



WIND PROPULSION FOR CLEANER SHIPPING

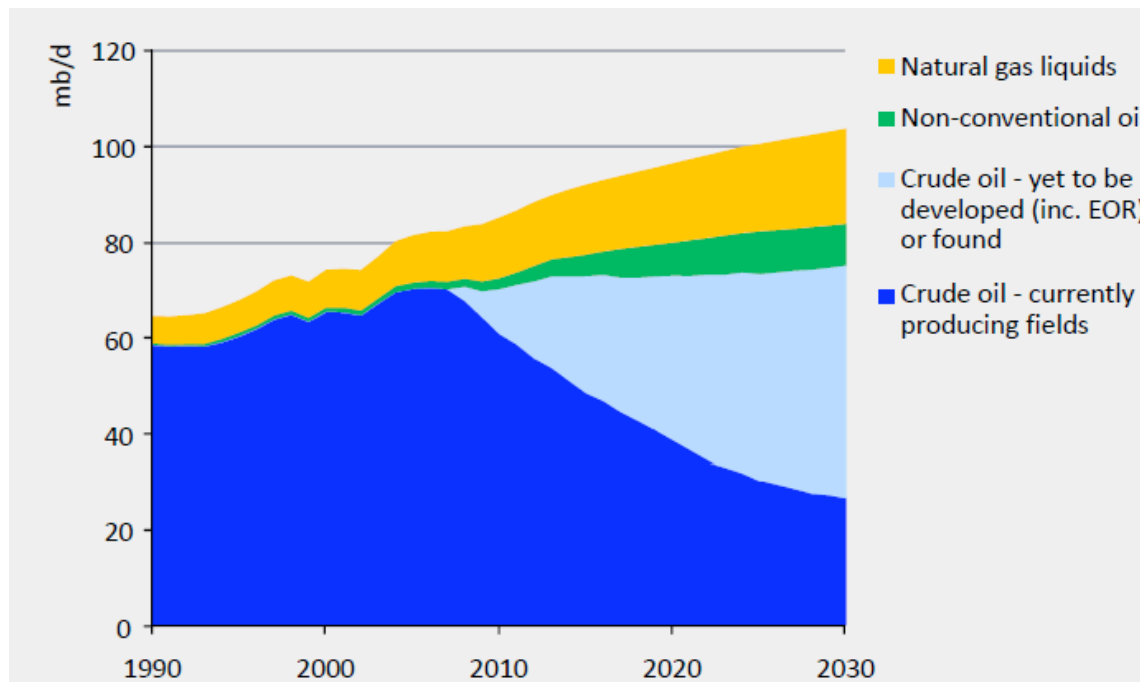
EMISSIONS

- Urgent need to reduce CO2 emissions is affecting every industry
- Shipping accounts for 4-5% of global emissions
- Shipping already faces emission rules:
Heavy fuel oil ban until 2020
- More emission rules are likely to be applied for shipping in Copenhagen already
- The industry starts to act!
- Example:
Stena E-Max concept



PEAK OIL

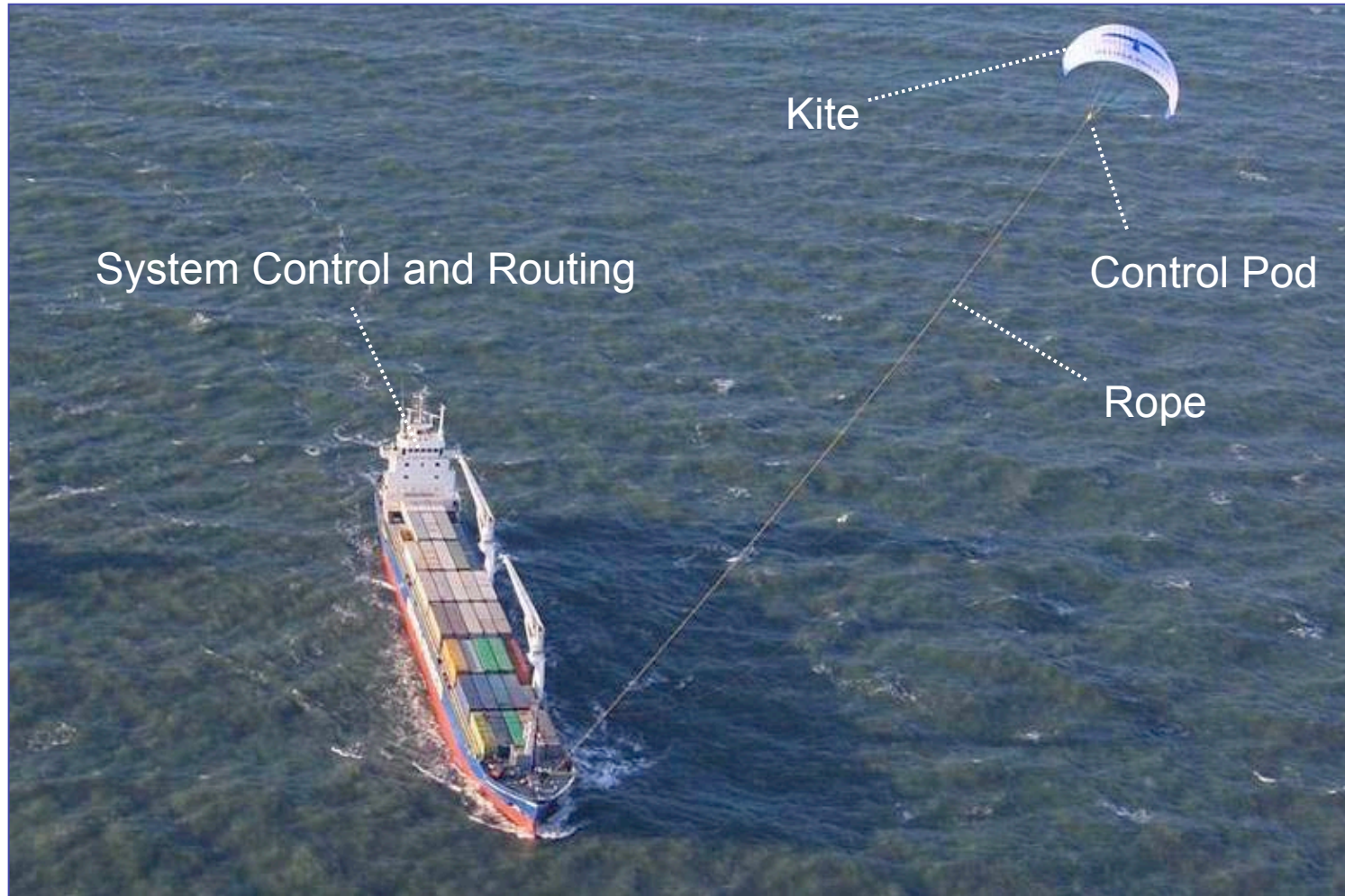
- Production rate of conventional oil drops 5 – 10% per year
- Just to offset production decline we need to find and get into production one **NEW** Saudi Arabia **EVERY THREE YEARS**
- Despite the economic crisis: demand of oil will grow 1 – 3% per year from 2010 on
- Result: Again drastically raising oil prices from 2011 on



TECHNOLOGY



TURN WIND INTO PROFIT



Kite

Control Pod

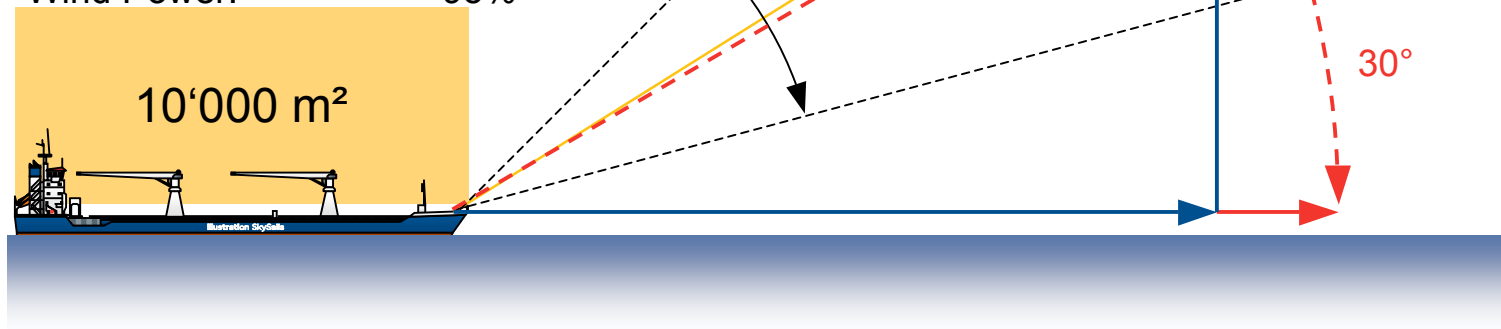
Rope

System Control and Routing

SkySails Flight Pattern Geometry

Rope Length: 300 m
Flight Path Length: 500 m
Flight Path Width: 20 m
Covered Area: 10'000 m²

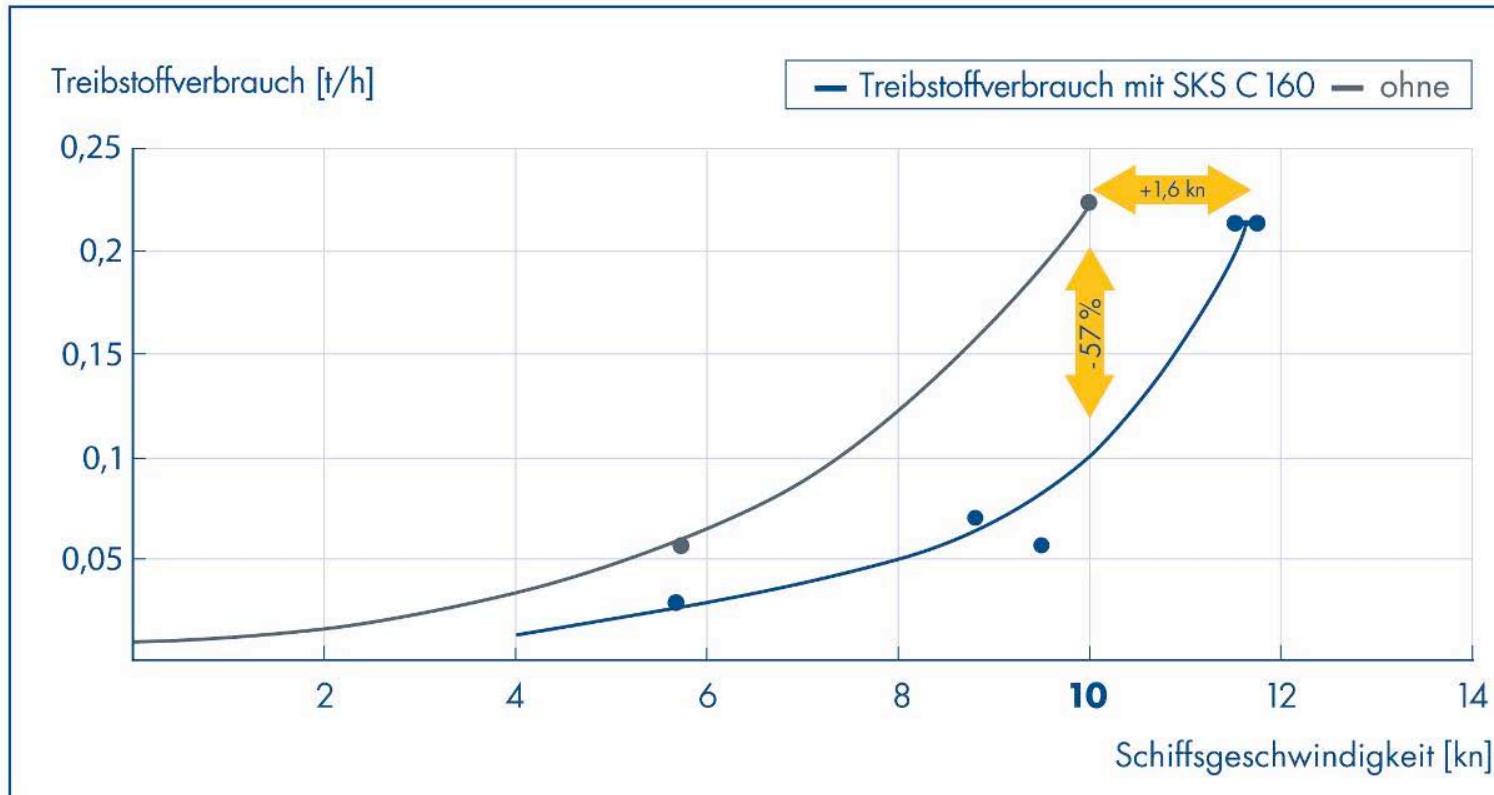
Flight Level: 150 m
Wind Speed: +25%
Wind Power: +95%



SAVINGS



TURN WIND INTO PROFIT



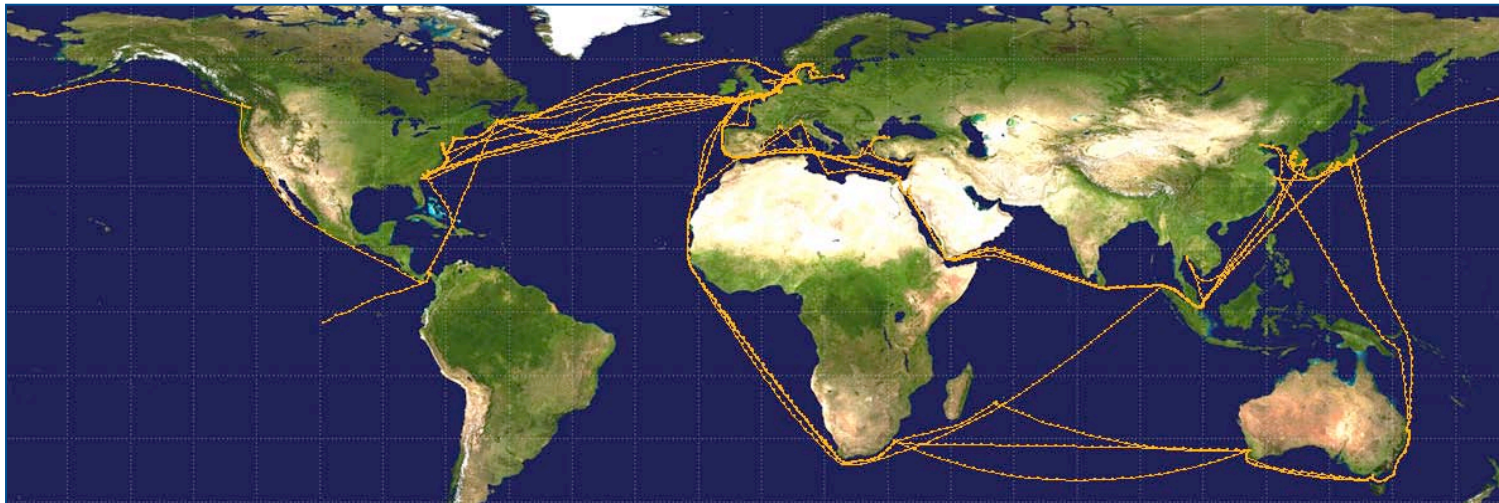
TREIBSTOFFVERBRAUCH MS "MICHAEL A." (MGO)

Beispiel: Betriebsergebnisse bei 6 Bft

Savings of 10-35% per year dependig on route and vessel

WHAT PORTS CAN DO


- Get smart!
 - Shipping and port operation will get more complex as energy sources diversify
 - Introduce a „dynamic berth reservation system“ (like airports) to allow weather adjusted operating profile
- Reward green ships



“Everything is always impossible
before it works.”

(Hunt Greene)

Thanks for your attention!



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