



Energy and Technology Policies

- Japan's Perspectives and Experiences

CARB Chair's Air Pollution Seminar
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Outline

- I) Background
- II) Energy and Technology Policies
 - eg. “Top-runner program”
- III) Asia Pacific Partnership on Clean Development and Climate (APP)



I) Background

Historical Background on Energy Efficiency in Japan

- 30 years Lessons learnt from energy crisis & economic growth

Year	Events	Priorities
1960-	High Economic Growth	Large Quantity of Inexpensive Oil
1973-	Oil Crises	Security of Energy Supply
1985-	Plaza Accord	Efficiency of the Market Mechanism
1992-	United Nation Framework Convention on Climate Change	Harmony with Environment

- Due to the limited land, resources, ...
 - Need to be efficient
 - Technologies: core competence in business

Improvement over last 30 years

Oil Stockpiling

Alternatives to Oil

Nuclear

Gas

Coal

Oil

Energy Conservation

(Energy Intensity in Manufacturing)

1973

2003

56days

168days

0.6%

13%

1%

13%

16%

19%

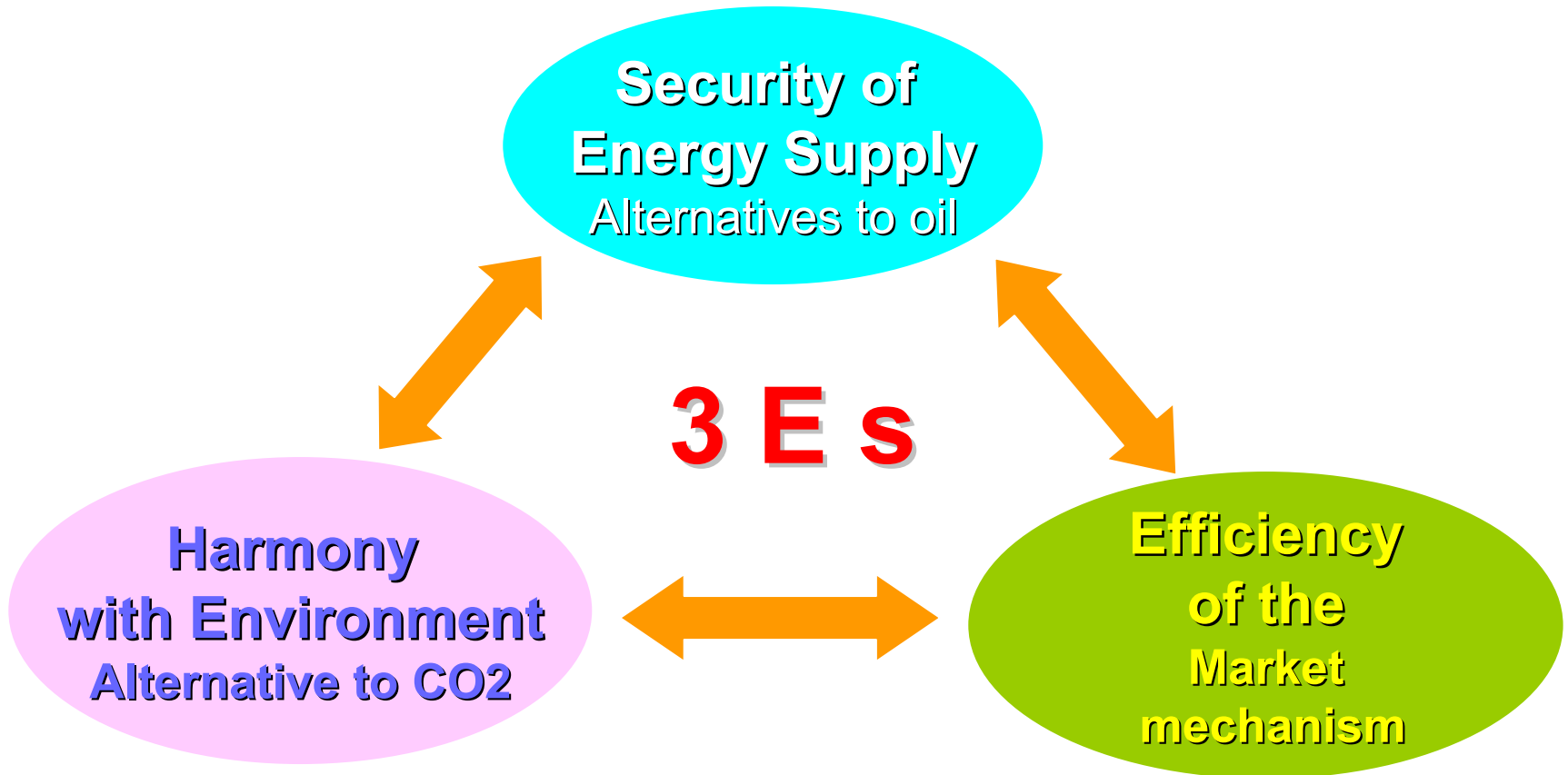
77%

49%

100

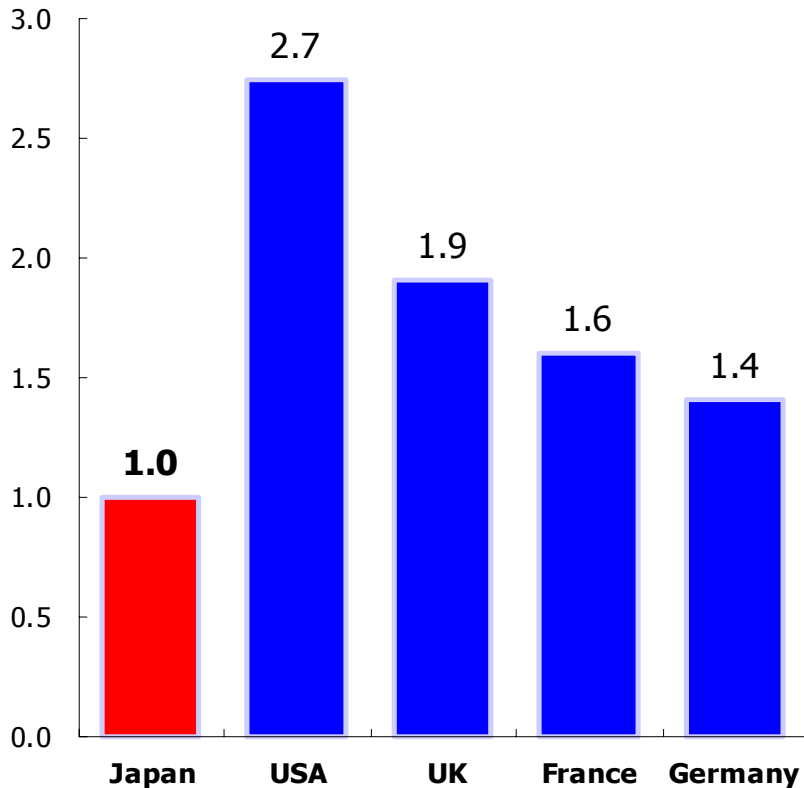
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Basic Principles of Japan's Energy Policy : 3Es



Energy Conservation

Comparison of Energy Consumption per GDP



*Energy Consumption in 2001 (k l :Oil Equivalent) / GDP in 2001
 * Converting Japan as 1

International Comparison of Energy Consumption Rates (Japan=100)

	Japan	USA	UK	France	Germany
Steel	100	118	112	103	111
Chemicals	100	118	120		
Paper	100	161	-	-	-
Cement	100	180		110	120

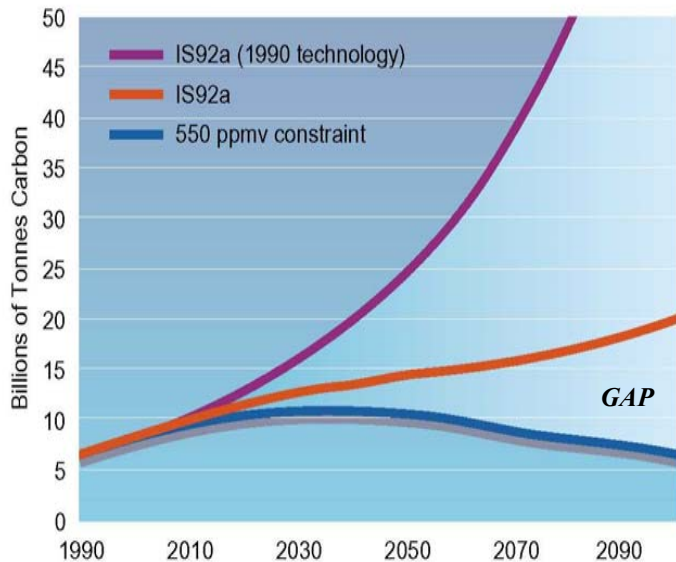
Source : Subcommittee on Demand & Supply, Advisory Committee for Natural Resources and Energy, Interim Report 1998

※Chemicals shows the unit of soda industry.
 ※Cement shows the unit of calcination process.

Development and diffusion of innovative technologies

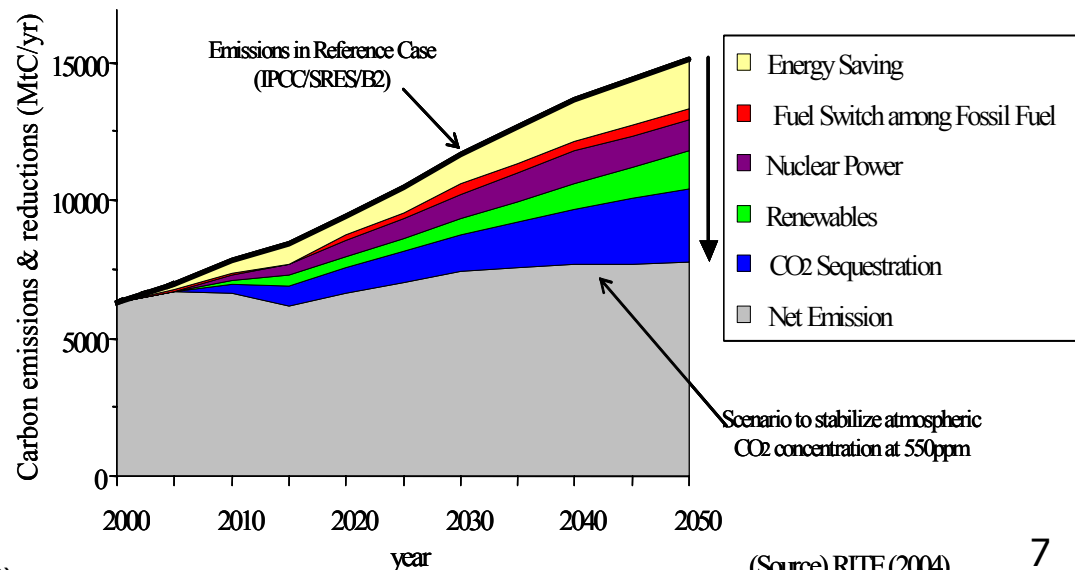
- Stabilization of GHG concentrations can be achieved only through development and diffusion of innovative technologies, together with maximum use of existing technologies.
- There is *no silver bullet*. Need to pursue multiple technologies.
- Future framework has to incorporate a mechanism for promoting efforts for innovative technologies.

Fig: Importance of innovative technologies in CO₂ emission reduction



(Source) Battelle (2000)

Fig: CO₂ emission reduction by various technologies



(Source) RITE (2004)

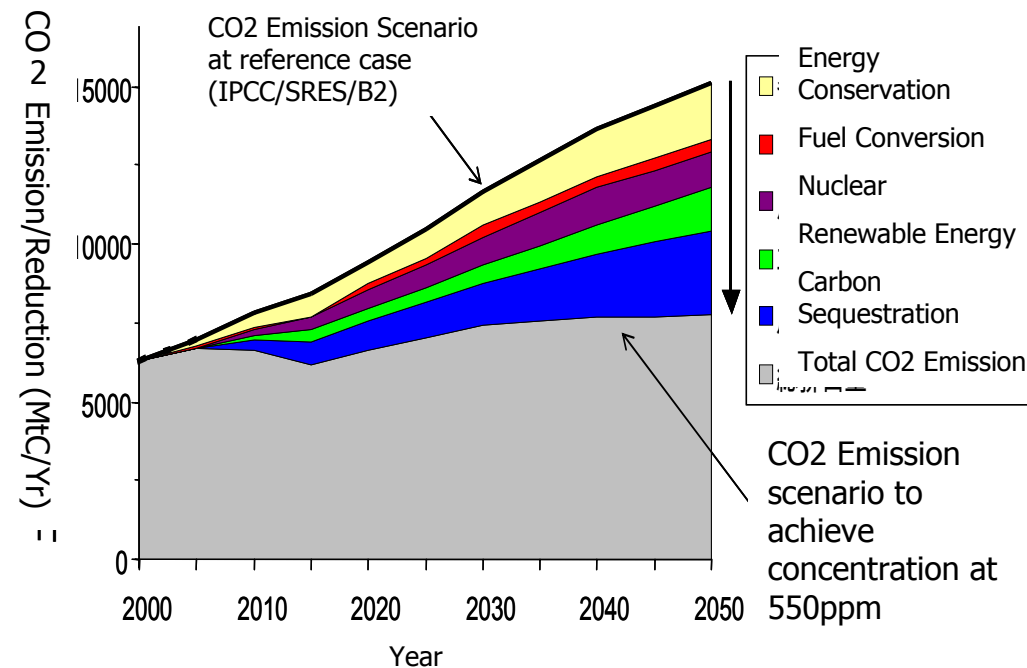


II) Energy and Technology Policies

Emphasis on Energy-Related Tech. R&D Prgms.

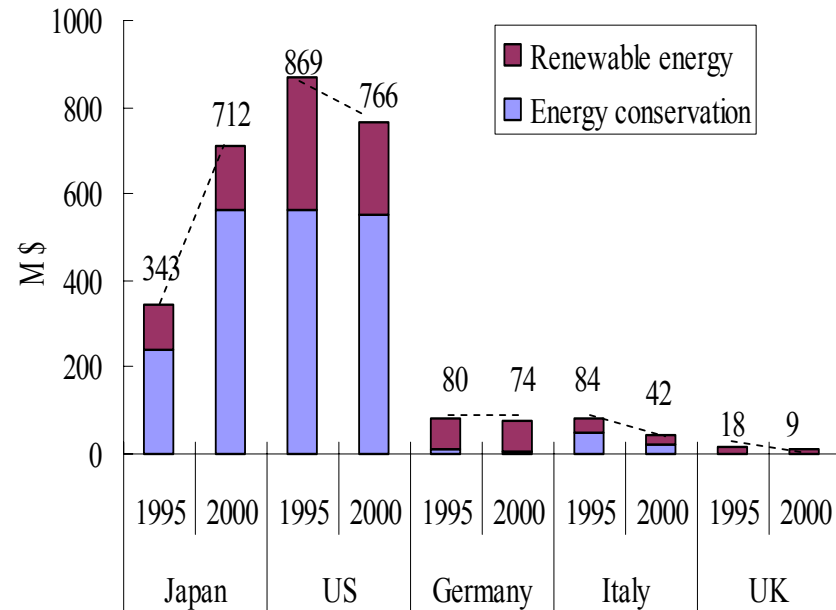
- Innovative technologies are necessary for sustainable development as well as for stabilization of GHG gas concentration in the long run.
- The Government of Japan has put emphasis on energy-related R&D with a view to reducing emissions not only domestically but also globally.

Fig: Expected Effect of reduction of CO2 emission by technology



(Source) RITE DNE+ Model

Fig: Energy-related R&D investment by government

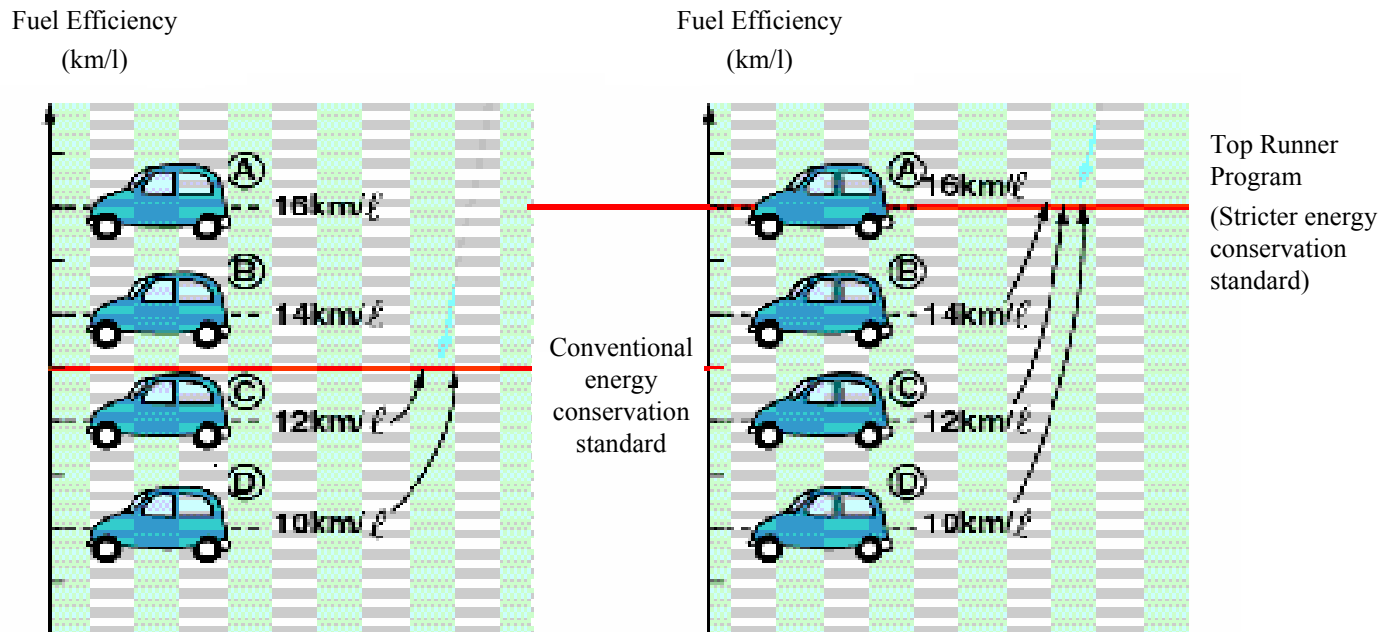


(Source) IEA (2002)

Top Runner Program (1)

The Top Runner Program sets the level of the energy efficiency standard of the product in the market in consideration of the existing highest efficiency and the potential technological improvements.

- Introduced in 1998
- Energy conservation standards for home/office appliances and fuel efficiency standards for automotives
- Adopts a values of the product with the highest energy efficiency as a base value of a product category
- Targets are to be revised in 4 to 8 years, reflecting the outlook for future technological developments



Top Runner Program (2)

- Main features

- Covers energy-use products used in large volumes, which consume substantial amounts of energy
- Provides manufacturers incentives for developing more energy efficient equipment
- Diffuses more efficient products in the market

The Top Runner Program creates “Win-Win” situation and virtuous cycle.

- Target products (21 Items)

1 Passenger Vehicles	8 Fluorescent Lights	15 Copying Machines
2 Freight Vehicles	9 Electric Toilet Seats	16 Space Heaters
3 Air Conditioners	10 TV Sets	17 Gas Cooking Appliances
4 Electric Refrigerators	11 Video Cassette Recorders	18 Gas Water Heaters
5 Electric Freezers	12 DVD Recorders	19 Oil Water Heaters
6 Electric Rice Cookers	13 Computers	20 Vending Machines
7 Microwave Ovens	14 Magnetic Disk Units	21 Transformers



Top Runner Program (3)

- How to establish “Top Runner” standards
 - Technical and methodological evaluation by the Advisory Committee
 - Committee’s membership
 - industry representatives, academic experts, researchers, consumer representatives, local government representatives
 - Target standard and year set in consideration of the technological improvement
 - Working group study, subcommittee deliberations, etc.
 - Public comment
 - Report to the WTO/TBT
 - Avoid trade barriers to imported products
 - Amendment of the government ordinance

Top Runner Program (4)

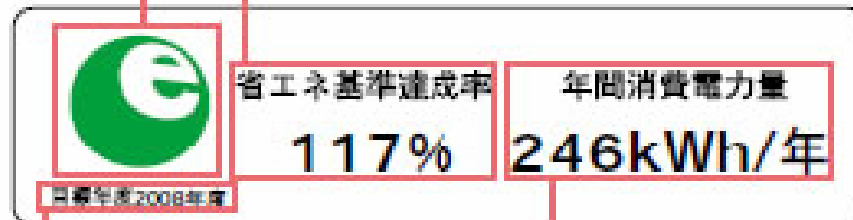
- Related measures to diffuse the target product
 - Display obligations
 - Manufacturers are required under the “Notification” to display the energy efficiency information
 - Penalty can be imposed if the manufacturer does not obey the order from the Ministry
 - Retailer assistance
 - Government awards are given to the excellent shops.
 - Labeling System
 - Promotes the diffusion of the target products

Energy-saving symbol

Green symbol is given to products meeting Energy Conservation Standard. Orange symbol is for products failing to meet the standard.

Energy Conservation Standard achievement percentage

Percentage shows how much a given product achieves Energy Conservation Standard (target standard value). Target standard values are provided for in Energy Conservation Law for each product category. Higher the percentage, the better energy-saving performance is. As for computers and magnetic disk units, products achieving the standard will have “A”, “AA” or “AAA”.



Target fiscal year

Targeted timing to achieve Energy Conservation Standard. Target fiscal year is provided for in Energy Conservation Law for each product category.

Energy consumption efficiency

An index (e.g. annual energy consumption) shows how much energy a given product consumes, and which is obtained by using a measuring method provided for each product category.



Top Runner Program (5)

- Verification Methods
 - To confirm achievement of standards, questionnaires are distributed to the manufacturers
- Measures to the manufacturers in non-compliance
 - Government offers recommendations to the manufacturer in question
 - If the recommendation is not followed, the manufacturer may be ordered to follow the recommendation

Top Runner Program (6)

- Assessment of the target achievement
 - Many products show better improvement of efficiency in the earlier stage than planned

Products	Improved Efficiency Ratio (actual)	Improved Efficiency Ratio (planned)
TV sets	25.7 % (FY1997-2003)	16.4 %
VCRs	73.6 % (FY1997-2003)	58.7 %
Air Conditioners	67.8 % (FY1997-2004)	66.1 %
Electric Refrigerators	55.2 % (FY1998-2004)	30.5 %
Electric Freezers	29.6 % (FY1998-2004)	22.9 %
Passenger Vehicles	22.0 % (FY1998-2004)	23.0 % (FY1995-2010)

Efforts for innovative technologies

- Quite a few energy technologies such as nuclear, gas-turbine and photovoltaic were developed by technology-push.
- GOJ's photovoltaic program induced private sector's R&D at initial stage and realized cost-down at deployment stage.

Fig: Total worldwide installations of photovoltaic power system

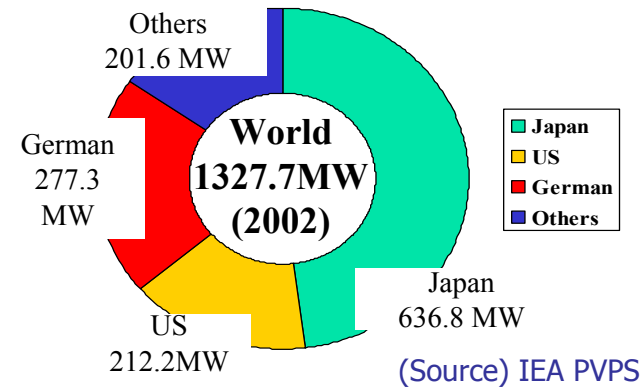
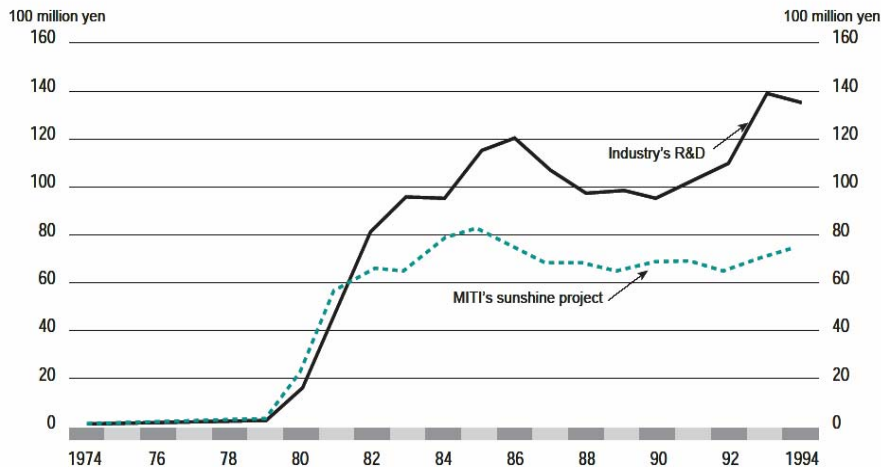
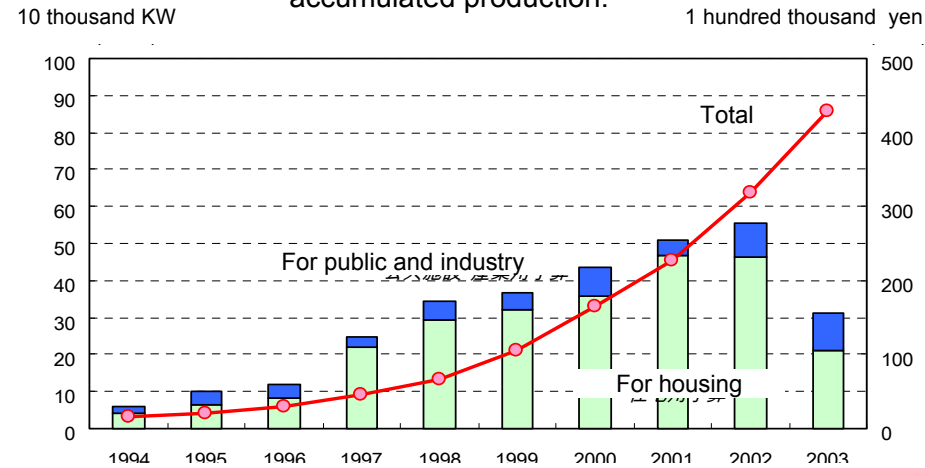


Fig : Public and private R&D expenditures on photovoltaic.



(Source) Watanabe (1999)

Fig : Support for installation of photovoltaic and accumulated production.



(Source) The Institute of Energy Economics, Japan (2005)
 (Reference) Agency for Natural Resources and Energy, METI

R&D Program on New Energy Technologies

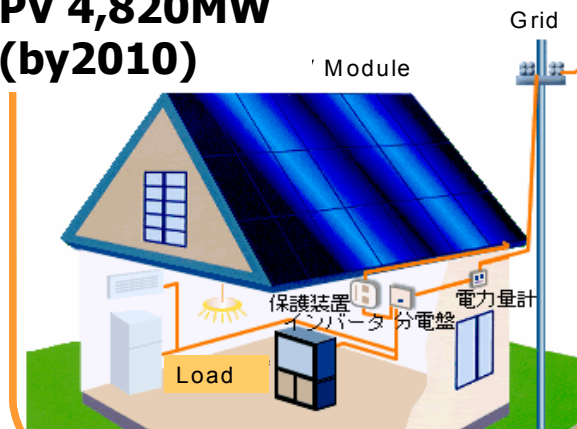
Goal: To contribute to stable and efficient energy supply, solution to the global warming (CO₂) problem and global environment (NO_x, particulate matters, etc) problem, creation of new industry/employment, and realization of hydrogen society.

Targets:

1. Enable new technologies in the long run to play a role as one of major energy resources by conducting strategic government-industry-academia cooperation in R&D activities to reduce their cost, to stabilize their supply and to improve their performance.
2. Contribute to achieve the introduction target of new energy (19.1 million liter by 2010) as well as the introduction target of fuel cell technology (2,200 MW for stationary FC and 50,000 FCVs).

Budget: FY 2006 JPY 58.2 billion (FY 2005 JPY 58.7 billion)

**PV 4,820MW
(by2010)**



**FC 2,200 MW & FCV 50,000
FCVs (by 2010)**

- Fuel cell cars
- Stationary fuel cell



Innovative Technology Program on Global Warming Prevention

Goal: To establish a sustainable society with a good balance of 3E (environment, energy and economy) by promoting R&D and introduction of the innovative technologies to radically improve energy efficiency, to fix and use CO₂, and control 3 gases including substitute chlorofluorocarbon.

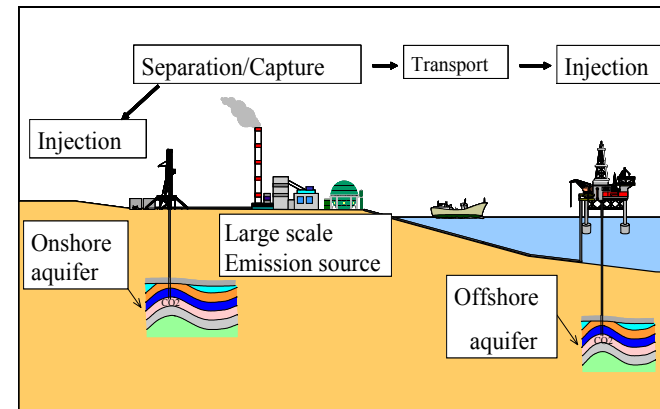
Targets:

Establish in the long run effective technologies contributing to further reduction of CO₂ emission in order to ensure sustainable economic growth with constraining energy consumption and to secure industrial competitiveness through world top-class global prevention technologies.

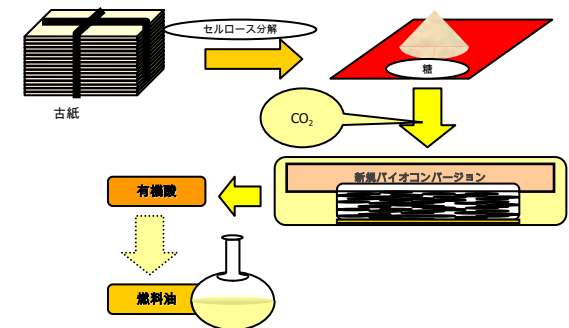
Budget: FY 2006 JPY 5.7 billion (FY 2005 JPY 5.3 billion) (for CCS) / FY 2006 JPY 1.1 billion (FY 2005 JPY 1.2 billion) (for 3 gas) /

Development of technology to store CO₂ underground

Progress of CO₂ Aquifer Sequestration Project



Development of CO₂ fixation technology based on the effective use of used paper



Model Projects for Int'l Energy Efficiency

As of August 2006

Project name	Host country	Counterpart	Implementation site	Entrusted company	Term of project implementation
The Model Project for Utilization of Waste Heat from Incineration of Industrial Waste in Industrial Estates	Thailand	Ministry of Industry/Industrial Estate Authority of Thailand	Bang-poo Industrial Estate	NKK CORPORATION	1999–2005
The Model Project for Flare Gas and Hydrogen Recovery Systems in an Oil Refinery	Indonesia	Directorate General of Oil and Gas, Ministry of Energy and Mineral Resources	Balikpapan Refinery of Pertamina	Cosmo Engineering Co., Ltd.	2002–2005
The Model Project for Increasing the Efficient Use of Energy	Kazakhstan	Ministry of Energy and Mineral Resources/The Government of West Kazakhstan Region/Ministry of Natural Resources and Environmental Protection	Zhaiykteploenergo	Tohoku Electric Power Co., Inc.	2002–2006
The Model Project for Renovation to Increase the Efficient Use of Energy in a Brewery	Vietnam	Ministry of Industry/Ministry of Natural Resources and Environment	Uralsk Heat and Electric Power Station"	MAEKAWA MFG. CO., LTD.	2003–2005
The Model Project for High Performance Industrial Furnaces	Indonesia	Ministry of Industry and Trade	Thanh Hoa Brewery Company, Hanoi Beer Alcohol Beverages Corporation	NIPPON STEEL CORP.	2003–2006
The Model Project for Energy and Water Saving in the Textile Dyeing and Finishing Industry	Thailand	Department of Industrial Promotion, Ministry of Industry	PT. Gunung Garuda	KRI, Inc.	2004–2005
The Model Project for Ethanol Production from Molasses and Bagasse in a Sugar Factory in Thailand	Thailand	Office of the Cane and Sugar Board Ministry of Industry Kingdom of Thailand	Thong Thai Textile Co., Ltd.	Marubeni Corporation	2006–2007
The Model Project for Increasing the Efficient Use of Energy Using a Coke Dry Quenching System	India	Department of Economic Affairs, Ministry of Finance/Ministry of Steel	Thai Roong Ruang Energy Co., Ltd.	NIPPON STEEL CORP.	2006–2009

III) Asia-Pacific Partnership on Clean Development and Climate (APP)





Asia-Pacific Partnership on Clean Development and Climate (APP) (1)

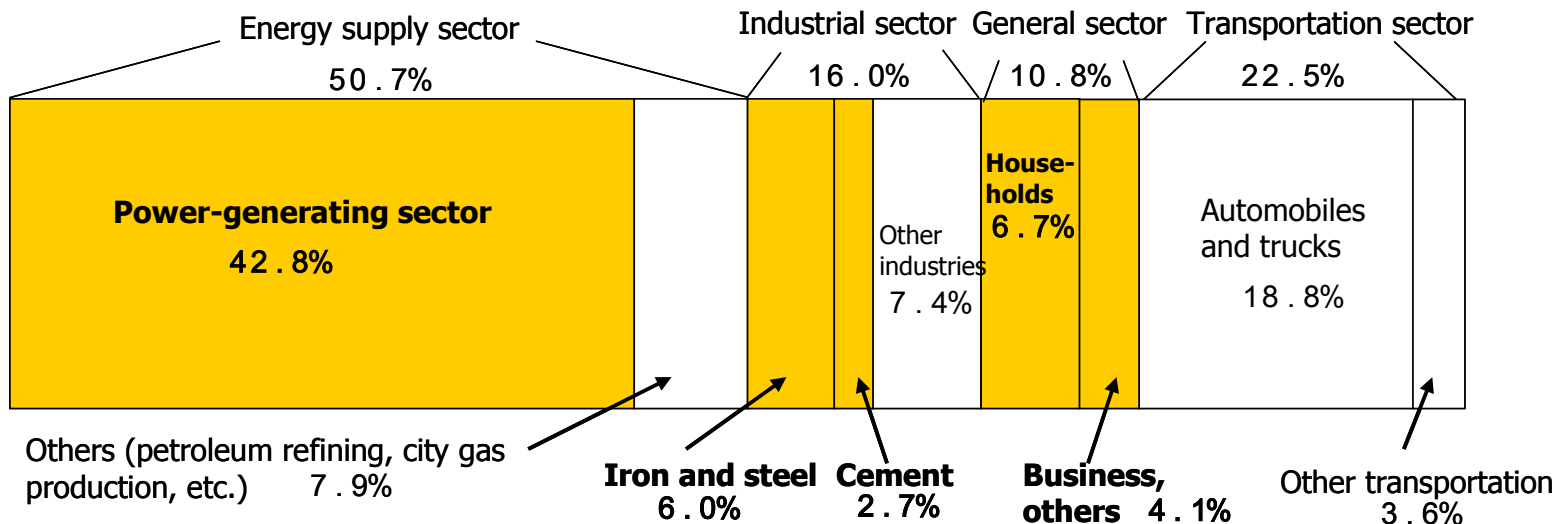
- Partners
 - Australia, China, India, Japan, Korea, USA
- Characteristics
 - Complement to Kyoto Protocol, Technology-oriented, Sectoral approach, Public-Private partnership, project- and activity-based
- Potential
 - Significant shares in these major sectors in the world

Asia-Pacific Partnership on Clean Development and Climate (APP) (2)

- 8 public-private sector Task Forces:
 - (1) Cleaner fossil energy
 - (2) Renewable energy and distributed generation
 - (3) Power generation and transmission
 - (4) Steel
 - (5) Aluminium
 - (6) Cement
 - (7) Coal mining
 - (8) Buildings and Appliances

Japan leads: (4) Steel and (6) Cement
US leads: (3) Power generation and transmission and (7) Coal mining

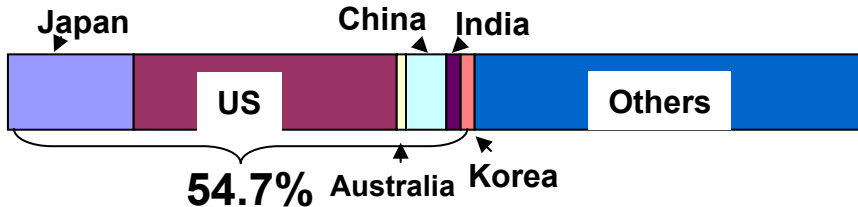
Percentage of CO2 emissions by sector in 6 APP countries



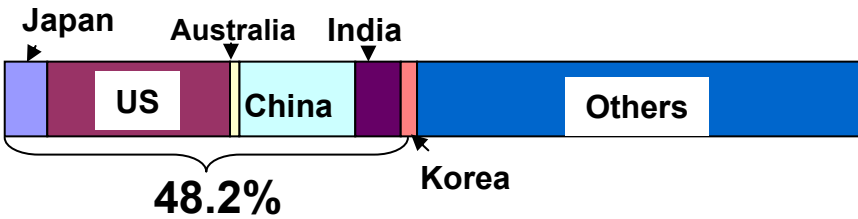
Asia-Pacific Partnership on Clean Development and Climate (APP) (3)

- APP countries share about half of the world production

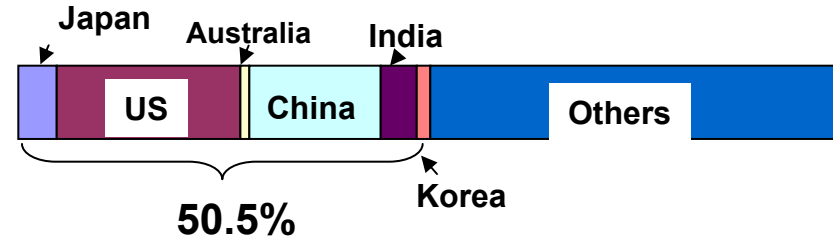
Actual GDP (2003)



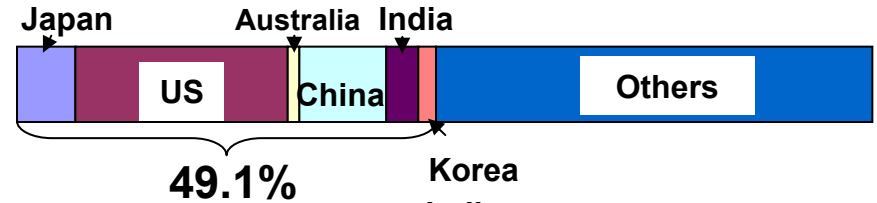
Primary energy consumption (2003)



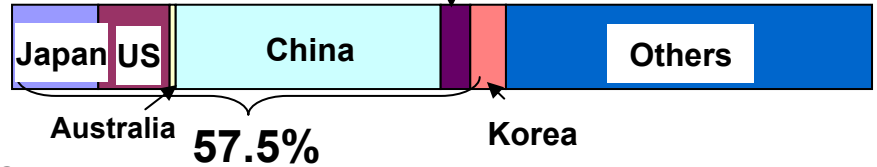
CO₂ emissions (2003)



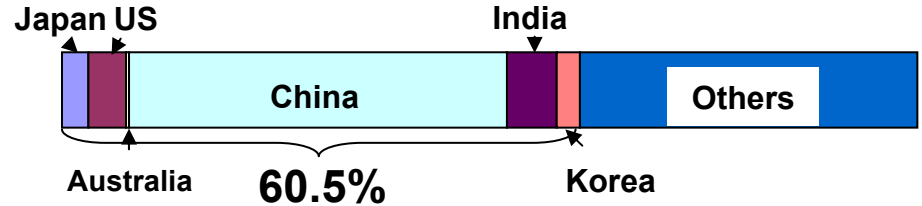
Power (kWh)



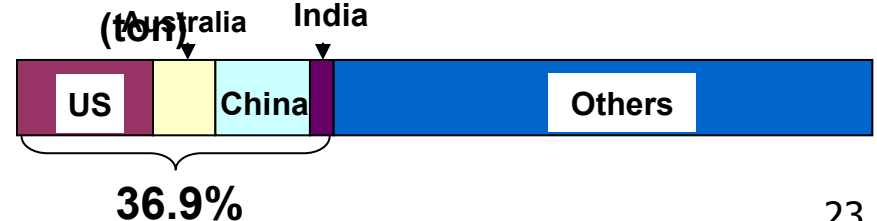
Steel (ton)



Cement (ton)



Aluminum (ton)





Asia-Pacific Partnership on Clean Development and Climate (APP) (4)

- 3rd Policy Implementation Committee (PIC) meeting
 - Oct. 11-13, 2006 @ Jeju Island, Korea
 - Main outcomes
 - Endorsed the all Action Plans in principle
 - APP is experiencing an important transition from “Planning” to “Implementation”
 - Recognized the importance of financing to the project activities
 - Strong demands for financing from project participants
 - The number of projects: 92 (as of October 31, 2006)
 - Agreed on some procedures such as flagship and outreach
 - Foundations for the future activities

Asia-Pacific Partnership on Clean Development and Climate (APP) (5)

- For future activities of APP
 - Incentives to China and India
 - Private companies need short term results
 - Capacity building through cooperative work with US or Japanese business partners
 - Collaboration with IEA
 - “Sectoral approach”
 - To develop energy efficiency indicators in each industrial sector
 - To identify “best-practices”
 - Exchange views between APP and IEA
 - To give insights for IEA’s task



Thank you for your attention.

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