



# FutureShip Scandlines – Zero Emission Ferry

Schwerin – April 12<sup>th</sup>, 2013



# Agenda

## Idea and concept of Zero Emission

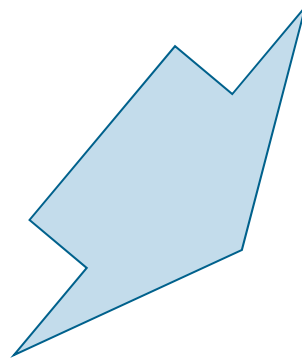
- Scandlines Zero Emission Ferry

# Zero Emission – concept: 0 emission

simple and clear goals:

Zero emission of

- CO<sub>2</sub>
- NO<sub>x</sub>
- SO<sub>x</sub>
- particulate matter

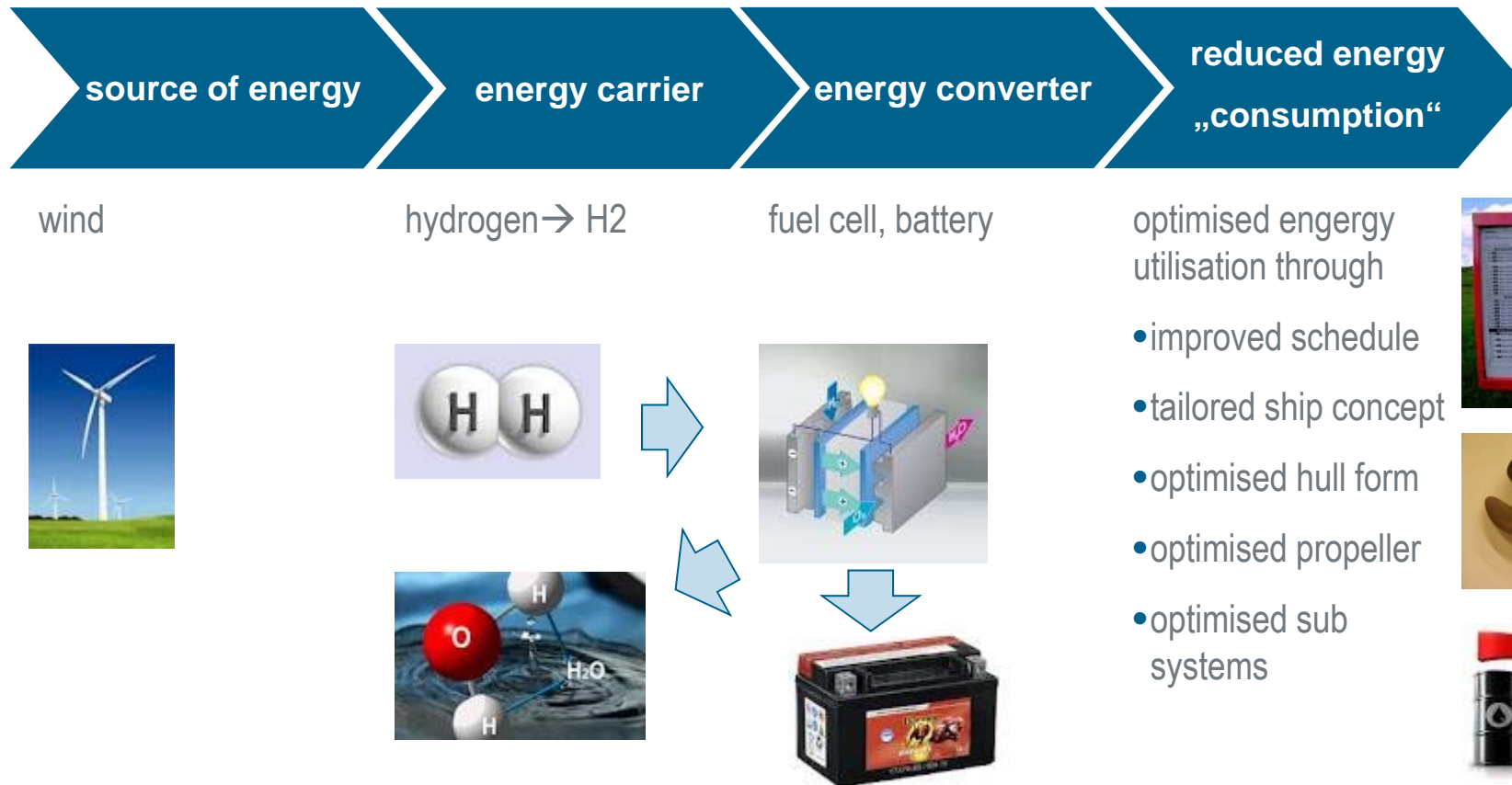


exploring new pathways:

- new energy sources
- new energy carriers
- new energy converters
- consumption reduction

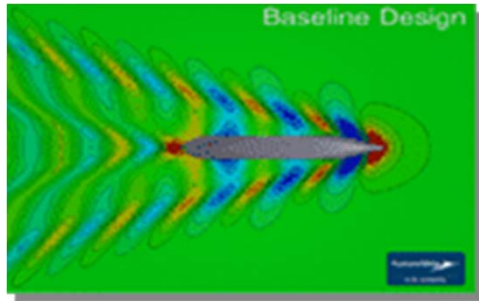
# Zero Emission – sustainable produced hydrogen for emission free ferry service

The new pathway:



# Zero Emission - idea of an optimised consumer structure

Energy converter → reduced demand



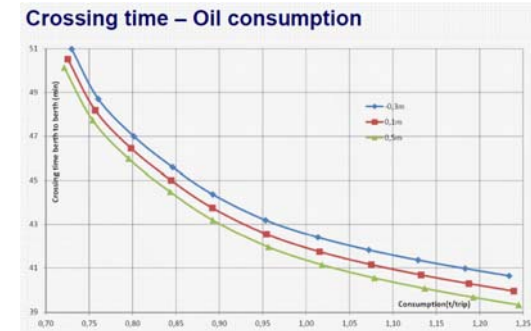
reduced wave resistance



exclusive utilisation of premium insulation

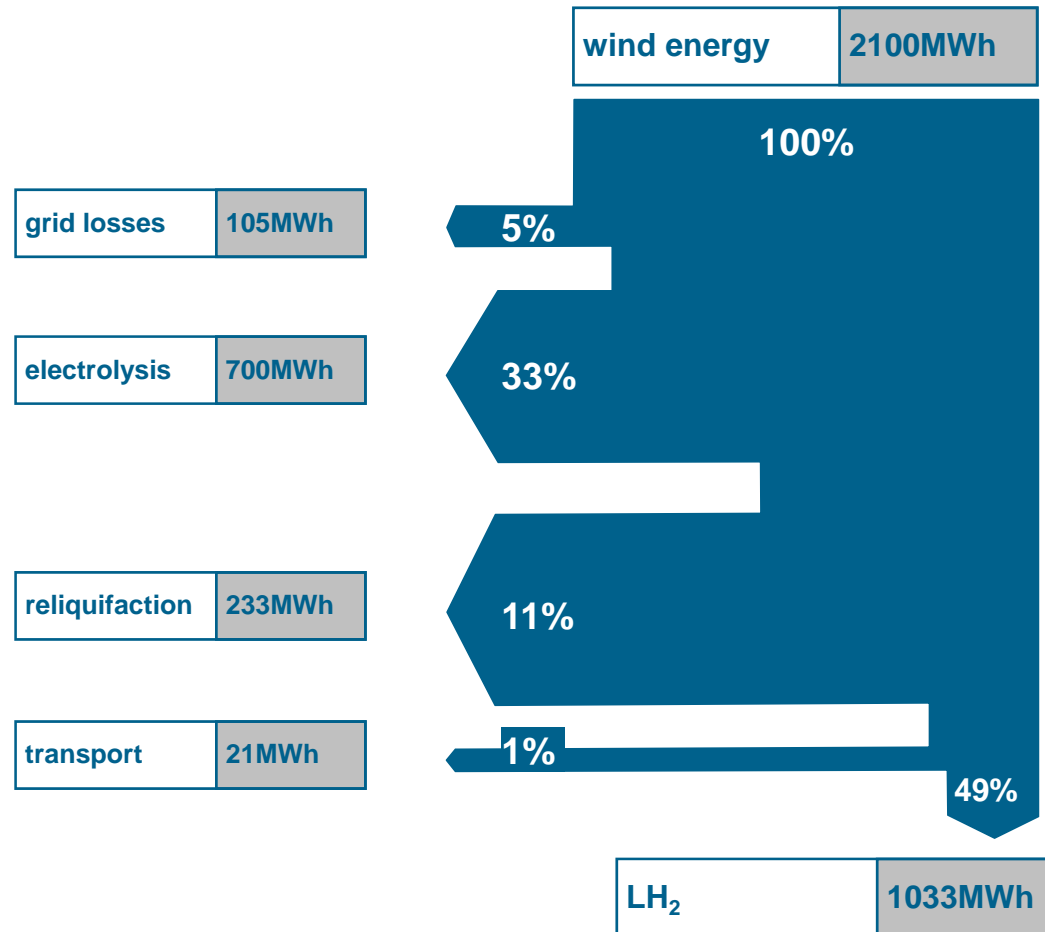


optimized consumer structure



improved timekeeping to avoid rush at sea

# Sustainable power generation process chain



# Agenda

- Idea and concept of Zero Emission

## Zero Emission Scandlines Ferry

# Zero Emission Ferry concept

**ZERO EMISSION DOUBLE-ENDED FERRY**  
Proj. no. 1015 (1015) 15.01.2012; RaMar

**CLASS:**  
 GERM. LLOYD 100 A5 E RO-RO SHIP, PASSENGER SHIP,  
 R20 IW NAV-OC RSD ERS DG;  
 \* MC AUT, RP, GF, EP

**OUTFITTING/ACCOMMODATION:**  
 TWO WATERTIGHT BOW/STERN RAMPS  
 FOUR PERSON ELEVATORS  
 SHOPPING AREA  
 RESTAURANT AREAS / CAFETERIA  
 LOUNGES  
 CHILDREN AREAS  
 ENTERTAINMENT  
 GAMING  
 CONFERENCE  
 BARS

**ENERGY STRATEGY II:**  
 - 8.30 MW FUEL CELL  
 - 2.40 MWh STORED POWER (E.G. ACCU)

**MACHINERY/PROPULSION:**  
 ONE EMERGENCY DIESEL GENERATOR; BIO FUEL  
 FOUR POD THRUSTERS OF 3.000 kW EACH

**CONSUMPTION AT DRAUGHT= 5.30 m:**

CONDITION:	ISO
SEAMARGIN:	15%
FUEL:	H2
13.0 kn	abt. 13,93 MJ/PASS.
16.0 kn	abt. 15,95 MJ/PASS.
18.5 kn	abt. 18,83 MJ/PASS.

**PRELIMINARY!**

**CLASS:**  
 GERM. LLOYD 100 A5 E RO-RO SHIP, PASSENGER SHIP,  
 R20 IW NAV-OC RSD ERS DG;  
 \* MC AUT, RP, GF, EP

**DIMENSIONS:**

LENGTH O. A.	abt.	181,18 m
LENGTH LWL	abt.	173,60 m
BREADTH MOULDED	abt.	24,80 m
DEPTH TO MAIN DECK	abt.	8,20 m
DEPTH TO UPPER CAR DECK	abt.	13,75 m
DRAUGHT DESIGN	abt.	5,30 m
DRAUGHT MAX.	abt.	5,50 m
SEVICE SPEED AT DES. DRAUGHT (95%MCR/15%SM/HOTEL LOAD)	abt.	18,5 kn

**TONNAGE**

GT	abt.	26.150
NT	abt.	9.600
CGT	abt.	27.400

**CAPACITIES:**

DEADWEIGHT ALL TOLD	abt.	3.000 tdw
NUMBER OF PASSENGER	abt.	1500 PAX
LANE METER CARS	abt.	2.200 m
LANE METER TRUKS	abt.	1.600 m
RANGE	abt.	40 nm
BUNKER : LH2	abt.	140 m3
FRESH WATER	abt.	200 t
WATER BALLAST	abt.	1000 t

**CREW'S ACCOMMODATION:**  
 20 DAY-CREW  
 40 NIGHT-CREW

**HOLD DIMENSIONS:**  
**CLEARANCE HEIGHTS:**  
 MAIN DECK: 4,80 m  
 UPPER CAR DECK: 4,70 m

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**FutureShip**  
 A GL company

1500 passengers

18,5 knots

2.200 lane meters

140m<sup>3</sup> H2-tanks

8300 kW fuel cells

2400 kWh batteries

4 x 3MW pod - propeller

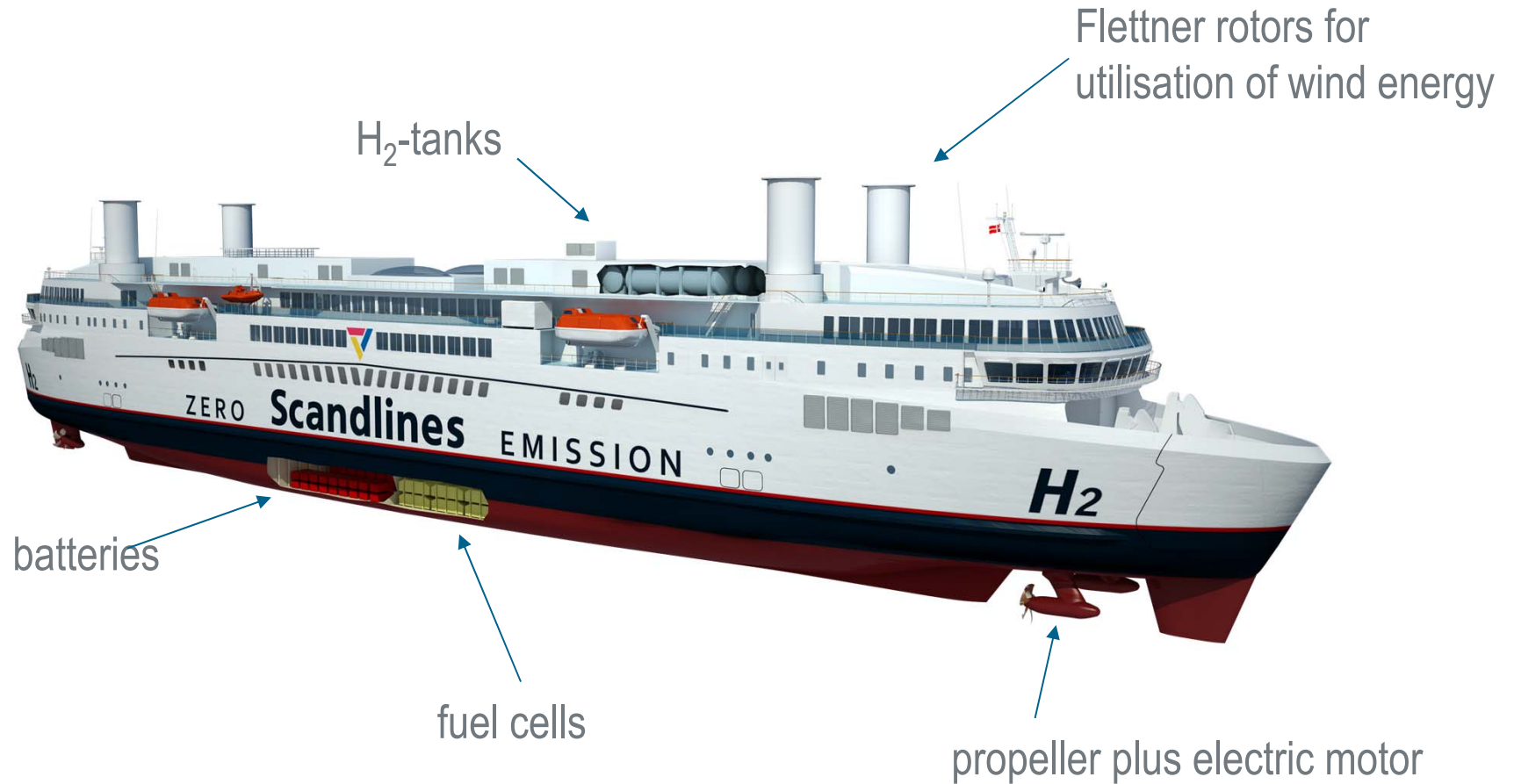
energy demand per trip

16,0 kn → 16 MJ

18,5 kn → 19 MJ



# Insights into the Zero Emission Ferry



# Emission balance of the Zero Emission Ferry



Ø consumption and emissions today per trip: Ø consumption and emissions tomorrow per trip

0,95t low sulphur heavy fuel oil

0t heavy fuel oil

2,96t CO<sub>2</sub>

0t CO<sub>2</sub>

20kg SO<sub>x</sub>

0t SO<sub>x</sub>

50kg NO<sub>x</sub>

0t NO<sub>x</sub>

# Impressions









# Thank you for your attention!



**FutureShip**   
A GL company

Design Practice - Machinery

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