

ORIGINAL OBJECTIVES

Original

- Increase utilization of existing fleet
- Cater for the ever-growing turbines
- WTG installation without use of a jack-up

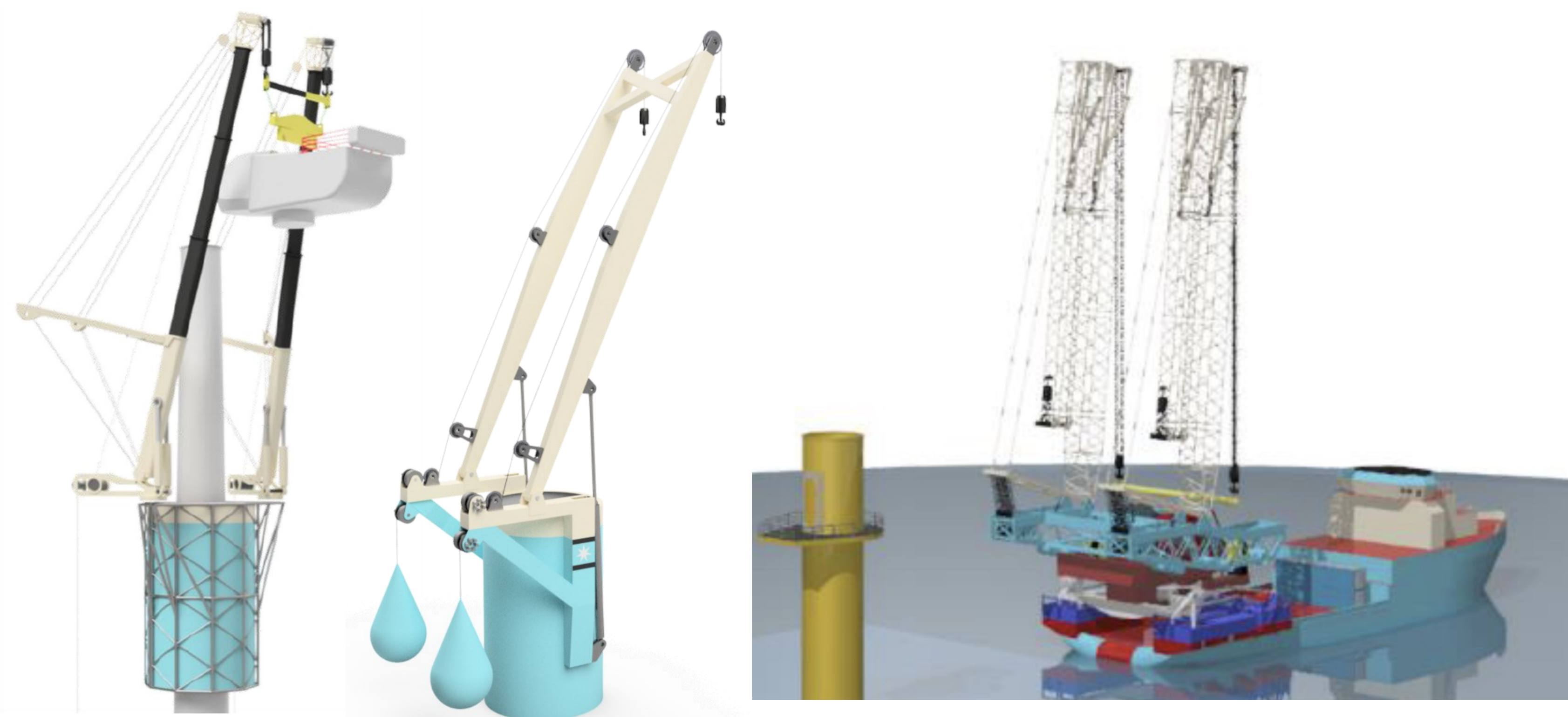


NEW OBJECTIVES

New

- Develop a feeder solution to keep jack-up on critical path
- Stabilize barge offshore to enable fixed-to-fixed lifts
- Fully Jones Act compliant solution

THE JOURNEY



2017 -2018

2019 -2020

2020-2021

LEARNINGS

- Choose the right supplier for your R & D project
- Allocate substantial resources (you won't get it right the first time)
- Accept mistakes, learn and move on
- Establish a dedicated team
- Watch out that you don't fall in love with a failed solution – cut your losses
- Find out what you don't know at an early stage
- Get feedback from possible clients – if it is all negative, reconsider your solution (but don't build a Swiss knife)



Think outside the box

- Consider different ideas and approaches – even wild ones
- No “holy cows”



Don't stamp on an idea

- As a starting point, there are no bad ideas – no criticism
- Get as many ideas as possible



No war stories

- Avoid war stories
- Transform learnings from the war story into a constructive idea



Avoid ownership

- Don't defend ideas
- Build on someone's idea to make it better



No complaining

- Focus on activities, not people
- Don't bring problems without solutions

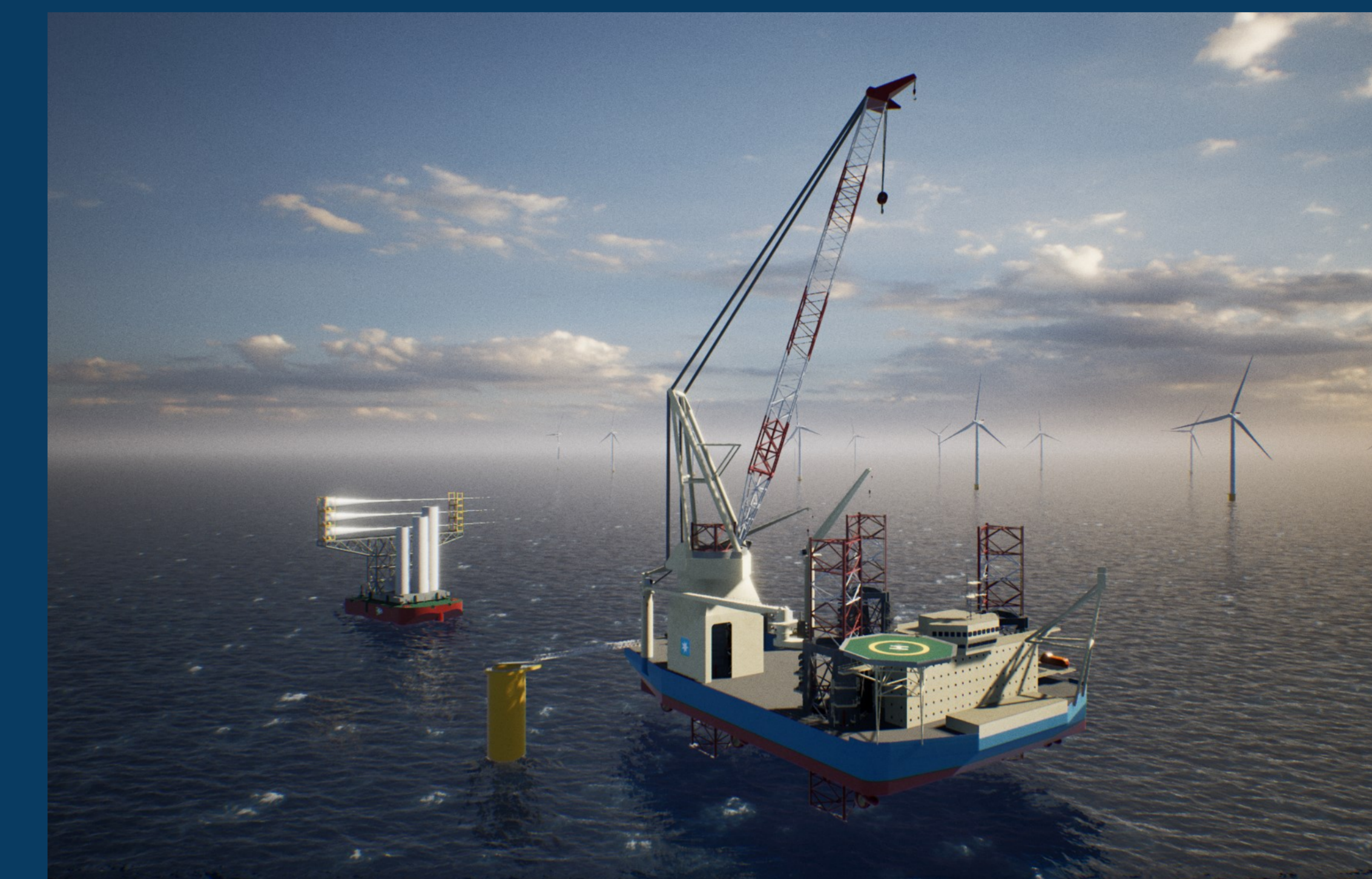


No evaluation

- Write down and evaluate ideas after brainstorming



THE END RESULT



TURBINE INSTALLATION:

- Elevator system lifts transport frame to deck level
- From this position, the installation methods mirror traditional WIV installation
- Feeder solution designed to install 20 MW+ WTGs (max cargo weight 3.000 MT)
- Purpose-built barges designed to fit the docking system
- Fender system protects the WIV and position the barge
- Fender system locks the barge in horizontal plane
- 4 VFD-driven pistons push the barge deeper into the water and stabilize it, ensuring a fixed-to-fixed lift
- WIV and feeder barges enable 30% efficiency gain versus traditional WIV methods

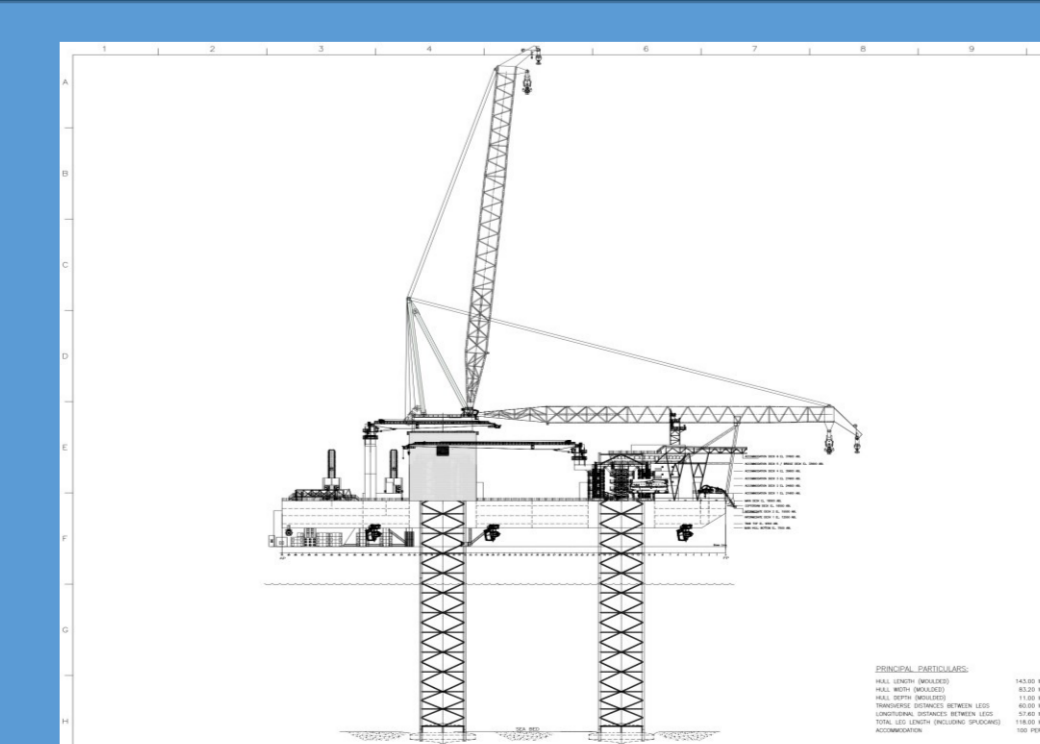


MONOPILE INSTALLATION

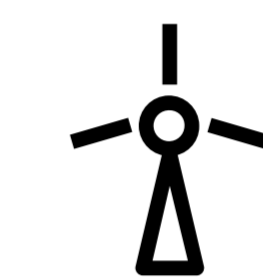
- Besides installing wind turbines, the new Wind Installation Vessel will also be capable of installation monopile foundations
- The huge NOV crane is large enough to embed this turbine foundation type at +60m water depth

TECHNICAL SPECIFICATION:

- *A1 SELF ELEVATING UNIT, *AMS, *ACCU *DPS-2, HELIDK, CRC(OC), Wind IMR, UWILD
- IHM
- Complies with DNV : CLEAN DESIGN & COMF V(2) & C(2)
- Green Passport EU (Recycling)
- Complies with Hongkong convention for ship recycling
- EU (SRR)



Innovative new concept for turbine and foundation installation



30% faster installation of bottom-fixed turbines:

- Wind Installation Vessel stays on site
- Feeder (tug and barge) solution shuttles back and forth to port
- Patented stabilizing system enables fixed-to-fixed lifts offshore



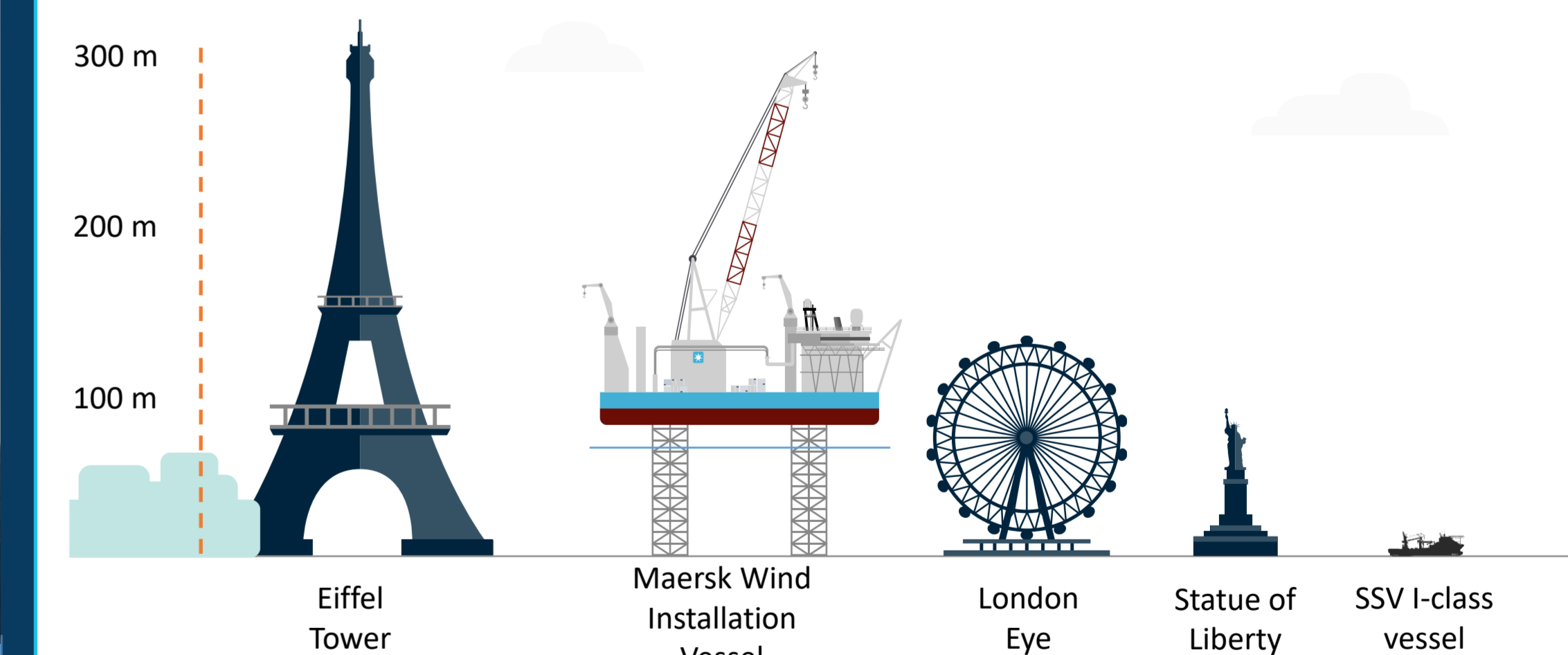
Jones Act approved concept

FIRST CONTRACTS

MAERSK SUPPLY SERVICE HAS BEEN AWARDED A FIRM CONTRACT FOR EMPIRE OFFSHORE WIND: A JOINT VENTURE BETWEEN EQUINOR AND BP IN THE U.S.

THIS WILL COMPRISE OF THE INSTALLATION OF OFFSHORE WINDFARMS EMPIRE 1 & 2 AND BEACON WIND.

SIZE MATTERS



ACKNOWLEDGEMENTS

- Equinor** – For a professional approach and an open mind
- Kirby** – For constantly having a “Can do” attitude
- Sembcorp** – For developing a unique design
- OSK** – For coming up with the unique design now patented

CONTACT INFORMATION

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