eConowind-unit

Wind Assisted Ship Propulsion

ECONOWIND

Autonomous 40 ft containerized unit with one foldable VentoFoil
Up to 200 kW feasible power reduction on propulsion per unit

Design Rationale eConowind-unit

The eConowind-unit is integrated in a 40 ft container from which one folding 'VentoFoils' can be deployed: a ridged 'wing profile' acting as sail. The VentoFoil is designed as optimal compact (non-rotating) wing profile, creating superior thrust by means of the principle of 'boundary-layer-suction', for which ventilators are mounted in the VentoFoil.

Due to the generated thrust by the eConowind-unit, the thrust of the propeller can be reduced to maintain the same speed, see figure 2. This leads to fuel savings and emission reductions, depending on vessel type and number of eConowind-units, what brings you closer to IMO's goals on reduction of carbon emissions.

Fig.1: Equal sail-area for identical VentiFoil thrust of one (1) unit

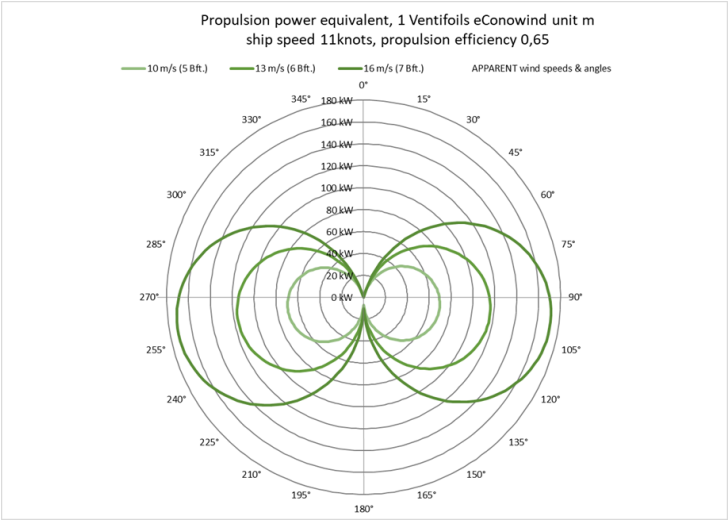

Fig.2: Propulsion power reduction of one (1) unit at v_s = 11 kn

Installation

The eConowind-unit can be very easily retrofitted on existing vessels, especially if container fittings are available on deck or hatchcovers, or otherwise on a dedicated foundation. The eConowind unit can be mounted with regular twistlocks, enabling 'plug & play' installation and/or removing from the hatchcovers for cargo loading and unloading.

For new vessels Conoship can integrate eConowind-units (or individual VentoFoils) in the design on dedicated positions.

Autonomous operation

From a remote panel the eConowind-unit can be closed or initiated for operation from the bridge. The eConowind-unit senses the wind speed and -direction and on captains demand autonomously deploys the VentoFoil, adjusting the ventilator power and optimizing the angle of each VentoFoil relative to the apparent wind.

In heavy and/or unfavourable wind conditions the VentoFoil is lowered down, minimising crew efforts and ensuring safe operations.

Main particulars

Dimensions		
Deployed	12.20 × 2.44 × 13.30	m
Closed	12.20 × 2.44 × 02.60	m
VentoFoil	2.80-× 1.30 × 10.50	m
Weight (complete)	9,000	kg
Centre of Gravity above container fitting		
Deployed	2.60	m
Closed	1.55	m
Material		
Container	Steel	
VentoFoil	Aluminium	

Electrical particulars

Power demand		
Main power supply	Ca. 20.0	kW
Ventilators	Max 14kW, in 4x 3,5	kW
Voltage	3 phase, 400-460 V @ 50-60 Hz	
Control unit	PLC	
Frequency controller	15kW	

Operational conditions

Max. average apparent wind speed	17	m/s
Max. windspeed incl gusts	22	
Thrust (max. continuous)	25	kN
Typical forces per container fitting (vessel specific)		
Pull (up) / Push (down)	80 / 140	kN
Shear (forward) / Shear (sideways)	40 / 40	kN