

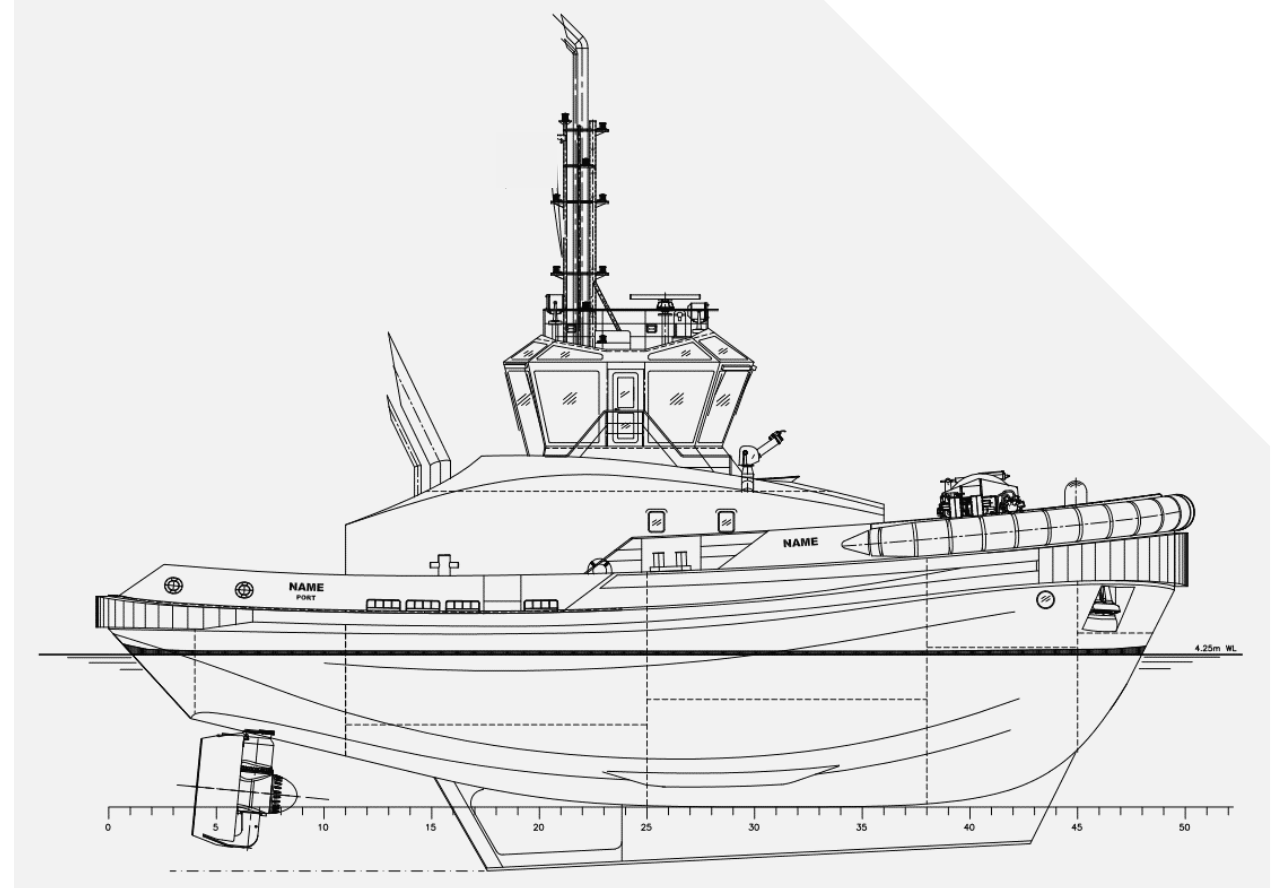
WÄRTSILÄ DUAL FUEL – LNG HARBOR LNG HYBRID TUG

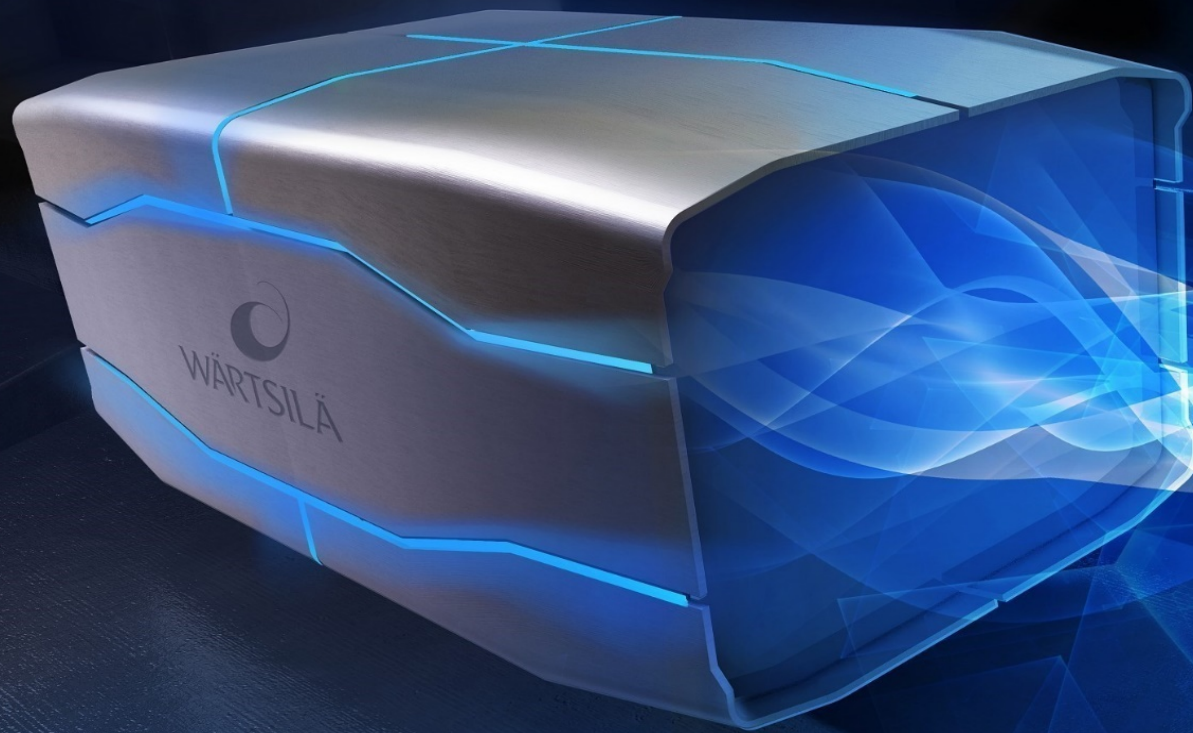
DONG HWAN KIM
AREA SALES GM MEA MARINE BUSINESS

Harbor tug

Power installed

4500~ 5 000 BHP



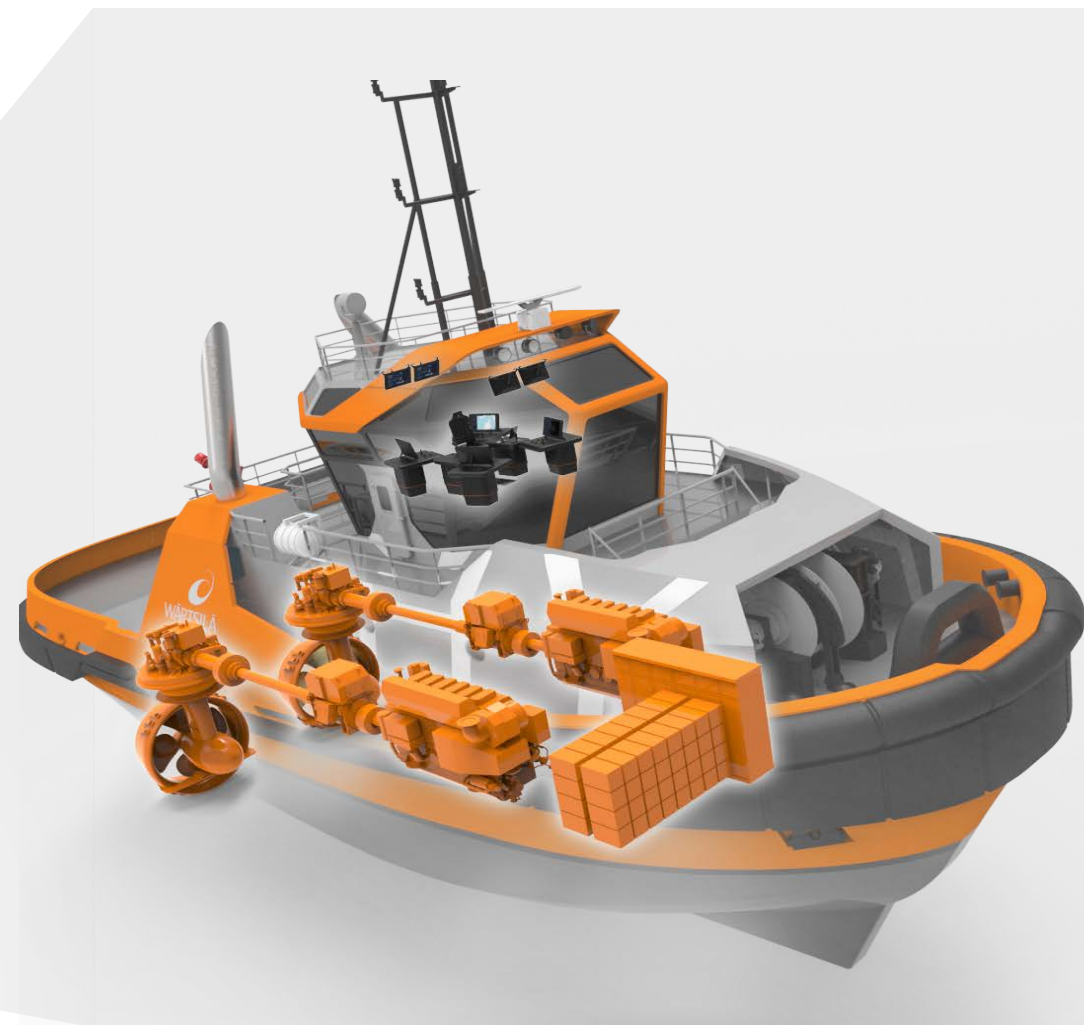


WÄRTSILÄ HY for TUG

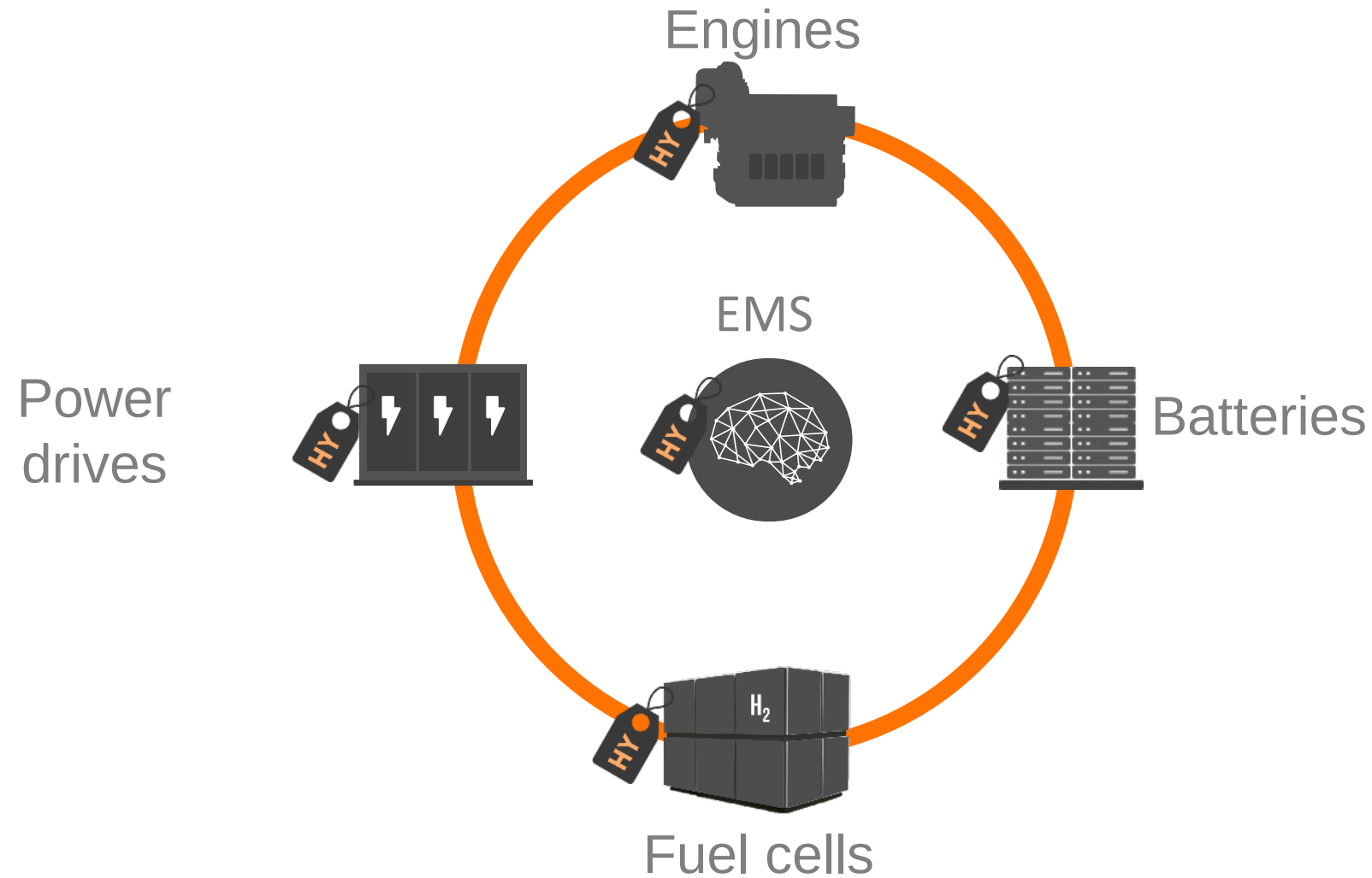


Wärtsilä HY

The first integrated hybrid
power module
designed for tugs

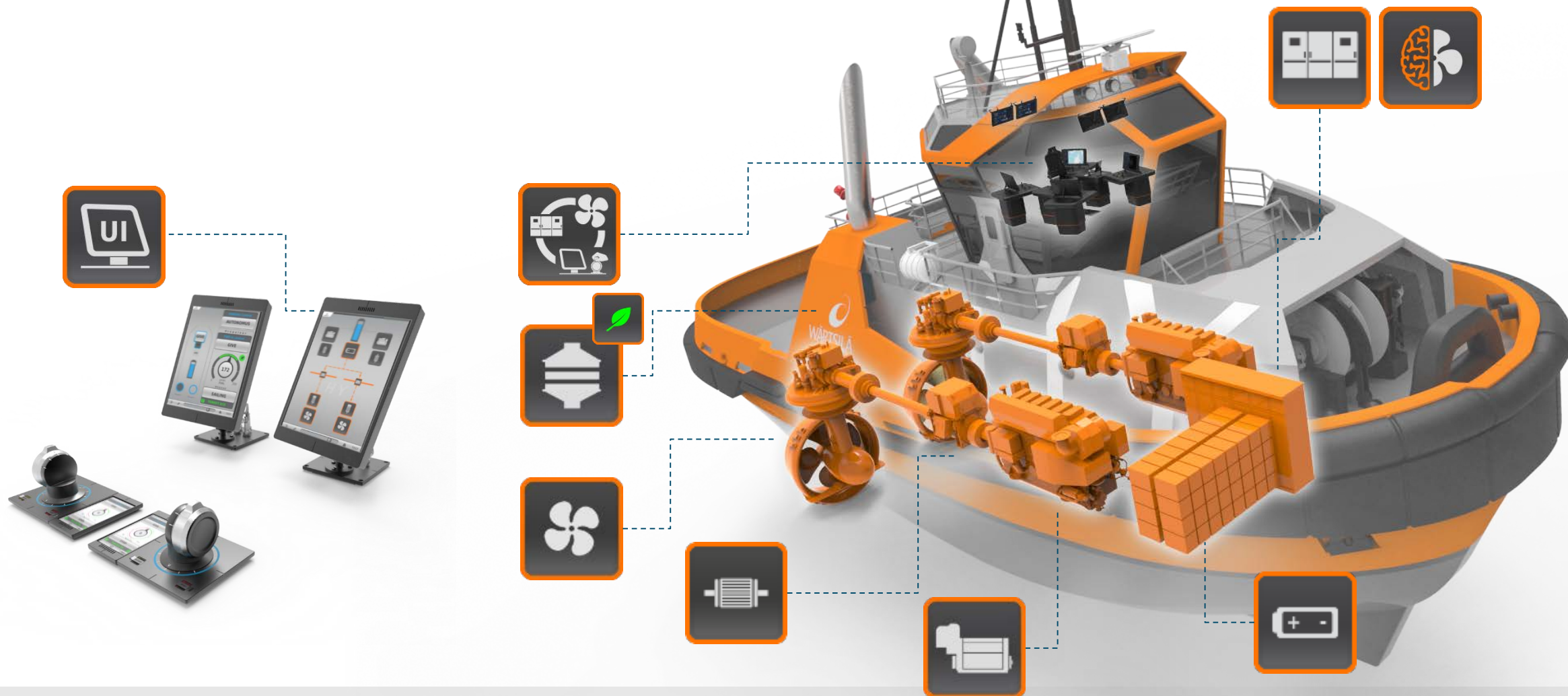


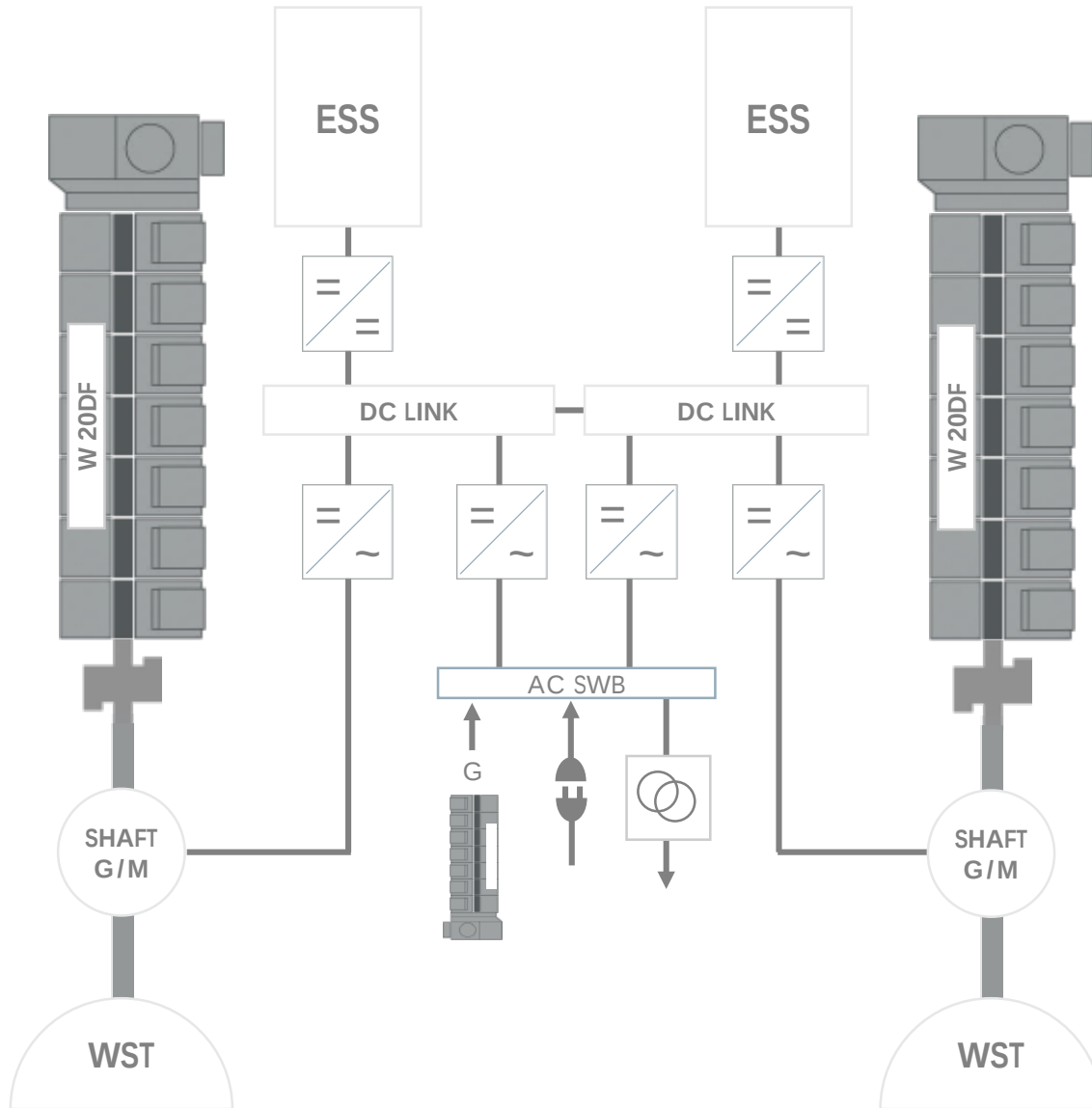
TOWARDS A HYBRID ECOSYSTEM



Wärtsilä HY

Inside the module





Engines

2x W 9L20DF

Auxiliaries

1x 100 kW (no mandatory)

2x Shaft G/M

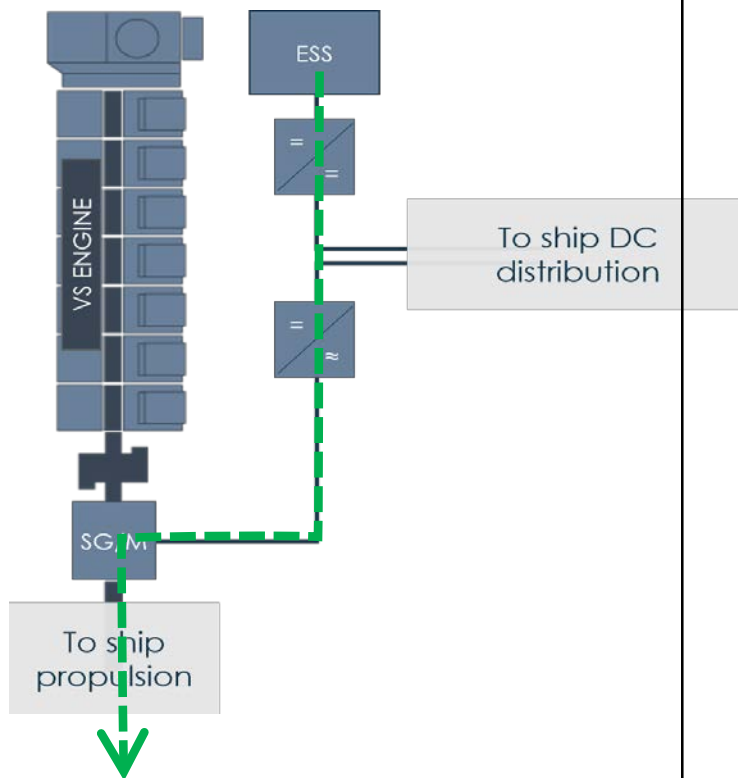
Batteries

Thrusters

2x WST 18-CP

GREEN MODE

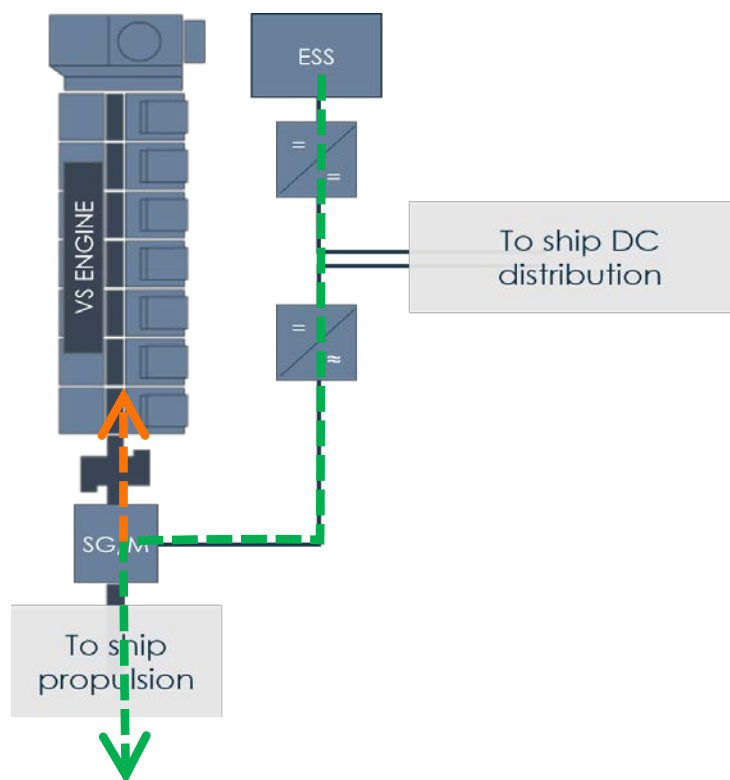
no emissions or noise



PATENTED

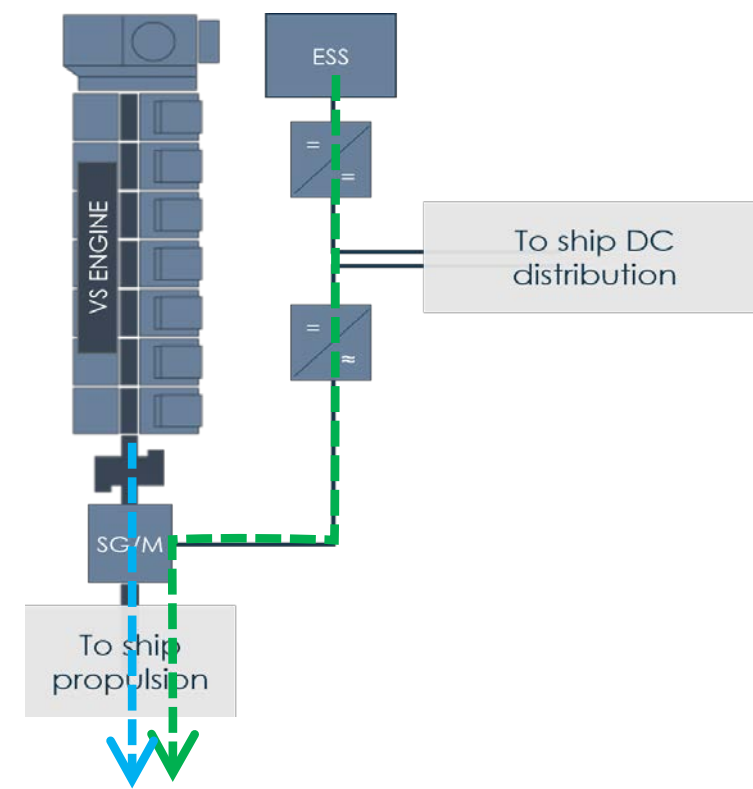
NEW START-UP PROCEDURE

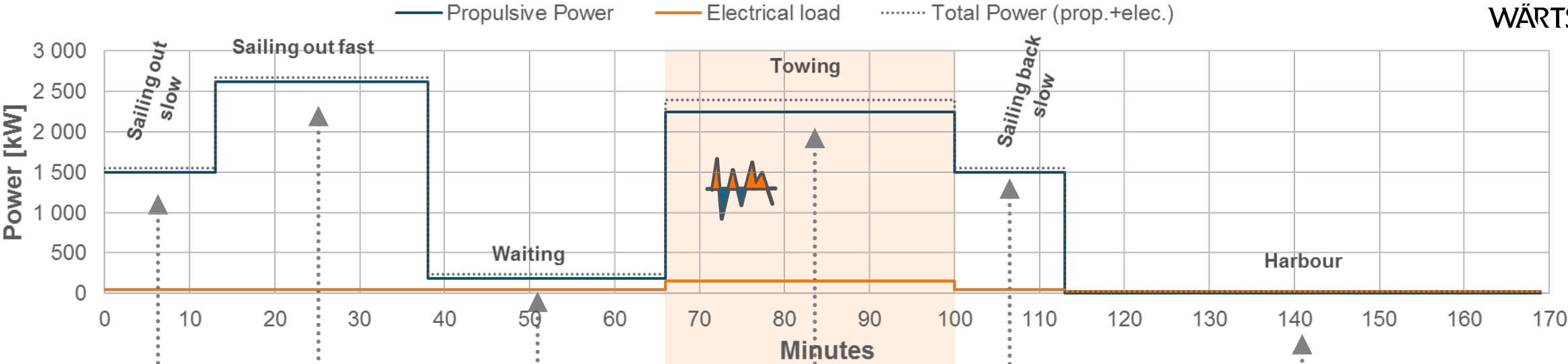
no smoke



HYBRID MODE

full TBP, instant response, no smoke





40%

70%

5%

60%

40%

OFF

Main Engine
Loads*

1

1

1

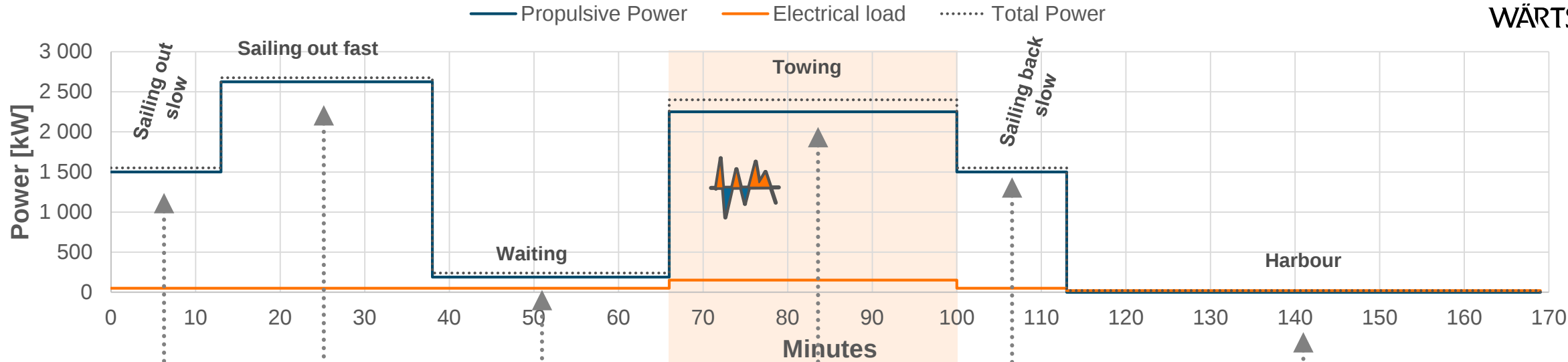
2

1

1

Running
auxiliries

*based on 3729 kW installed



61%

83%

OFF

75%

61%

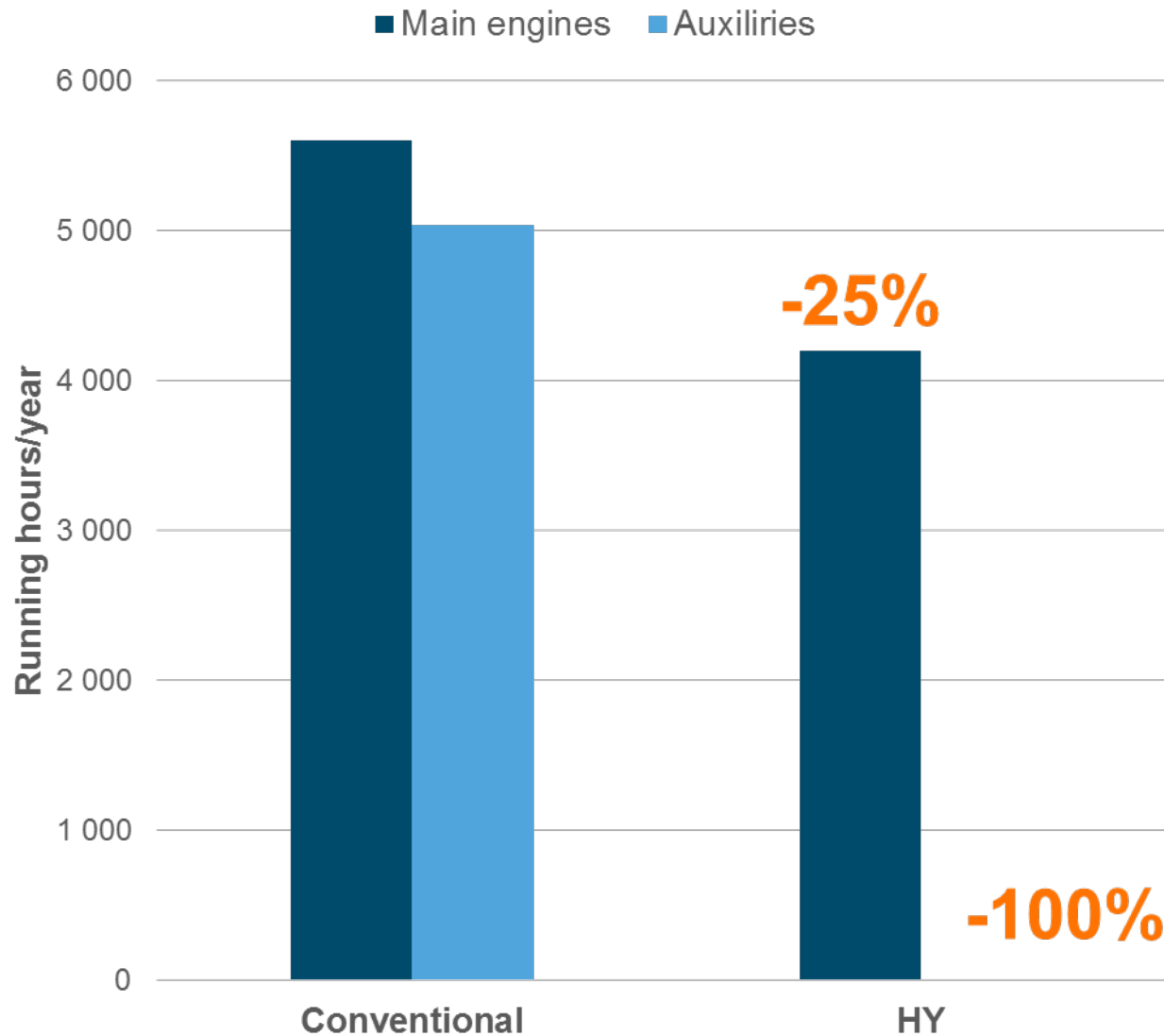
OFF

Main Engines
Loads

None

Running
auxiliries

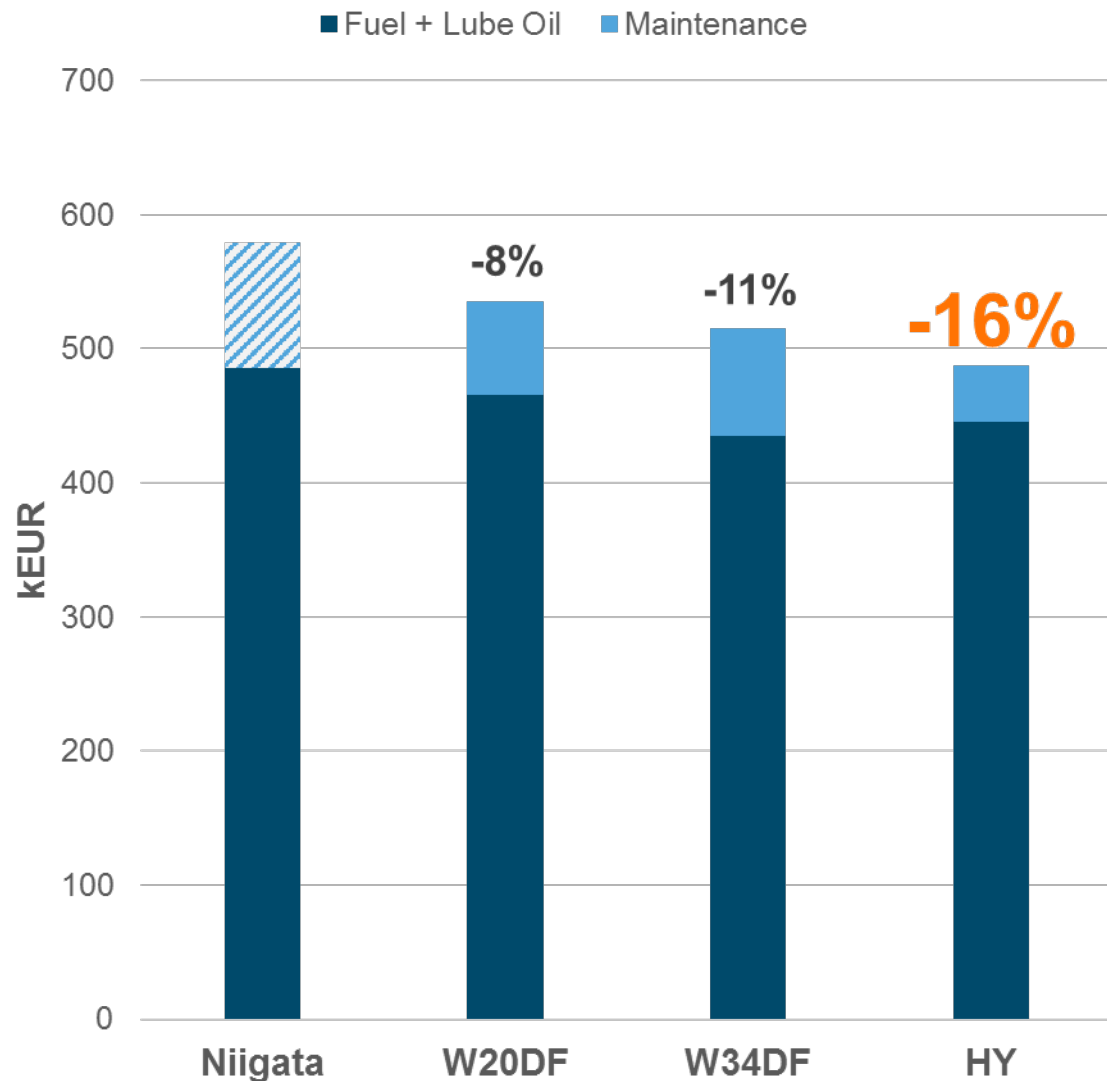
Charging Peak Shaving Discharging Peak Shaving Charging Discharging Batteries



✓ Less main engine rhs

✓ No auxiliaries rhs

Great maintenance saving



Bunker price

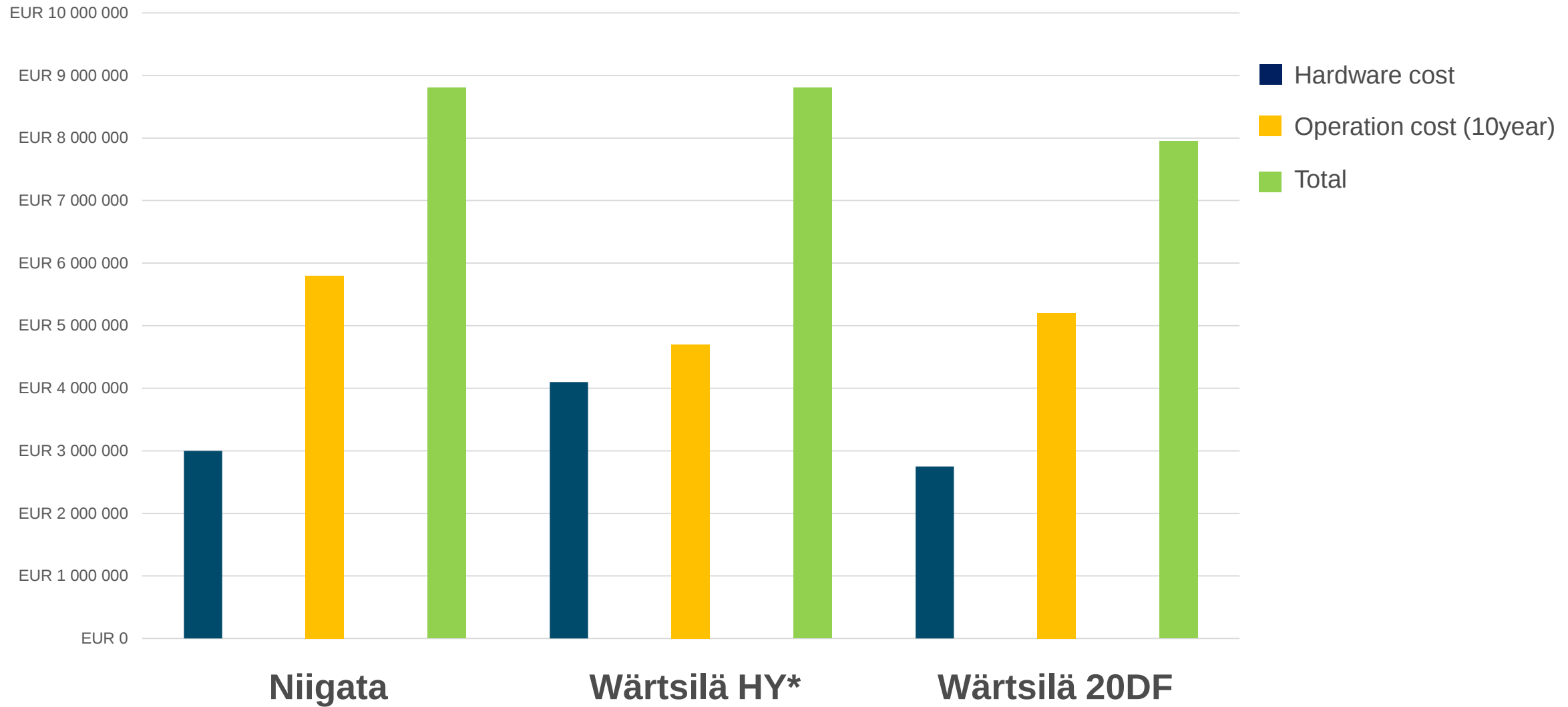
MGO 600 EUR/ton

LNG 480 EUR/ton

Lube Oil 2 300 EUR/ton

Maintenance included*

*Niigata assumed similar than W34



Wartsila HY* : Do not consider the operation cost for aux Genset

WÄRTSILÄ HY for TUG

- ✓ Smaller main engines
- ✓ Optimal thrusters
- ✓ Less auxiliaries
- ✓ Less starting air system installed
- ✓ Less consumptions
- ✓ Less maintenance costs
- ✓ Less emissions
- ✓ More redundancy





WÄRTSILÄ