

PRESS RELEASE

NORSEPOWER ROTOR SAILS CONFIRMED SAVINGS OF 8.2% FUEL AND ASSOCIATED CO₂ IN MAERSK PELICAN PROJECT

Two 30-metre tall Rotor Sails installed match initial fuel saving expectations

COPENHAGEN, LONDON, HELSINKI – 24 OCTOBER 2019: Norsepower Oy Ltd., together with project partners Maersk Tankers, Energy Technologies Institute (ETI) and Shell International Trading and Shipping Company Ltd., today announced successful trial results of two Norsepower Rotor Sails onboard the Maersk Tankers product tanker, *Maersk Pelican*.

The Rotor Sails are large, cylindrical mechanical sails that spin to create a pressure differential, the Magnus Effect, that propels the vessel forward; in this instance a Maersk Tankers' Long Range 2 (LR2) product tanker vessel. The Rotor Sails deliver auxiliary wind propulsion to the vessel - which have operated in conditions ranging from tropical climate to arctic conditions in Europe, Middle East, Asia and Australia – resulting in the optimisation of energy efficiency and a reduction in fuel consumption.

The Rotor Sails were installed onboard *Maersk Pelican* in August 2018. As part of the test, the aggregated total fuel saved from 1 September 2018 to 1 September 2019 was 8.2% savings. This is equivalent to approximately 1,400 tonnes of CO₂. The savings were confirmed by comparing detailed performance information to a baseline established with full scale measurements and computational analysis done for the vessel prior the Rotor Sail installation.

Independent experts from Lloyd's Register's (LR's) Ship Performance Group have analysed and validated the performance data during the project to ensure an impartial assessment. In addition, technical and operational insights for performance studies will also be published.

"During the one-year trial period on *Maersk Pelican*, crew and operators have reported positively on the usability, safety and performance of the Rotor Sails in all conditions," says Tommy Thomassen, Chief Technical Officer at Maersk Tankers.

"Maersk Tankers and the industry have developed and tested a number of technological solutions, which contribute to reducing fuel consumption and associated emissions. We see wind technology as one of the technologies that can give us a real breakthrough in reducing CO₂ and help us achieve our emission-reduction target of 30% by 2021. We will closely follow the development around the financial and commercial viability of the technology for potential future installations on some of our other larger vessels, while we have decided that *Maersk Pelican* will continue to sail with the Rotor Sails."

Dr. Chris Craddock, Technical Advisory & Ship Performance Manager, Lloyd's Register, said, "As the independent performance verifier of the Norsepower Rotor Sail, LR sees our role as a trusted independent expert, assessing the return on investment for new technologies that address the challenges of decarbonisation. Wind power technologies are

part of the solution, and the Norsepower Rotor Sail has proven itself to save fuel and reduce emissions.”

Tuomas Riski, CEO at Norsepower is pleased with the results, as they meet expectations. He sees great opportunities for the technology: “With the *Maersk Pelican*, there are three vessels in daily commercial operation using Norsepower’s Rotor Sails. Each of these cases represents a very different vessel type and operational profile, demonstrating the widespread opportunity to harness the wind through Rotors Sails across the maritime industry.”

In a simulation model, Norsepower shows that with the currently installed Rotor Sails operating in global average wind conditions of all shipping routes¹, yields a savings potential up to 12 pct on fuel and emissions, including CO₂. Based on the same simulation model, Norsepower estimates that applying Rotor Sail technology to the entire global tanker fleet would reduce annual CO₂ emissions by more than 30 million metric tonnes, which corresponds to emissions of about 15 million passenger cars. “Through future advances in technology we believe the Rotor Sails can contribute even more as one of the solutions to tackle CO₂ emissions within the shipping industry,” says Riski.

Darryl Hylands, Programme Manager, HDV, Energy Technologies Institute (ETI) said, “This is one of ETI’s large scale demonstration projects aiming to accelerate low carbon technologies. Successfully demonstrating this technology at scale shows its capability to significantly reduce fuel costs and environmental impact of the shipping industry. On certain routes during the trial the vessel achieved fuel savings way beyond the average of 8,2 pct even with average wind conditions. There is a clear potential to achieve higher fuel savings, and hence CO₂ savings, on routes with more favourable wind conditions, which further improves the commercial viability of the technology.”

Norsepower’s Rotor Sail solution is the first data-verified and commercially operational auxiliary wind propulsion technology available for the global maritime industry. When wind conditions are favourable the main engines can be throttled back, saving fuel and reducing emissions, while maintaining speed and voyage time. Each Norsepower Rotor Sail is made using lightweight composite sandwich materials, which ensure the Rotor Sail remains well-balanced and offers a hi-tech, low maintenance solution.

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Notes for Editors

About Norsepower

Norsepower Oy Ltd is a Finnish clean technology and engineering company pioneering modern auxiliary wind propulsion for the global maritime industry. Norsepower’s Rotor Sail Solution is a proven, low-maintenance, easy to use, and reliable fuel saving technology, supporting the decarbonisation of the shipping industry.

Norsepower’s Rotor Sails are currently installed on three commercially operating vessels:

- M/V Estraden, a Bore vessel offering a Ro-Ro and General Cargo service between the UK and the Belgium

¹ IMO MEPC 62/INF.34 “Global Wind Specification along the Main Global Shipping Routes to be applied in the EEDI Calculation of Wind Propulsion Systems”

- Viking Grace, a Viking Line cruise-ferry travelling between Finland and Sweden
- Maersk Pelican, a Maersk Tankers 109,647-deadweight tonne (DWT) Long Range 2 (LR2) product tanker

For more information on the Norsepower Rotor Sail Solution, please visit www.norsepower.com.

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About Maersk Tankers

Maersk Tankers facilitates the trade of energy to meet the world's energy needs. The company is a leading player in the product tanker industry, operating one of the largest fleets of vessels and employs 3,000 employees worldwide. Established in 1928, Maersk Tankers has nine decades of experience and expertise in commercial and technical vessel management, providing customers and partners safe, efficient and flexible services that benefit their businesses. For more information on Maersk Tankers, please visit www.maersktankers.com

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About Shell Shipping & Maritime

Shell Shipping & Maritime is the Group's centre for maritime expertise, providing commercial, ship management and technology services, along with assurance advice to internal and external customers.

With an interest in around 2,000 vessels on the water on any given day, including managing one of the world's largest fleets of LNG carriers, Shell Shipping & Maritime plays a vital role in the safe and secure delivery of energy around the world. Its network of maritime professionals across the globe, enable safe operations that realise business value, minimise maritime risk, and maintain Shell's standards and reputation.

About Lloyd's Register's Ship Performance Group

LR's Ship Performance Group provide independent advisory services for all stakeholders involved in global shipping. The group brings together industry experts in energy efficient marine technology, data science, performance monitoring, modelling and commercial shipping operations to de-risk technology and design that addresses the challenges of decarbonisation and regulation. For more information on LR's Ship Performance Group, please visit www.lr.org/en-gb/ship-performance/

About the Energy Technologies Institute

The ETI is a public-private partnership between global energy and engineering companies – BP, Caterpillar, EDF, Rolls-Royce and Shell – and the UK Government.

The role of the ETI is to act as a conduit between academia, industry and the government to accelerate the development of low carbon technologies. We bring together engineering projects that develop affordable, secure and sustainable technologies to help the UK address its long-term emissions reductions targets as well as delivering nearer term benefits. We make targeted commercial investments in nine technology programmes across heat, power, transport and the infrastructure that links them.