




NORCOWE – Offshore Wind Operations

Lessons learnt from recent WTG installations

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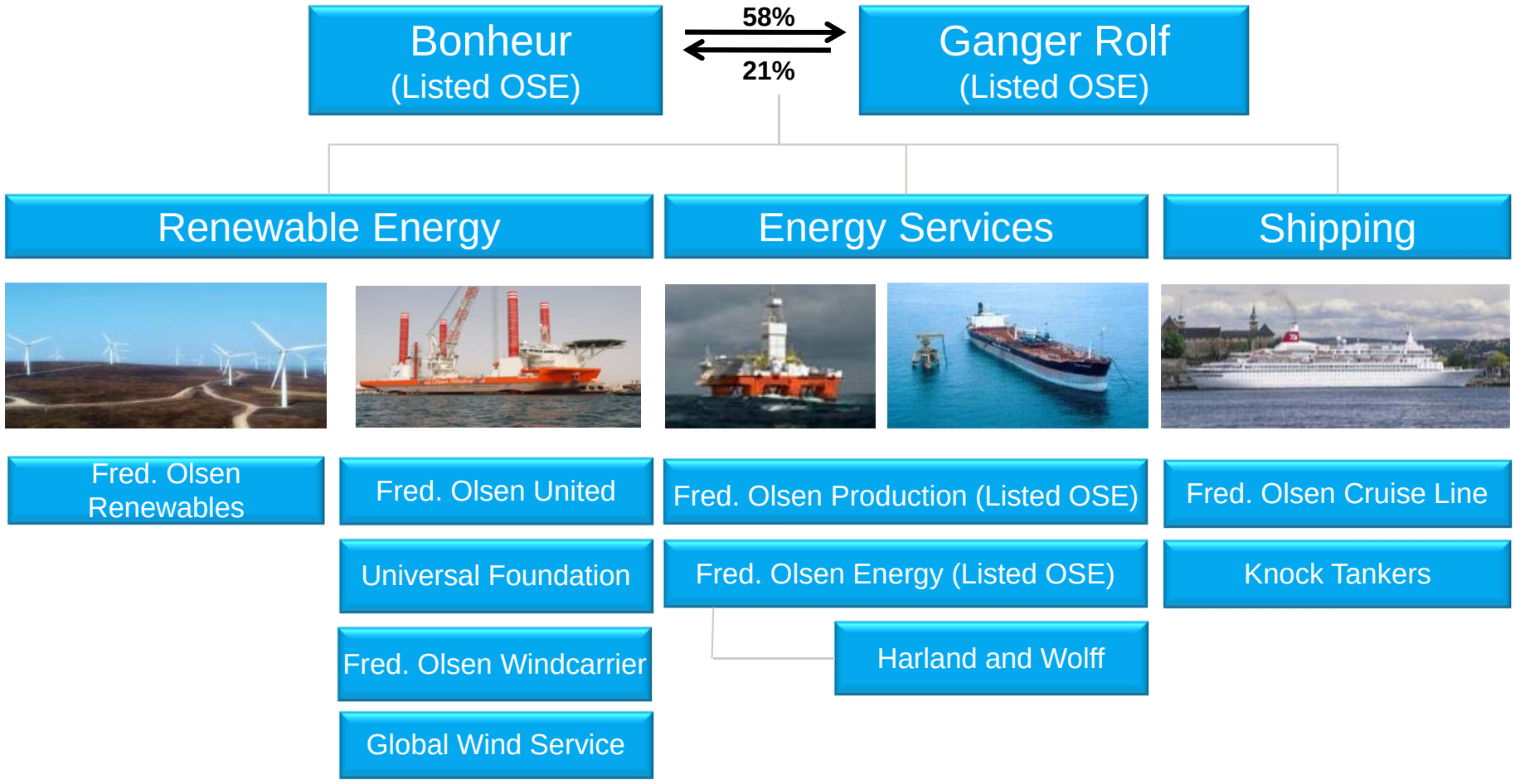
Fred. Olsen and the energy sector

Building on 164 years experience from logistics, marine operations and installation



Fred. Olsen United – a solution provider

Fred. Olsen United

- Project management
- Secures a seamless interface and serves as single-point of contact

Universal Foundation

- Design of support structure
- Specialist in engineering and sub-seabed installation

Universal Foundation

Harland and Wolff

- Foundation structure manufacture at their shipyard in Belfast

Windcarrier

- Offshore logistics & installations of structures & WTGs
- Crew & service vessels

Natural Power - SeaRoc

- Supply and installation of met-mast structures and equipment
- HSEQ services

Global Wind Service

- Installation of wind turbines
- Service & maintenance
- Fibre repair
- Commissioning

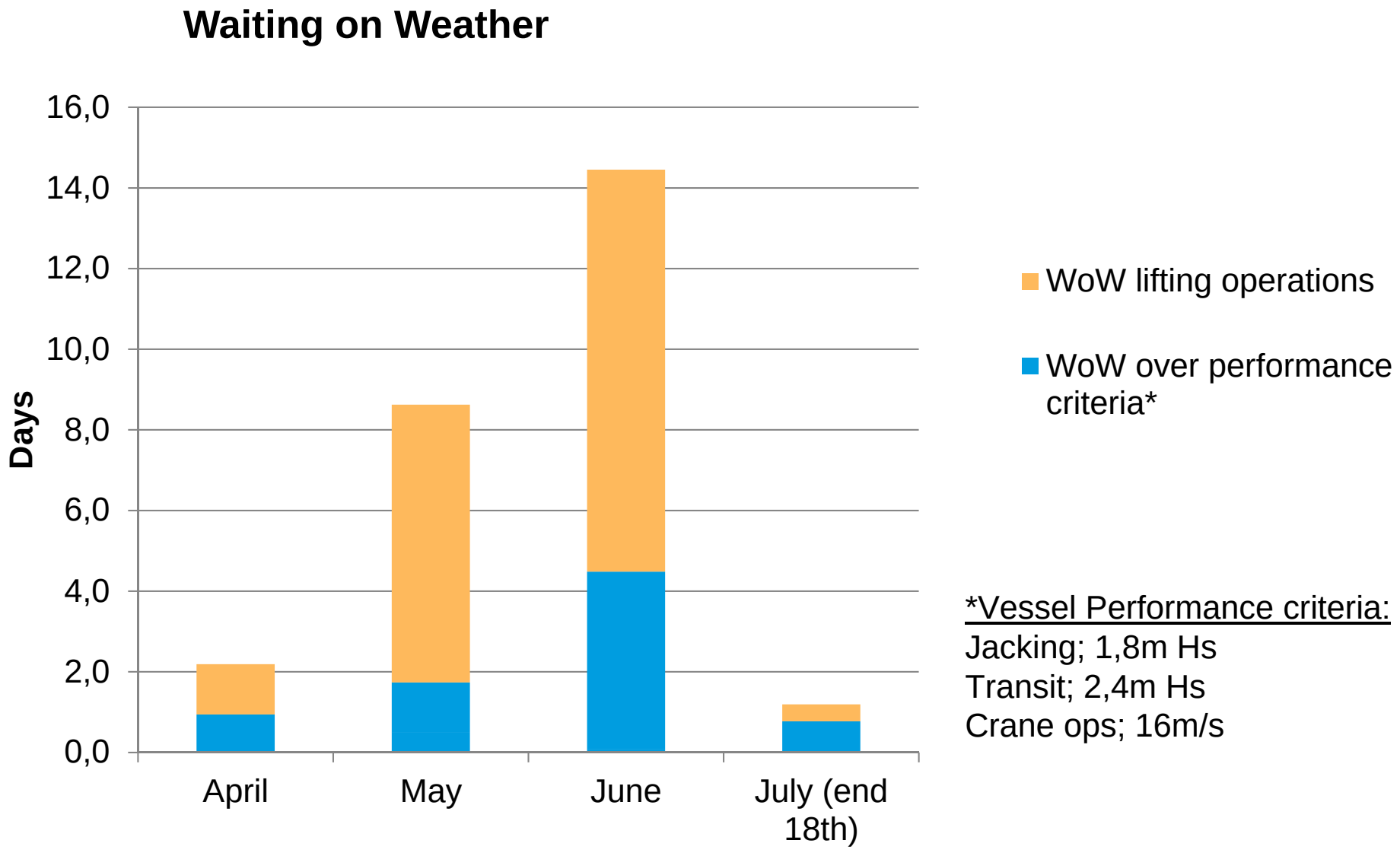
BARD Offshore Windfarm

- Commenced April 17th 2013
- Completed end July 2013
- 4 rotorstars and 15 complete WTG’s

Riffgat Offshore Wind Farm

- 108 MW (electricity for 12 000 households)
- Offshore site 15 km from Borkum island, North-West Germany
- Water depths 18 - 23 m
- 30 Siemens 3.6 MW turbines
- Monopile foundations
- Commenced 1. April 2013
- Completed mid July 2013
- Installation Port: Esbjerg, DK

Waiting on weather...



*Vessel Performance criteria:
Jacking; 1,8m Hs
Transit; 2,4m Hs
Crane ops; 16m/s

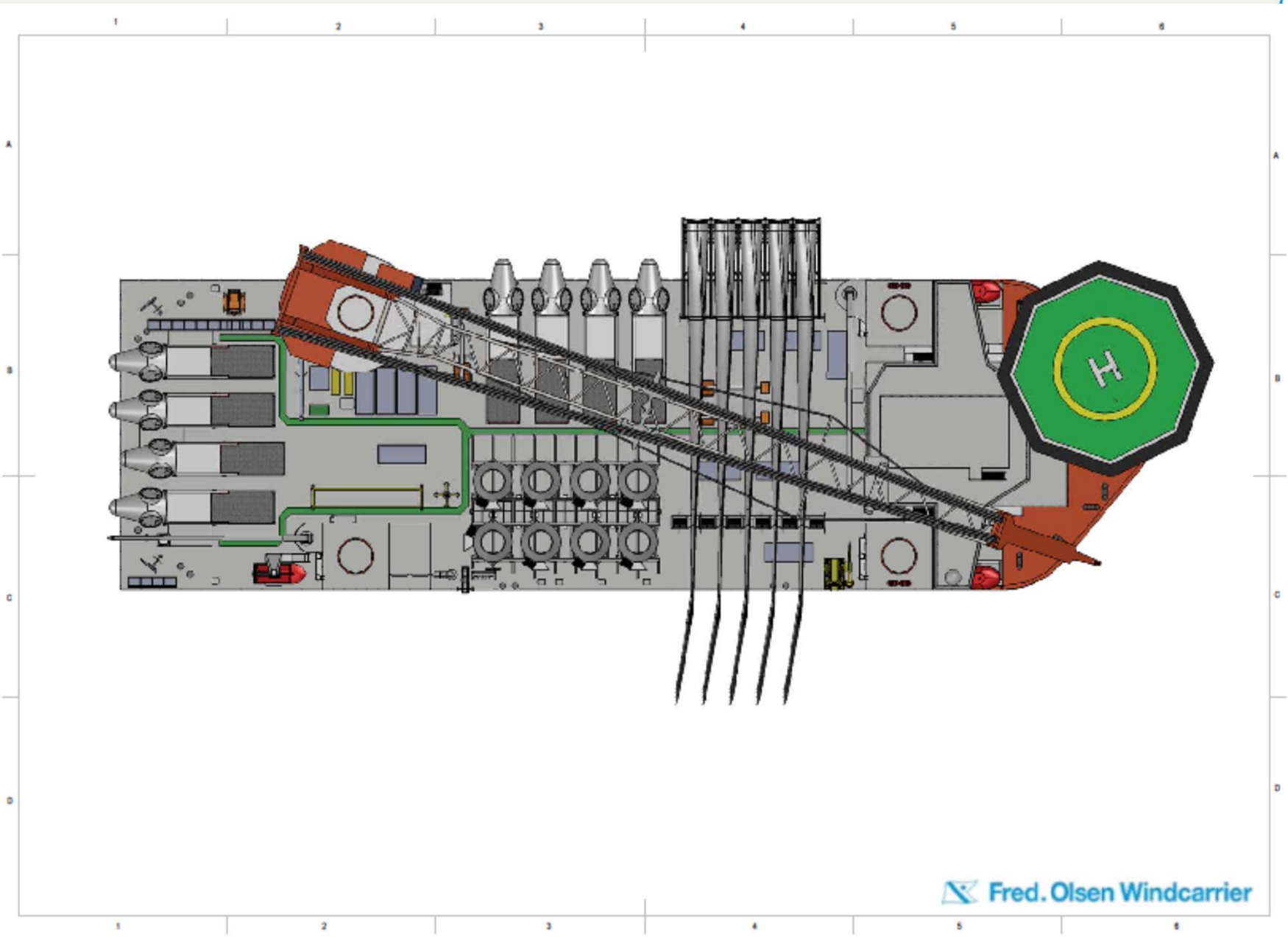
Scope Overview

- Responsible for load-out, transit and lifting of WTGs
- Siemens Wind Power (SWP) responsible for WTG installation and commissioning
- Interface FOWIC/SWP:
  "Main Crane hook«
- Sailing distance to Riffgat: 130 Nm

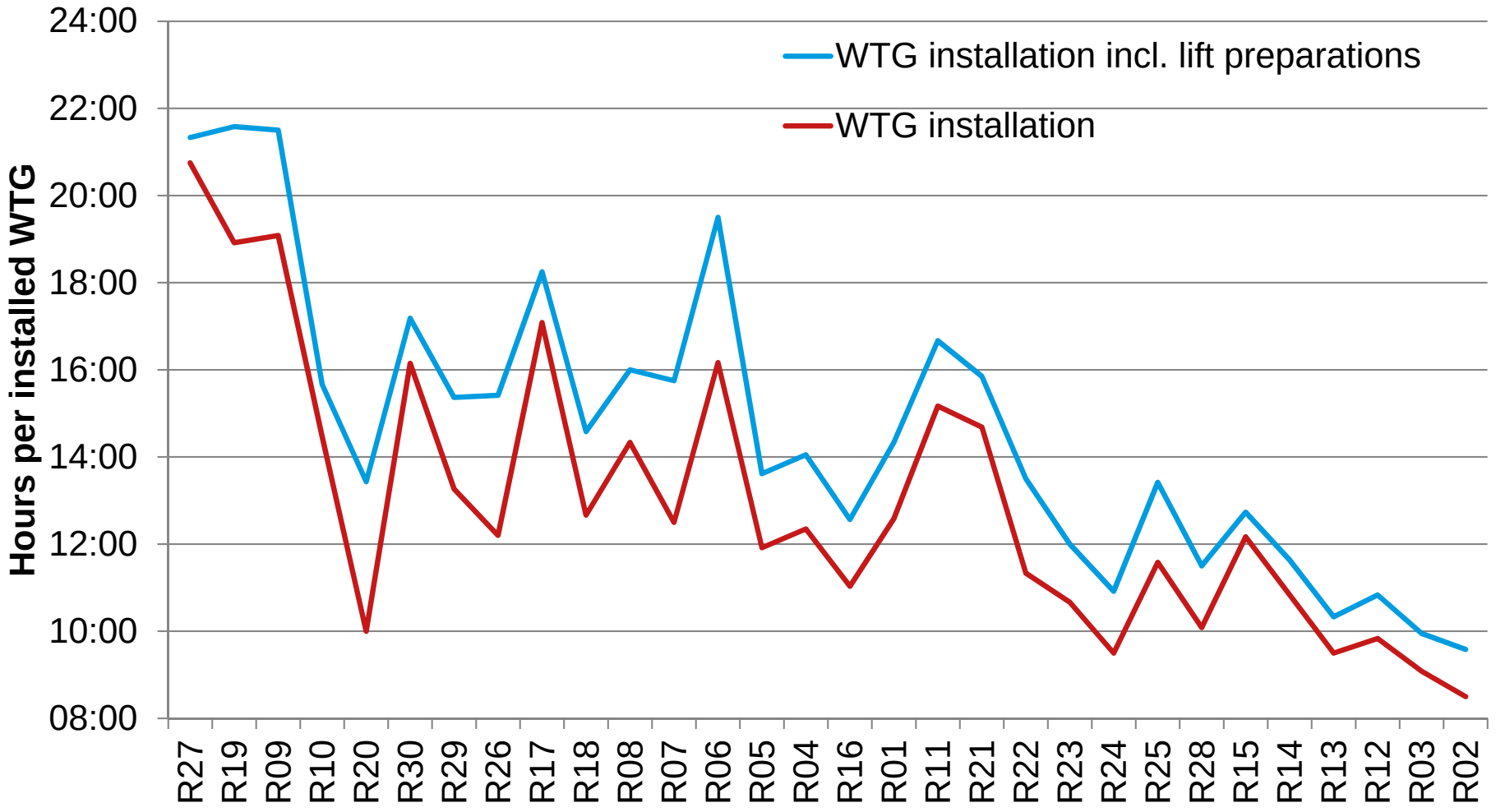
Riffgat Project – Main Highlights

- Completed on time according to client expectations
- Hands-on project management and ops team
- Commercially good project, project duration shorter than planned
- Vessel and deck layout / arrangement: tidy and efficient

Deck layout



WTG installation



Riffgat Project – Main Improvement Areas

- Cooperation and interphase between office & vessel
- Communication with client onboard
- Contractual challenges and unclear responsibilities
- Avoid project dependency on individuals (redundancy)
- Coordination of crew change

Thank You

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