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Wind Lifting System
a wise solution for sustainable shipping

Multifunctional Concept device to serve sustainable shipping

The wind: a frequently used energy

To generate electrical energy

HAWT

Gorlov VAWT

Troposkein VAWT

Savonius VAWT

The wind: a frequently used energy

As wind assistance or full wind propulsion

ESTRADEN

ANKIE

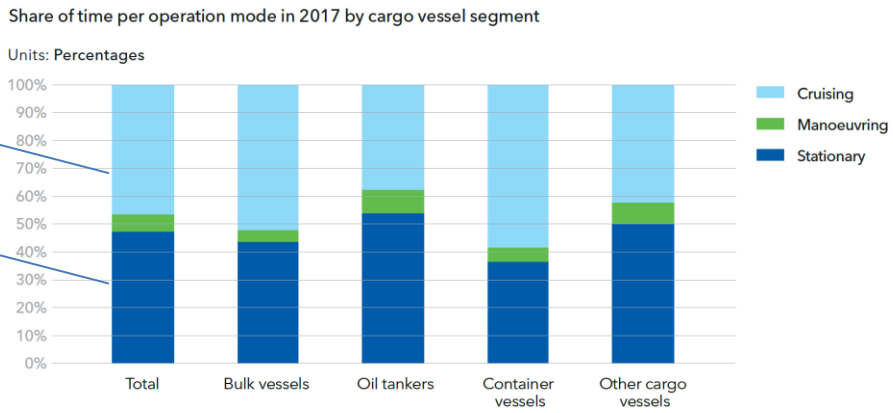
E-SHIP 1

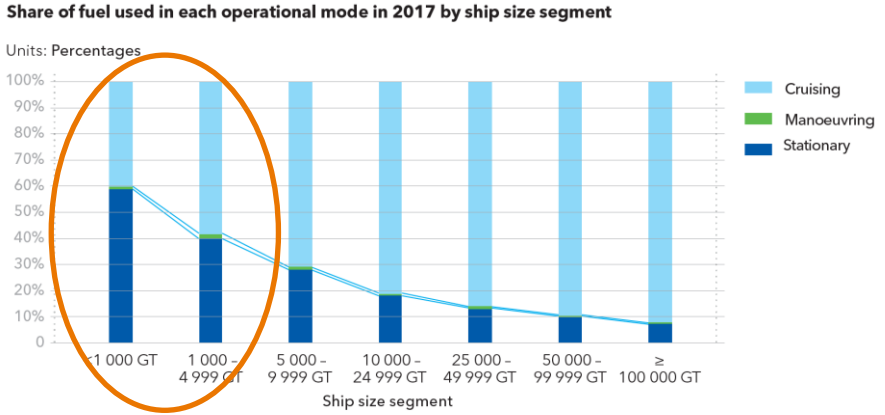
HENRY OLDENDORFF

Operational profile of ships

50% of time cruising

50% of time stationary





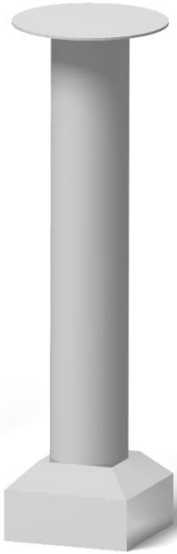
Source: *DNV-GL Maritime Forecast to 2050*
Energy transition outlook 2018

A multifunctional concept

Observation: many merchant and transport vessels are equipped with cranes

Goal: Maximize wind as energy resource

Energy production



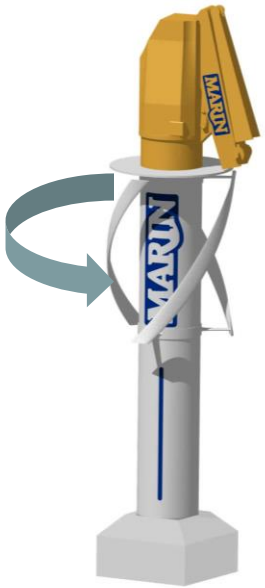
Wind propulsion

Crane operations

Goal: Maximize wind as energy resource

Goal: Maximize wind as energy resource

Ship stationary



Energy production

Ship cruising

Wind propulsion

Crane operations

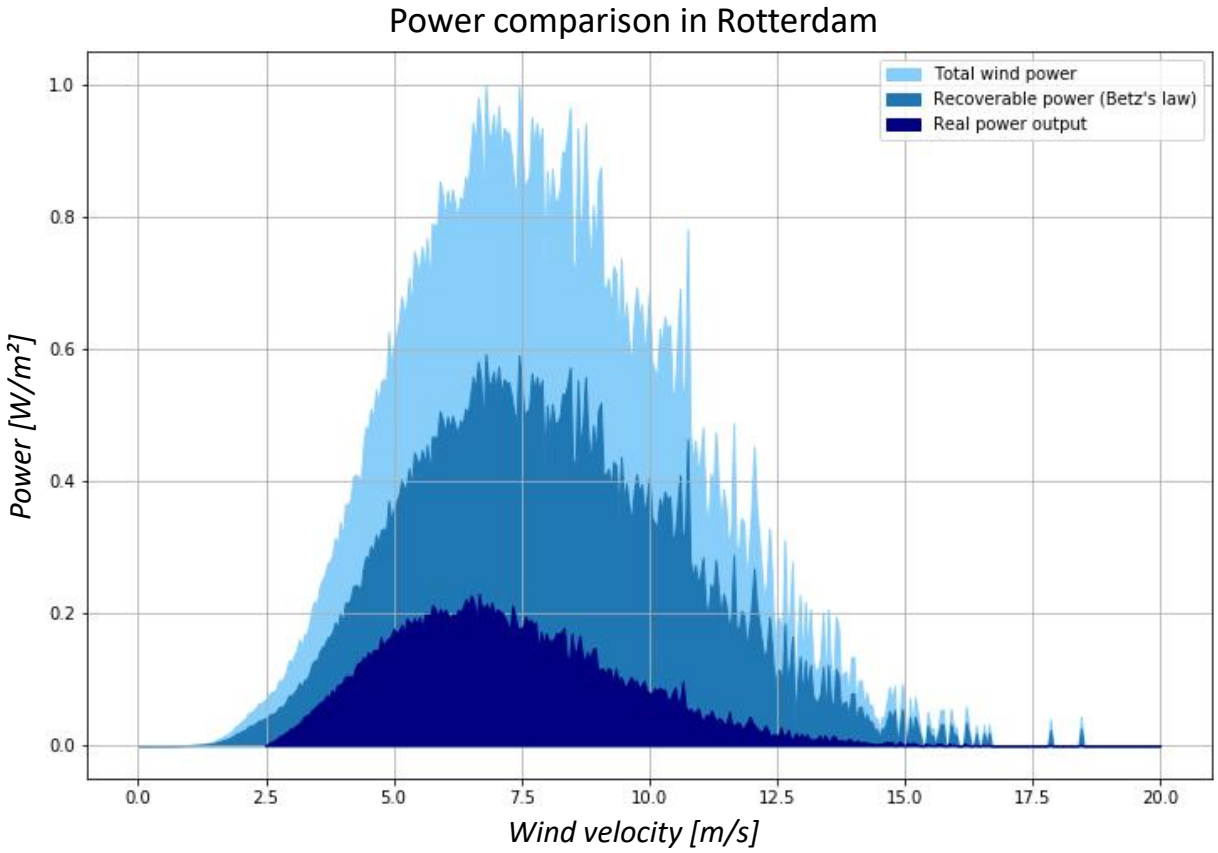
Goal: Maximize wind as energy resource

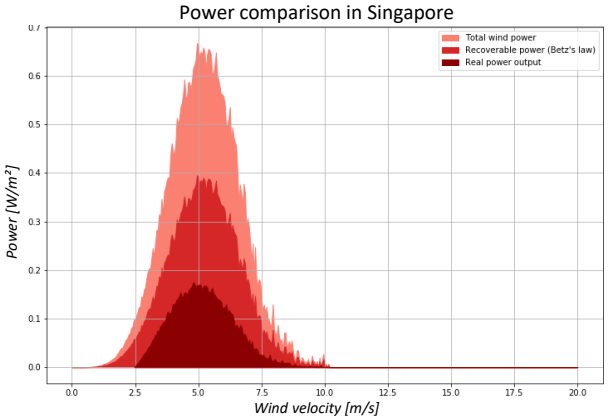
H-type VAWT

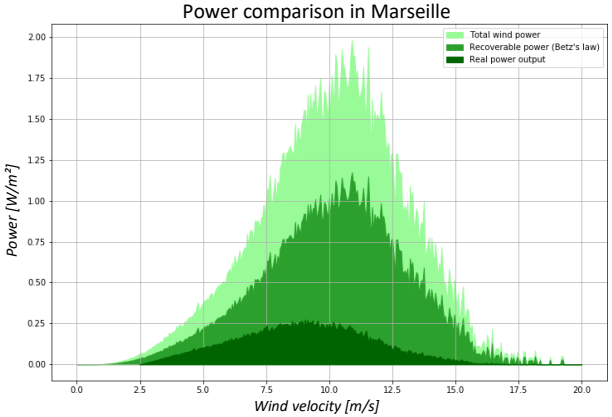
(possibly retractable)

Flettner rotor with foldable Savonius VAWT

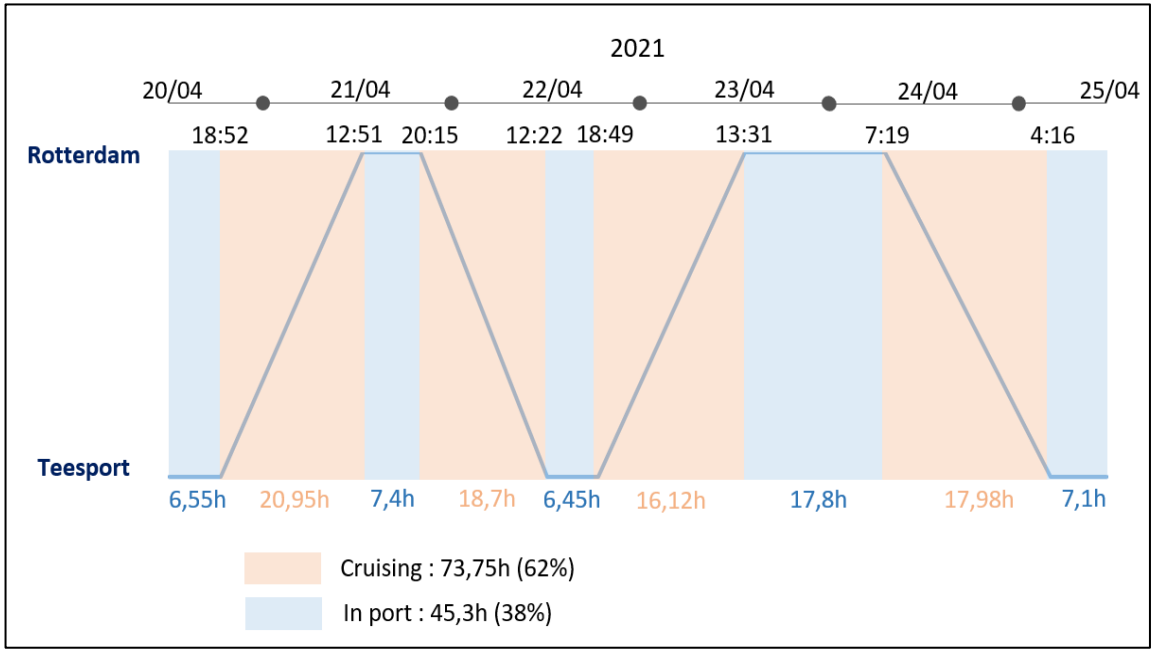
Wind study


Power comparison in Rotterdam
Total wind power
Recoverable power (Betz's law)
Real power output
Power [W/m²]
Wind velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
0.0
2.5
5.0
7.5
10.0
12.5
15.0
17.5
20.0


Power comparison in Singapore
Total wind power
Recoverable power (Betz's law)
Real power output
Power [W/m²]
Wind velocity [m/s]


Power comparison in Marseille
Total wind power
Recoverable power (Betz's law)
Real power output
Power [W/m²]
Wind velocity [m/s]

Case study: ESTRADEN



Operational profile from 20/04/21 to 25/04/2021

Case study: ESTRADEN

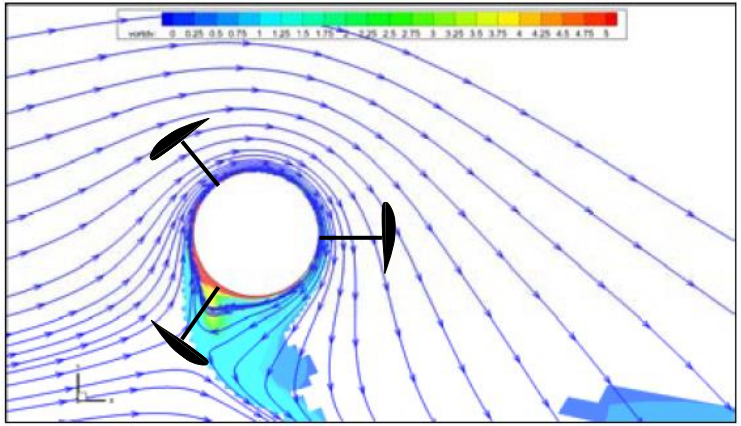
Energy output in one year of usage with two VAWTs

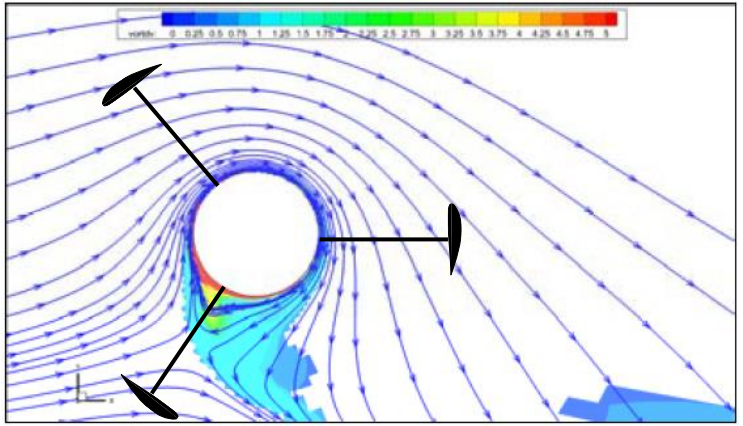
- Flettner: H = 18m ; ∅ = 3m
- VAWT: H = 8m ; ∅ = 6m

≈ 12.5 MWh from the VAWTs
Equivalent to 60m² of solar panels

Without taking into account the effects of the Flettner on the VAWT.

Undergoing research





Possible performance degradations:

- Impact of the blades on the rotor's thrust
- Impact of the rotor on the VAWT's efficiency

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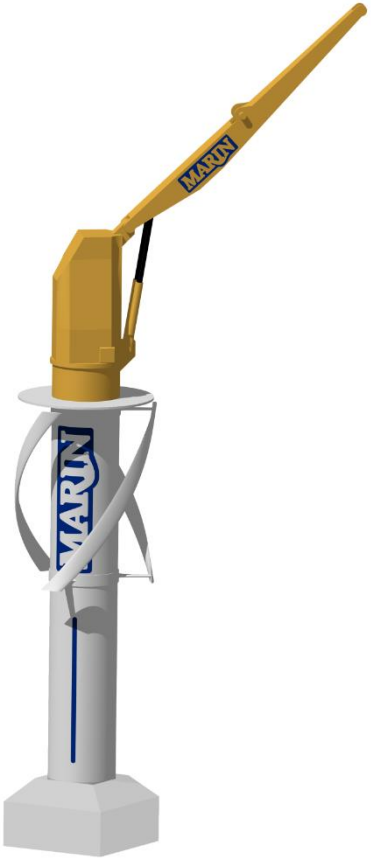
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