



Toshiba Hydrogen Business and Fuel cells

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Toshiba Energy Systems & Solutions Corporation

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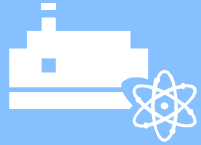
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Company Overview

Company Name	Toshiba Energy Systems & Solutions Corporation
Headquarters	72-34, Horikawa-cho, Saiwai-ku, Kawasaki-shi, Kanagawa
Established	October 1, 2017 (spun off from Toshiba Corporation)
President and CEO	Mamoru Hatazawa
Common Stock	¥56.5 billion
Business Outline	Development, manufacture and sales of energy business products, systems and services
Net Sales	¥568.8 billion (Consolidated net sales of Toshiba group, energy business, FY2019)
Number of Employees	Approx. 6,300 (as of 31st Mar, 2020)

Business Domains

Toward the realization of sustainable society



**Thermal
Power**



**Nuclear
Power**



**Renewable
Energy**



**Hydrogen
Energy**



**Transmission
&
Distribution**



**New
Technology**

Toshiba's Hydrogen Footprint & Line-up



**50kW PAFC
Pilot plant**



**PC25C 200kW
shipment of 280 units**



**H2Rex™
H2 Stationary Fuel Cell
700W to MW**



**Demonstration
H2 Fuel Cell Boat**



**Commercialization
of maritime fuel
cells (2023)**

1980

1990

2000

2010

2020

**11MW PAFC plant
For TEPCO**



**Ene-farm PEFC 700W
For Residential Cogeneration**



**More than 80,000 units
were delivered.**

**H2One™
Hydrogen
Energy Storage**



**FH2R
10MW EC
Power to Gas Demo Plant**



(*1)Phosphoric Acid Fuel Cell
(*2)Polymer Electrolyte Fuel Cell

Demonstration Project Begins for Commercialization of Vessels Equipped with High-power Fuel Cells (NEDO Project)

Demonstration Project Begins for Commercialization of Vessels Equipped with High-power Fuel Cells

-- Japan's First Effort to Achieve Zero Emissions by Using Hydrogen to Power Vessels --

PRESS RELEASE

Hydrogen Energy

R & D / Technology

September 1 2020

NYK Line

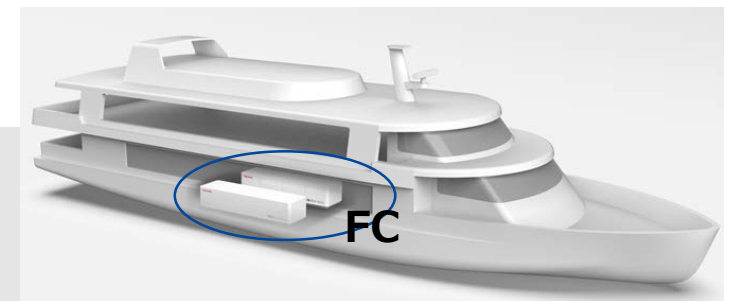
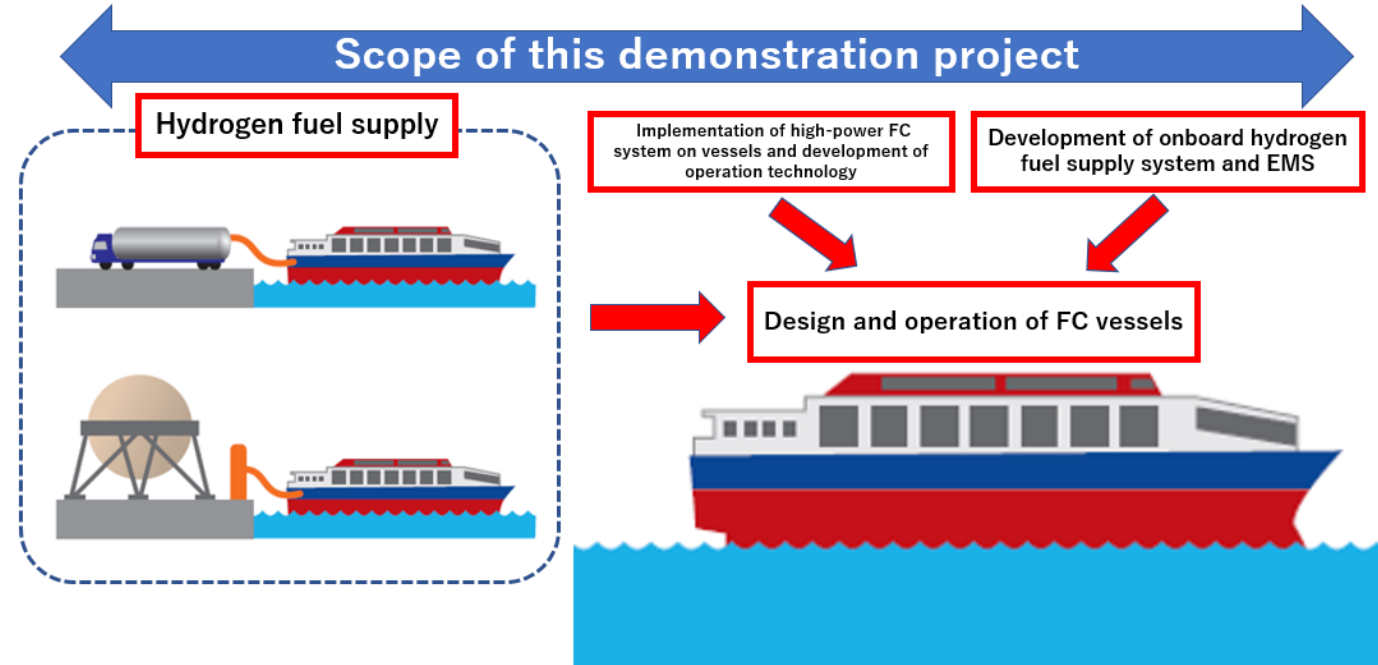
Toshiba Energy Systems & Solutions Corporation

Kawasaki Heavy Industries, Ltd.

Nippon Kaiji Kyokai (ClassNK)

ENEOS Corporation

NYK Line, Toshiba Energy Systems & Solutions Corporation, Kawasaki Heavy Industries Ltd., Nippon Kaiji Kyokai (ClassNK), and ENEOS Corporation (i.e., "the Companies") are pleased to announce that the New Energy and Industrial Technology Development Organization (NEDO) has approved the Companies' participation in a demonstration project for the commercialization of high-power Fuel Cell (FC) vessels. The project, which will begin in September 2020, is Japan's first effort to develop a commercially available FC vessel and carry out a demonstration operation involving the supply of hydrogen fuel. By using FCs as a power source, it will be possible to completely eliminate greenhouse gas (GHG) emissions during navigation.



Maritime fuel cells (image)

Demo. of 150tons high-power Fuel Cells vessel (approx.100 passengers)

- Feasibility study of FC vessel and H₂-fuel-supply in 2020
- Designing the vessel and H₂-fuel-supply equipment in 2021
- Construction and production starts in 2023
- Pilot operation of the vessel in 2024

https://www.toshiba-energy.com/en/info/info2020_0901.htm

https://www.toshiba-energy.com/en/info/info2020_1008.htm

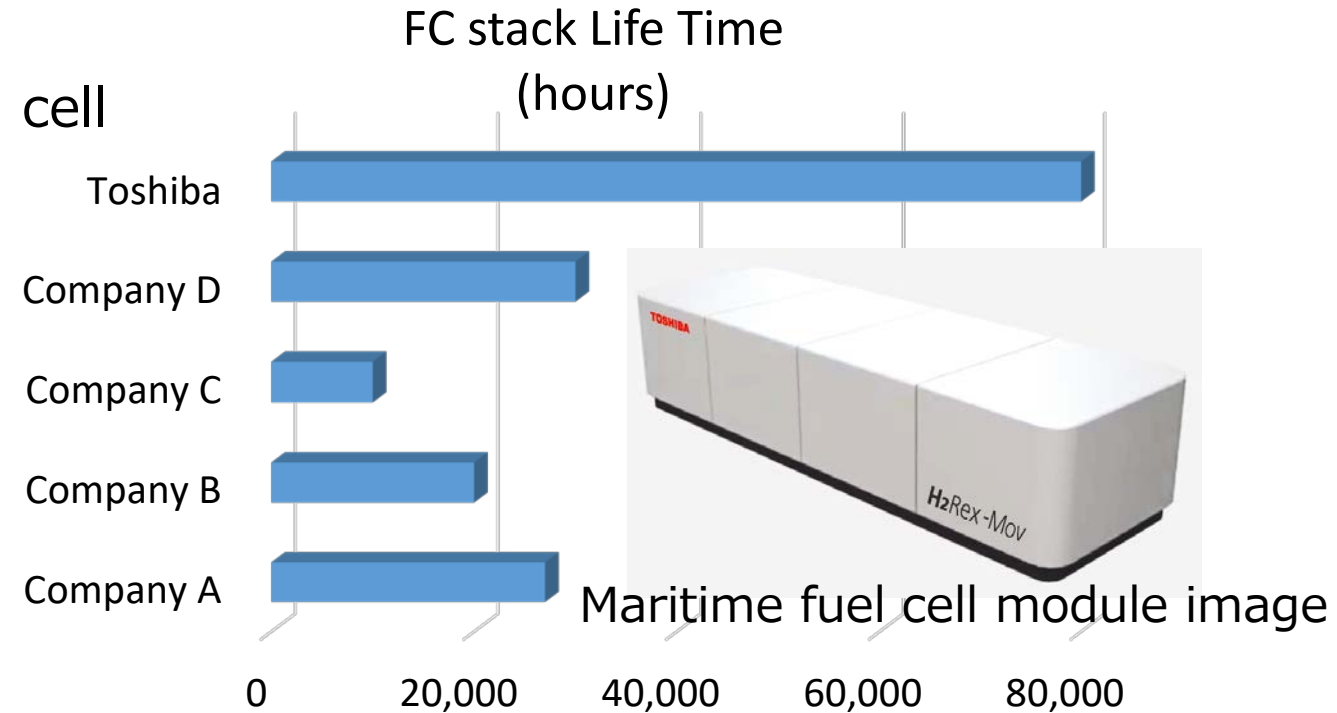
This project introduction video

Advantages of Toshiba Maritime Fuel Cell

- Apply widely proven our stationary PEM fuel cell technologies (More than 80k units)
- Enables continuous maximum output operation over the long life (80k hrs.)
- High power generation efficiency
- Supplied in JFY2023

Design specifications of Toshiba maritime fuel cell

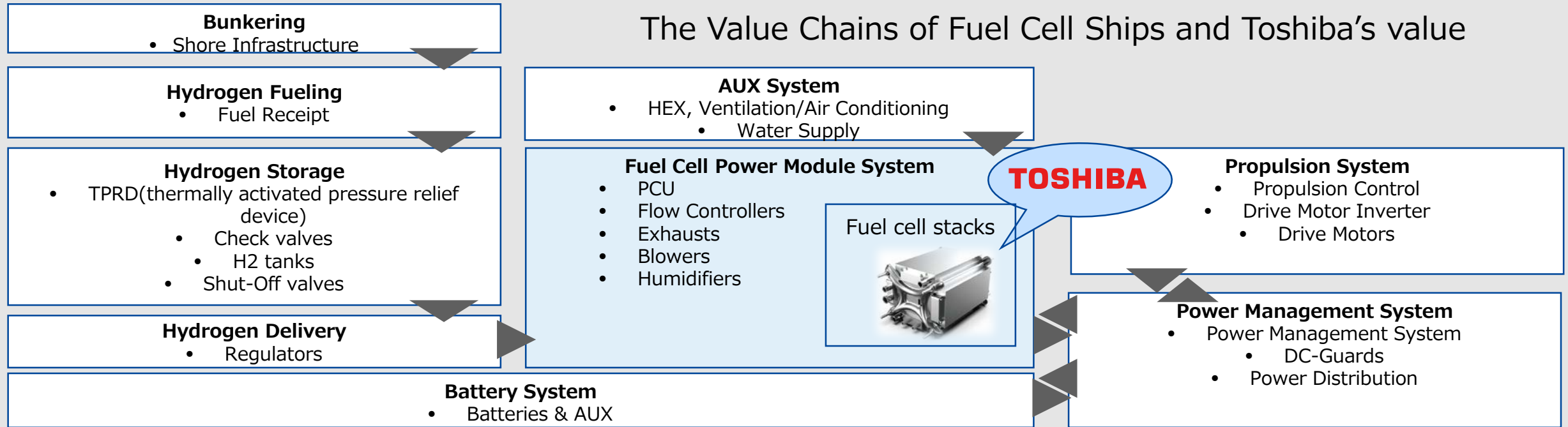
Type	PEM
Max. output	200kW class/module
Design life time	80,000hrs
Regulation	Scheduled to comply with European vessels
Manufacturing capability of cell stacks	20MW/y



Expectations for Biz Collaboration in EU

Towards construction of the partnerships with EU companies

Toshiba can provide technologies and products of the following area.



Our expectations for partnerships

- Marketing & design collaboration
- Joint participation to demonstration projects in EU
- Sales & Manufacturing collaboration

TOSHIBA

Thank you for your attention