

Statements from Panasonic on Residential Fuel Cell m-CHP

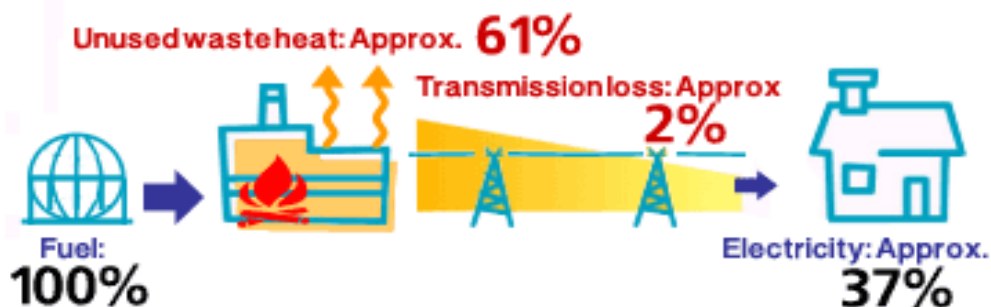
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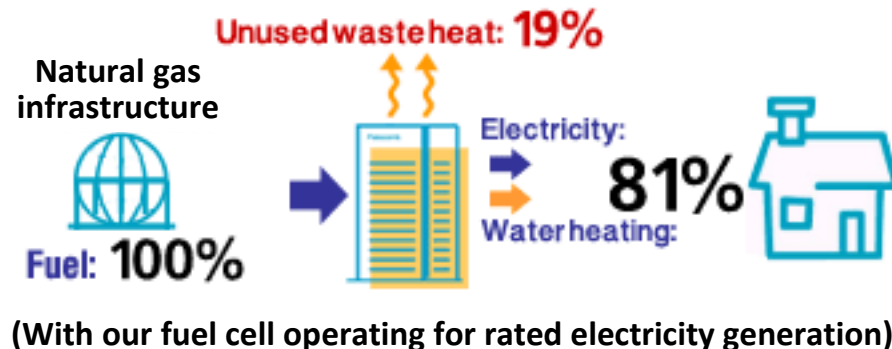
Fuel Cell m-CHP Benefit : High efficiency & CO₂ reduction

Proven in the market to increase efficiency and reduce CO₂ emissions

Centralized electricity generation



Electricity generation at home by FC



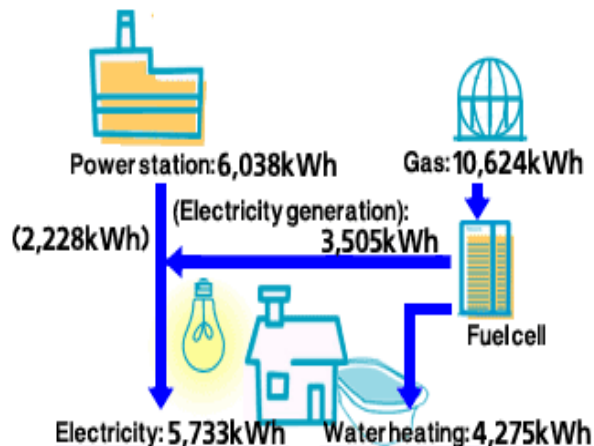
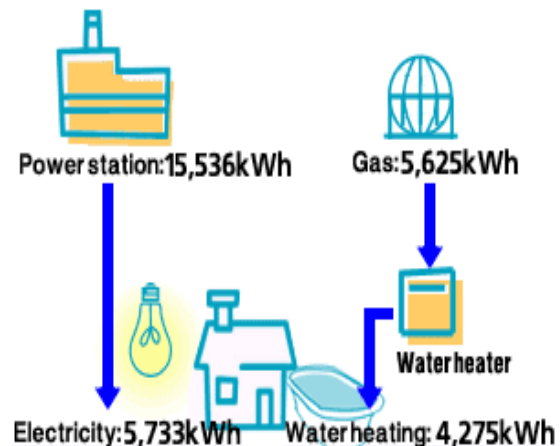
Required energy (Electricity + Water heating): 10,008 kWh (Our estimate for a family of four)

Primary energy input comparison:

Gas water heater
21,161 kWh

Fuel cell
16,662 kWh

Energy saving amount
Δ4,499 kWh



CO₂ 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		η -Electrical (%-HHV)	η -Thermal (%-HHV)	η -Total (%-HHV)	Noise (dB(A))	Durability
Power Plant		37	---	37	---	---
m-CHP	Fuel Cell*	36	45	81	38	50000h or 4000SS**
	Internal Combustion Engine***	23.7	59.3	83	43	24000h

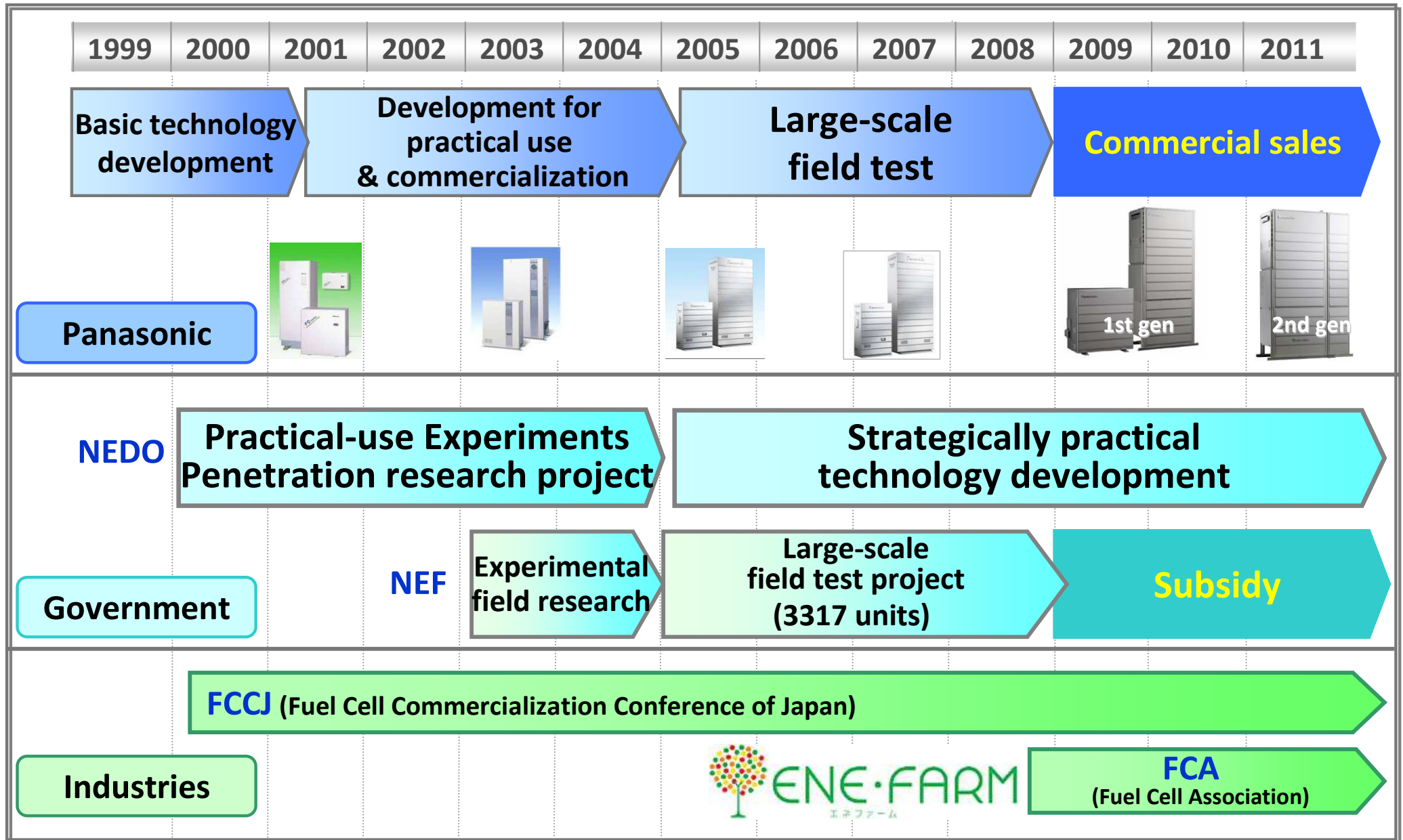
* start-stop times

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

*** 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)	η -Electrical (%-LHV)	η -Thermal (%-LHV)	Durability	Fuel	RRP (EUR)**
1 st 	300 -1000	37	52	40,000h or 4,000SS*	Natural Gas	31.5k
2 nd 	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!