



Nedstack

PEM FUEL CELLS

Let's Navigate towards Zero-Emission Shipping!

Hydrogen Fuel cell technology for maritime power and propulsion
Impulse Speech


1st Sustainable Shipping Forum – Graz – September 2019



Nedstack First



Name	Nedstack Fuel Cell Technology BV
Location	Westervoortsedijk 73, Arnhem, the Netherlands
Founded	1999
Ownership	Privately

Website	www.nedstack.com
Industry	PEM Fuel Cells
Logo	

High lights

- Leading Global Player in High Power PEM-FC Technology;
 - Longest PEM Power Plant in Operation > 10 years;
 - First MW Sized PEM Power Plant;
 - Largest PEM Power Plant > 2 / 3.6 Mwe.
- > 700 FC Systems installed-base as per 2017;
- > 23.000 Hours in-use Lifetime demonstrated;
- In-house stack assembly – systems with co-makers on Nedstack IP;

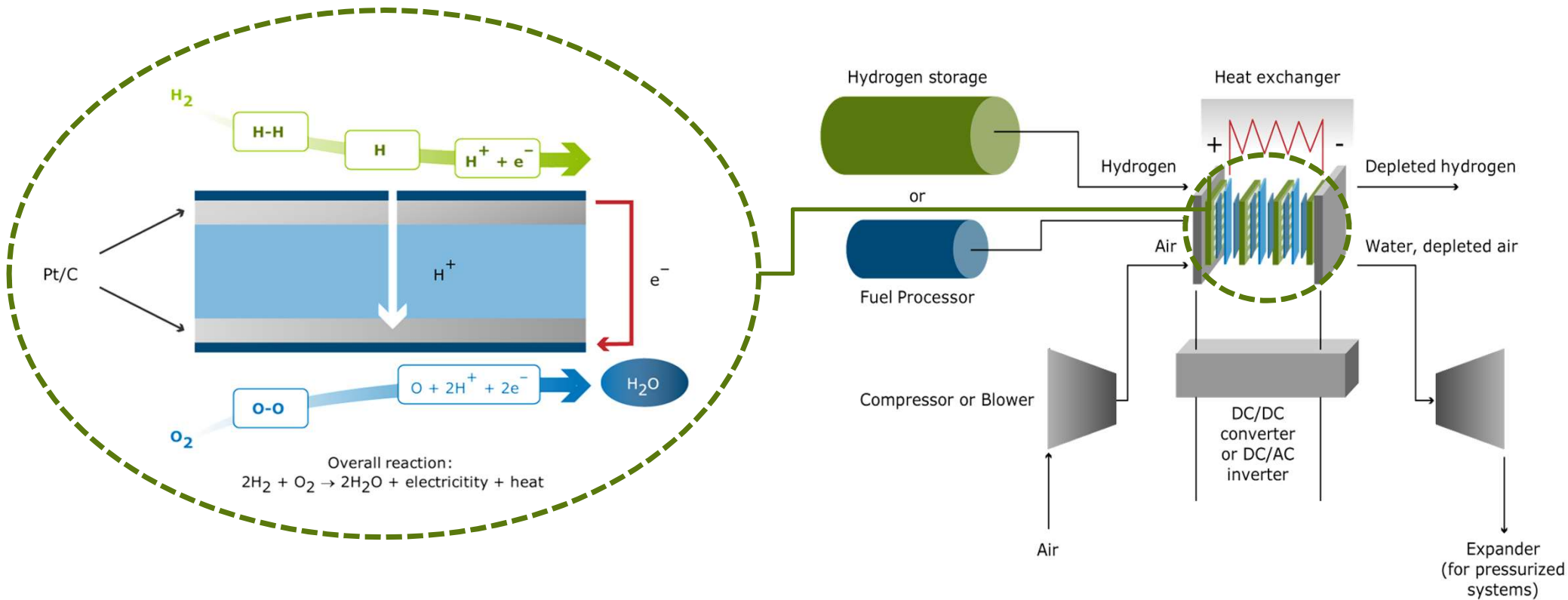
Specialized in Containerized Power Plants



Nedstack main location



PEM Fuel Cells and Fuel Cell Power Installations





Why Fuel Cells as a Maritime Power Solution?



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Why Fuel Cells ?

HFO + ICE

Negative

- Climate impact;
- Air quality impact;
- Import dependence;

HYDROGEN + PEM FUEL CELL

Positive

- Long range;
- Fast bunkering;
- Low weather sensitivity;

Positive

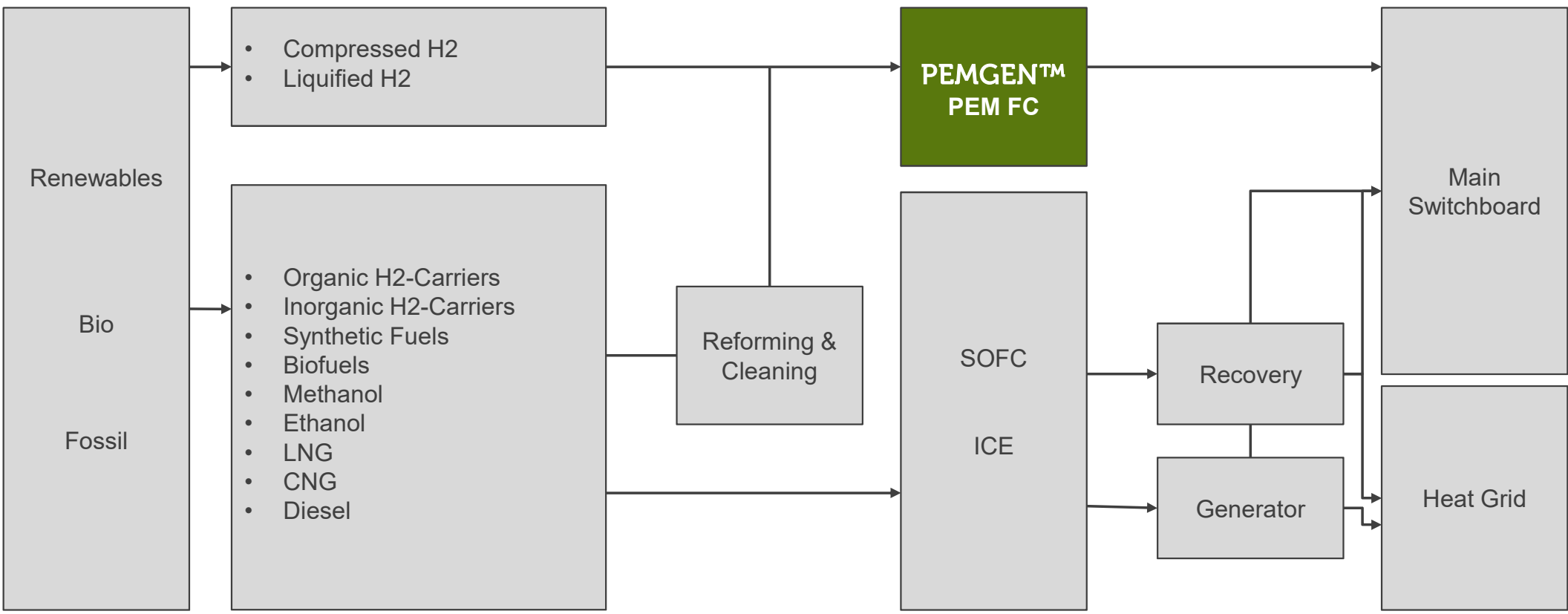
- Zero Emission;
- Efficient;
- Direct Torque;
- Quiet;
- Local Source.

BATTERY

Negative

- Limited range;
- Long charging time;
- Low power density;
- Weather sensitive.

Energy Source → Energy Carrier → Reformer → Conversion → Recovery → Distribution



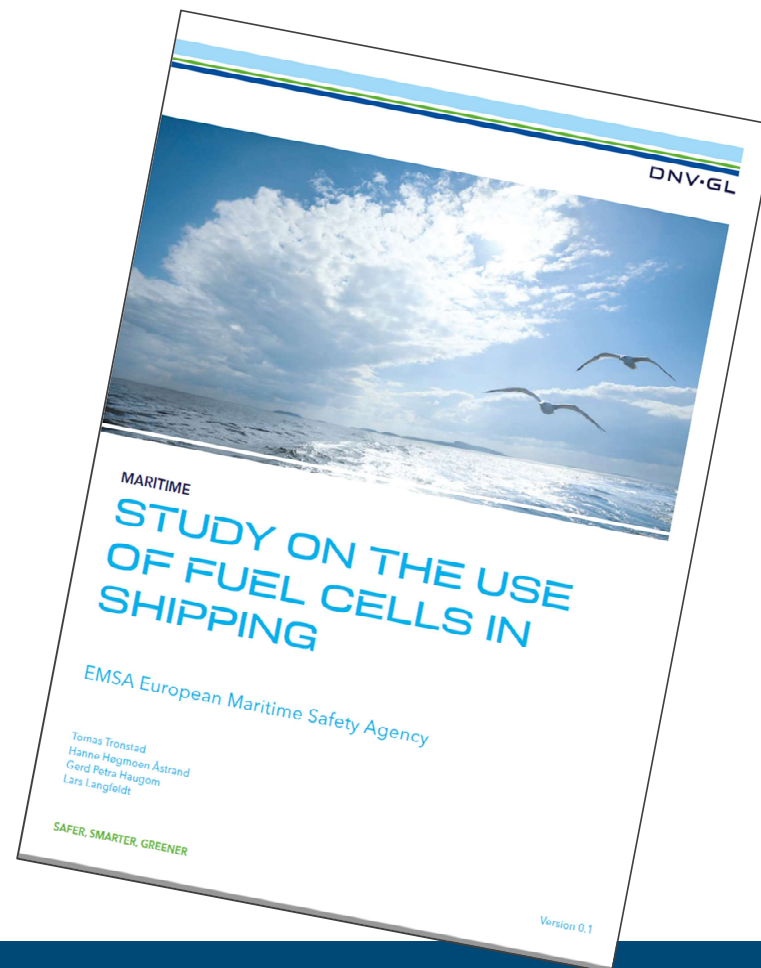
PEM FC's the best option for the maritime domain?



**PEM FC's are the highest ranked
Fuel Cell solution for shipping**

Top ranked on:

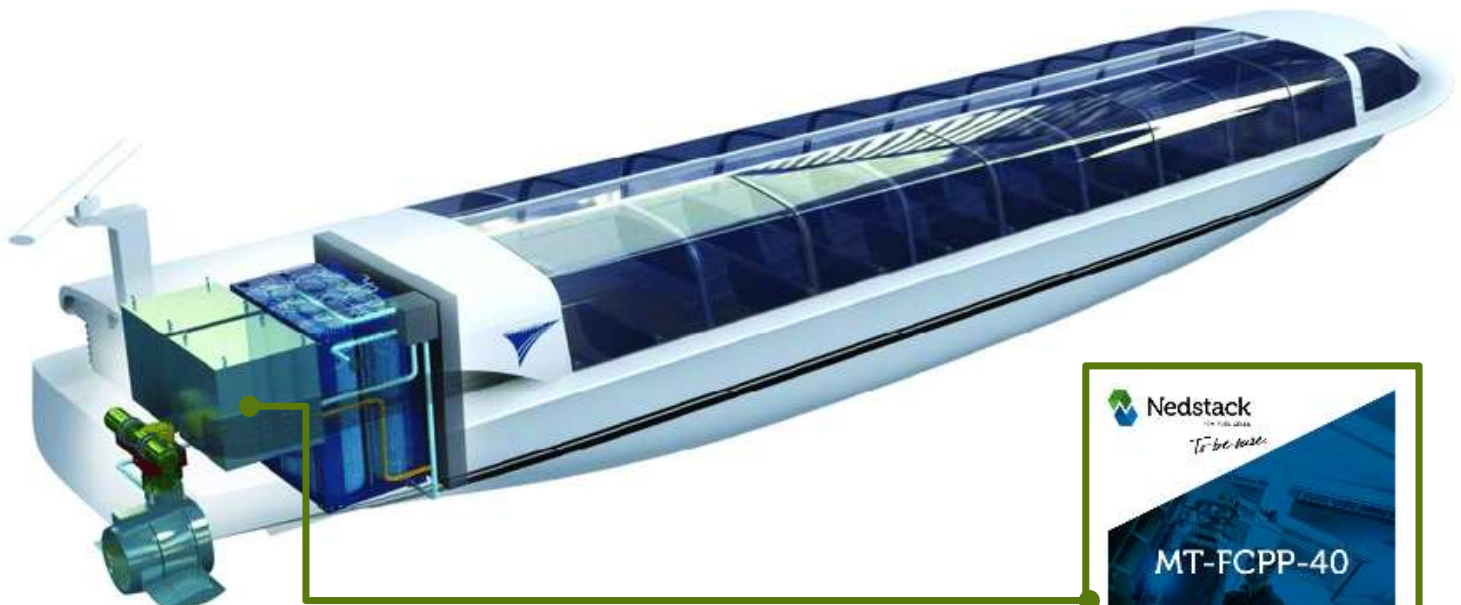
- Power Density;
- Resilience;
- Safety;
- Environmental Performance;



Nemo H2 – Second FC pax vessel with Class Appr.



Spec	Value
Length oa	21,95 m
Beam oa	4,25 m
Draught	1,1 m
Displacement	45 tons
Payload & Crew	88
Mission	Canal Boat
Max Speed	8,5 Kn
Cruising Speed	7 kn
E-Propulsion	Sern thruster 75 kWe Bow thruster 11 kWe
Battery pack	70 kWh
H2 storage	24 kg @ 35 Mpa
FC Engine	2 x 40 kWe



A Portfolio of Fuel Cell Power Installations



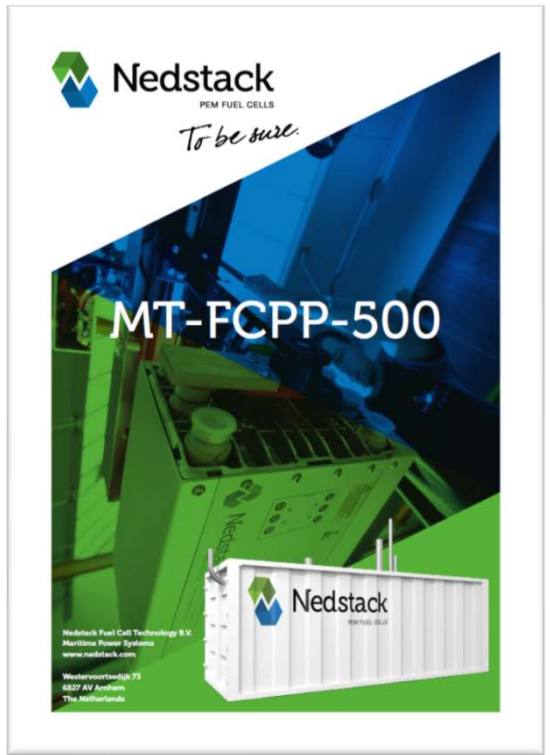
NFCT MT-FCPP-40

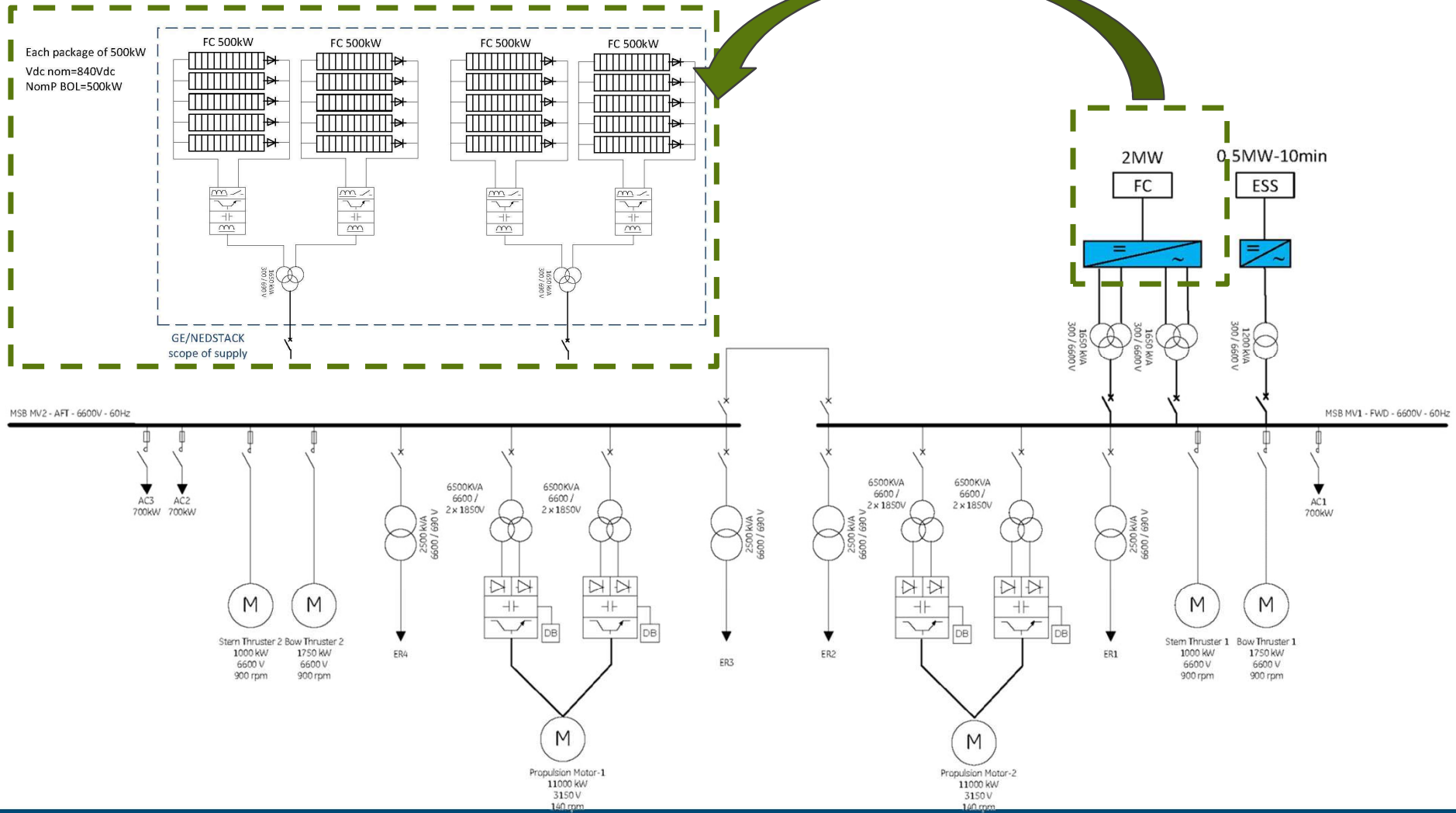


NFCT MT-FCPP-100



NFCT MT-FCPP-500





Nedstack / GE Power Partnership (Cruise & Ferry)





OUR NEWS

Let's Navigate towards Zero-Emission Cruising.

Nedstack & GE announce a collaboration to develop marine fuel-cell power and propulsion solutions for passenger Vessels.



PEM fuel-cell power plants offer a zero-emission shipping enabler for electric power and propulsion applications. Our portfolio of maritime power systems allows for a wide range of use on-board passenger vessels.



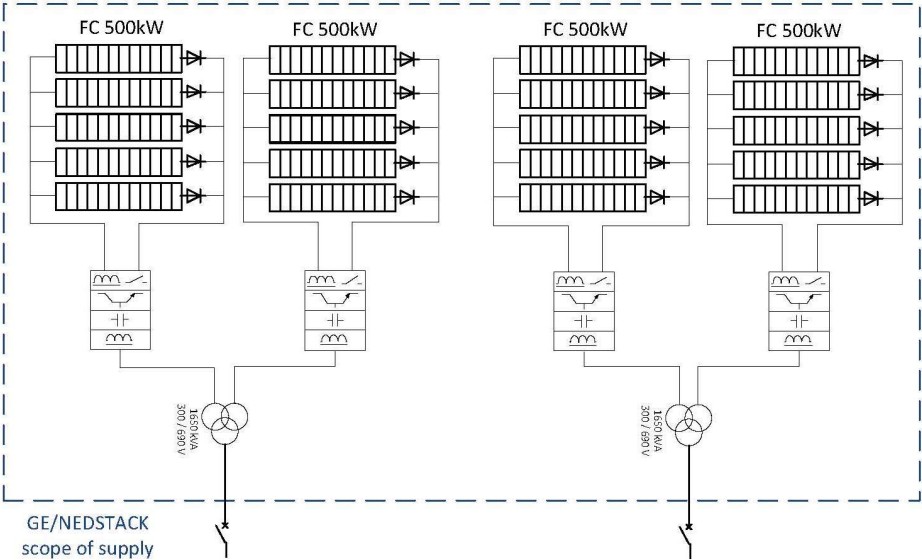
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GE and Nedstack Partnership Sets Sights on Zero Emission Cruise Vessels

Mar 21, 2019 / 0 comments



Each package of 500kW
Vdc nom=840Vdc
NomP BOL=500kW



1

Fuel Cell technology enables Zero-emission shipping

and complements battery technology to allow for:

- Superior 0-emission ranges,
- Faster turn around times
- and long endurance at sea.

2

Fuel cells can exist in cohesion with a variety of energy vectors.

Hydrogen can be bunkered in both compressed or liquid state or can be generated on board by means of reforming any qualified hydrogen carrier.

3

Technologies are reaching there maturity and are available today

Class approved fuel cell systems can be obtained today and we are at a momentum to act.

Let's Stay in Touch !



www.Nedstack.com

Roel van de Pas

Chief Commercial Officer
Nedstack Fuel Cell Technology BV
Westervoortsedijk 73, NL-6827 AV, Arnhem

Phone: +31 622 72 11 25

E-Mail: roel.vandepas@Nedstack.com



www.Nedstack.com

Jogchum Bruinsma

Project Manager Maritime Power Systems
Nedstack Fuel Cell Technology BV
Westervoortsedijk 73, NL-6827 AV, Arnhem

Phone: +31 630 03 23 19

E-Mail: Jogchum.Bruinsma@Nedstack.com