

# **Panasonic Contribution to Future Hydrogen Society**

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Smart Energy System Business Division  
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Dec. 4<sup>th</sup>, 2020**

# Agenda

- 1) Panasonic Vision for Hydrogen Society
- 2) Panasonic Current Fuel Cell Activity
- 3) Panasonic Hydrogen Fuel Cell

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# Panasonic Environment Vision 2050

## Panasonic Environment Vision 2050

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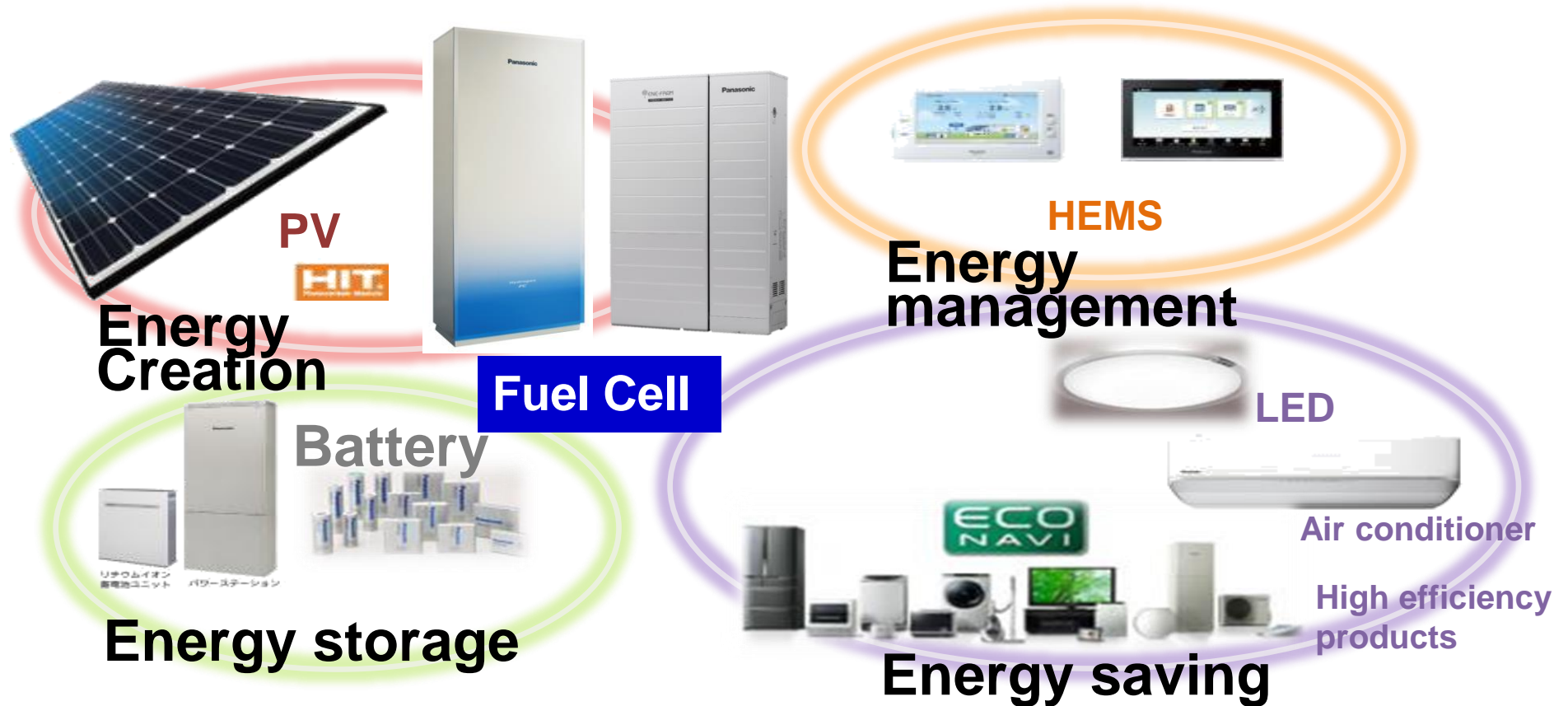
To achieve “a better life” and “a sustainable global environment,”  
Panasonic will work towards  
creation and more efficient utilization of energy  
which exceeds the amount of energy used,  
aiming for a society with clean energy and a more comfortable lifestyle.

**Energy used < Energy created**

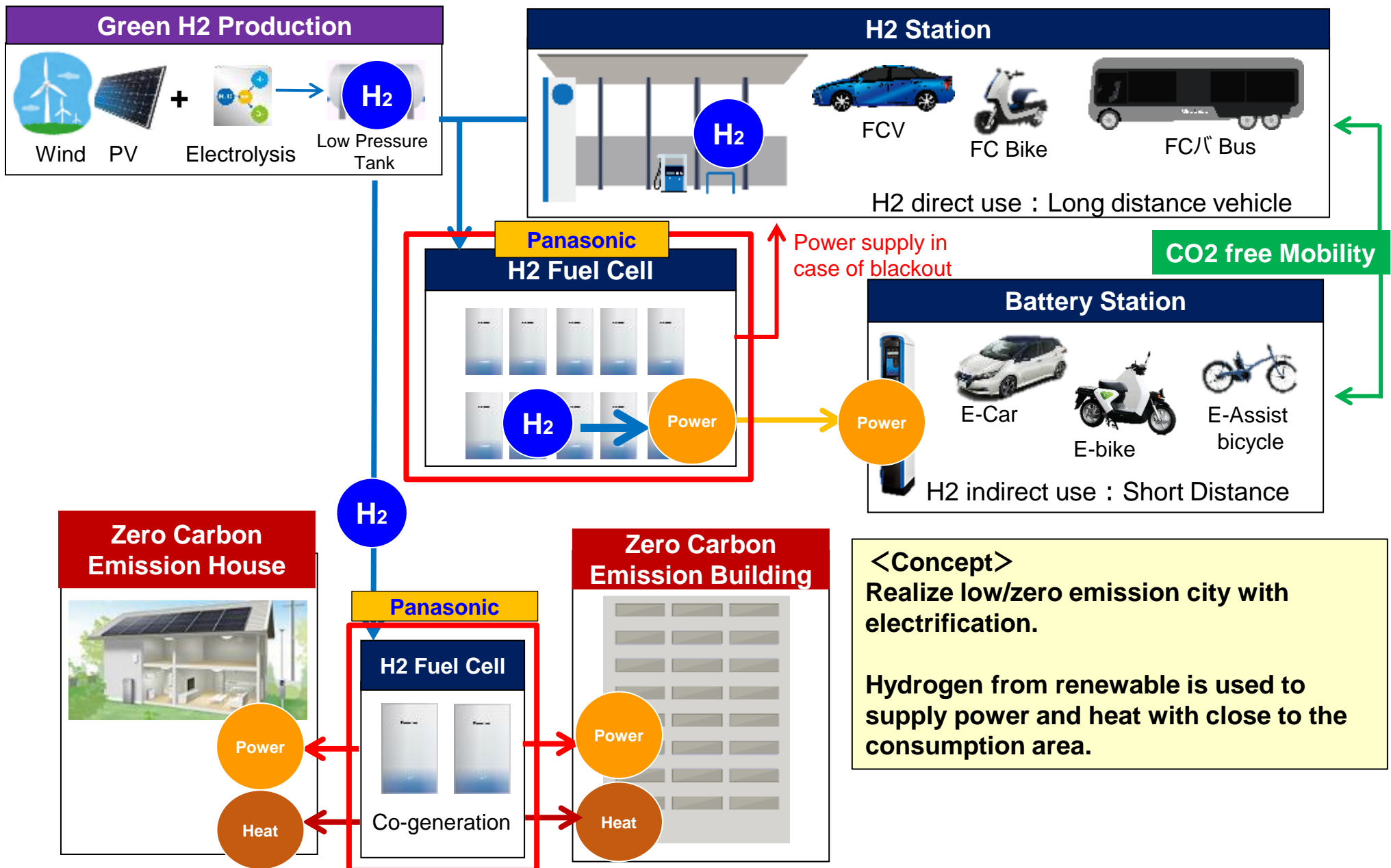
Panasonic

# Panasonic Environment Vision 2050

For this goal, we will contribute to energy-saving and more energy-creation than use with clean energy solution. Fuel cell is one of key items to realize it.



# Low/Zero Carbon Smart City to target “Local production for local consumption of H2”





# Hydrogen Smart City has just started ...

Hydrogen Fuel cell **120kW** and 4,145 units(**2.9MW**) of ENF-FARM will be installed at HARUMI FLAG after Tokyo 2020.

■ 4,145 units of ENE-FARM(Natural-gas type) will be installed (**Total 2.9MW**).



**HARUMI FLAG**

2018年10月31日

5kW  
Hydrogen  
Fuel Cell Generator



**Reduction of CO2 emissions**  
**1.4t/year/unit** Calculated Data by Panasonic

≡

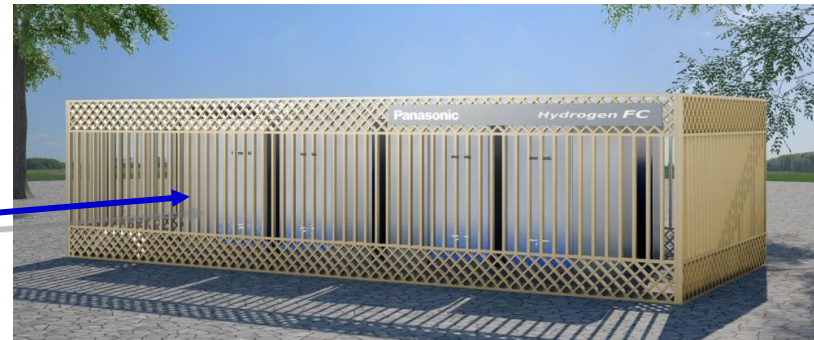


Hybrid car

**Annual total CO2  
Reduction(4,145  
units): 5,800t**



■ Hydrogen Fuel Cell **120kw**  
will be installed in commercial area  
**30kw** (5kw x 6 units) x 4 location



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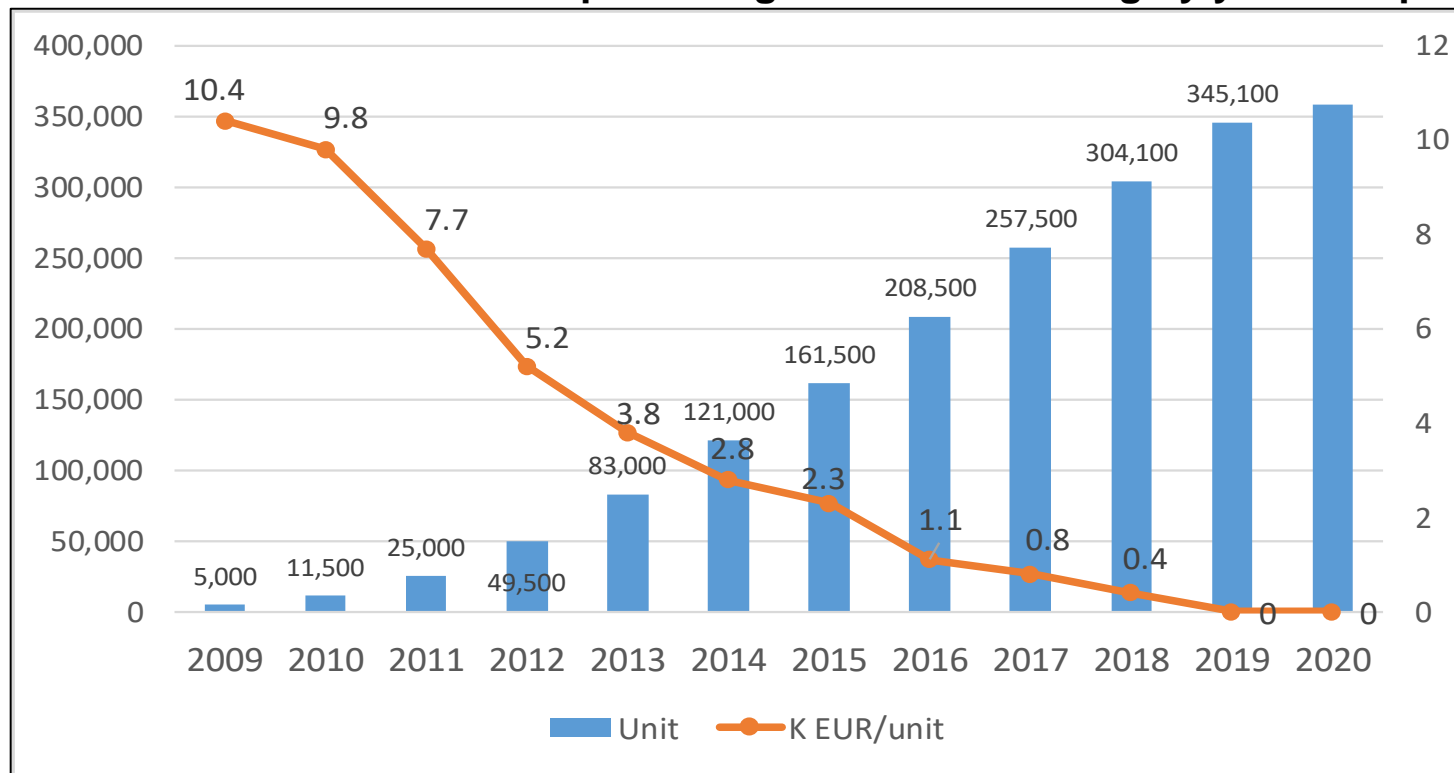


# Japanese Market(Market Expansion of Ene-Farm)

Market has been growing since 2009 while government subsidy is reduced.  
Accumulated industrial quantity achieved 360,000 units as of June 2020.

\*Ene-Farm : Natural gas type fuel cell

## 【Accumulation of Ene-Farm shipment & government funding by year in Japan】



1EUR=125JPY

Source: Cogeneration Foundation, FCA application status our estimate and forecast

\*Above year is fiscal year base from April to March.


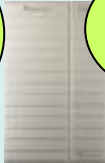
**Total**  
**360,000 units**  
(June, 2020)

**Panasonic**  
**190,000 units**  
(June, 2020)

# History of Panasonic residential fuel cell development(Japan)

From 2009 Panasonic has introduced new model every 2 years to get more acceptance from the market.

Development for higher electrical efficiency, longer durability, compact size/weight to meet market's demand.

	1st Gen (2009)	2nd Gen (2011)	3rd Gen (2013)	4th Gen (2015)	5th Gen (2017)	6th Gen. (2019)
			 <div>World Highest Efficiency 95%(LHV)</div>	 <div>Slim &amp; Compact Design</div>	 <div>• Long life time • Network connection</div>	 <div>• World Highest Efficiency 97% • Compact design</div>
Power	1000-300W	750-250W	750-200W	700-200W	700-200W	700-200W
Durability	40,000h	50,000h	60,000h	70,000h	90,000h	90,000h
Footprint	3.9m <sup>2</sup>	2.0m <sup>2</sup>	2.0m <sup>2</sup>	1.7m <sup>2</sup>	1.7m <sup>2</sup>	1.7m <sup>2</sup>
Weight (FC Unit)	125kg	100kg	90kg	77kg	65kg	59kg

# Joint Development for Europe with our partners

**VIESSMANN**



Vitocalor PA2/PT2

**BDR THERMEA GROUP**

**remeha**



Remeha eLecta

**SENERTEC**



Dachs 0.8

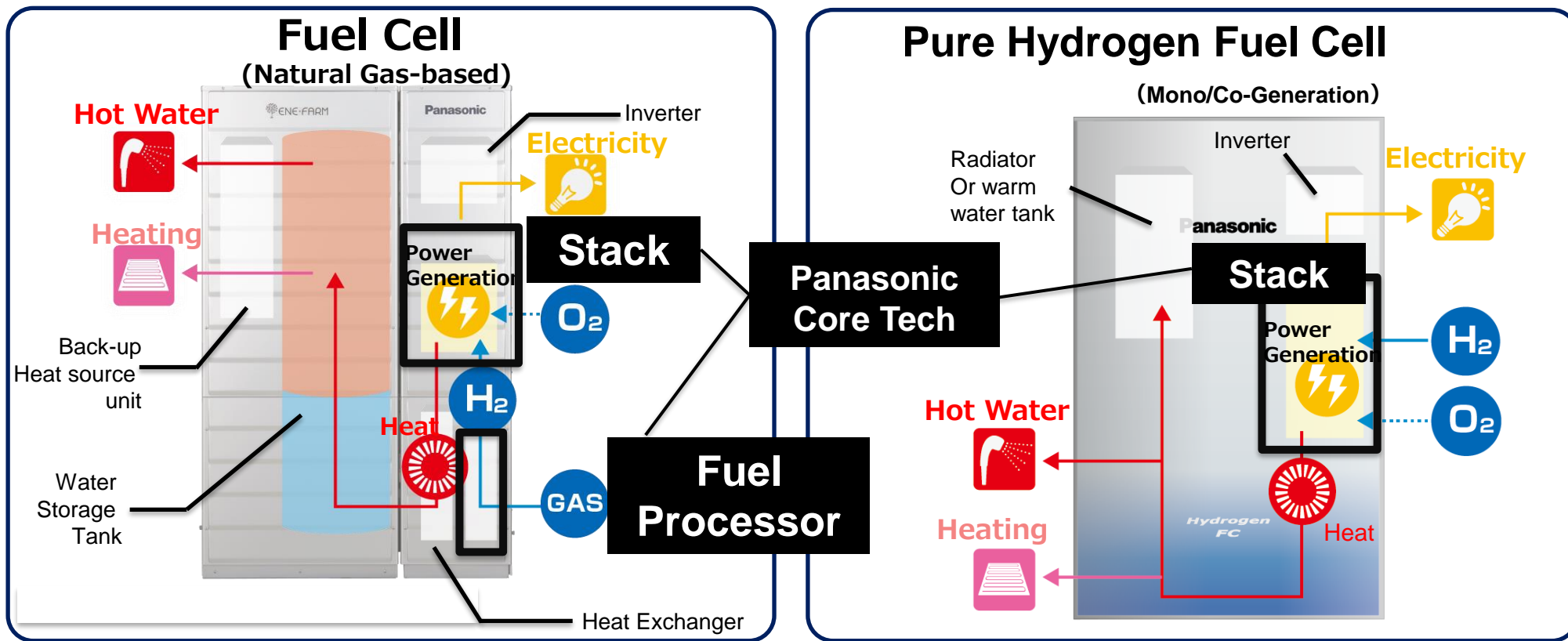
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# Panasonic Pure Hydrogen Fuel Cell Generator

## Horizontal Technology implementation

Hydrogen fuel cell is being developed by using technology and know-how with current mass production Ene-Farm(Natural Gas Fuel Cell)



# Future concept : Flexible System Configuration with optimum output

**Flexibility for a wide range of power request from 700W to large MW level at various installation sites.**

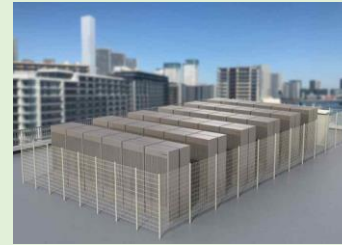
Single unit installation



HARUMI FLAG



Rooftop install of building



Power generate facility



**5kW  
700W**

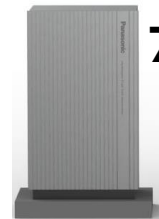
**10MW**



**5kW Unit**



**700W Unit**



# Pure Hydrogen Fuel Cell(5kW & 700W)

## 5KW



**Electrical Efficiency :**

**56%** ※LHV Standard

**Size(mm) :**  
**900(W)×500(D)×1800(H)**

**Output type : Mono, Co-Generation**

**Launch : October 2021 in Japan**



Image of Co-generation unit(Hydrogen-FCU & Hot Water Tank)

## 700W



**Electrical Efficiency :**

**50%(Target)** ※LHV Standard

**Size(mm) :**  
**500(W)×300(D)×890(H)**

**Output type : Mono, Co-Generation**

**Launch : End of 2022(EU)**



Electrolysis





# Field Test for 5kW Hydrogen Fuel Cell(Yokohama, Japan)

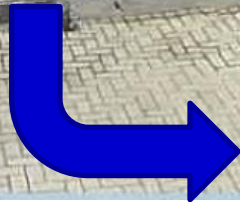


5kW Hydrogen Fuel Cell supplies electric power into the showroom at Hydrogen station.  
(Dec. 2018 ~)



# Field Test for 5kW x 3 units P2G(Yamanashi, Japan)

5kW(Mono-Gen) H-FC  
X 3 units(15kW)



Power generated by hydrogen  
fuel cell is supplied to the  
exhibition room.(May, 2016~)



# Summary

Panasonic contribution to future hydrogen society :

- Flexibility to the requested power output from 700W to large MW.
- High reliability with core technology & long experience from ENE-FARM to implement such on hydrogen fuel cell generator.



**Panasonic**

**Business Partners**

***Thank you for your attention***