

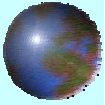
Distributed Energy System - pooling heat and power -

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IPCC Expert Meeting, Tokyo, Japan

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 **The Japan Gas Association**



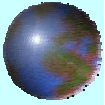
Introduction

- The 21st Century - the Age of Natural Gas
 - ✓ *abundant reserves and low environmental impact*

- Japan's Energy Policy and Energy Supply / Demand Prospects
 - ✓ *shift to natural gas*
 - ✓ *increasing use of distributed energy systems*

Role of Japanese gas utilities

- *to improve the efficiency & economics of natural gas cogeneration systems*
- *to promote distributed energy networks*



Distributed Energy System

vs. Centralised power system

➤ Performance

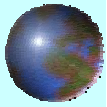
- ✓ *effective use of exhaust heat and no transmission loss*
- ✓ *energy savings through combination of energy systems (ie. distributed + distributed or distributed + centralised)*

➤ Reliability

- ✓ *low risk of investment = high probability to materialise*
- ✓ *additional power source improvement in the stability of power supply for customers*

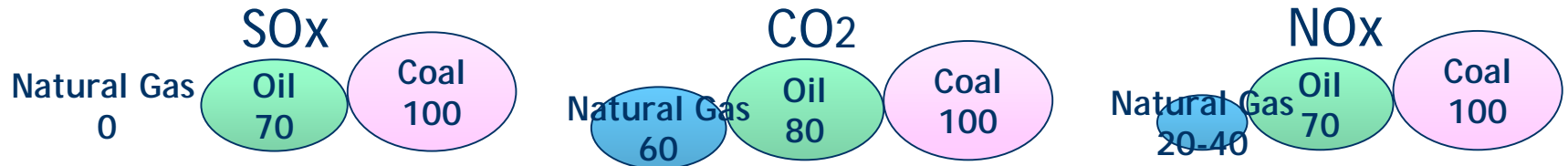
➤ Diversity

- ✓ *players increase in number and competition brings efficiency improvement*



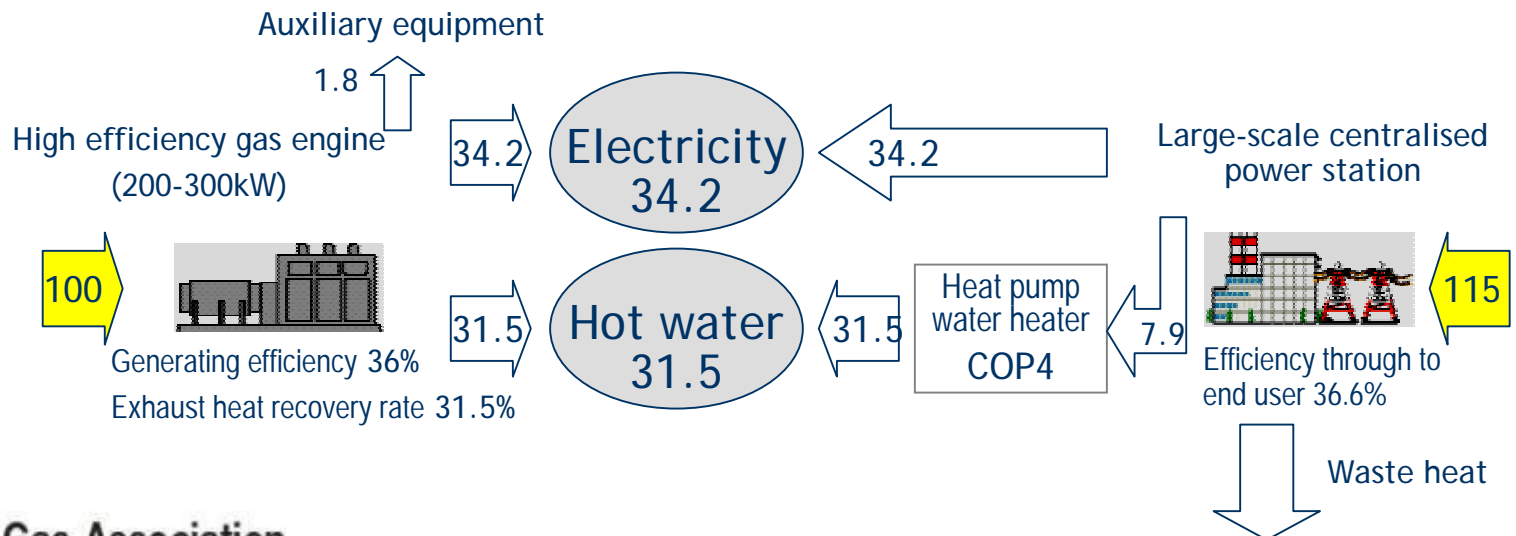
Natural Gas

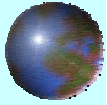
● Combustion Products (Coal = 100)



(Source: The Institute of Energy Economics, Japan)

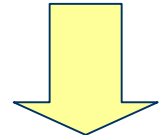
● System Efficiency





CO2 Reduction Potential

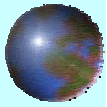
Sector	Consumer/ residential	Consumer/ commercial	Industrial	Total
*Installation potential (GW)	14	27	15	56
**Estimated CO2 mitigation (million t-CO2)	9	29	35	73



Equivalent to 6.2% of Japan's
greenhouse gas emissions in 1990

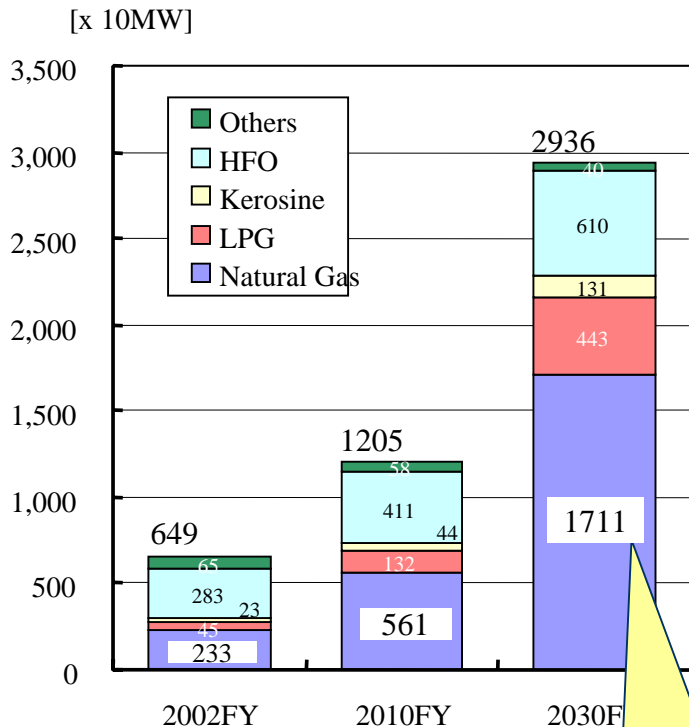
* Installation potential : "New Energy Potential and Economy" (METI, January 2000).

** CO2 mitigation : estimated by Japan Gas Association.

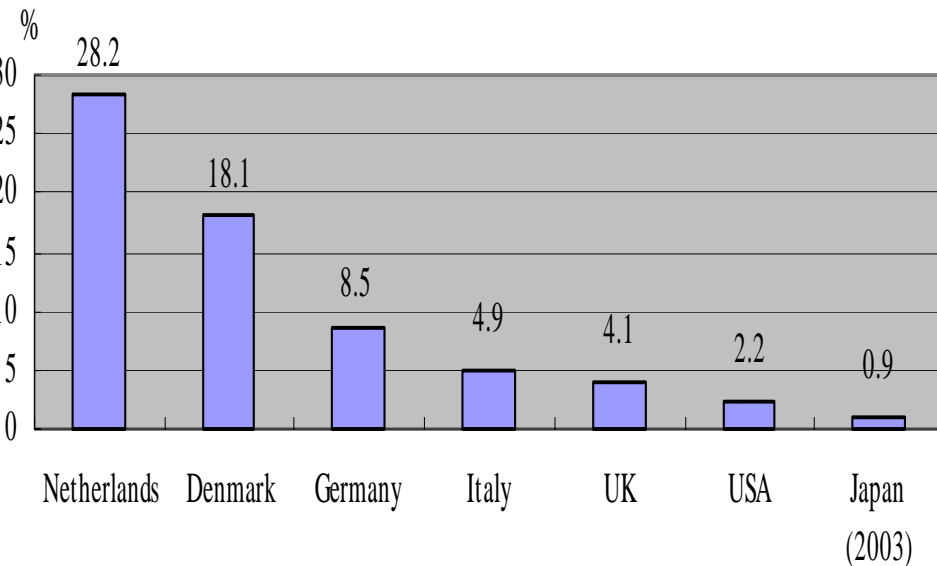


Prospects of Distributed Energy

[Prospects for distributed energy systems in a scenario with progress in energy saving]



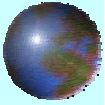
[Share of natural gas cogeneration in the total generating markets (FY 2000):capacity base]



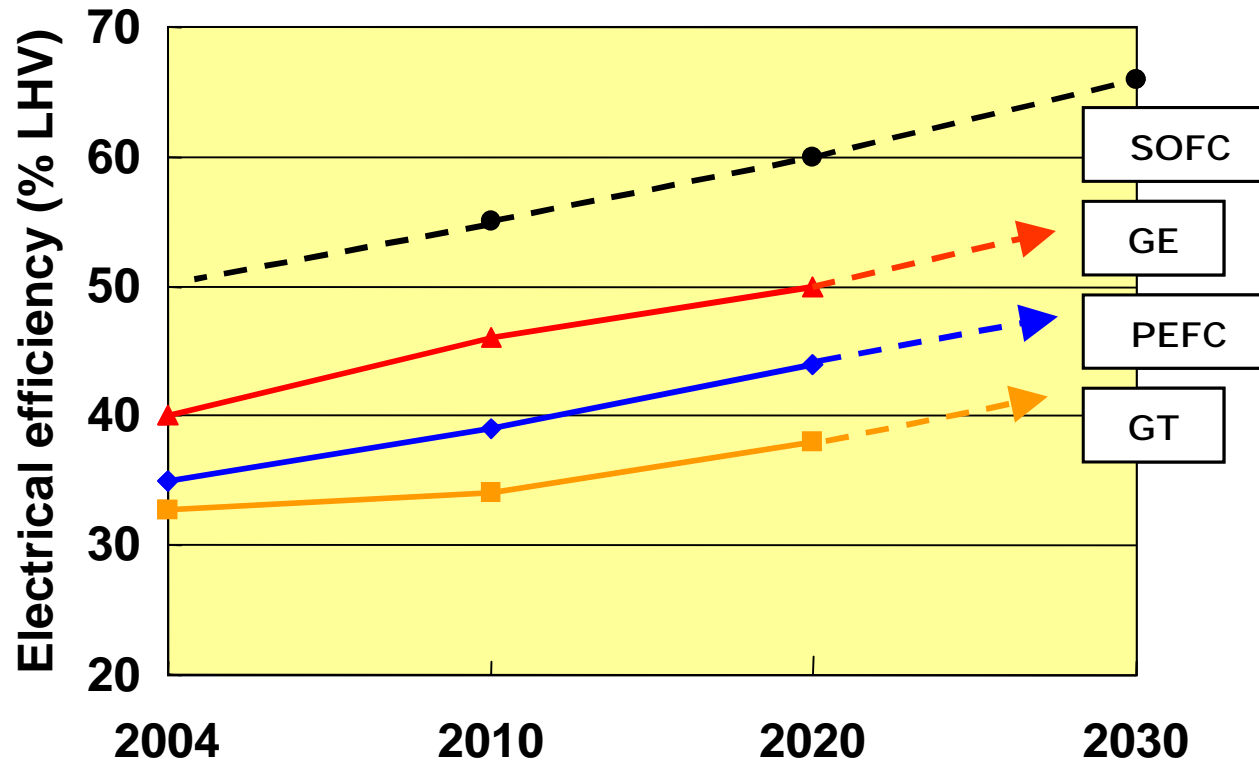
- Incentives available in Europe
- subsidies for installing facilities
 - tax incentives (exemptions from environment tax, etc.)
 - subsidies for development of technology, etc.

Estimated CO2 reduction:
24 million t-CO2
(JGA estimates)

(Source: "Prospects for Energy Supply and Demand in 2030" (METI, June 2004))

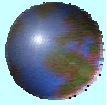


R&D on the Efficiency

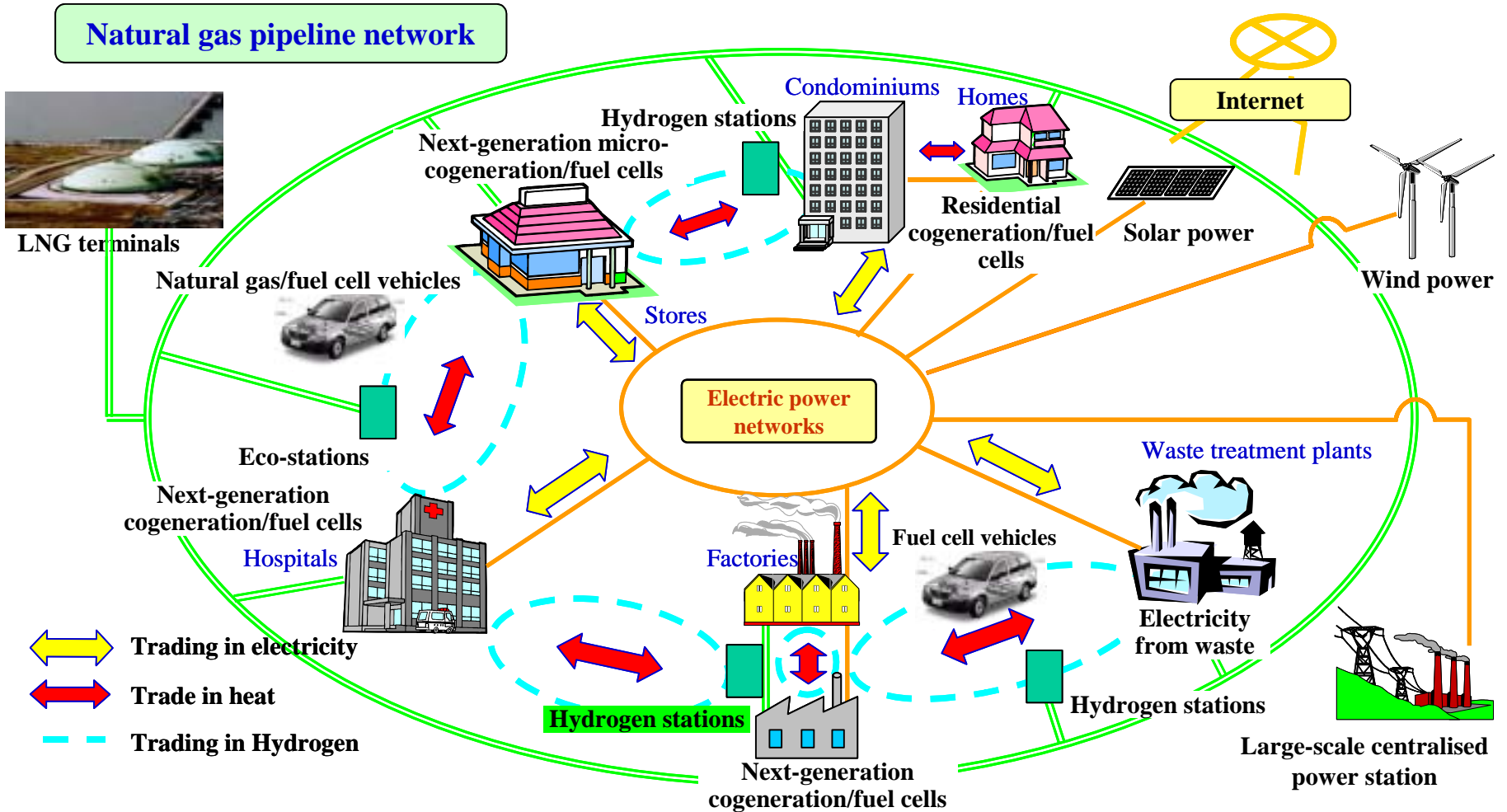


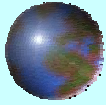
Note: SOFC: solid oxide fuel cells, PEFC: proton-exchange membrane fuel cells, GE: gas engines, GT: gas turbines

(Source: Surveys for Formulation of Policy for Energy Technology Strategy (in the Field of New Energies) (MITI, March 2000))

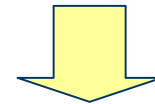
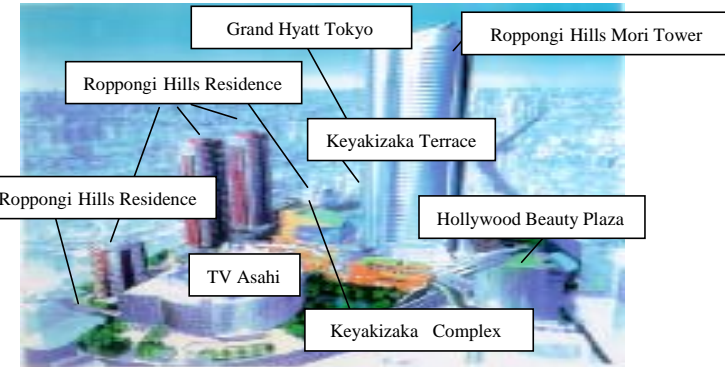
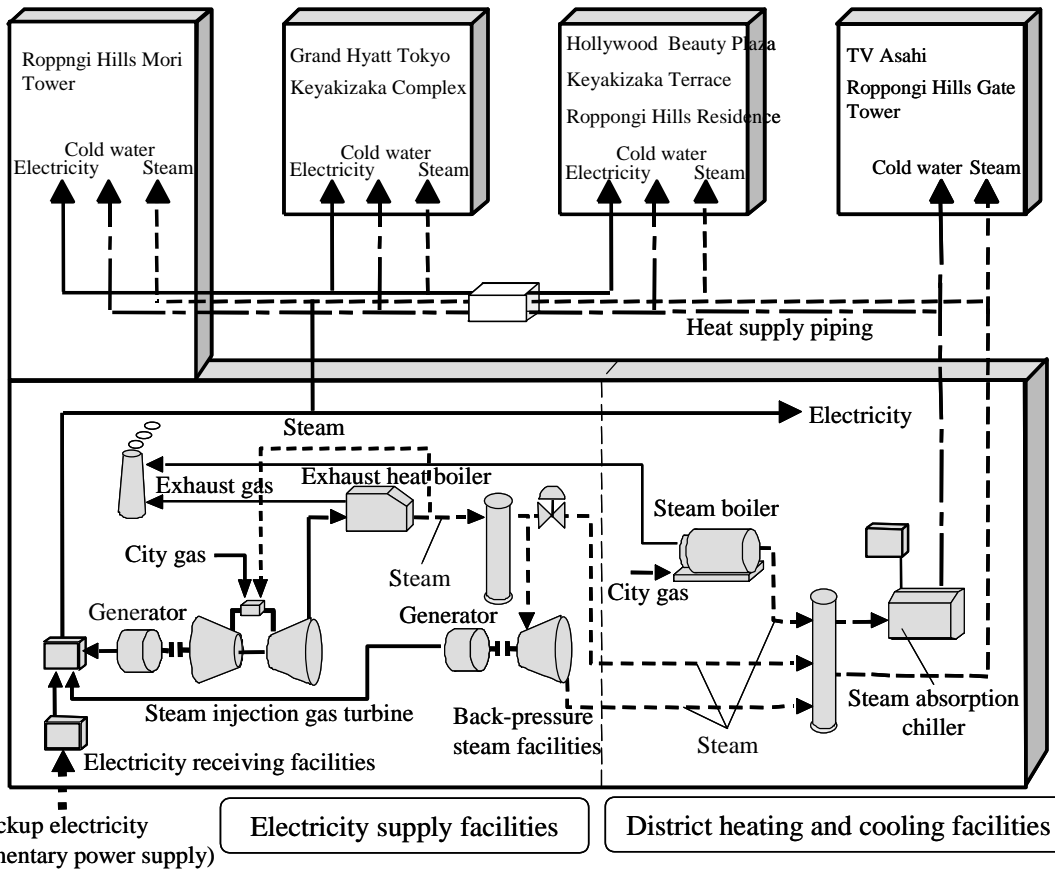


Energy Pool





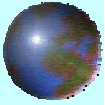
Roppongi Hills : an example



<Effect of distributed energy system (estimated) >

Reduction in primary energy consumption: 20%

Reduction in CO2 emissions: 27%



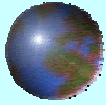
Agenda for the Future

Potential sites for heat and power pooling:
More than 1,000 locations identified in Japan

(Source: Japan District Heating & Cooling Association)

- Coordinated action by the national and the local governments with private sectors
 - ✓ *to make pooling a standard feature of urban development projects*
 - ✓ *to take the initiative in introducing core facilities of pooling*
 - ✓ *to incorporate renewable energies, etc.*

- Easy access method to the power grid

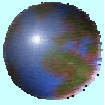


Business Creation



Flow of onsite energy service business	Diagnosis for energy savings Procedures for system introduction /adjustment	Procurement of equipment Installation work	Equipment ownership	Operation/control Inspection and maintenance Measuring/remote monitoring	Areawide load adjustment (Electricity/heat etc.)	LNG purchasing Gas supply	Financial services
ESCO, ESP businesses	←-----→					←-----→	
	Entry into new market					Business expansion	
Engineering companies	←-----→						
Trading companies	←-----→					←-----→	
Heavy electric manufacturers Energy appliance manufacturers		←-----→		←-----→			
Construction and construction materials companies		←-----→					
Building management companies			←-----→				
Energy supply companies (Gas, electricity, oil, etc.)	←-----→					←-----→	
Financial institutions (Banks, securities companies, leasing companies, etc.)		←-----→					←-----→
Users						←-----→ Power supply cogeneration	

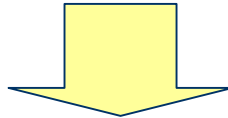
*Solid lines mark core business areas



Conclusions

➤ Connecting distributed energy systems to local area networks

- ✓ *to maximise energy efficiency,*
- ✓ *to provide new business opportunities,*
- ✓ *to make a variety of services available to customers.*



Japanese experience and technology will be transferred overseas by ESCO's and ESP's as their business expands, which is the key to achieving energy savings and CO2 reductions on an international basis.