

evs|27

The 27th INTERNATIONAL
ELECTRIC VEHICLE
SYMPOSIUM & EXHIBITION
BARCELONA
17th-20th November 2013

INTELLIGENT +BOATING

DEMONSTRATION OF A SYSTEM FOR
SUPERCHARGED PLUG IN HYBRID
COMMUTER BOAT

**ECHANDIA
MARINE**
INTELLIGENT BOATING

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THE COMPANY

- + Echandia Marine

HYBRID PRINCIPLE

- + Series hybrid system
- + Echandia system principle

DEMO PROJECT PLUG IN HYBRID BOAT

- + Background
- + Environmental benefits
- + Economy



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OUR MISSION **ELECTRIC**

"Echandia Marine's mission is to electrify boat traffic for business and pleasure. The focus of our business is public transport on water in cities and pleasure boats in the archipelago. Echandia is supplying both drivetrain and the energy to be used"



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OFFER

SUSTAINABLE FUTURE

- + Low cost of operation and TCO
- + Environmentally friendly (No CO₂, NOX or PM)
- + Better comfort (Low noise and vibrations)
- + Better manoeuvrability

GREEN CITY FERRIES CONCEPT

- + Bareboat contract through Green City Ferries
- + Enables shared risk and investments



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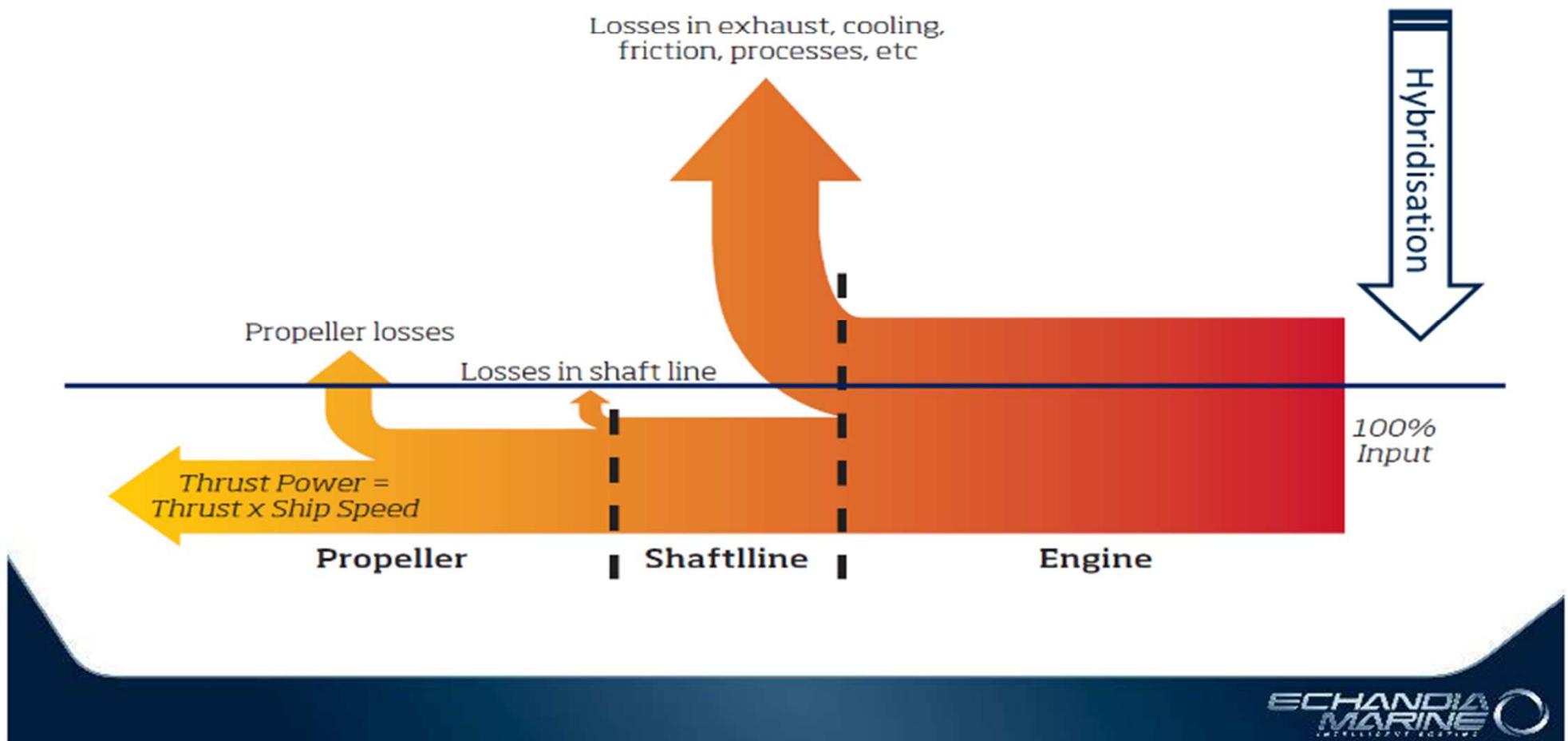
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 INNOVATION IN MARITIME

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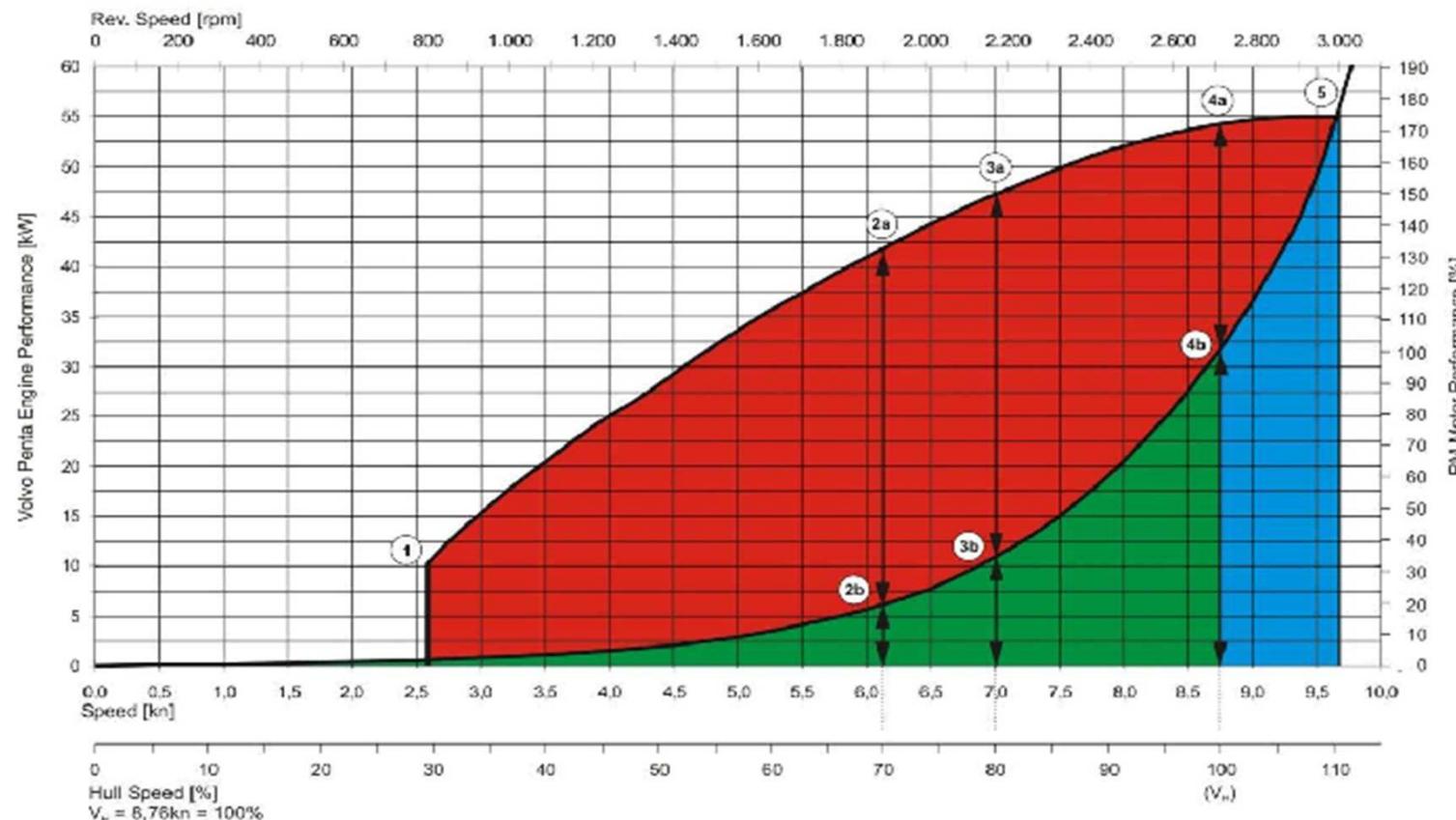
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MARINE**
MANUFACTURERS OF
EXCLUSIVELY
EXCLUSIVE

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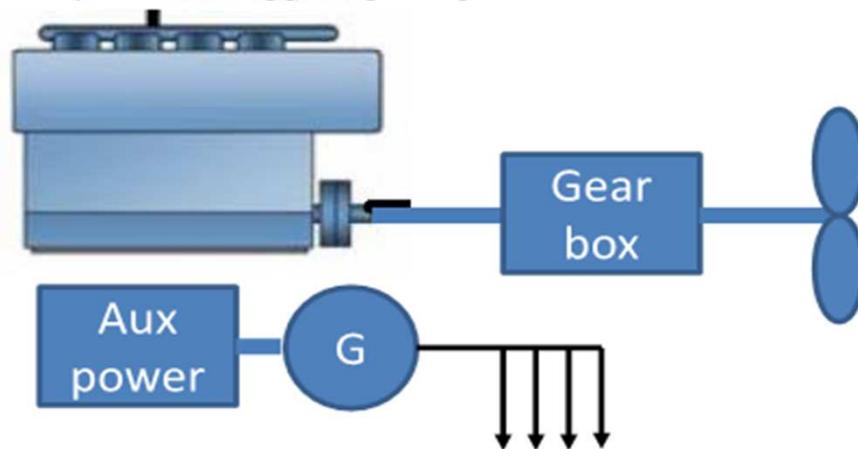
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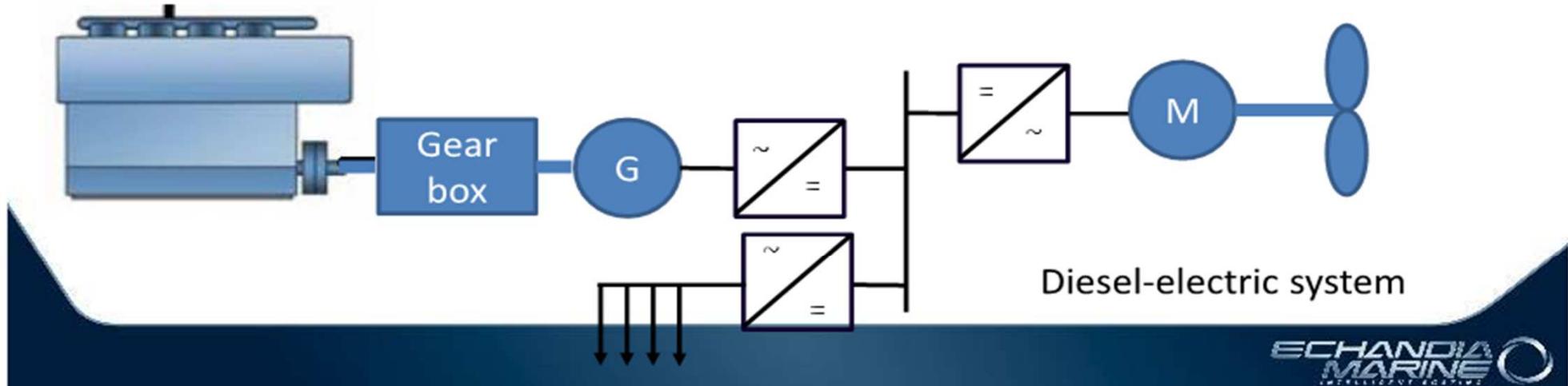
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HYBRID PRINCIPLE



Conventional system



Diesel-electric system

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INNOVATION IN MOTION

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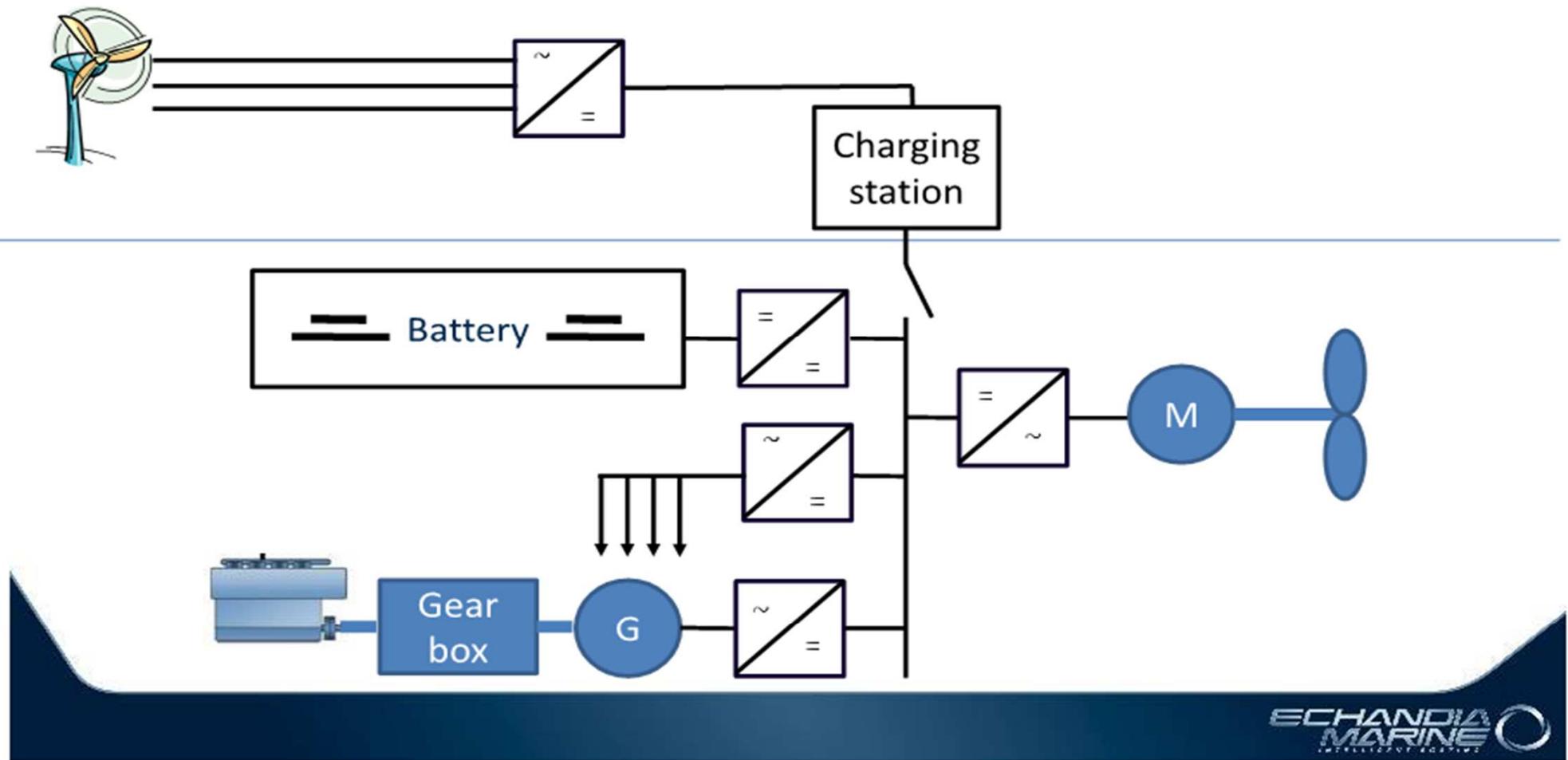


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 **Swedish
Energy Agency**

**ECHANDIA
PRINCIPLE**



**ECHANDIA
MARINE** 

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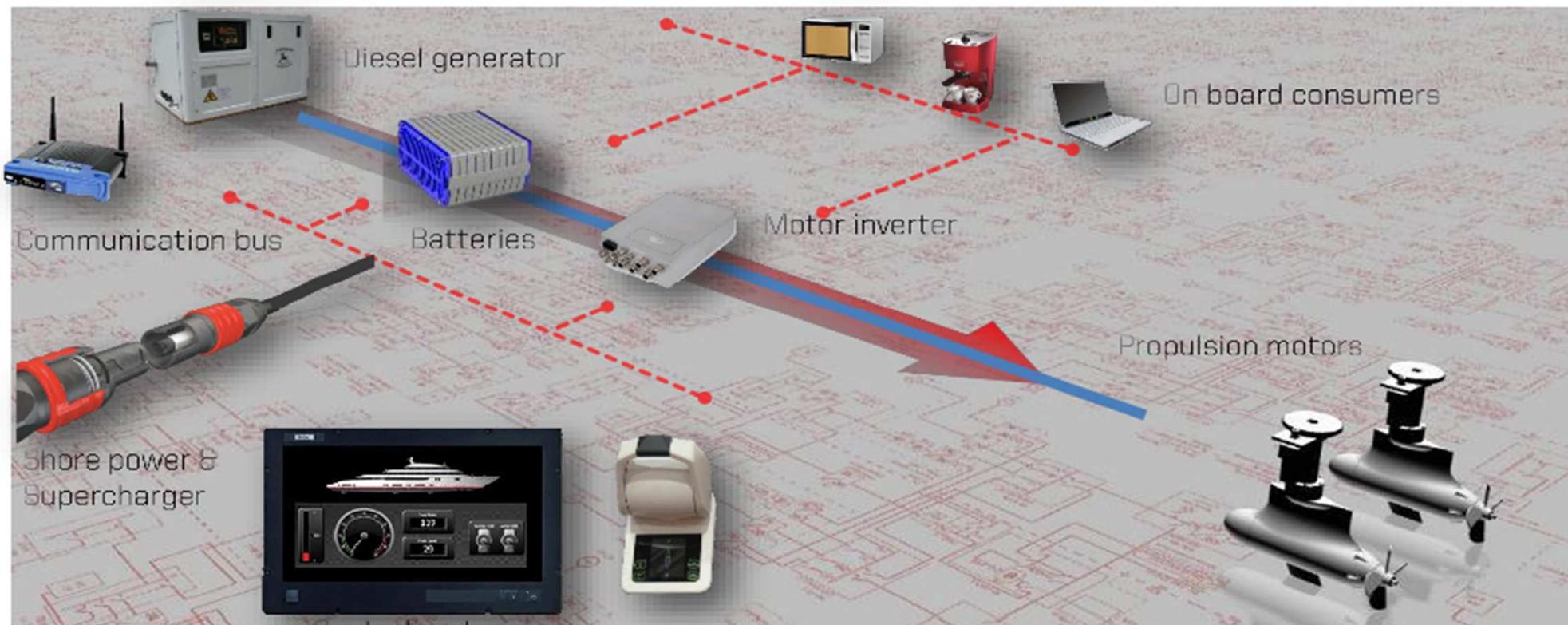
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FLEXIBLE SYSTEM



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MARINE**
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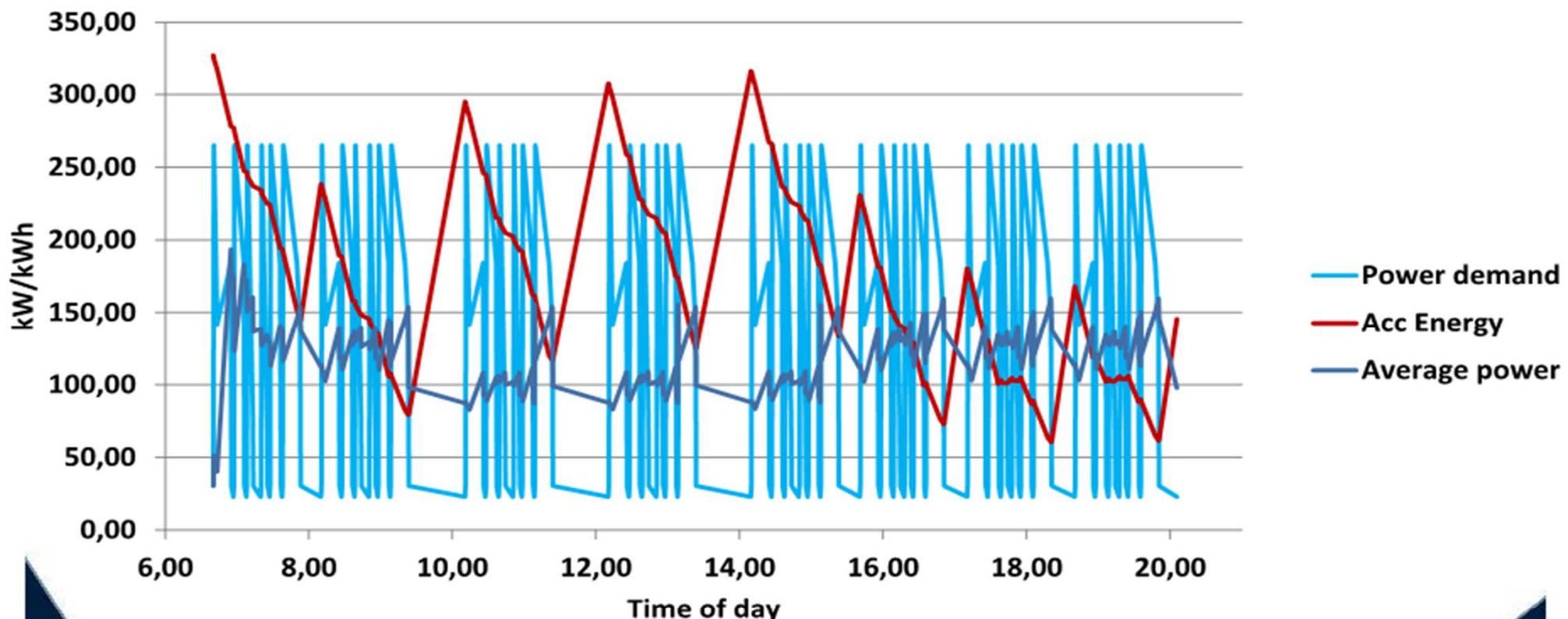


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MARINE**
INNOVATION IN SAILING

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PRE STUDY, Energy Agency 30 k€ (45%)

- + Conducted 2011 - 2012
- + Passenger flow analysis
- + Dimensioning requirements
- + Environmental benefit analysis

DEMO PROJECT, Energy Agency 1 M€ (45%)

- + Project time frame July 2012 - June 2016 (start Q3 2014)
- + Verify lower energy usage and emissions
- + Verify lower M&O costs vs conventional system



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Energy Agency

DEMO CASE



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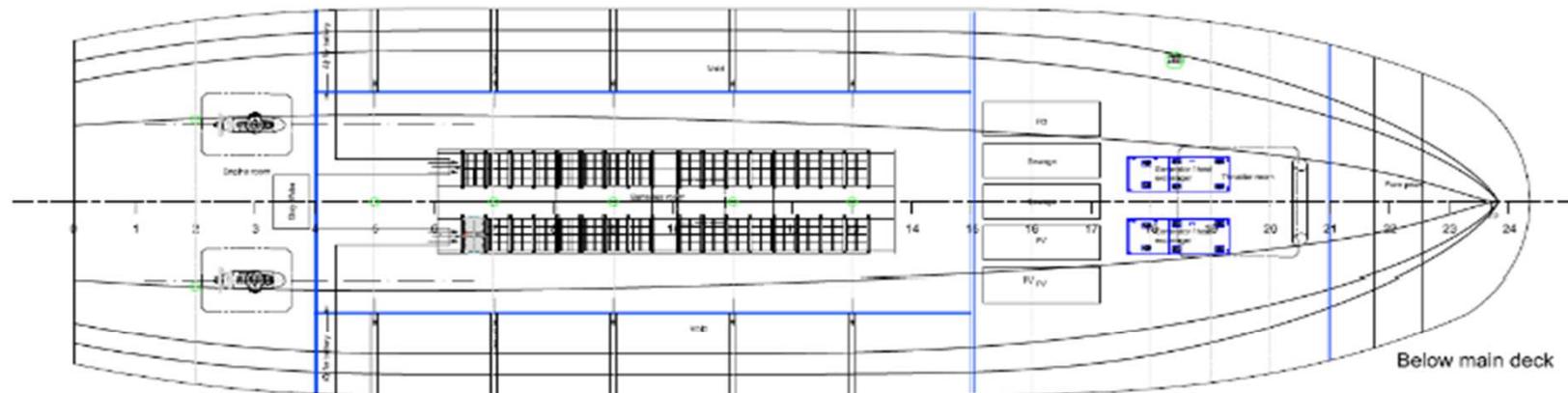
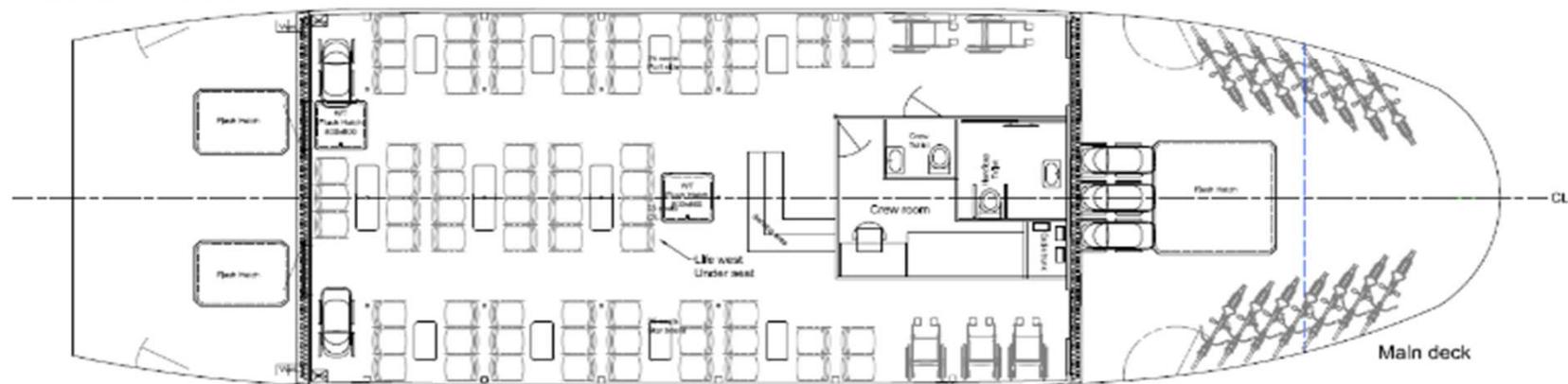
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Energy Agency**

DEMO BOAT



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CALCULATED BENEFITS

- + Lower energy consumption 700 MWh/y (60%)
- + Lower CO₂ emissions 280 tons/y (85%)
- + Lower NO_x emissions 3 tons/y (95%)
- + Lower PM emissions 140 kg (95%)

HEALTH EFFECTS

- + Less victims from heart attacks (PM effect)
- + Lower health care costs



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	CONVENTIONAL	ELECTRIC
INVESTMENT	1 600 k€	1 900 k€
CAPEX (7%)	110 k€/y	130 k€/y
BATTERY LEASE	0 k€/y	70 k€/y
MAINTENANCE	40 k€/y	10 k€/y
ENERGY 3000 H (0,9 €/L 0,16 €/KWH)	160 k€/y	90 k€/y
ENERGY- & CO ₂ -TAX	0 k€/y	20 k€/y
SUMMA	310 k€/y	320 k€/y

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BENEFITS FOR COMMUTERS

- + Lower environmental footprint
- + Higher comfort on board (no noise)
- + Deliver upon environmental targets (75% RES)

BENEFITS FOR CITY

- + Cleaner air and less noise - Lower health care costs
- + Positive image
- + Future realistic demand for Public bidding process



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