

An aerial photograph of the ship Lady Christina, a red-hulled vessel with a white superstructure, sailing on a grey sea. Two large, grey, vertical suction wings are mounted on the deck. The ship's name 'LADY CHRISTINA' is visible on the bow. The text 'ECONOWIND' and 'TECHNOLOGY POWERED BY WIND' are visible on the suction wing structure.

**Suction wings  
state of technology and potentials**

The Econowind logo consists of a red horizontal bar above a blue horizontal bar.

**ECONOWIND**

**FRANK NIEUWENHUIS**

## Concept:

- Suction wing
- Foldable
- Fixed, flatrack or Containerized

**van Dam Shipping**

**MV Ankie**

**Retrofit 10 now 13m**



  
**ECONOWIND**





  
**ECONOWIND**





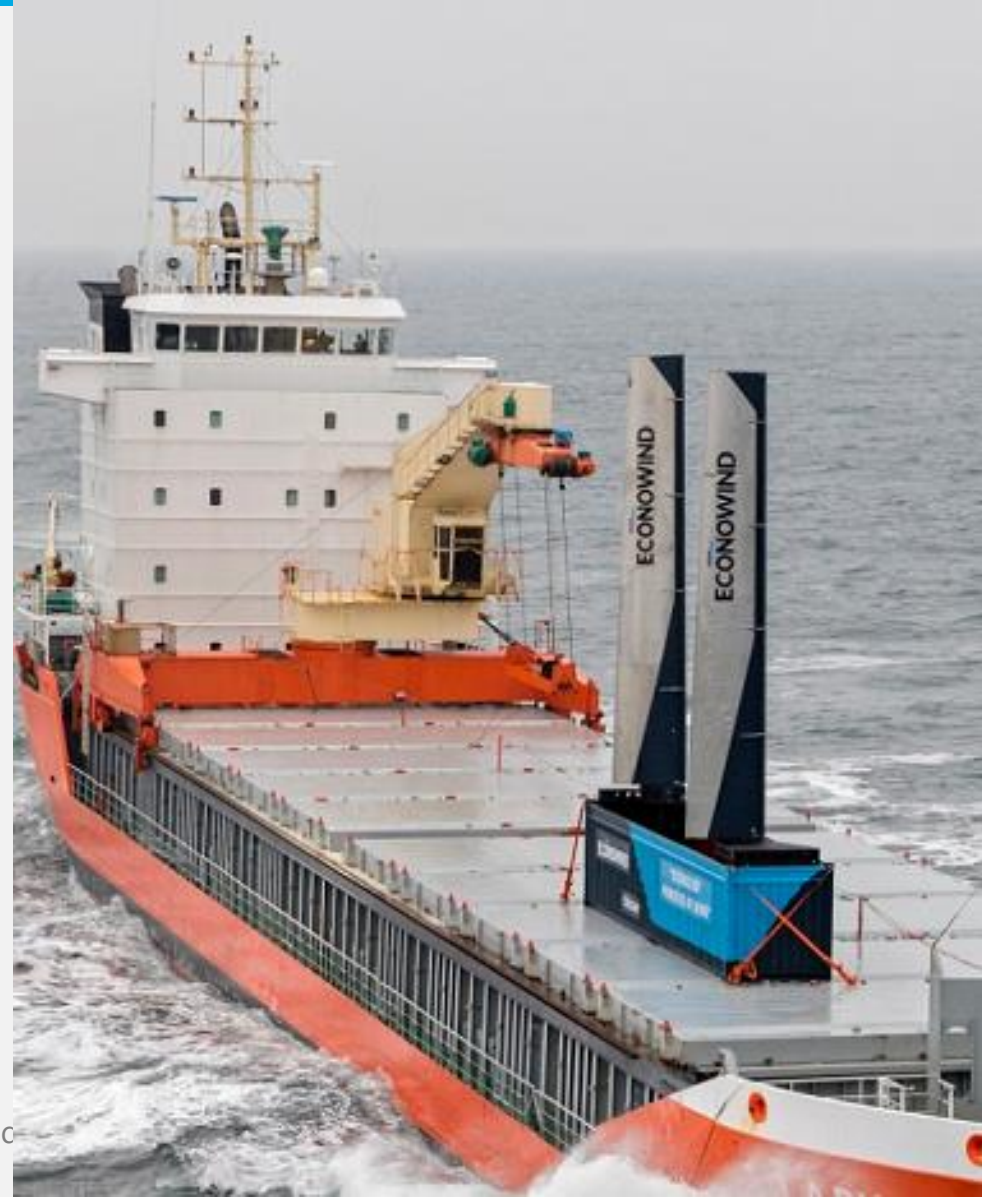
**Boomsma shipping**

**Flatrack**

**Movable by hatchcrane**



***Several, now Marfret***  
***Containerized:***



## Tharsis ship management

### MV Tharsis



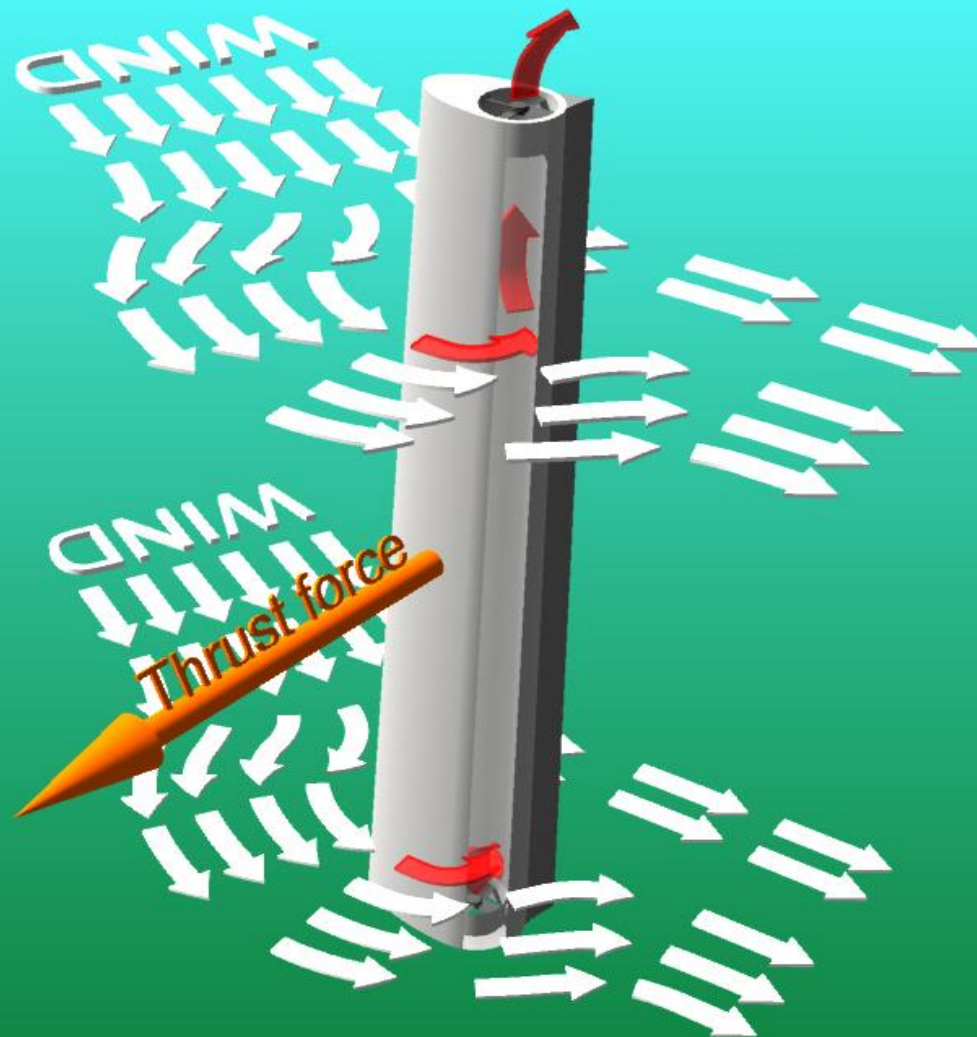
## Concept:

- Multi-Element wing
- Foldable
- Flatrack





## "Suction wing" ?





## Wing with Suction:

- High force controlled by suction
- Sailing High to the wind
- Slender shape optimal visibility

## Testing for Real:

### Size matters

up to:  
V: +0,8%  
FC: -0,7%

Up to:  
V: +3%  
FC: -4%

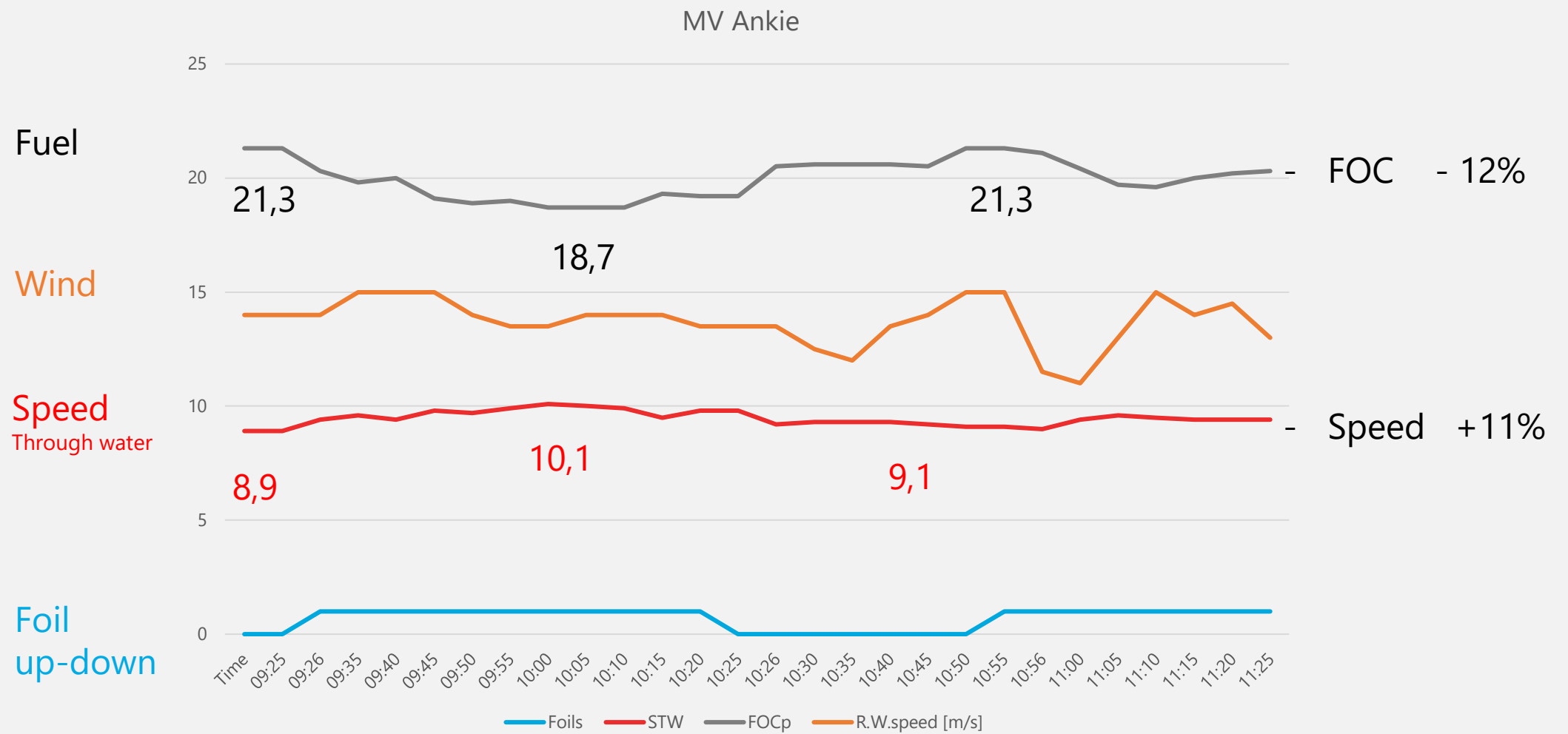
Up to:  
V: +1,2%  
FC: -0,8%





## **Conclusion:**

**We need to evaluate extra  
speed and fuel consumption**



## Measurements over 2 years period

**Interreg**  
North Sea Region  
WASP

European Regional Development Fund



EUROPEAN UNION

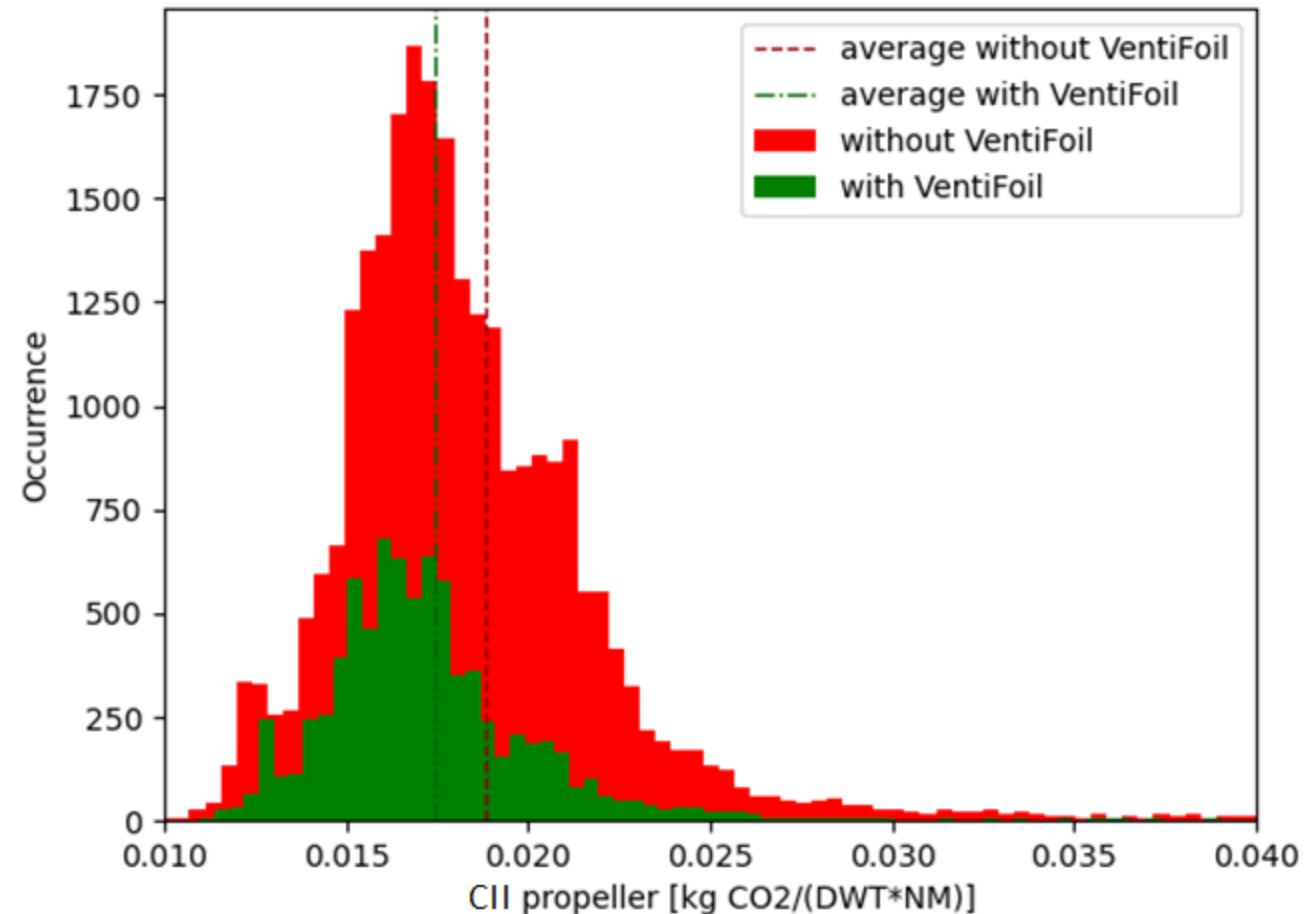


# CII saving propeller

Averaging on MV Ankie when "up":

- Propeller power reduction
  - 6% over the year
  - 7,3% few months
  - 10,3% on long-haul trip
  - 22% maximal

Reduction

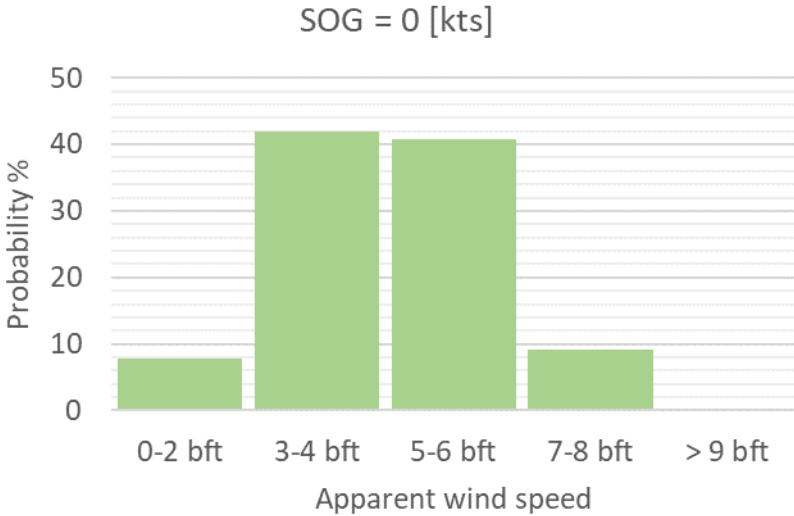
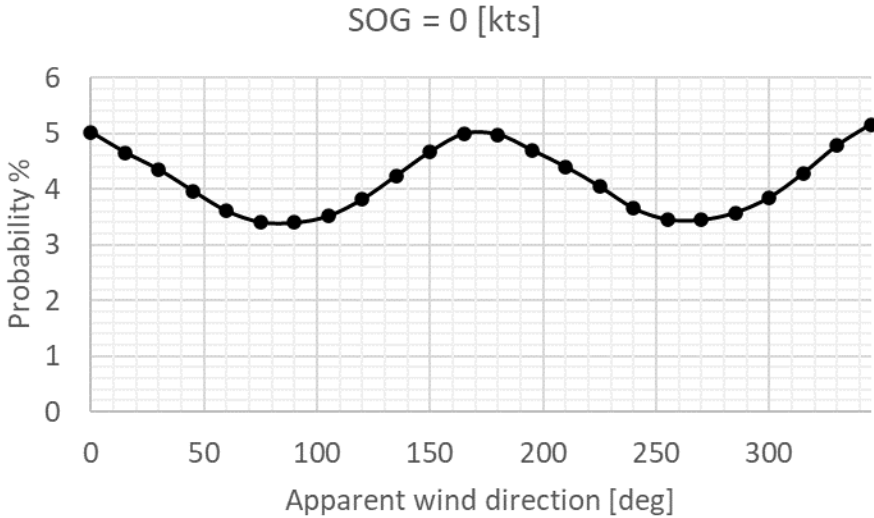
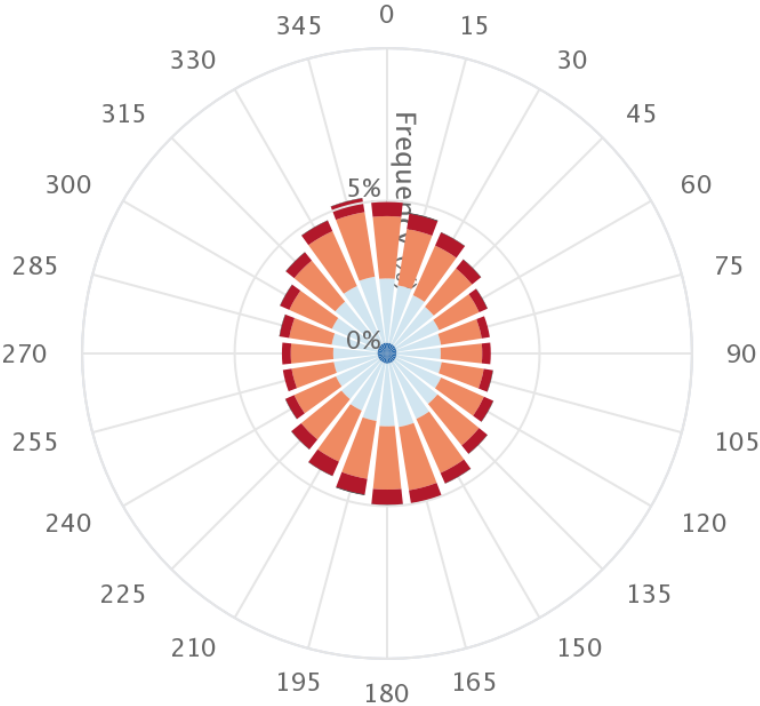


# SOG = 0 [kts]

Variation due to  
tradewinds

## Apparent Wind @ 0 kts ship speed

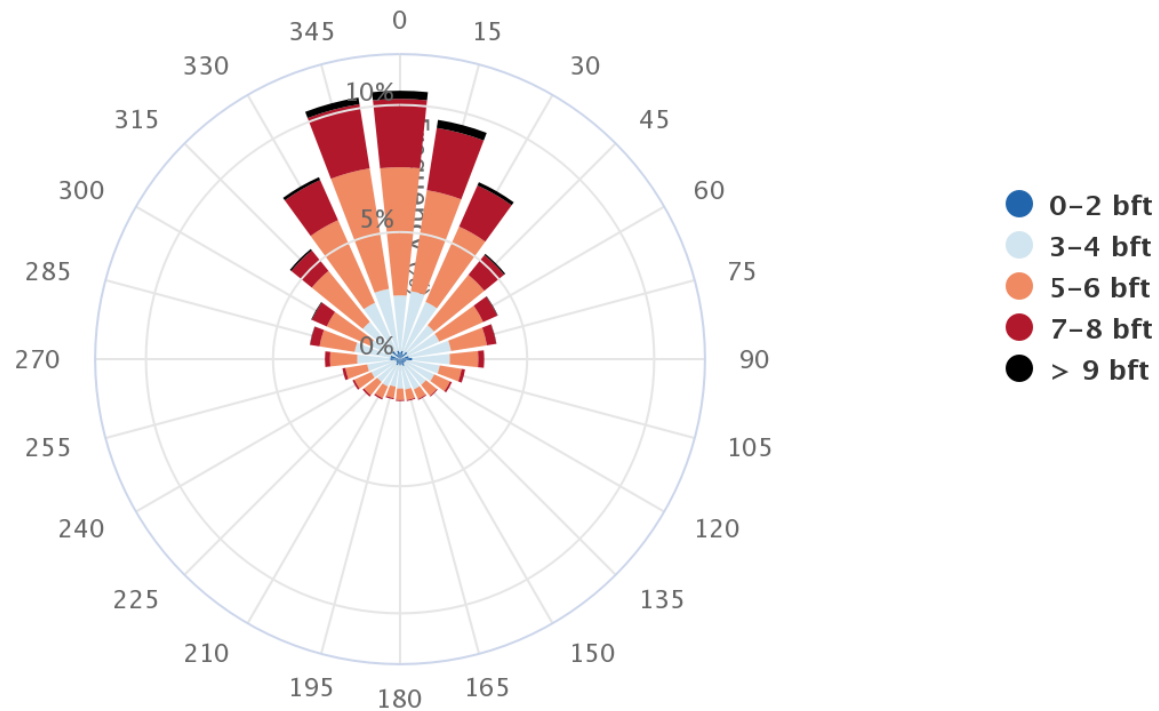
Source: ERA-5 (1989-2019)



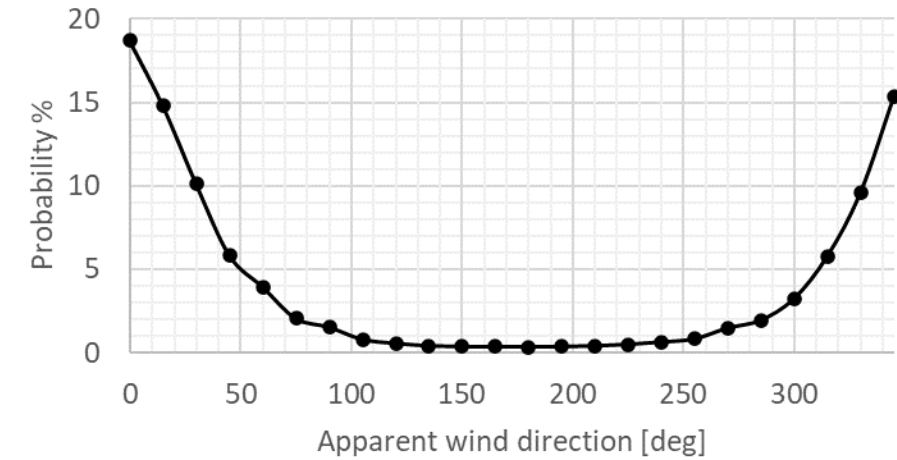
# SOG = 10 [kts]

## Apparent Wind @ 10 kts ship speed

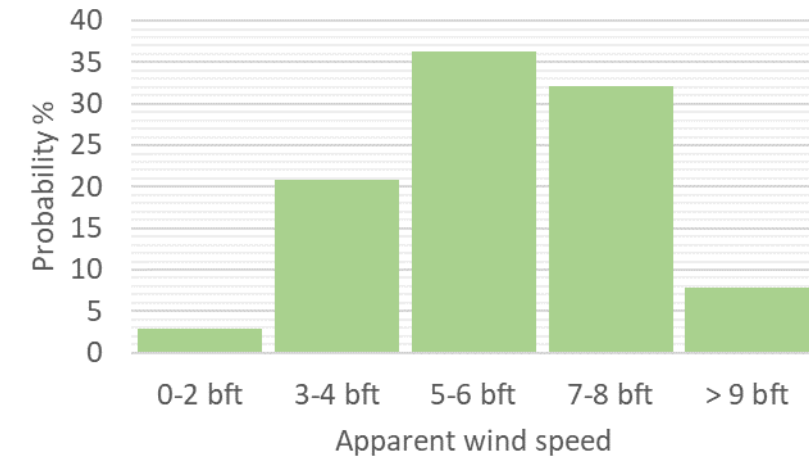
Source: ERA-5 (1989–2019)



SOG = 10 [kts]



SOG = 10 [kts]

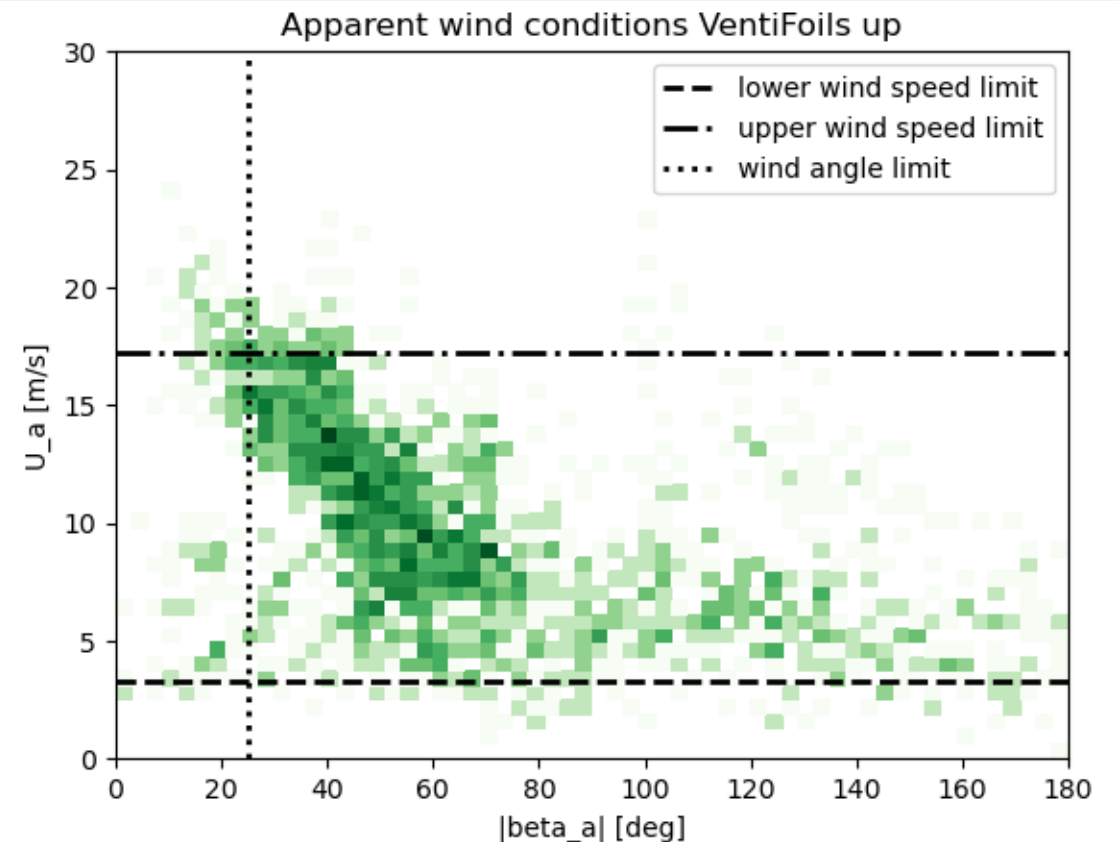
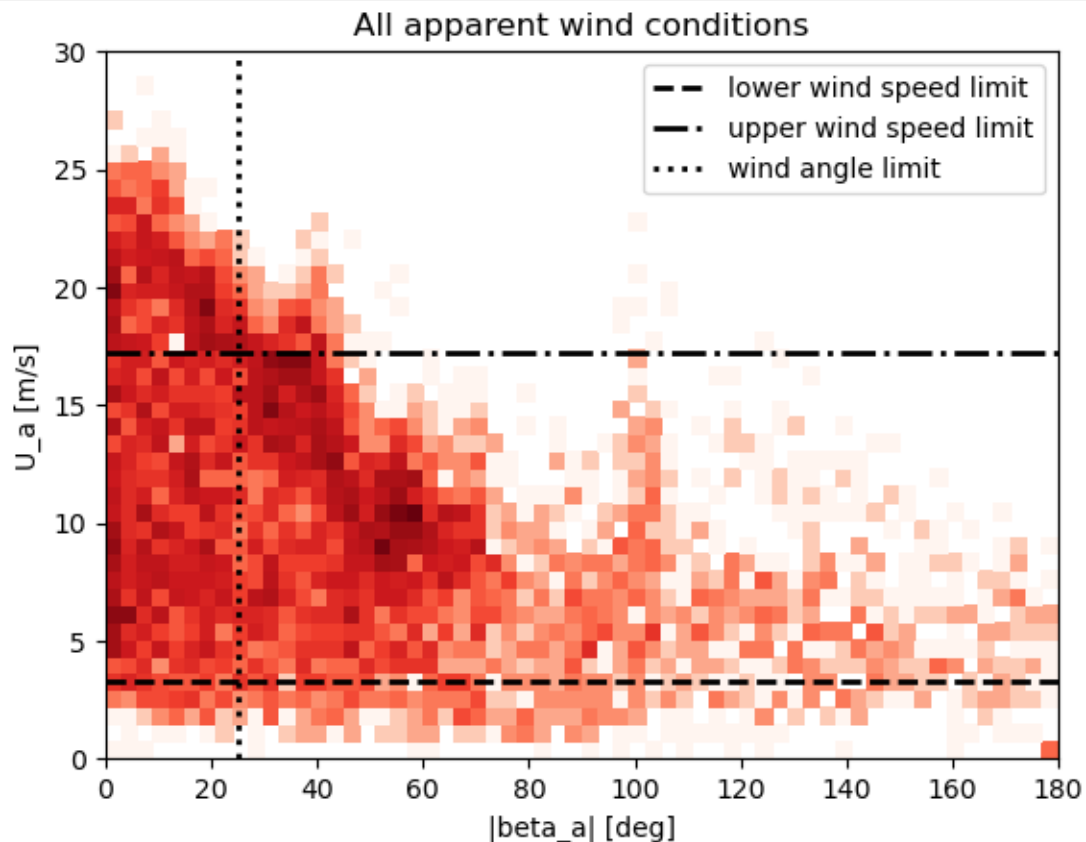




- Data after 1-11-2020
- VentiFoil use to be optimized

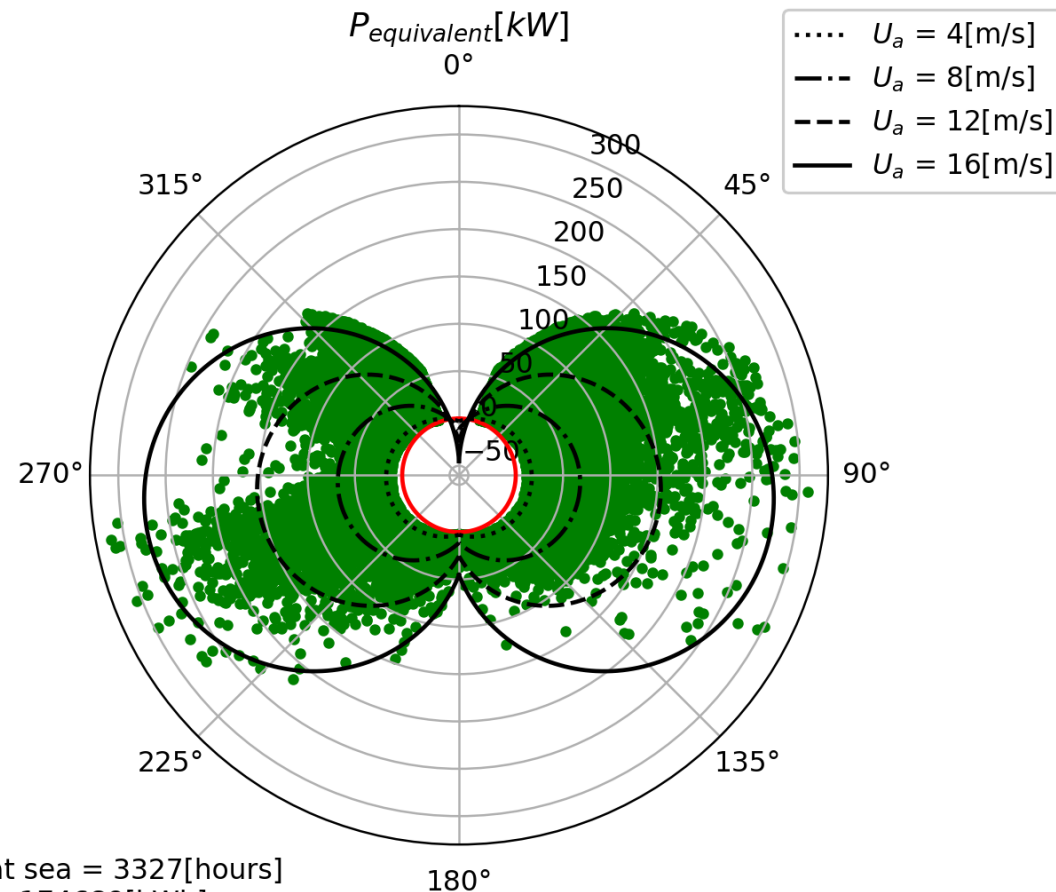
## “up” limitations:

- Wind angle / force
- routing (f.e. Kiele-canal)
- Captain's “wind-sense”
- service



# Equivalent power polar

- Power reduced by VentiFoil



time usable at sea = 3327[hours]  
saving total = 174689[kWh]  
P equivalent average when usable at sea = 53[kW]

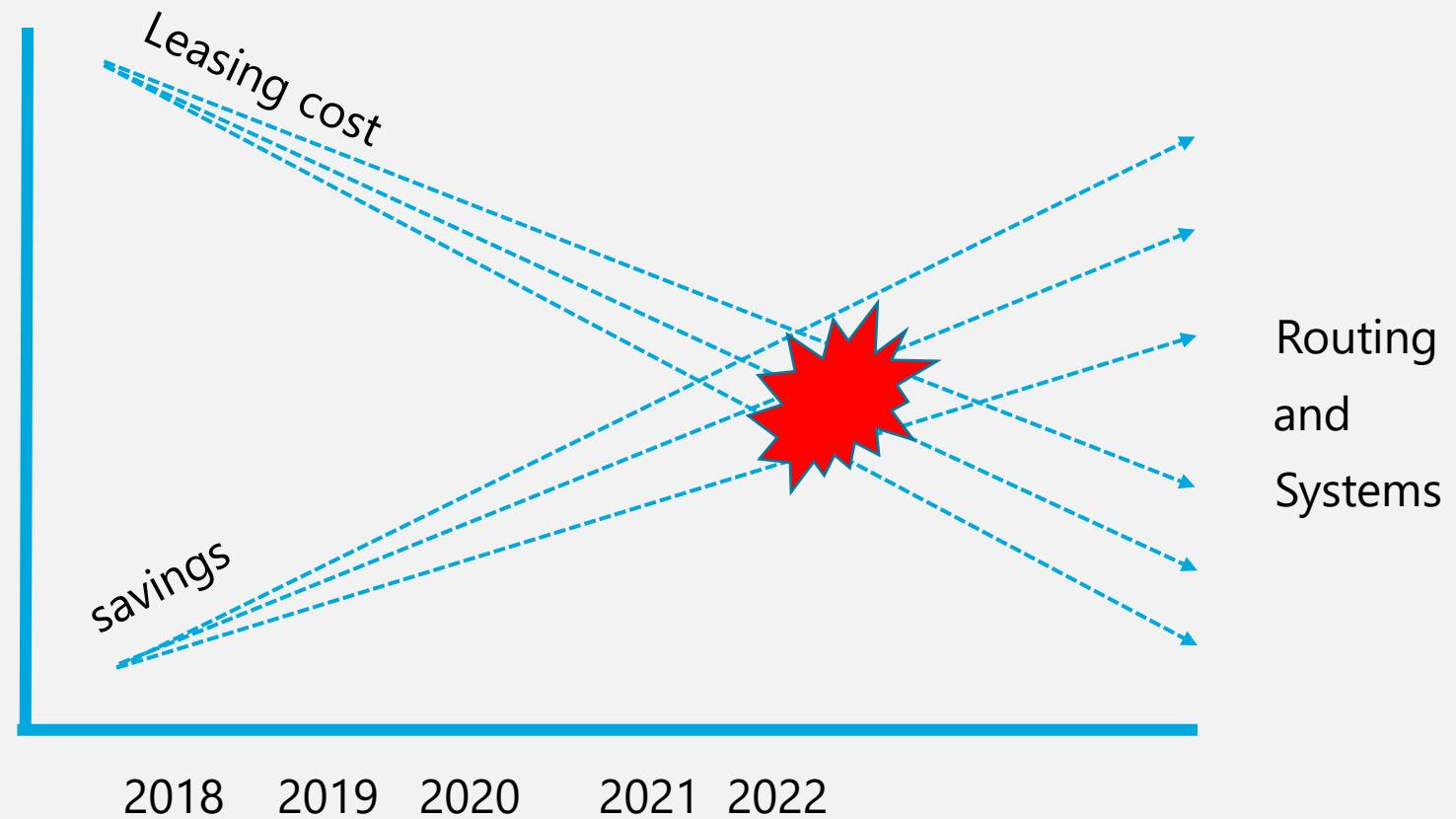


**270 kW maximal**

**53 kW average**

- **Use more often:** data feedback
- **Enlarge system:** 10, 13, 16, 20, 30m
- **Automate better** (AI, sensors etc)





**Lower € / kW saved:**

## **Helped by:**

**Higher fuel price**

**Regulations**

**“clean shipping marketing”**

**Poseidon principles financing**



**Lower € / kW saved:**

**Scale-up industry**

- **Increase numbers**
- **Enlarge system: 10, 13, 16, 20, 30m**
- **Subsidy as extra, not as condition**

## **Lower € / kW saved:**

### **Optimize products**

- **Productline**
- **More or less automation**
- **Different versions**
- **Less service** ("moving parts")

## Lower € / kW saved:

### Optimize products

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Working-on-it ...

... combining the experience from:



**Lower € / kW saved:**

**Scale-up project “2022”:**

- Pricing set on 10 units production
  - Production methods for >10 units
  - Leasing support
  - Subsidy during project-time
- (Horizon, AI project, ....)

**Lower € / kW saved:**

**Scale-up project “2022”:**

- 1 being delivered**
- 3 ships ordered already**

**Lower € / kW saved:**

**Scale-up project “2024”:  
100 – 200 units....**

**The answer my friends ..... ,**

**..... is blowing in the wind!**



**Thanks for listening!**

**Questions?**