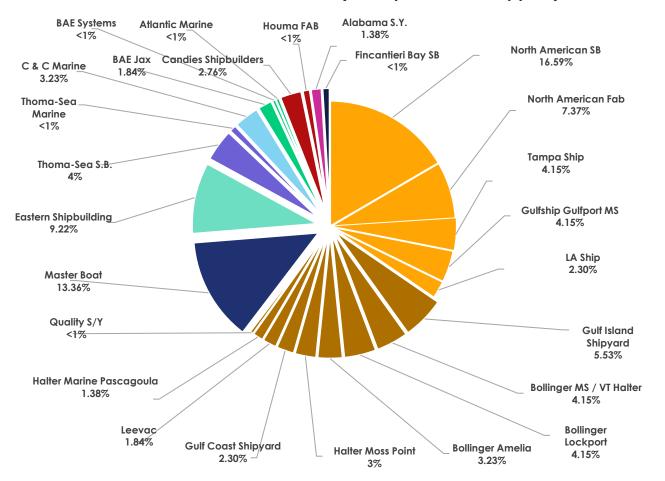


PSV Shipyard Ownership in the U.S. has Consolidated Over the Years

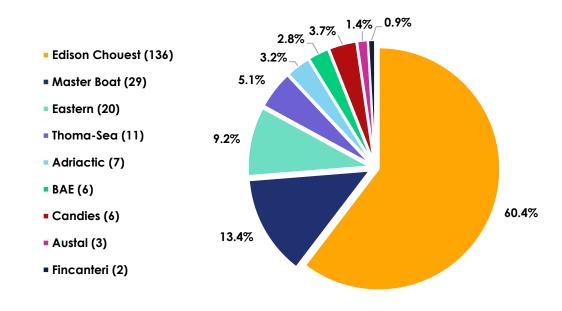


Acquisitions increased Edison Chouest's share of the Shipyard market to over 60% of PSVs

All DP2 PSVs U.S. Jones Act (217, by individual shipyard)



All DP2 PSVs USA Jones Act (217, by shipyard group)



- Need for fleet renewal
- Very **limited shipbuilding** in the last 5 years
- Day rate increases
- Increasing labor rates
- Challenging environment for shipyards to build private vessels at a gain
- Preference for government contracts vs commercial vessels (GLDD example)



Source: Clarksons Research

Example of Newbuilds to Hit the Water for the Renewables Sector.

Long Runway – Years from Order to Delivery.



CTV - NOS Gripper - 2024

Delivered: March 01, 2024 Keel Laying: April 15, 2022 Steel Cutting: Dec 15, 2021 Order Date: Nov 17, 2021

Total Duration: 2.3 years (835 days)
Shipyard – Blount Boats (Warren, RI, shipyard)

Other CTVs on Order



SOV - ECO Edison - 2024

Delivery: June 04, 2024 Launch Date: Dec 12, 2023 Keel Laying: Dec 02, 2021 Steel Cutting: Nov 02, 2021 Order Date: Oct 01, 2020

Total Duration: 3.6 years (1,342 days)

Shipyard - Edison Chouest's (LaShip) shipyards in Florida,

Mississippi and Louisiana

2 More SOVs on Order La Ship and Fincantieri



WTIV - Charybdis - 2025

Expected Delivery: TBC 2025 Launch Date: April 15, 2024 Keel Laying: Dec 16, 2020

Steel Cutting: TBC

Order Date: Oct 09, 2020

Total Duration: > 4.5 years (1,660 days)
Shipyard – Keppel AmFELS shipyard Brownsville, TX



Source: ABS Records , WorkBoat



HOS Mystique & HOS Bayou Conversion

From PSV to MPSV



Specifications

HOS Mystique	
Current Name	HOS Mystique
Type before conversion	PSV
Type after conversion	MPSV
Current owner	Hornbeck Offshore Services
Crane size	100 MT Knuckle Boom Crane
Status	Active
LOA (ff)	250ft
Breadth (ft)	54ft
Accommodation	49
DP Class	2
Deck Area sq.ft.	5,130 ft2

HOS Bayou	
Current Name	HOS Bayou
Type before conversion	PSV
Type after conversion	MPSV
Current owner	Hornbeck Offshore Services
Crane size	150 MT Knuckle Boom Crane
Status	Active
LOA (ff)	302ft
Breadth (ft)	64ft
Accommodation	70
DP Class	2
Deck Area sq.ft.	7,595 ft2

Before Conversion



After Conversion



Source: Clarksons Offshore and Renewables, Hornbeck.



Current Conversions in Progress

Conversions / Alternative Services reducing PSV fleet size



Specifications

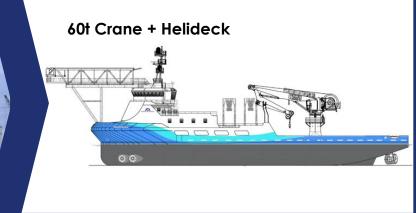
Lilly Bordelon	
Current Name	Lilly Bordelon (Ex Royal)
Type before conversion	PSV
Type after conversion	MPSV
Current owner	Borderlon Marine
Crane size	60 AHC
Status	Under Constructions
LOA (ff)	252 ft
Breadth (ft)	54ft
Accommodation	60
DP Class	2
Deck Area sq.ft.	4860 ft ²

HOS Rocinante	
Current Name	Rocinante (Ex HOS Rosehill)
Type before conversion	PSV
Type after conversion	CSOV
Current owner	Hornbeck Offshore Services
Crane size	Motus 3D Motion Comp. Crane
Status	Under Construction
LOA (ff)	300 ft
Breadth (ft)	60 ft
Accommodation	119
DP Class	2
Deck Area sq.ft.	3,000 ft ²

Before Conversion



After Conversion





Source: Clarksons Offshore and Renewables, Hornbeck, Borderlon Marine



Conversions in Wind

Conversions / Alternative Services reducing PSV fleet size



Specifications

C-Pioneer	
Current Name	
Type before conversion	PSV
Type after conversion	CSOV / W2W
Current owner	Edison Chouest
Crane size	n/a (gangway)
Status	Active East Coast
LOA (ff)	260ft
Breadth (ft)	56ft
Accommodation	53
DP Class	2
Deck Area sq.ft.	5835 ft ²

C-Fighter	
Current Name	
Type before conversion	PSV
Type after conversion	CSOV / W2W
Current owner	Edison Chouest
Crane size	60 AHC
Status	Active East Coast
LOA (ff)	300ft (280ft with 20ft faintail)
Breadth (ft)	60 ft
Accommodation	56
DP Class	2
Deck Area sq.ft.	6135 ft ²

Before Conversion

After Conversion





Source: Clarksons Offshore and Renewables, Edison Chouest & Shipspotting



Tariffs as a moving target

Which direction is the market headed?



Current market situation:

- 1/20/25: Presidential Memorandum stopping new offshore permitting in the US
- As of 6/4/25: 25% tariff on steel raised to 50%
- · Prospect of removing government subsidies for offshore wind

Effects:

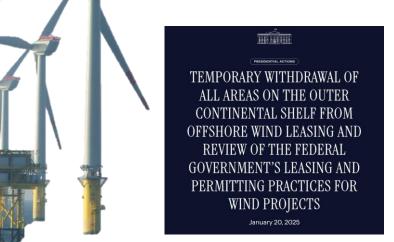
- Increase operational costs for vessels
- · Wind turbine components more expensive (monopiles),
- Supply chain effects
- Grim outlook for American offshore wind over the next 4 years



It is my great honor to raise the Tariffs on steel and aluminum from 25% to 50%, effective Wednesday, June 4th. Our steel and aluminum industries are coming back like never before. This will be yet another BIG jolt of great news for our wonderful steel and aluminum workers. MAKE AMERICA GREAT AGAIN!

2.83k ReTruths 12k Likes

May 31, 2025, 4:46 AM







Source: ReedSmith, Truth Social



Comparisons of Major Energy Project Timelines in the US

Large scale energy projects will span multiple US administrations



Offshore Wind

Permitting: 3-5 years
Design: 1-2 years

Construction: 2-3 years

Total Duration: 6-10 years

BOEM Lease

EIS assessment typically takes 2-3 years



LNG Terminal

Permitting: 2-4 years
Construction: 1-2 years
Commissioning: 3-5 years

Total Duration: 6-10+ years

DOE approval

High capital costs and financing



Nuclear Power Plant

Licensing: 4-7 years
Construction: 2-4 years

Commissioning: 4-10 years

Total Duration: 10-20+ years

Trump favorable towards, speeding up approval

process

Only 2 large reactors built in the last 50 years



Sources: Bureau of Ocean Energy Management, Federal Energy Regulator Commission, Nuclear Regulator Commission



Case Studies: Comparisons of Major Energy Project Timelines in the US

Large scale energy projects will span multiple US administrations



Equinor – Empire Wind 1

Lease: 2017

Surveying: 2018-2020
Permitting: 2021-2023
Construction: 2024-2027E

Total Duration: 2017-2027E (10 years)

1 month stop work order Projected cost: \$5 billion

Projected energy generating capacity: 810 MW



NextDecade - Rio Grande LNG

Permitting: 2015-2019

FID: 2023

Construction: 2023-2027E

Total Duration: 2015-2027E (12 years)

Despite environmental lawsuits, construction has

continued

Projected cost: \$25 billion

Energy liquification capacity: 48 MTPA (mass flow)



Southern Company - Plant Vogtle

Licensing: 2006-2012

Construction: 2013-2022

Grid connection: 2023-2024

Total Duration: 2006-2024 (18 years)

Only newbuild nuclear plant in the last 50 years

Cost: \$35 billion (150% over initial budget of \$14 billion)

Contractor of reactors filled for bankruptcy (2017)

Energy generating capacity: 4,536 MW



Sources: Southern Company, NextDecade Corporation, Equinor





Opportunities and Challenges for the U.S. Subsea Fleet



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US Jones Act Subseq Fleet Overview



50T

ROVSV/RM



Capabilities:

Survey and seabed mapping and construction support

Vessel length:

250 - 277 ft

Crane capacity:

50 - 80t

Deck space:

3,100 - 10,200 ft2

Average age

17

vessels*

5 + 3

Brandon Bordelon, Shelia Bordelon, Connor Bordelon, Kelly Ann Candies, Ocean Guardian, *Lilly Bordelon (60t), *Cindy Jean Lab (60t) & *Subsea Responder III (80t)

100t

MPSV



Capabilities:

Inspection, maintenance and repair of pipelines, umbilicals, subsea trees, wellheads, etc.

Vessel length:

250 - 302 ft

Crane capacity:

100t

Deck space:

5.130 - 12.395 ft2

Average age

15

vessels*

5

HOS Briarwood, Wyatt Candies, Grant Candies,

HOS Mystique & Chloe Candies

C-Constructor, C-Installer, HOS Bayou, Harvey Deep Sea, Harvey Intervention, Cade Candies,

150t



Capabilities:

Light construction work, Inspection, maintenance and repair

Vessel length:

279 - 318 ft

Crane capacity:

150 - 165t

Deck space:

5,793 - 12,395 ft2

Average age

14

vessels*

10

Ross Candies, Holiday, Kirt Chouest & Dove

250t

CSV



Capabilities:

Subsea installation of subsea trees, manifolds, VLS and new well tie-ins

Vessel length:

302 - 353 ft

Crane capacity:

250t

Deck space:

10,300 - 12,595 ft2

Average age

vessels*

6 + 2

Harvey Blue-Sea, HOS Woodland, HOS Warland, Ocean Evolution, Harvey Sub-Sea, & Paul Candies, *HOS Wildhorse (250t) & *HOS Warhorse (250t)

Gangway

W2W



Capabilities:

Walk-to-Work support (personnel and cargo transfer), flotel and Accommodations work

Vessel length:

250 - 332 ft

Accommodation:

53 - 149 Berths

Deck space:

3,014 - 12,395 ft2

Average age

14

vessels*

7 + 2

ECO Edison, C-Pioneer, C-Fighter, Ross Candies (150t), Paul Candies (250t), Cade Candies (150t), Wyatt Candies (100t), *HOS Rocinante, *Subsea Responder III (80t)

Source: Clarksons Offshore & Renewables



The Rise of U.S. Subsea Contractors and Offshore Wind

Involvement





DEEPOCEAN

subsea 7















A New Hope

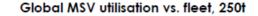
2024 year in review

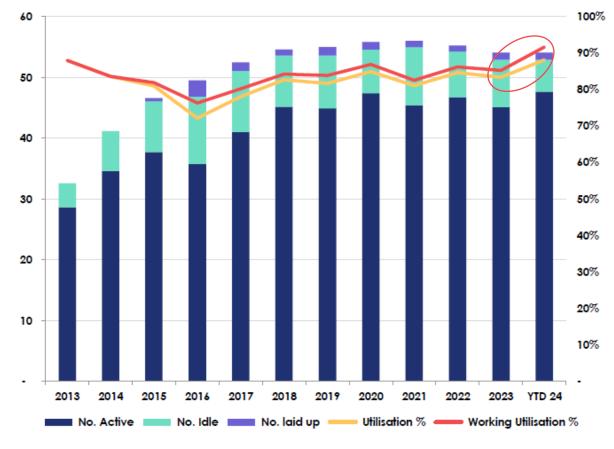
NEW YORK STATE NYSERDA

- Beginning 2024: Quiet Q1 with increased activity after April
- End 2024: High utilization across the subsea fleet
- Higher day rates than 2023, particularly with 250t crane vessels
- Long-term commitments made by subsea players to vessel/extensions declared

East Coast working vessels: Wyatt Candies Cade Candies HOS Mystique HOS Bayou HOS Briarwood HOS Woodland Source: Clarksons Research, Clarksons Offshore & Renewables

250t CSV (OCV) - Global fleet utilization







Revolution Wind's Fleet (50+)

2024's vessel activity was A New Hope for American offshore wind







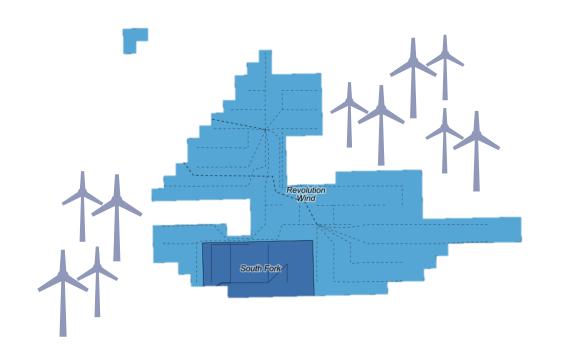
Revolution Wind's Fleet (50+)





Vessel Owners received more than HALF A BILLION DOLLARS (\$500,000,000) Charter Revenue alone at Revolution Wind in 2024.

- More than **50 vessels that worked for Revolution Wind**, assessment for charter hire spent on vessels is based on number of days worked and day rate.
- Vessels included are selected based on the criteria of sub types below:
 - Survey Vessel
 - Construction Vessel/Platform
 - AHTS
 - o PSV
 - Utility Support
 - Crew Transfer Vessel
 - Dredgers
 - o All Tugs





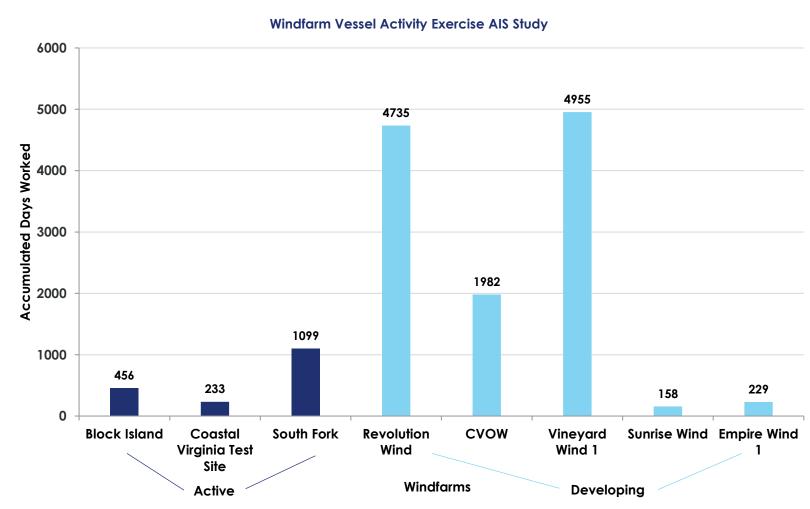


Offshore Wind in Numbers

AIS Data taken from January 1st, 2024 to December 31st, 2024



- Over 120 different offshore vessels supported
 East Coast Wind projects in 2024.
- More than 64% of the wind fleet consisted of U.S.-flagged vessels.
- 3. The fleet included **over 22** distinct vessel types.
- 4. The average vessel age was 18 years.
- Vessels logged more than 13,000 workdays supporting U.S. offshore wind operations along the East Coast.



Source: Clarksons Research, Seanet, U.S. Coast Guard



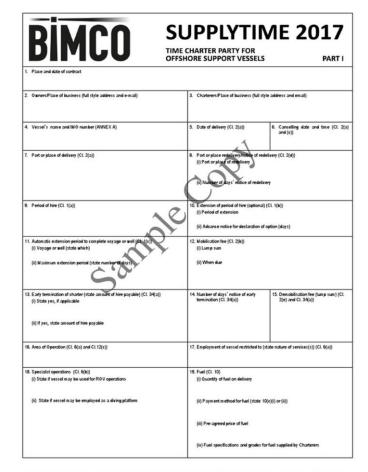
Bottlenecks and U.S. Response

Keel-Lay to Delivery (3 years)



Comments

- Bottlenecks lack of crane vessels, accommodation, subsea equipment, etc.
- Previous predictions S&P, conversions, reactivation
- Modifying Vessels COI Approvals, USCG, ABS
- Commencement Date a Moving Target
- Approval Process
- Vessel or a Service?
- Risk / Liability / Main contract flowdowns
- GOA v East Coast
- Early termination provisions



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Some Markets Positive but Challenges Ahead

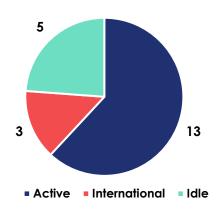
2025 current market trends



- Slow start with low utilization levels across sectors
- Accommodation / W2W market strong / O & M
- U.S. East Coast uncertainty increasing supply
- Some subsea contractors may choose to 'hand back the keys'
- Unusual to see subsea players relinquish control of Jones Act subsea tonnage



Jones Act 100-250t MPSV Status (As of April 15th)



76% working utilization of US Jones Act MPSVs 100-250t (Including Abroad)



Source: Clarksons Research



Empire Strikes Back But Headwinds Persist

Key Takeaways



- 1. Last 6 months have significantly curtailed many business cases / investment decisions.
- 2. Difficult to take long-term view on the U.S. offshore wind market given the turbulence of last 2-3 years and **current outlook**.
- 3. However, supply chain **gaps remain** and opportunities to invest still exist.
- 4. Focus on areas needing the most **on-going support** (maintenance, cable failures, inspections, additional accommodation, emergency response, etc).
- 5. Still **threats** to U.S. tonnage from foreign-flagged vessels to perform certain work-scopes.
- 6. Challenges of **contract durations** justifying the necessary investment.
- 7. Tariffs does this make U.S. wind "un-investable"?

Turmoil in U.S. Offshore Wind Projects: Orsted, Equinor, etc.



Where does U.S. Offshore Renewables go from here?





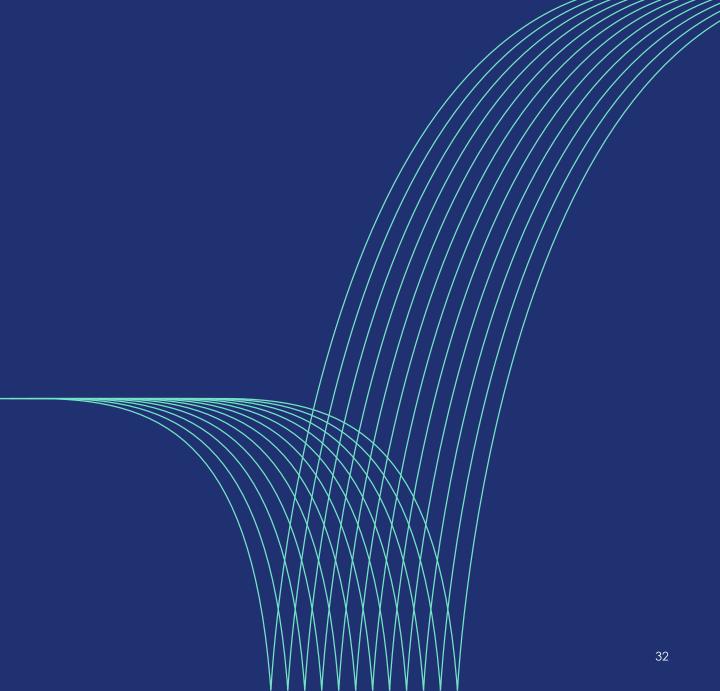


Thank you





Q&A



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July 9, 12:00 p.m. ET
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Wind Around the World
Global Wind Energy Council
(GWEC)

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