

# Statements from Panasonic on Residential Fuel Cell m-CHP

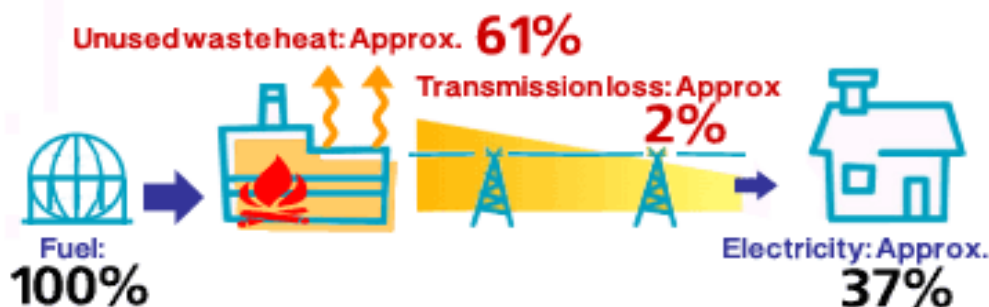
Nov. 17, 2011

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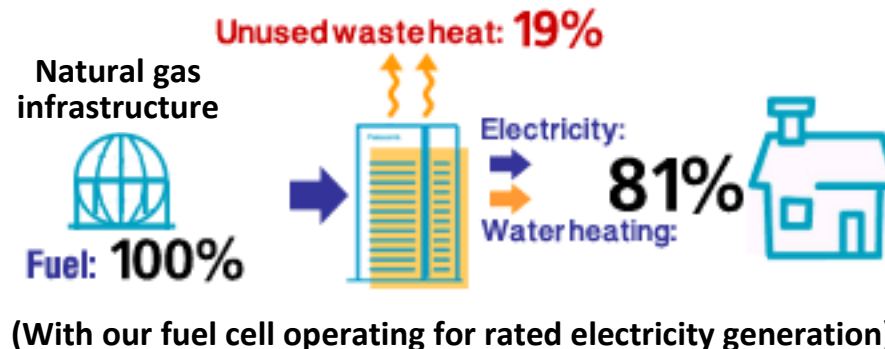
# Fuel Cell m-CHP Benefit : High efficiency & CO<sub>2</sub> reduction

Proven in the market to increase efficiency and reduce CO<sub>2</sub> emissions

## Centralized electricity generation



## Electricity generation at home by FC



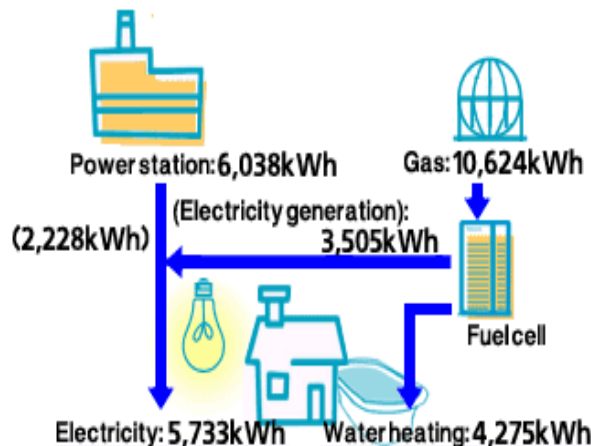
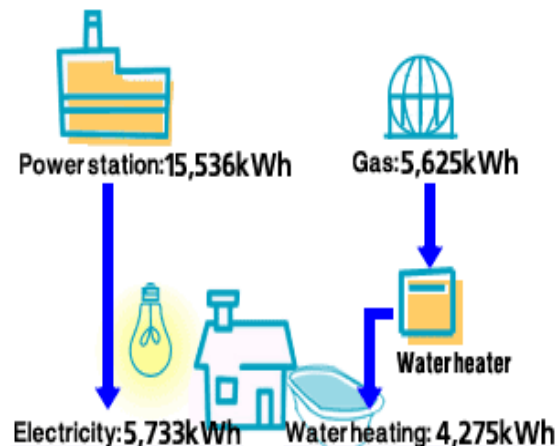
Required energy (Electricity + Water heating): 10,008 kWh (Our estimate for a family of four)

Primary energy input comparison:

Gas water heater  
21,161 kWh

Fuel cell  
16,662 kWh

Energy saving amount  
Δ4,499 kWh



CO<sub>2</sub> reduction  
= 1.5 ton/year

Our estimate  
for a family of four

Detailed information available at <http://panasonic.net/ha/e/FC/index.htm>

# Comparison

## Fuel Cell : High electricity generation efficiency & Low noise level

Type		$\eta$ -Electrical (%-HHV)	$\eta$ -Thermal (%-HHV)	$\eta$ -Total (%-HHV)	Noise (dB(A))	Durability
Power Plant		<b>37</b>	---	<b>37</b>	---	---
<b>m-CHP</b>	<b>Fuel Cell*</b>	<b>36</b>	<b>45</b>	<b>81</b>	<b>38</b>	<b>50000h or 4000SS**</b>
	Internal Combustion Engine***	<b>23.7</b>	<b>59.3</b>	<b>83</b>	<b>43</b>	<b>24000h</b>

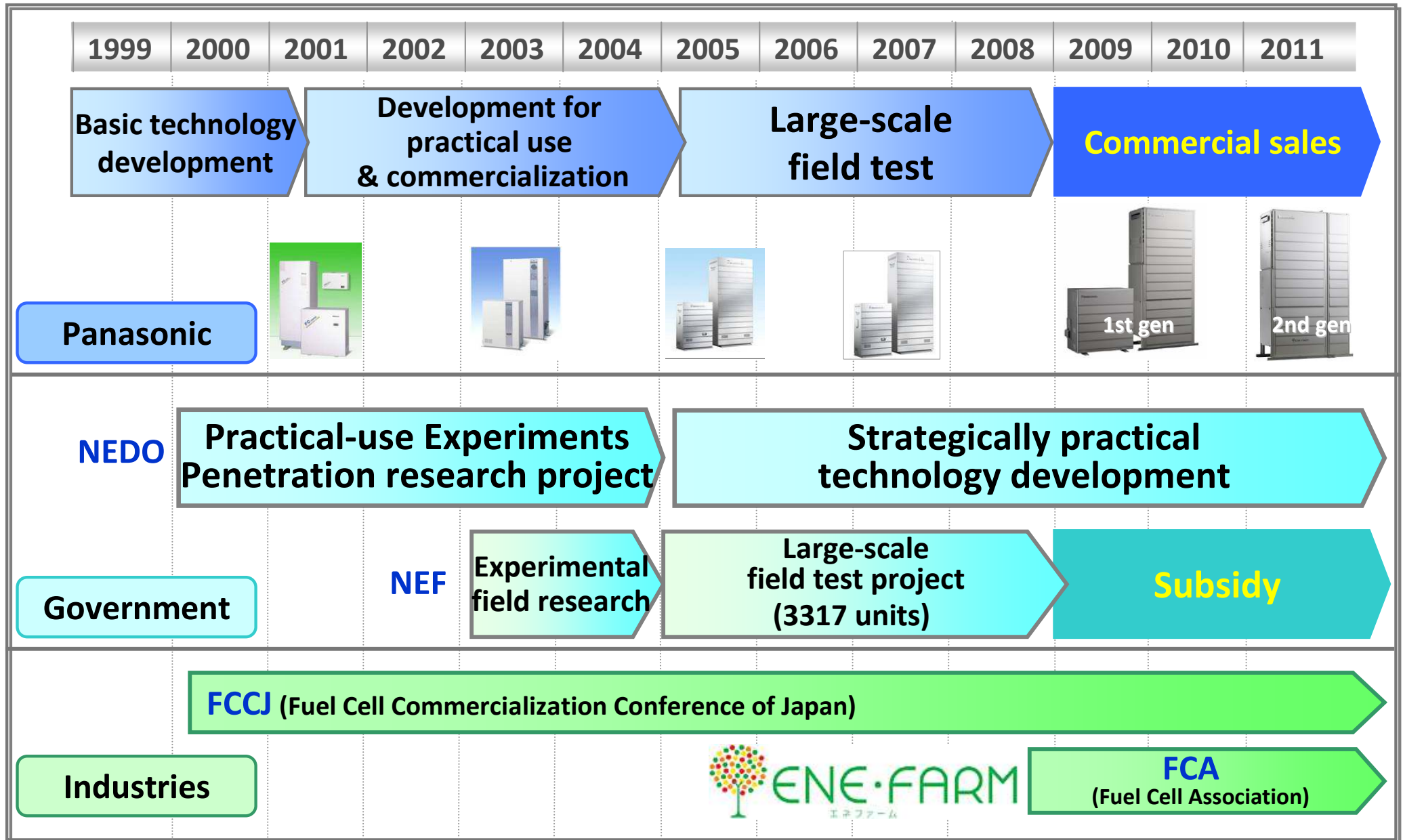
\* start-stop times

\*\* <http://panasonic.net/ha/e/FC/index.htm>

\*\*\* [http://home.tokyo-gas.co.jp/ecowill/ecowill03\\_01.html](http://home.tokyo-gas.co.jp/ecowill/ecowill03_01.html)



# Cooperation for commercialize

Public and private cooperation is essential at all stages



# Commercial product status and further requirements

**Technology has been successfully commercialized  
but further cost reduction is necessary for mass market penetration**

Generation	Electrical Output(W)	$\eta$ -Electrical (%-LHV)	$\eta$ -Thermal (%-LHV)	Durability	Fuel	RRP (EUR)**
1 <sup>st</sup> 	300 -1000	37	52	40,000h or 4,000SS*	Natural Gas	31.5k
2 <sup>nd</sup> 	250 -750	40	50	50,000h or 4,000SS*	Natural Gas	25.1k

\* start-stop times

\*\*tax incl. Tokyo-gas's recommend retail price, 1EUR=110YEN

**1st gen + 2nd gen > 10,000 units**

# Further cost reduction : How to achieve

Mass market penetration can be accelerated by gas standard harmonization considering fuel cell applications

**Manufacturer**

- ✓ New technology development
- ✓ System simplification
- ✓ Low cost material development (catalyst, etc)
- ✓ Each component cost reduction

**Gas standard/regulation considering FC applications**

Example

- ✓ Low sulfur / heavy hydrocarbon
- ✓ Spec uniformity
- ✓ Odorant uniformity

**Cost Reduction**

# Panasonic will realize “Green Innovation” with Fuel Cell technologies.



Thank you!