Real-life experiences with wind technologies

Rotor Sail on RoPax ferry "Copenhagen"

10 May 2022
WASP Conference „Wind technologies for cleaner shipping"

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Scandlines

Scandlines' Traffic Machines

Two ferry routes between Germany and Denmark

High frequency and large capacity, crossing times up to 2 hours

Reliable transportation services for passengers and freight customers

Catering services and retail sales of goods on board and ashore

Scandlines' Green Agenda

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The world's largest hybrid ferry fleet

Puttgarden-Rødby

- 48 MEUR „green" investments between 2013 and 2021
- Capacity per vessel 364 cars or 124 cars and 30 freight units

Rostock-Gedser

- 270 MEUR investments in new ships
- Operating since 2016
- Capacity per vessel 460 cars or 96 freight units

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

Co-financed by the Connecting Europe Facility of the European Union

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Why install a rotor sail?

- Scandlines is a frontrunner in green ferry operation
- Scandlines turns down the diesel motors once again and reduces CO_2 emission even more
- Scandlines continues the journey towards zero emission

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Green Agenda: Going forward!

We want to be pioneers in terms of green shipping technology

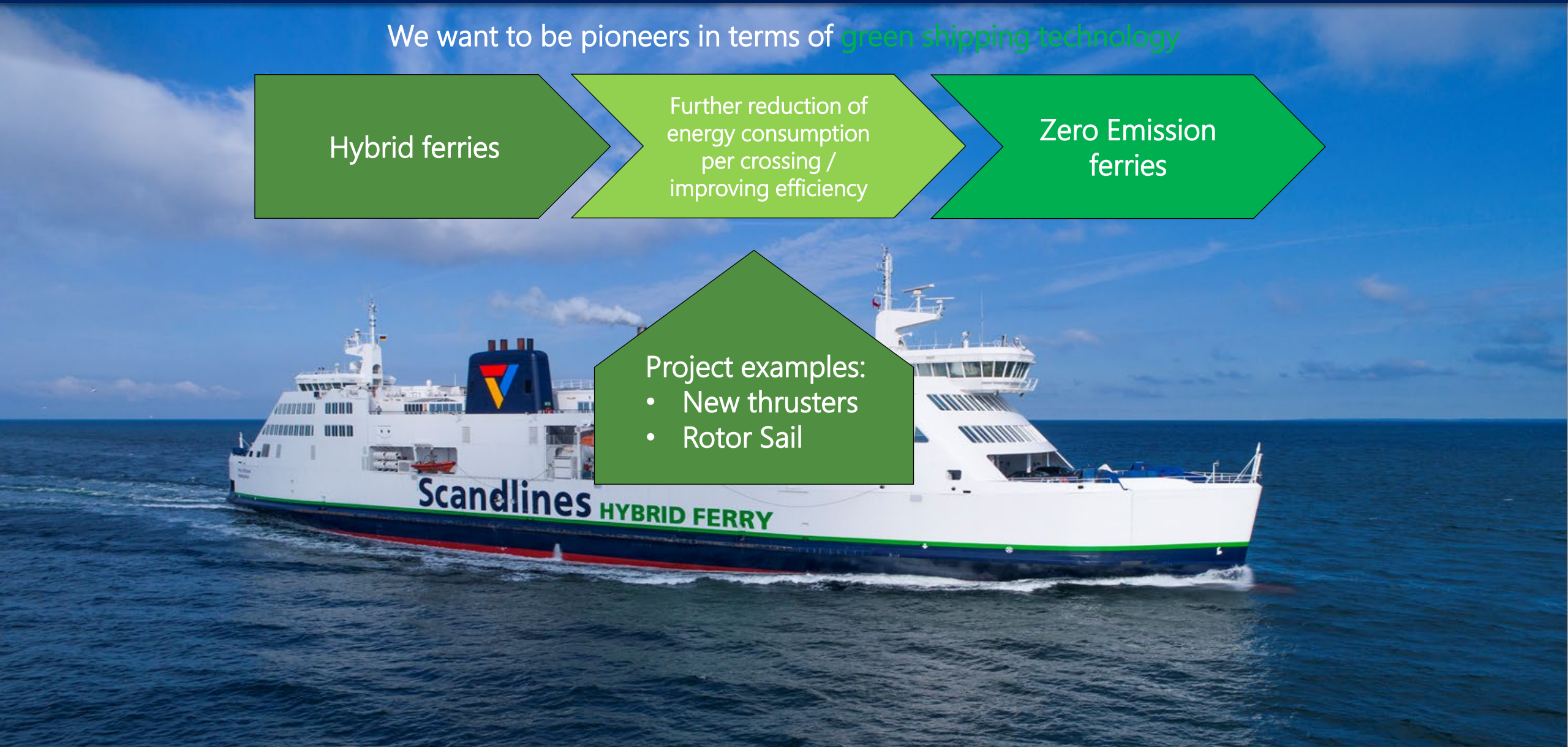
Hybrid ferries

Further reduction of energy consumption per crossing / improving efficiency

Zero Emission ferries

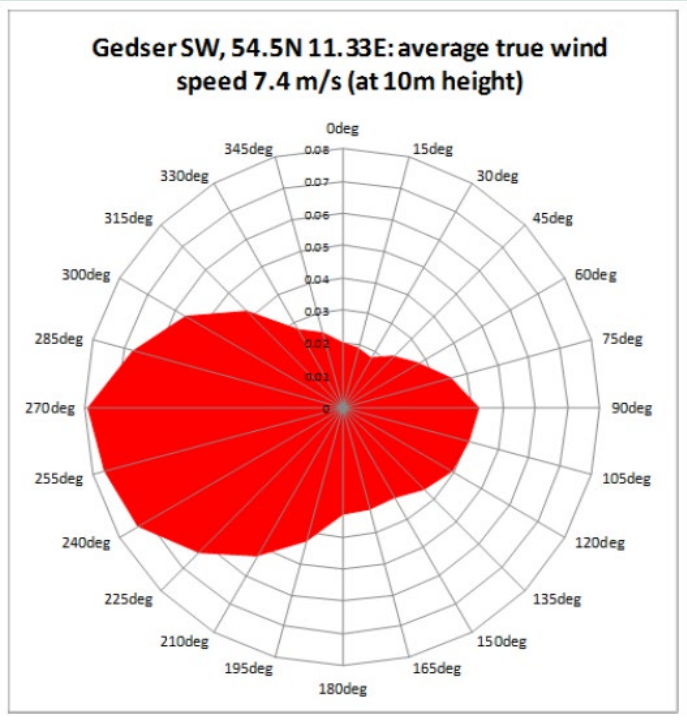
Project examples:

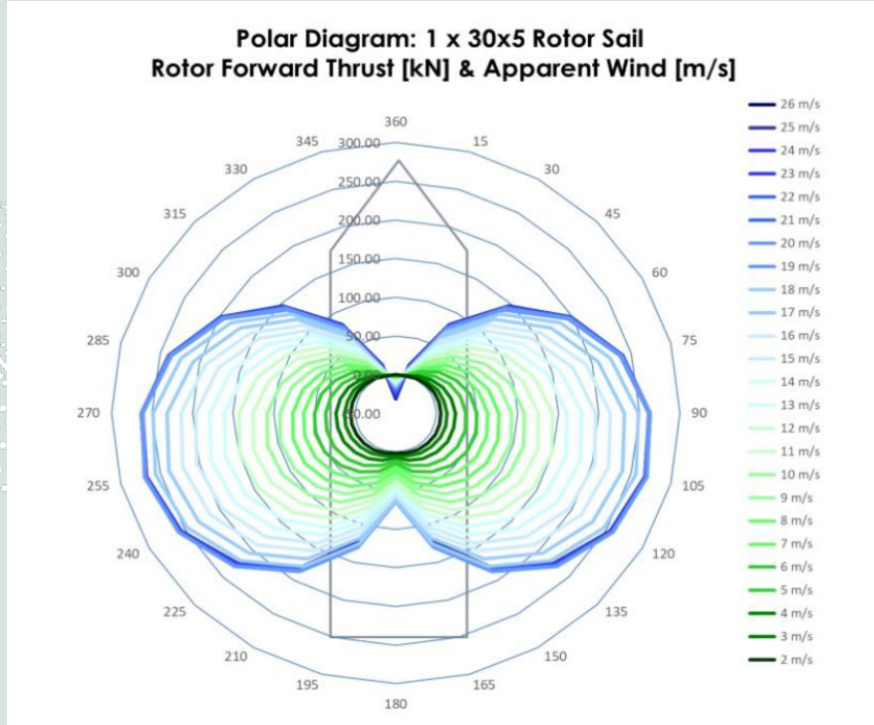
- New thrusters
- Rotor Sail



Wind conditions on the Rostock–Gedser route

- Wind conditions of the route area are good
- Prevailing wind direction is favourable for rotor sails





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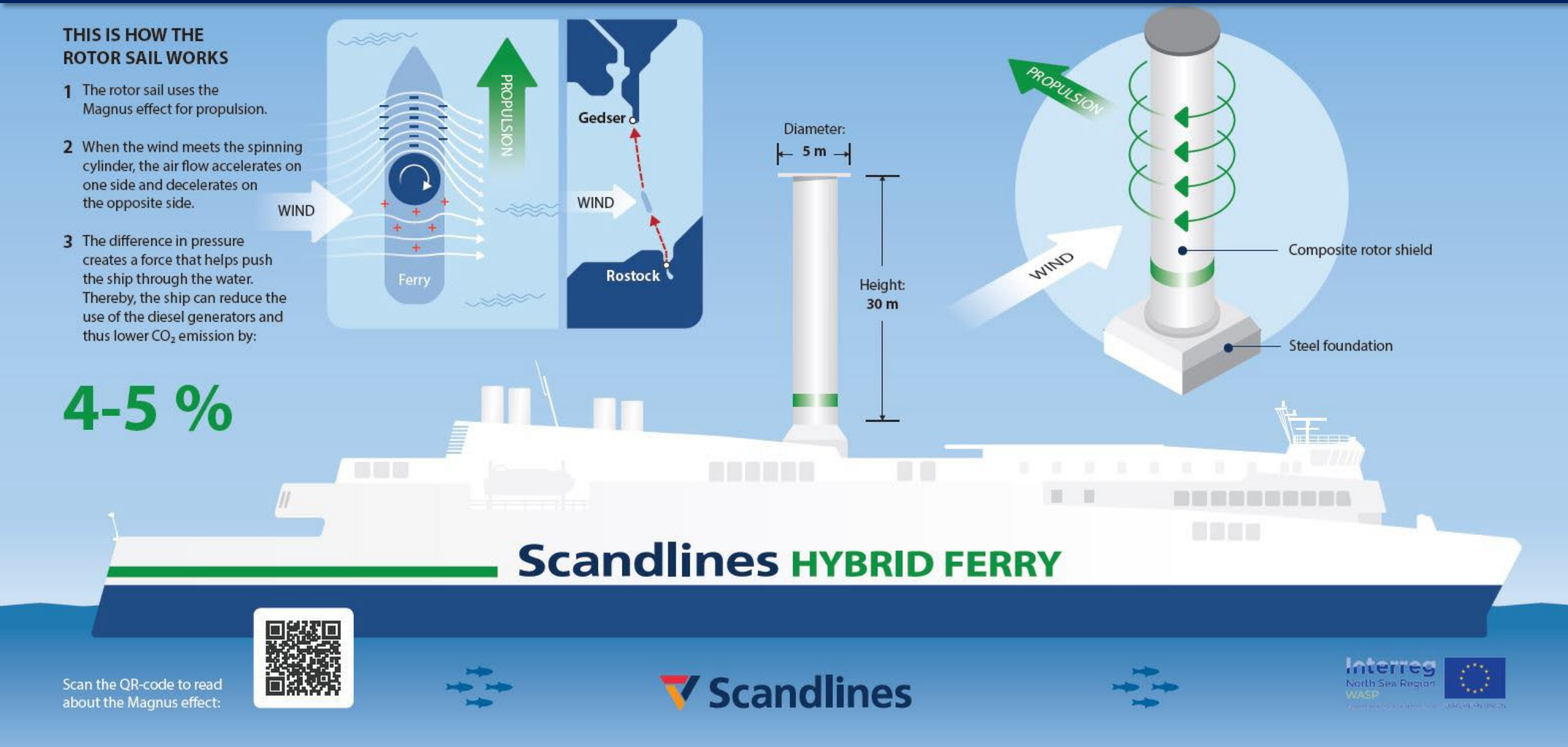
Investing in more efficiency: Rotor Sail for Rostock-Gedser service



Preparation

- Risk assessment
- Lloyd's Register
- DMA
- Stability
- Position of top lights
- Cabling
- Interface to Integrated Monitoring, Alarm and Control System IMAC
- Fire detection system
- Foundation

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Installation in Rostock – 25 May 2020

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Challenges after installation

- Vibration at high RPM
- Stiffness of foundation
  - Damping methods implemented
- Incorrect information from wind sensor
  - New position of wind sensor
  - Correction with precision sensor system
- Ice on top of rotor sail during operation
- Noise issues in accommodation

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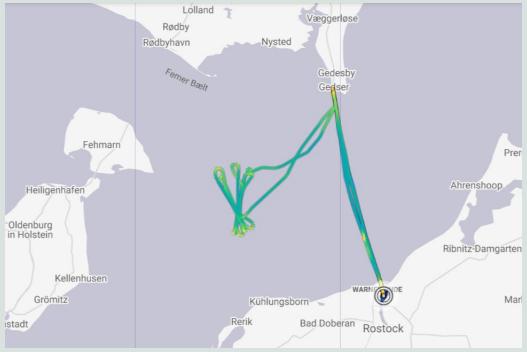
Speed test/sea trial – Performance according to expectations



Speed test 6-7 March 2021

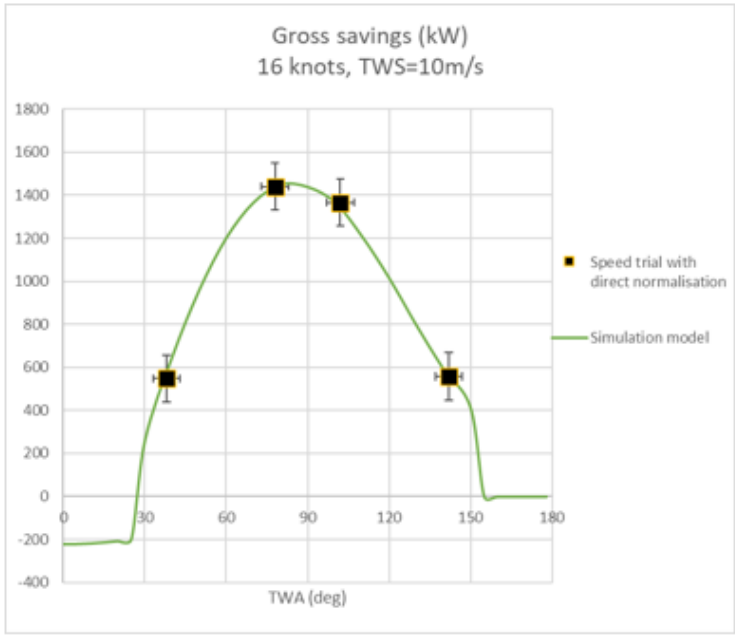


Figure 8. Gross Power saving derived from speed trial with direct normalisation and with ship simulation model tuned with thrust coefficient from speed trial. Error bars as described in section 8.1.

Source: Werner, Sofia et al, 2021, SPEED TRIAL VERIFICATION FOR A WIND ASSISTED SHIP

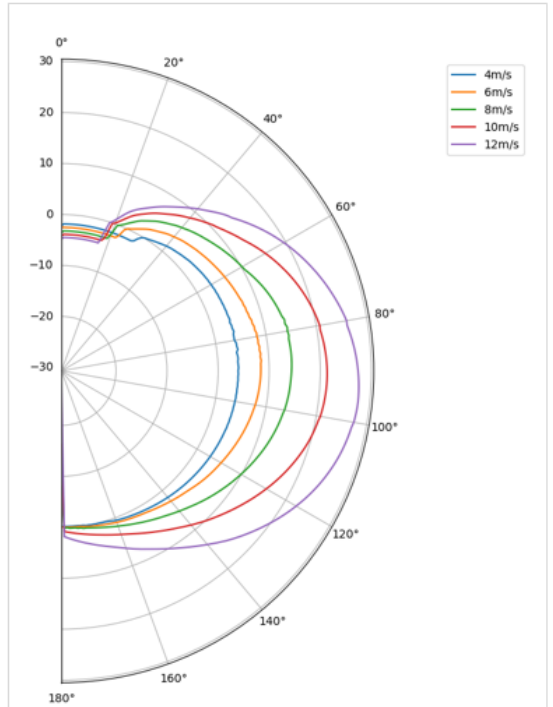


Figure 9. Power saving (%) including the power consumption from spinning the rotor for a variation of true wind speeds and angles. Derived using simulation model tuned to full-scale trials.

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Operation

- No significant impact on manoeuvrability
- Auto start and stop function
- No action needed from crew in daily operation

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Great public response

Amerikanischer YouTuber macht Aufnahmen bei Scandlines

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Thank you for your attention!

Any questions?