

The 31st International Bunker Conference

30 April, 2010

Per Croner
President, Wallenius Marine

Company History

- 1934** Founded by Olof Wallenius
- 1955** First purpose-built vehicle carrier
- 1963** First purpose-built Ro-Ro vessel
- 1970s** Focusing on Ocean Automotive and Ro-Ro transports
- 1980s** ARC, 10 vessels
- 1991** UECC, short-sea shipping, 30 vessels
- 1999** Wallenius Wilhelmsen Logistics, 60 vessels
- 2002** EUKOR Car Carriers, 80 vessels
- 2003** Wallenius Marine established: newbuildings, R&D and ship management of 35 vessels in Stockholm and Singapore



WALLENIUS...

...is, together with our shipping partners, one of the largest Car Carrier and RoRo- operators worldwide.

Through our commercial subsidiaries, *Wallenius Wilhelmsen Logistics, EUKOR, UECC and ARC*, we operate some 140 vessels,

Wallenius Marine provides Ship management, Technical Services, Newbuilding , Conversion and Environmental expertise for the Wallenius owned vessels and subsidiaries.



Our experience of operating on LS Fuel

- Our policy is to use as clean fuel as possible with less need of treatment.
- In 1998 a goal was set; reduce sulphurcontent in fuel to 1.5% by 2003
- Could MDO be an option to reach our goal? A MDO project was launched in 1998
- MDO with <math><0.5\text{ S}</math> is used for all auxilliary engines since 2000
- LS Fuel was introduced in normal operation since 2003

MDO Test on TURANDOT

- 1998-2001
- MDO < 1%S, DMB
- Aim: To thoroughly evaluate if running on Marine Diesel Oil is a sustainable option to reach our target of 1.5% S?



MDO Test, Conclusions

- More than 75% reduction of SO₂ emissions
- Reduction of spareparts, maintenance, work in engine room, etc
- Break even at a price gap of 40 USD/mt
- However; Price gap too large.
- MDO operation not sustainable solution to reach sulphur target of 1.5%!

LS Fuel operation, Conclusions

- No technical problems with low sulphur fuel operation!
- OK to bunker HFO with different sulphur level from time to time.
- There has been large variations in price.

ECA Challenges 2015

- Speed NCR or economy speed?
- Availability of MDO/MGO >0,1% in US?
- Safety

Modifications required for MGO operations

- Additional DO-bunker tank will be needed.
 - Increased capacity of MDO/MGO 500 → 1300 tons by 2015.
- All Vessels must be able to handle four types of fuel:
 - MDO/MGO <0,1%
 - MDO/MGO >0,1%
 - LSFO
 - HSFO
- Preparing for coolers/chillers
- On NB:s two DO service tanks

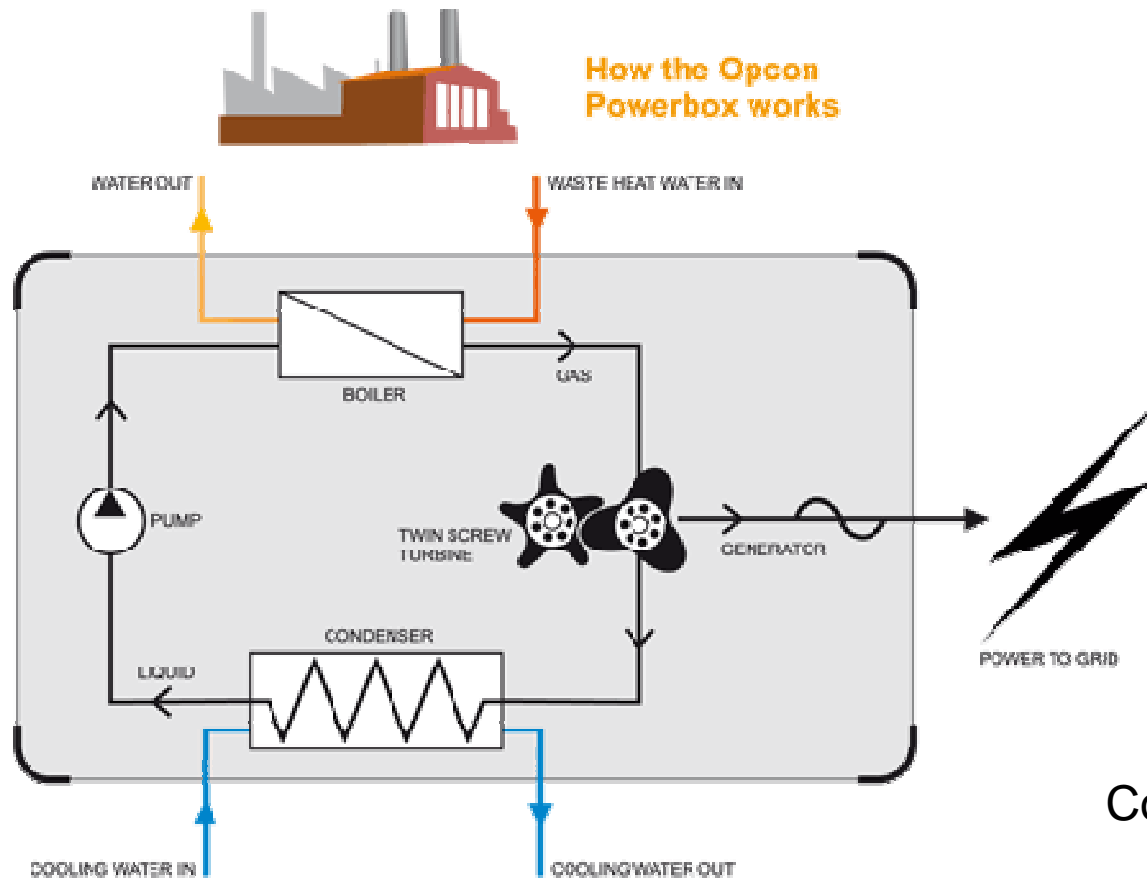
Fuel handling Onboard

Safety

- Increased risk for human errors?
 - Mixing qualities?
- Fuel oil quality problems?
 - Flashpoint of blended products
 - Too low Viscosity?
 - Maneuverability of ME

The use of fuel and consequential emissions has to be reduced in the future!

Near future, increased use of waste heat recovery

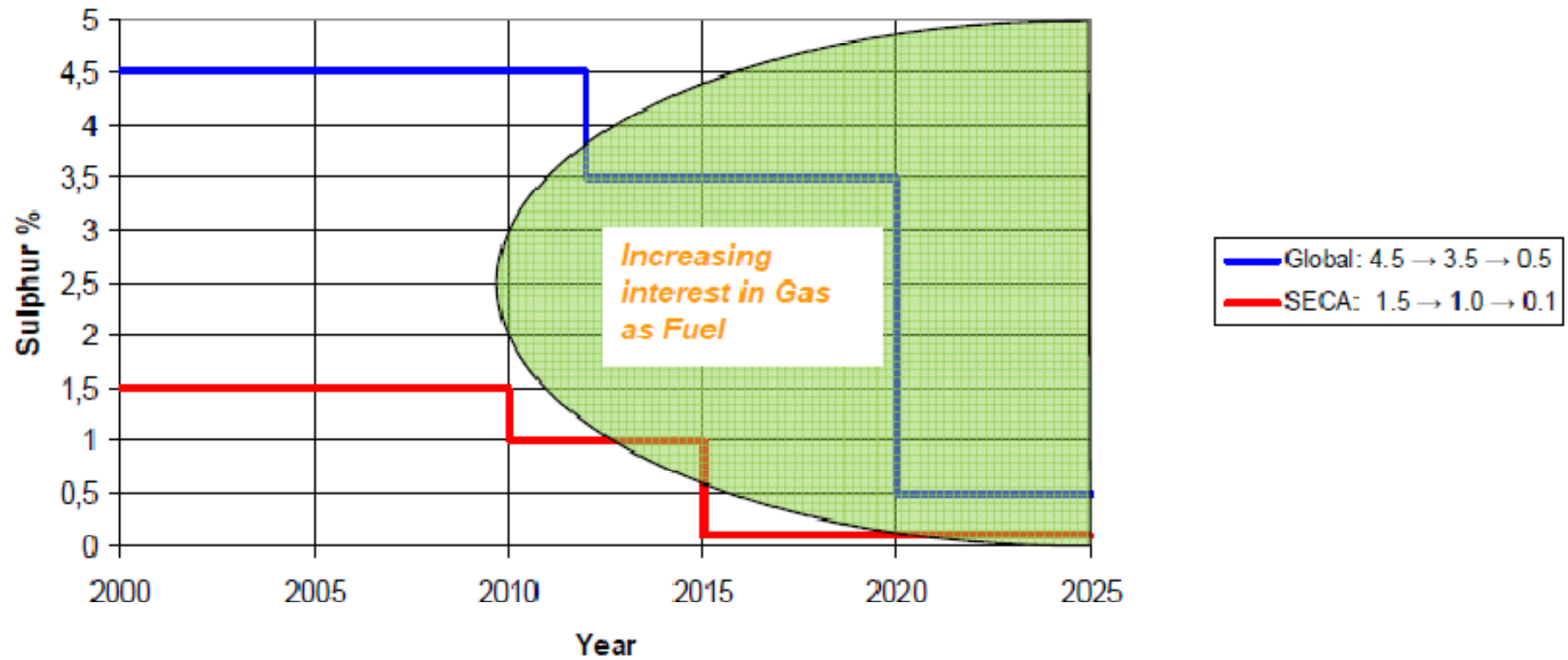


Courtesy of OPCON AB

LNG, Bio gas; The future energy for shipping?!

- + LNG is a technically mature option
 - + Practically no Sulphur
 - + 80-90 % NO_x reduction
 - + No PMs
 - + Slightly reduced CO₂ (even with methane slip taken into account)
 - + LNG forms a bridge to Bio gas which neutralise the CO₂ emissions
-
- Energycontent only 50% of fuel per volume
 - Challenging tank arrangement
 - Infrastructure not yet developed...but coming...
 - Safety (fire, structural if tank leakage -163 deg C)

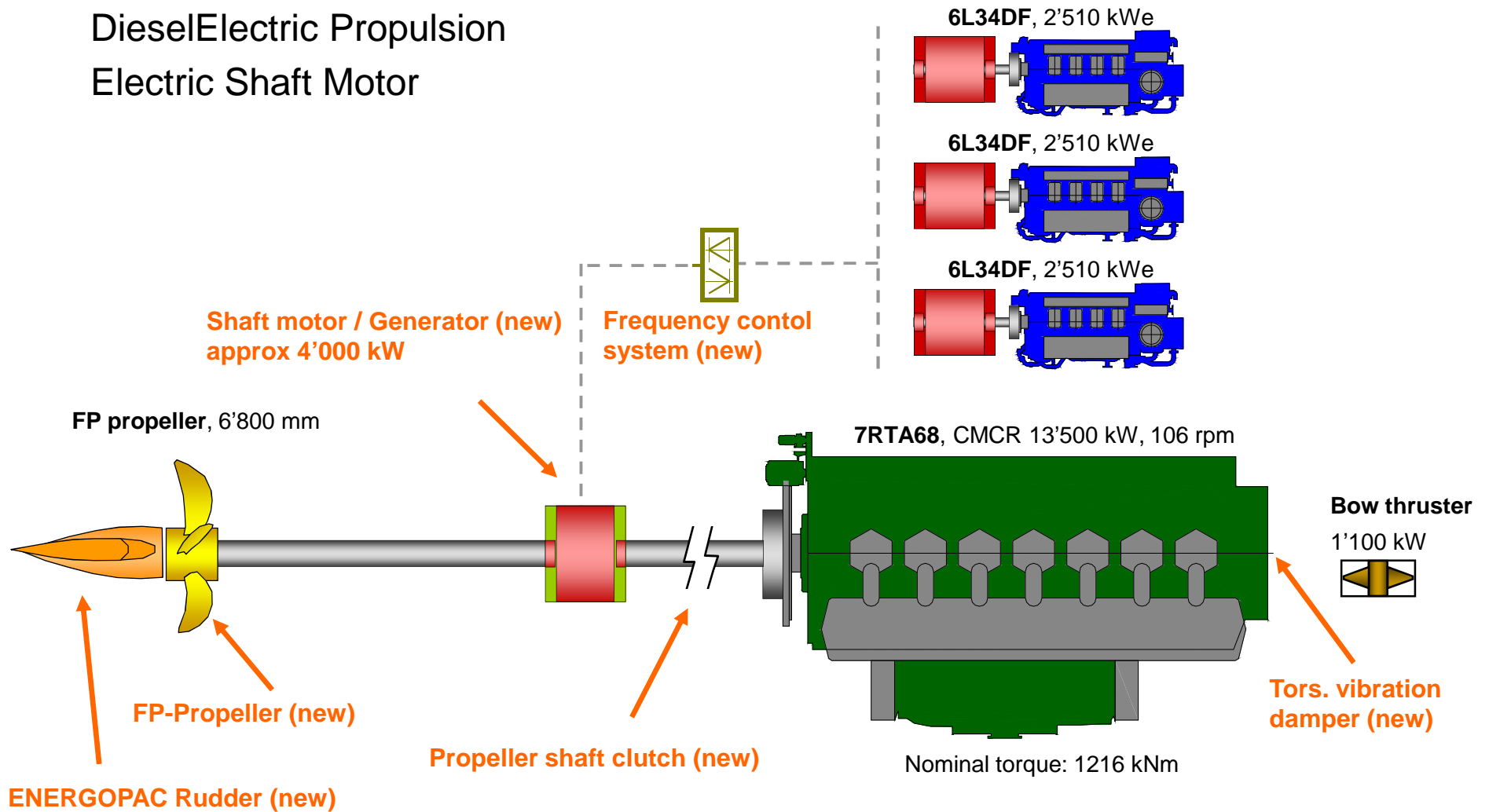
LNG replacing Fuel Oil?



LNG/BioGas Fuelled Dieselgenerators
for low emissions in ECAs ?

HYBRID Technology, utilizing LNG

DieselElectric Propulsion
Electric Shaft Motor



Renewable Energy, Bio Fuel

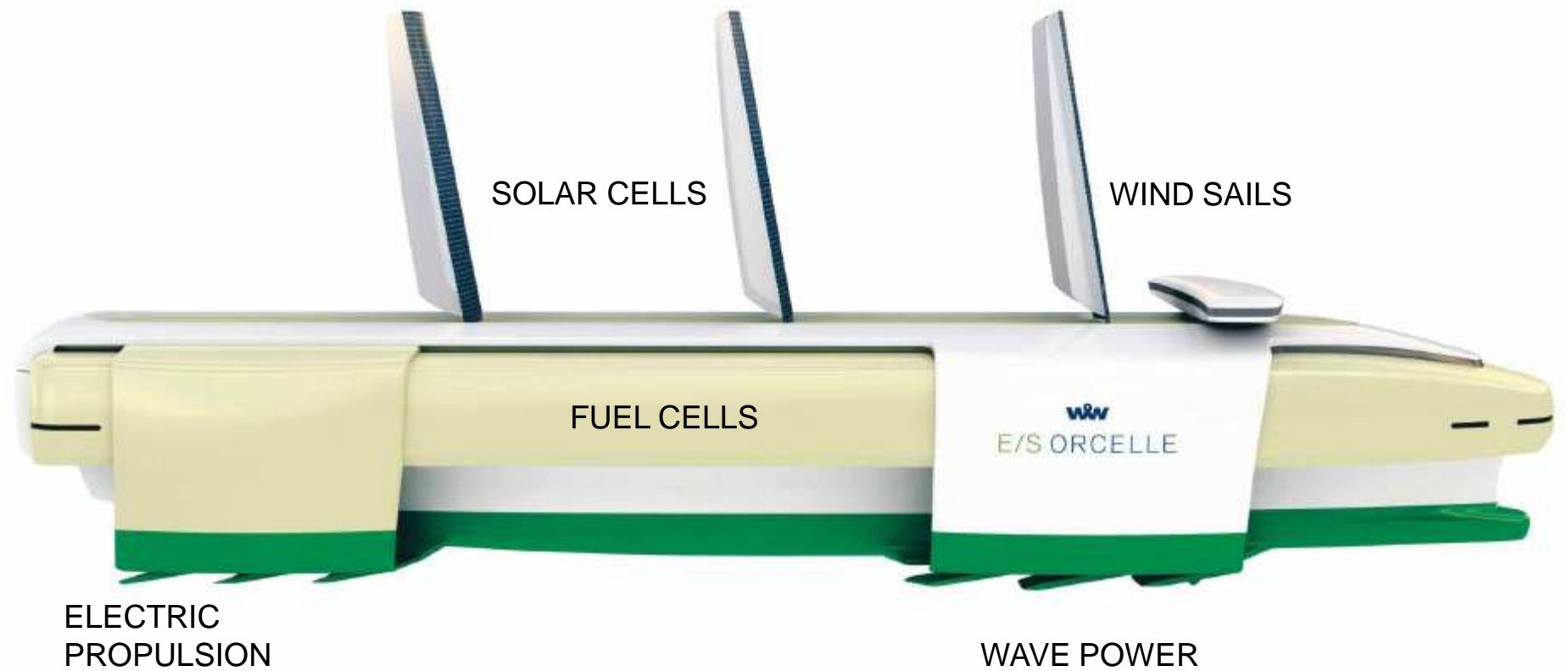
Fuel Cells

- EU Project METHAPHU, use of BIO Fuels on ships
- WÄRTSILÄ, LR, WALLENIUS MARINE, Univ of Genua, DNV
- 20 kW aiming at 250 kW
- Methanol
- Low emissions
 - CO₂ reduction 40 %
 - No SO₂
 - Low NOx
 - No CO
- Onboard Tests on m/v UNDINE May 2010



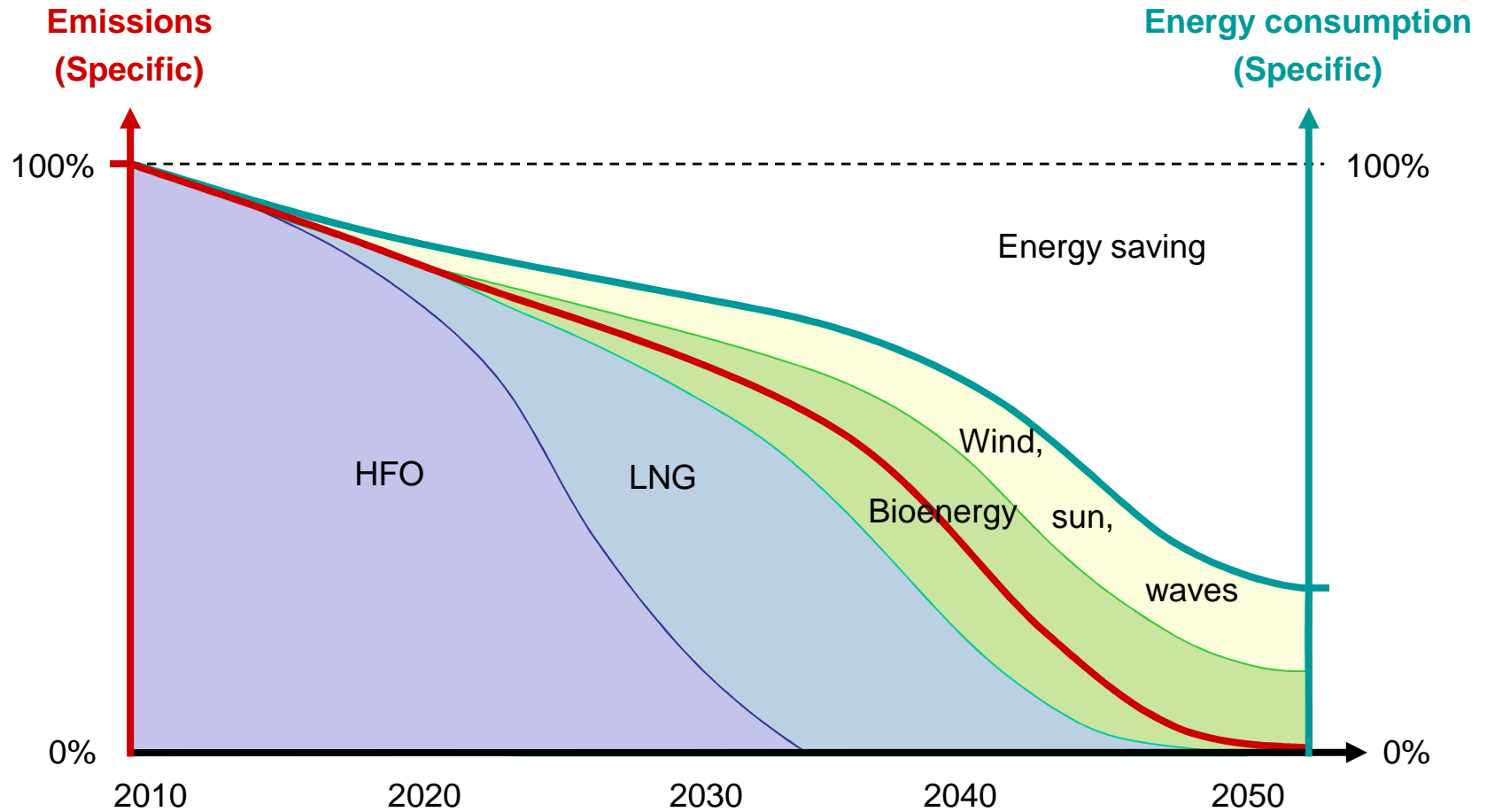
E/S ORCELLE, our vision – zero emissions

HYBRID TECHNOLOGY, Renewable Energy

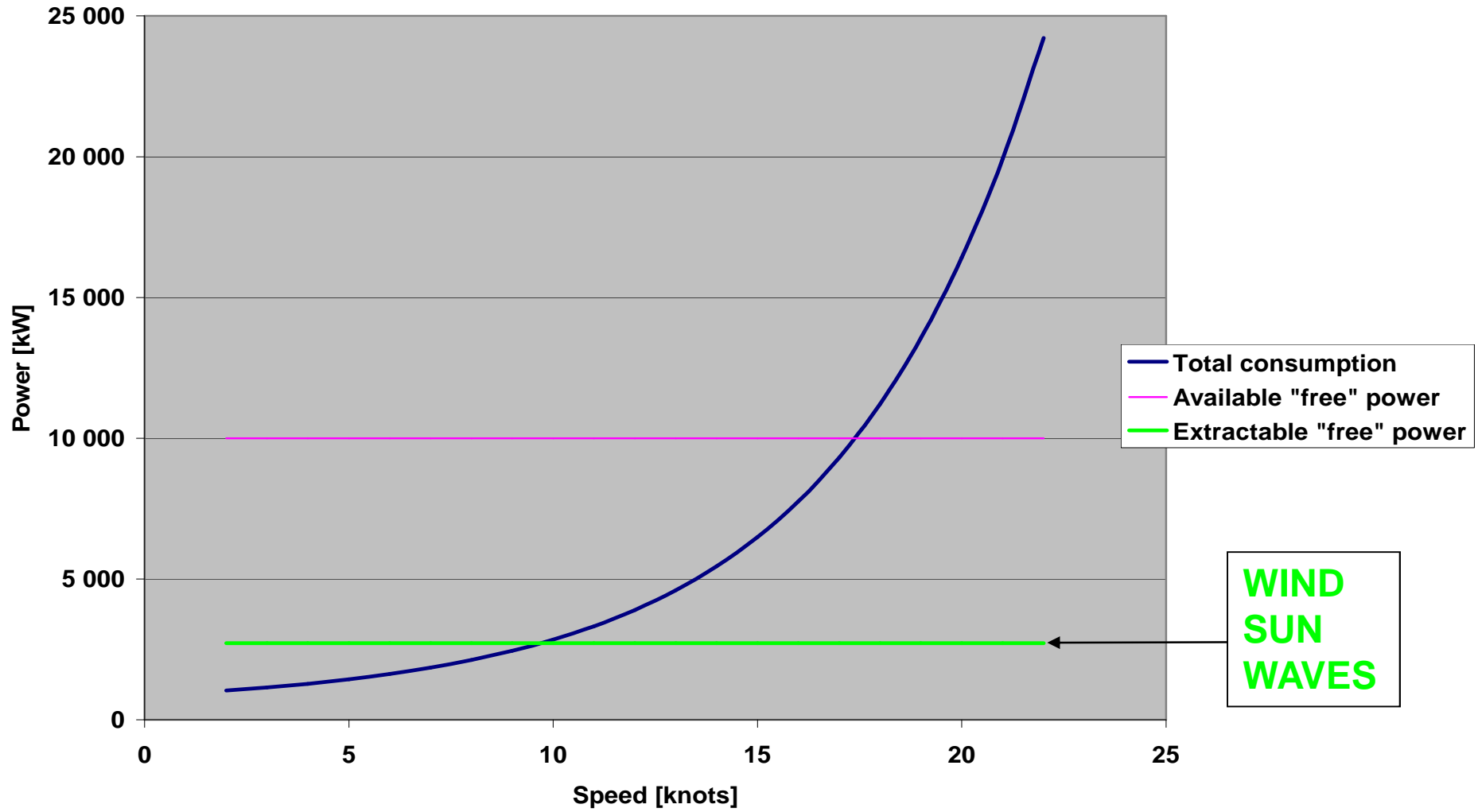


PROJEKT ZERO (Zero Emission ROro)

Road map for energy consumption, energy carriers and emissions

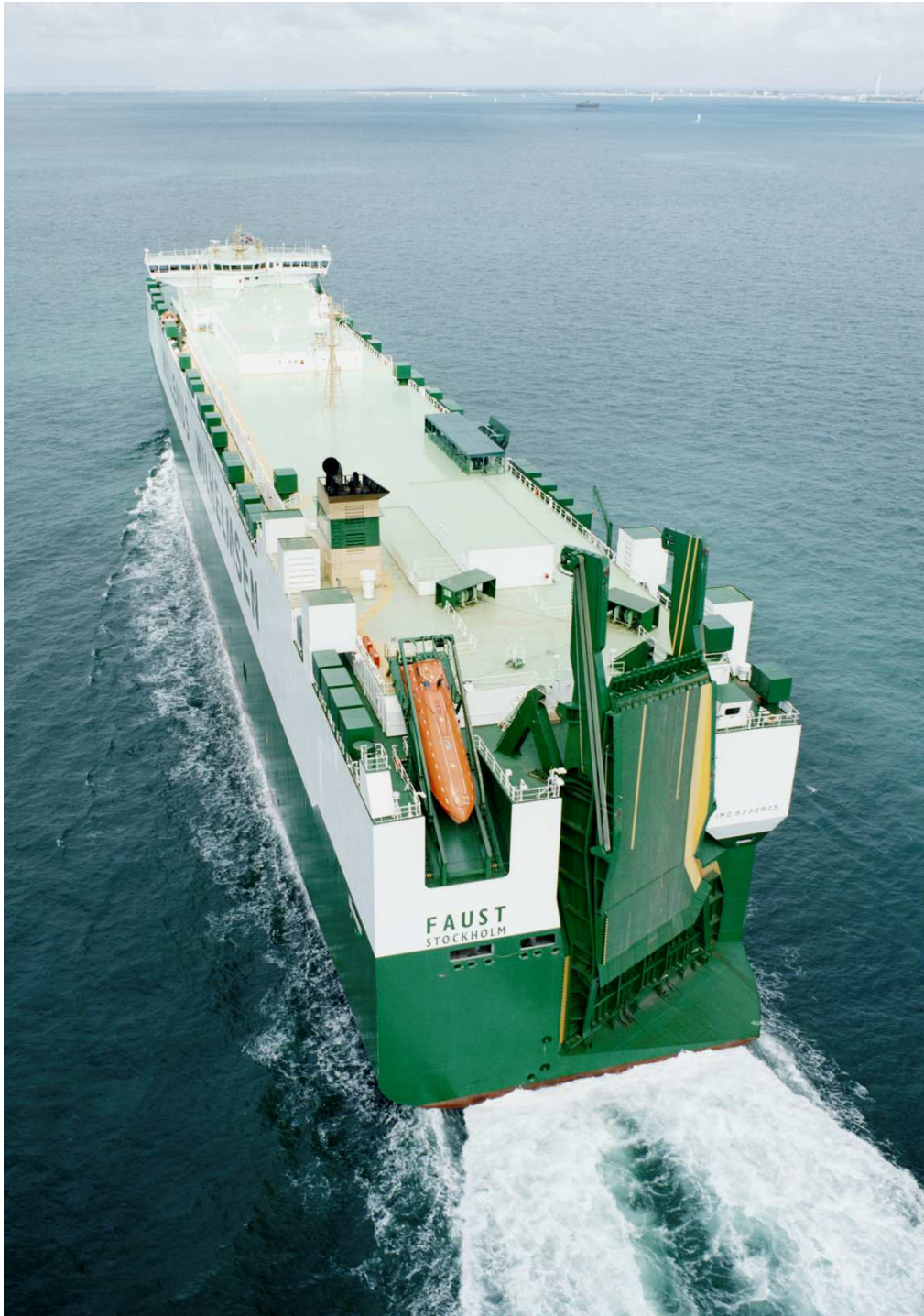


Available Power



Roadmap for emission free ships

	2010	2015	2020	2025	2030	2035	2040
Design speed [knots]	18	17	16	14	12	11	10
Primary energy carrier	LSFO	ULSFO	LNG	LNG	Biogas	Biogas	Methanol
Secondary energy carrier	MGO	LNG	Biogas	Biogas	Methanol	Methanol	Batteries
Machinery	Single shaft, direct drive, one engine	Single shaft, direct drive,	Single shaft, direct drive,	Hybrid, electric	Hybrid, electric	Hybrid, electric	Hybrid, electric
Primary driver	Two stroke diesel	Four stroke diesel	Gas engine	Electric motor	Electric motor	Sails	Sails
Secondary driver 1		Electric motor	Electric motor	Sails	Sails	Electric motor	Electric motor
Secondary driver 2		Wing sails at bow	Wing sails at bow		Foils	Foils	Foils
Auxiliary 1	Four stroke diesels	Combustion engine	Combustion engine	Combustion engine	Combustion engine	Combustion engine	Fuel cells
Auxiliary 2	Shaft generator	Shaft generator	Shaft generator	Solar heat gensets	Fuel cells	Fuel cells	Solar heat gensets
Auxiliary 3					Solar power	Solar power	Solar power
Propulsor	1 FPP	CRP	CRP	1 large FPP	1 large FPP	1 large FPP	1 large FPP



THANK YOU!

Read more about it:
www.walleniusmarine.com