

Energy Efficiency and Future Cornerstones for Economic Success



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Vice President

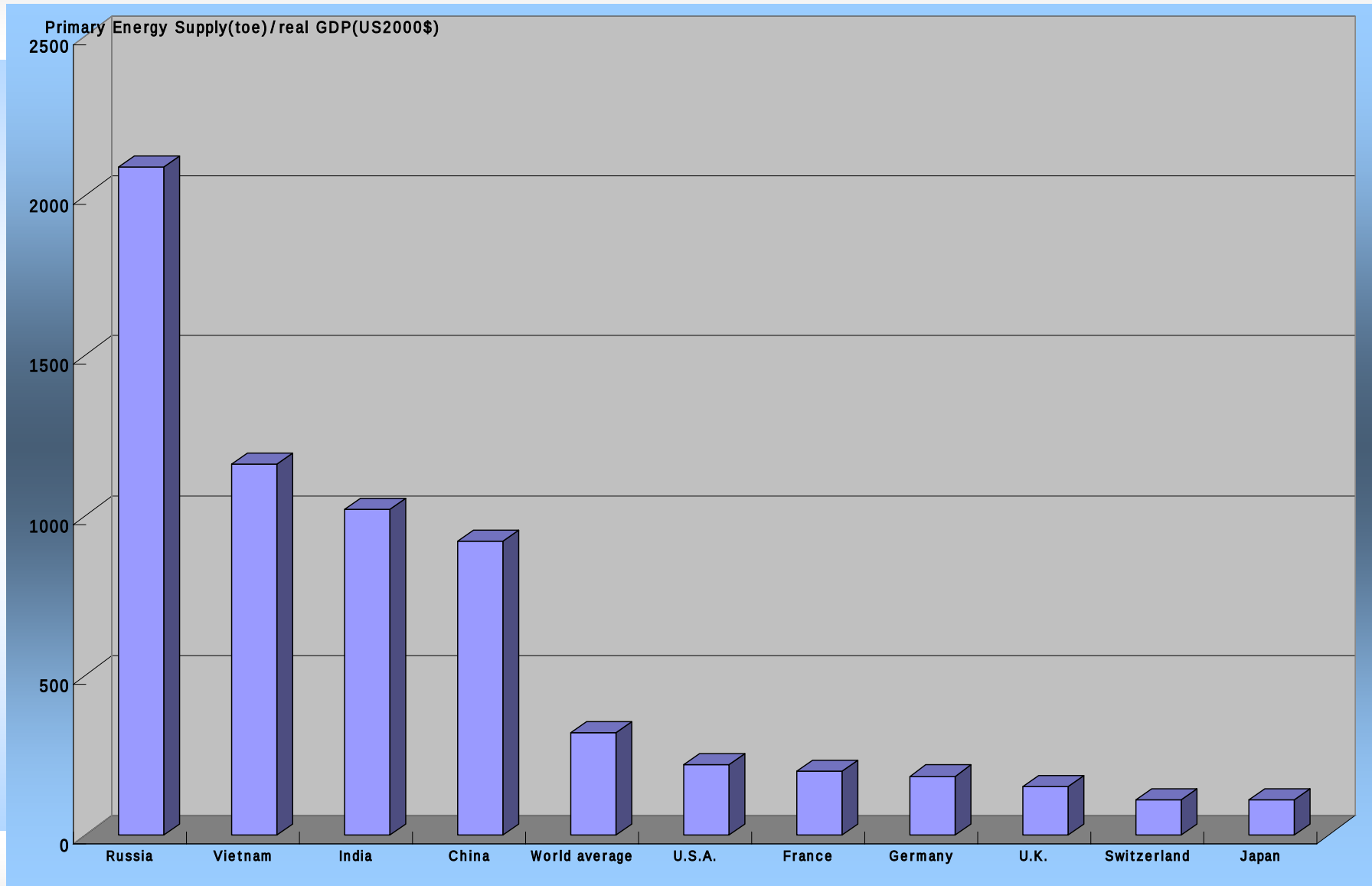
**Research Institute of Economy, Trade and Industry
(RIETI)**

“Economic Relations Japan-Switzerland” Conference
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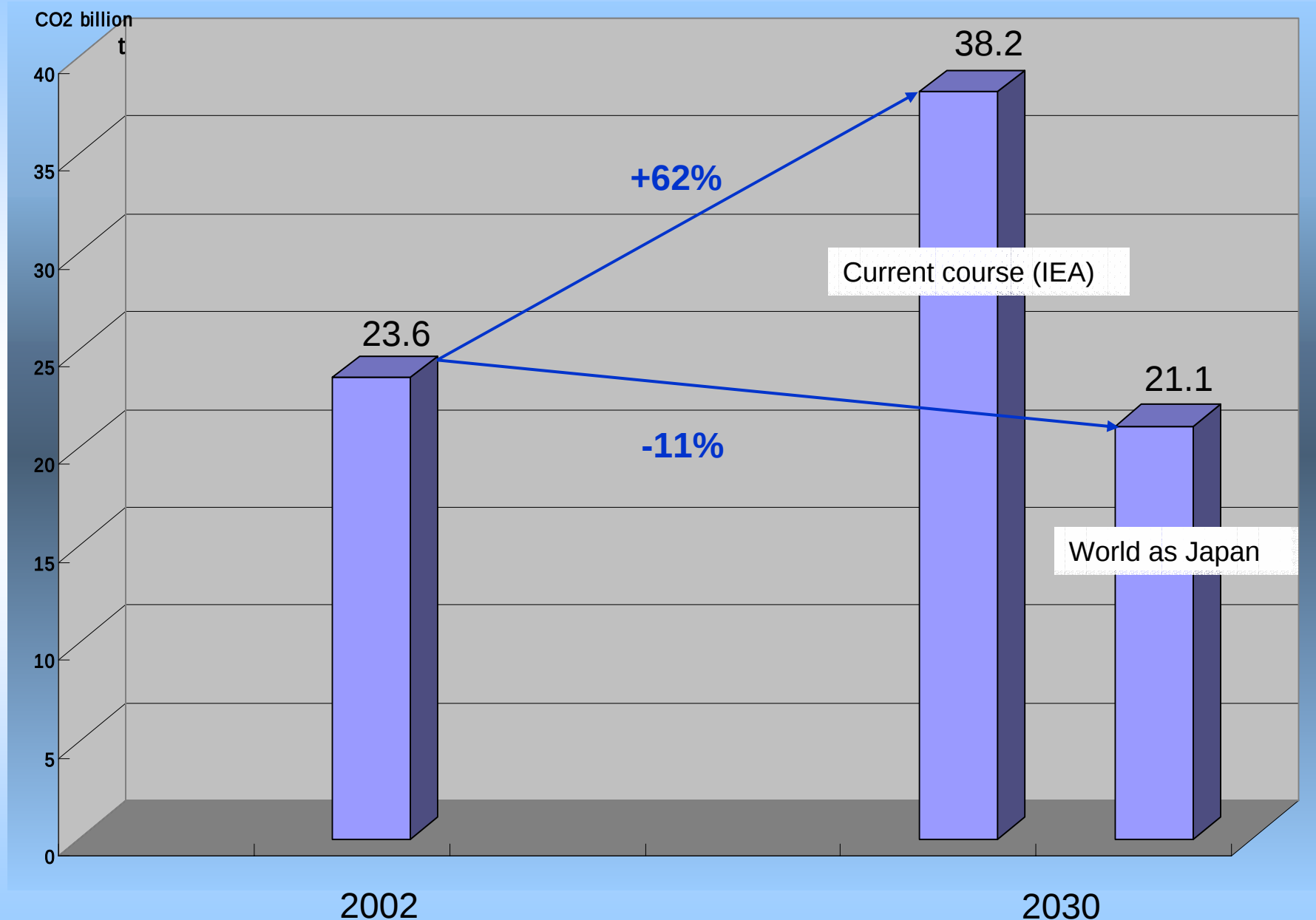
1. Key Issues and Positions

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- **Energy efficiency as triple bottom-line: energy security, environmental sustainability, and economic growth**
 - **Three keys: government, market and technology**
 - **International cooperation as essential mechanism**

(1) Energy Intensity of Key Countries



(2) If the world was Japan , how much CO2 would we have in 2030?



Source: IEA, World Energy Outlook 2004
calculation by Tanabe using Japan's CO2/GDP and 3.5% p.a. econ. growth (World Economic Prospects)

(3) Performance of Japan's Energy Efficiency

GDP and Energy Consumption in Japan



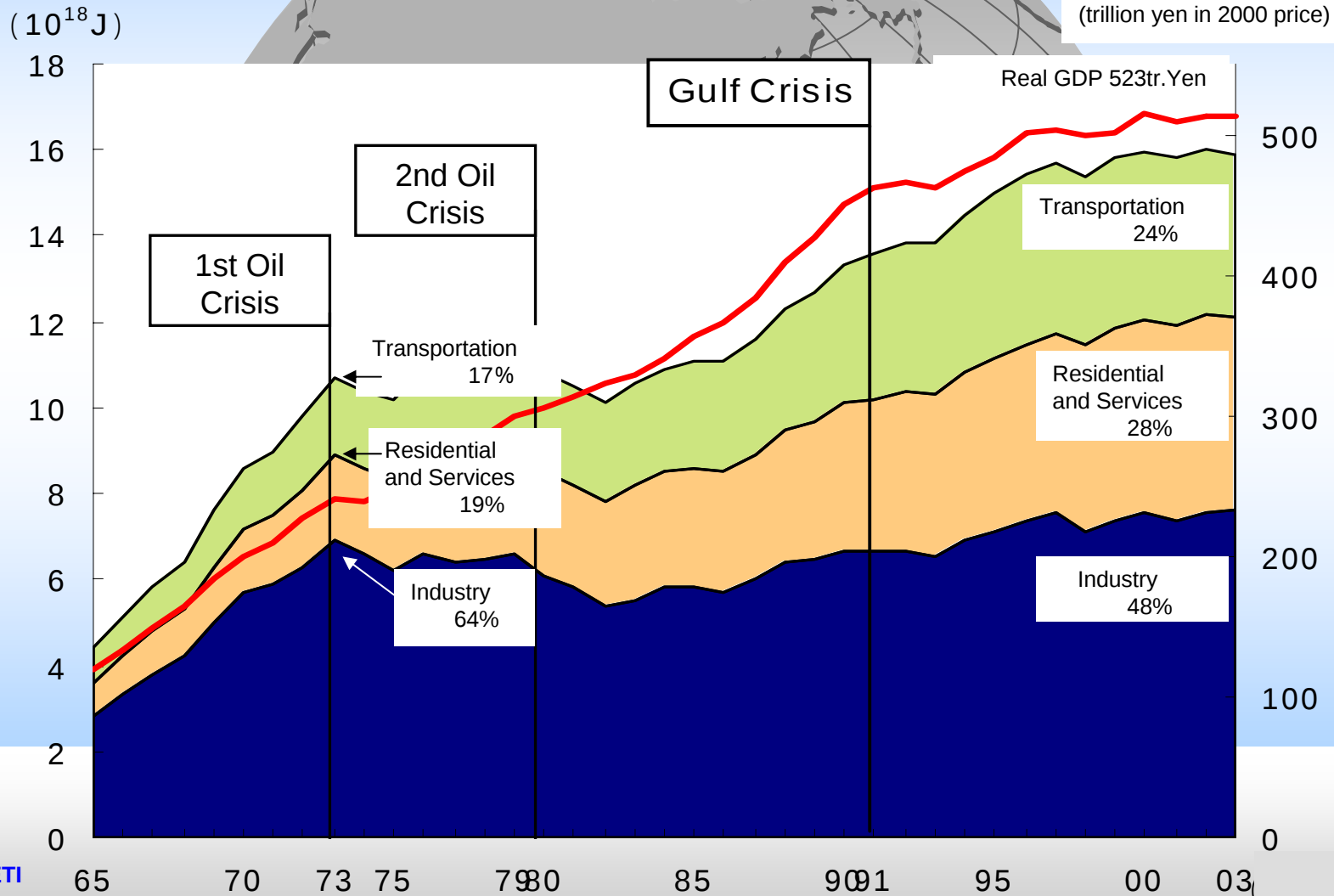
Elasticity

1965-'73	'73-'79	'79-'86	'86-'91	'91-2003
1.19	0.29	-0.11	0.85	0.71

Source : METI

(4) Performance of Japan's Energy Efficiency

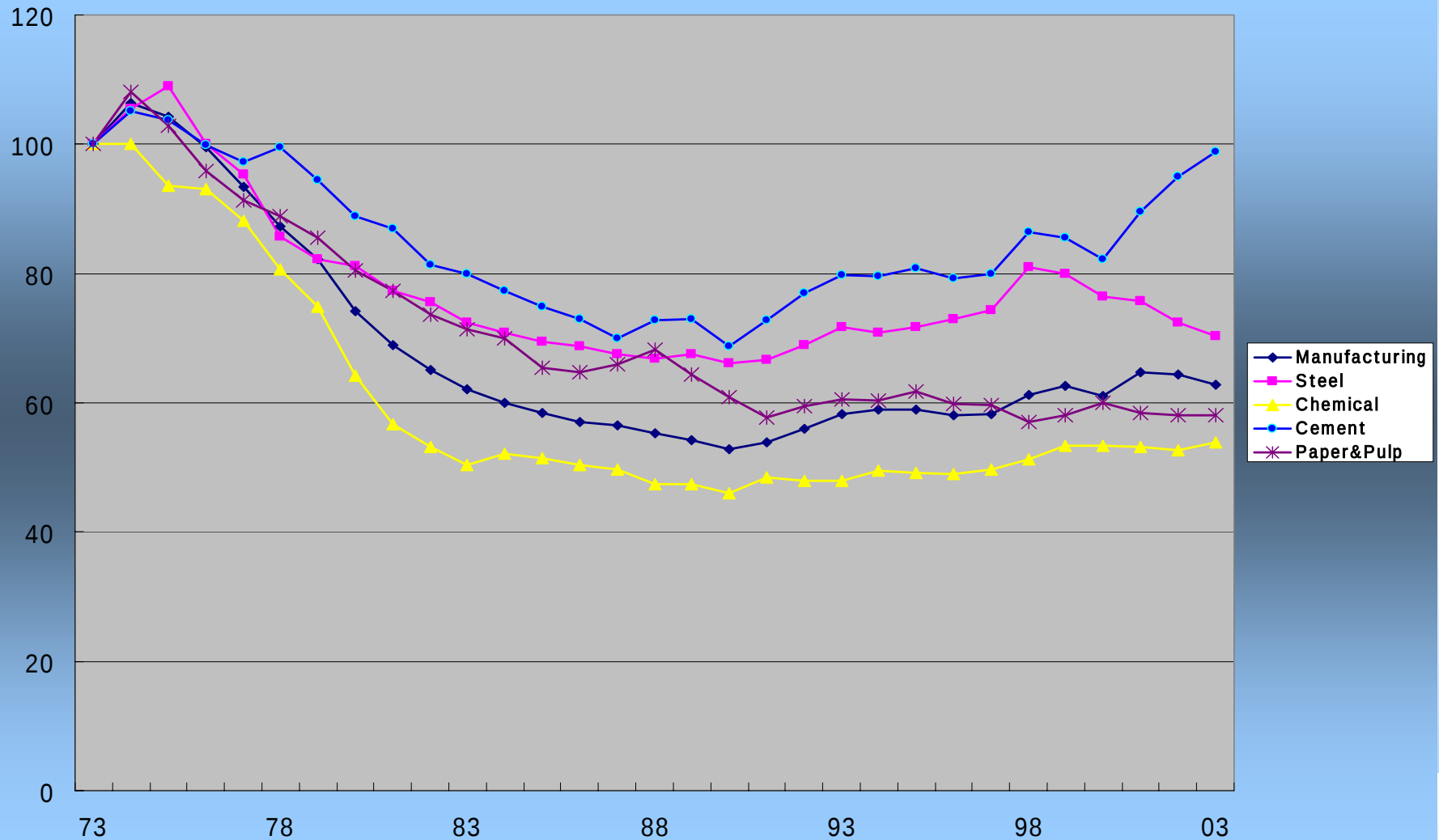
Energy Consumption by Sector in Japan



(5) Performance of Japan's Energy Efficiency

Energy Intensity by Industry in Japan

Fy73=100



(energy consumption / IIP)

Source : METI

2. Practical Examples (Japanese Experience)

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- **Top-runner standard**
 - **CDM**
 - **Technologies**

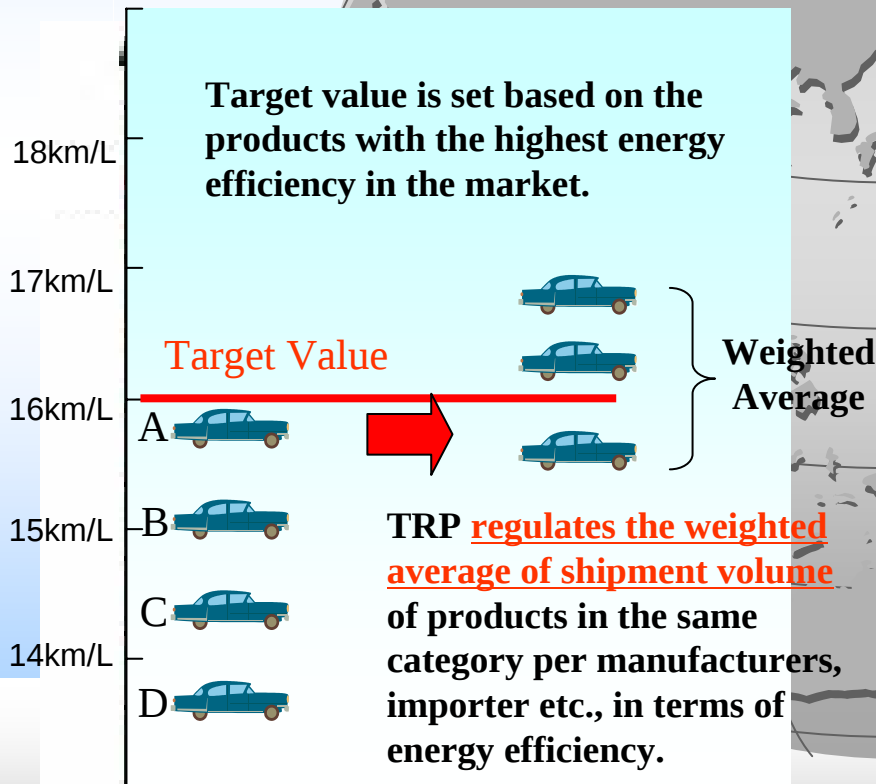
(1) Top Runner Program

Energy Conservation Measures for Machinery & Equipment

“Top Runner Program”

Concept for setting target standard

Fuel efficiency
Energy efficiency standard
(A is the top runner.)



Currently designated products

Total 21 products designated

1. Air conditioners
2. Fluorescent lights
3. Television sets
4. Copying machines
5. Computers
6. Magnetic disk units
7. Video cassette recorders
8. Passenger vehicles
9. Freight vehicles
10. Electric refrigerators
11. Electric freezers
12. Space heaters
13. Gas cooking appliances
14. Gas water heaters
15. Oil water heaters
16. Electric toilet seats
17. Vending machines
18. Transformers (molded)
19. Electric Ovens
20. Electric Rice Cookers
21. DVD Recorders

7 more products designated in 2002

11 products designated in 1999

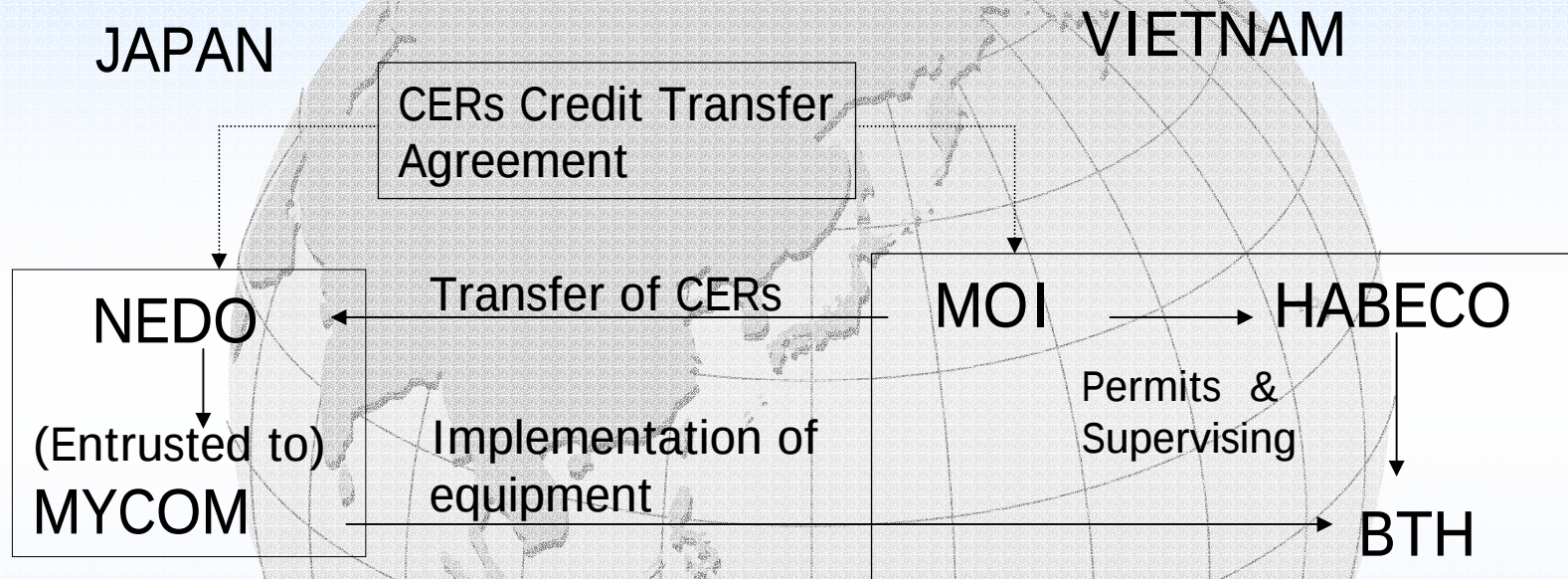
3 more products designated in 2006

(1) Top Runner Program

Actual Improvement of Energy Saving in Target Fiscal Year

Equipment	Base Year	Target Year	Initial Expected Energy Saving (%) compared to the Base Year at the Target Year	Actual Improvement Energy Saving (%) compared to the Base Year at the Target Year
Air Conditioners (below 4kW)	FY1997	FY2004	63.0	67.8
TV sets <Cathode Ray TV>	FY1997	FY2003	16.4	25.7
VCRs	FY1997	FY2003	58.7	73.6
Electric refrigerators	FY1998	FY2004	30.5	55.2
Electric freezers	FY1998	FY2004	22.9	29.6
Gasoline Passenger Vehicles	FY1998	FY2004	23.0 (*)	22.0

(2) CDM : Model Project in Vietnam



NEDO: New Energy & Industrial Technology Development Organization

MYCOM: Mayekawa MFG. Co., Ltd.

BTH: Bia Thanh Hoa

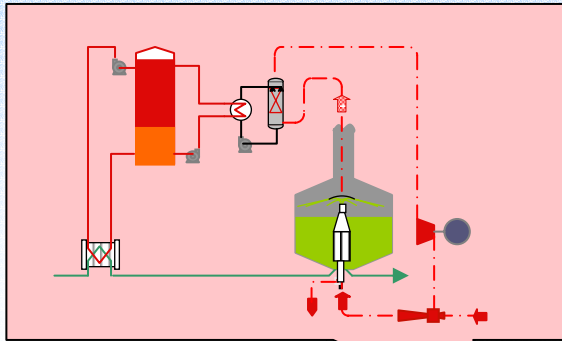
HABECO: Hanoi Alcohol Beer Beverage Corp.

MOI: Ministry of Industry

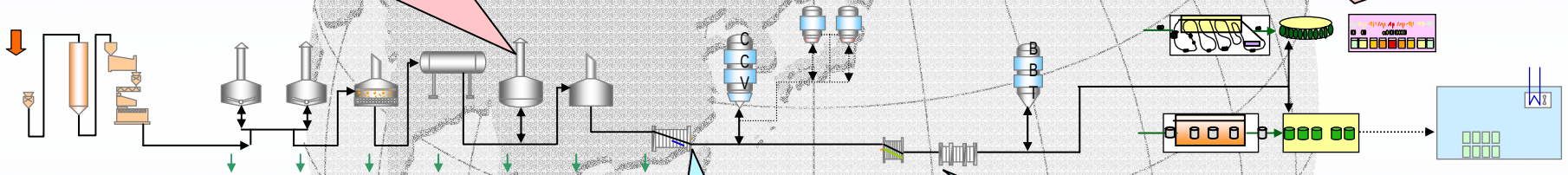
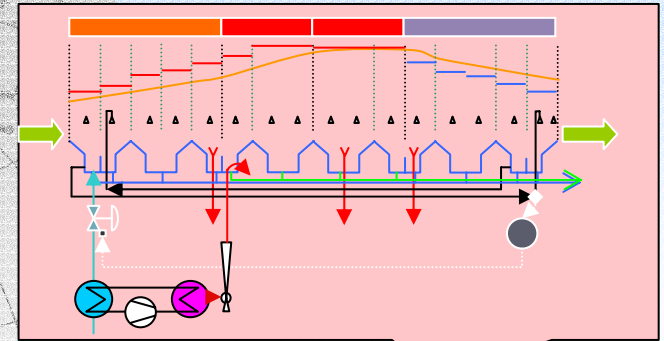
(2) CDM : Model Project in Vietnam

Introduced Energy-saving Systems

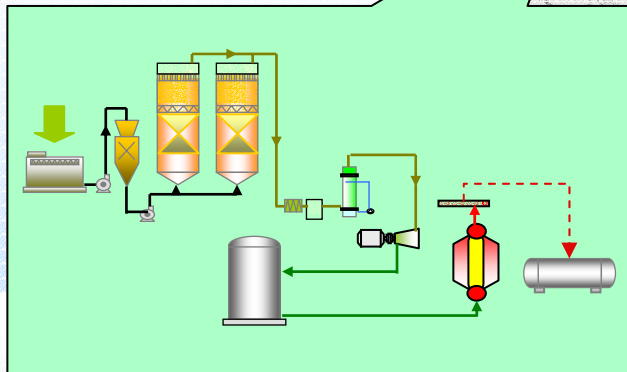
Latest VRC System



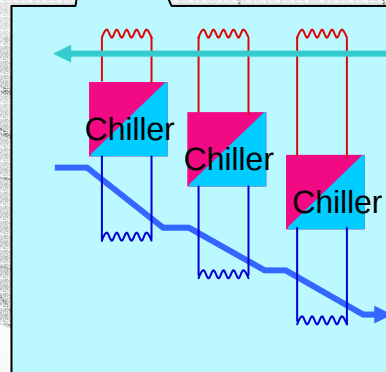
Optimal Pasteurizing System



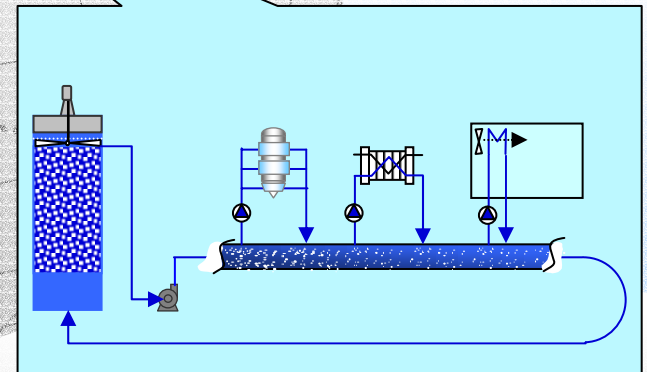
Economical Methane recovery System



Cascade Cooling System



Dynamic Ice Storage/Transportation System



(2) CDM : Model Project in Vietnam

Effect of the proposed 4 systems

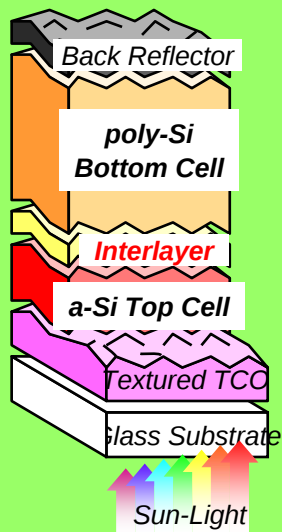
	Steam	Electric power	Others
Vapor Recompression Cycle	Saving steam by Reusing the discharged steam	Additional power required	Mitigating the strong odor to outside
Refrigeration system	Saving steam by heat recovery from discharge gas	Saving power	Effective demand-side management
Optimizing system for pasteurizer	Saving steam by optimization	No effect	Saving water consumption
Biogas Boiler	Steam generation by Biogas	No effect	Anaerobic wastewater treatment added

✧ Energy-saving: 3,386 Toe

✧ CO2 emission reduction: 10,376 Ton

(3)Technology Photovoltaic

Progress of PV R&D in Japan



R&D Items

NEDO's Present R&D Programs for
Low Cost Solar Cells and Module Production

R&D Results

2000
(NSS Project Completed)

Thin Film Silicon Solar Cells (140 yen/W)

<Hybrid TF-Si Solar Cells>

Low Cost SOG-Si Production Process

<BIPV module>

1997

<CIS solar Cells>

Low Cost mc-Silicon Solar Cells Production Technology
(Efficiency = 17.2%, 189 yen/W)

<TF-Si Solar Cells>

<III-V high eff. Solar cells>

1992

Technology for a-Si Solar Cells Production

<PV System Demonstration>

<1MW Demonstrate
PV plant (Saijyo)>

Residential PV System Technology

1MW PV Power Plant

<Grid Connected
PV System>

<Amorphous Silicon
Solar Cells>

1980

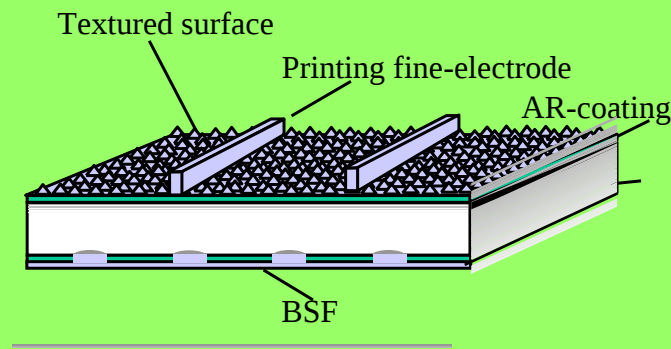
Establishment of NEDO

<II-VI compound
Solar cells>

Basic Technology for Silicon
Solar Cells (wafer, cell-process)

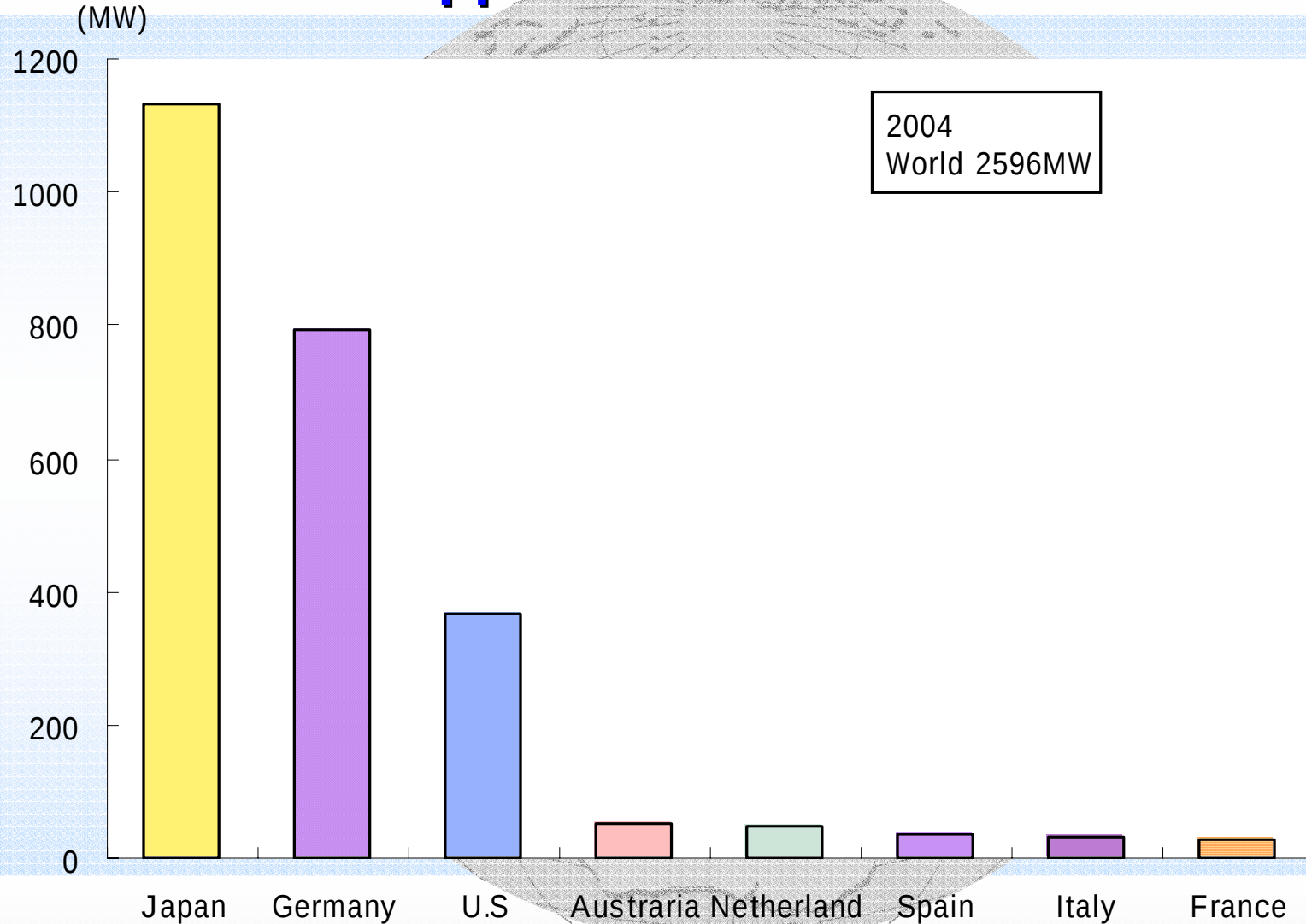
<Crystalline Silicon
Solar Cells>

1973 (SS Project Initiated)



(3)Technology Photovoltaic

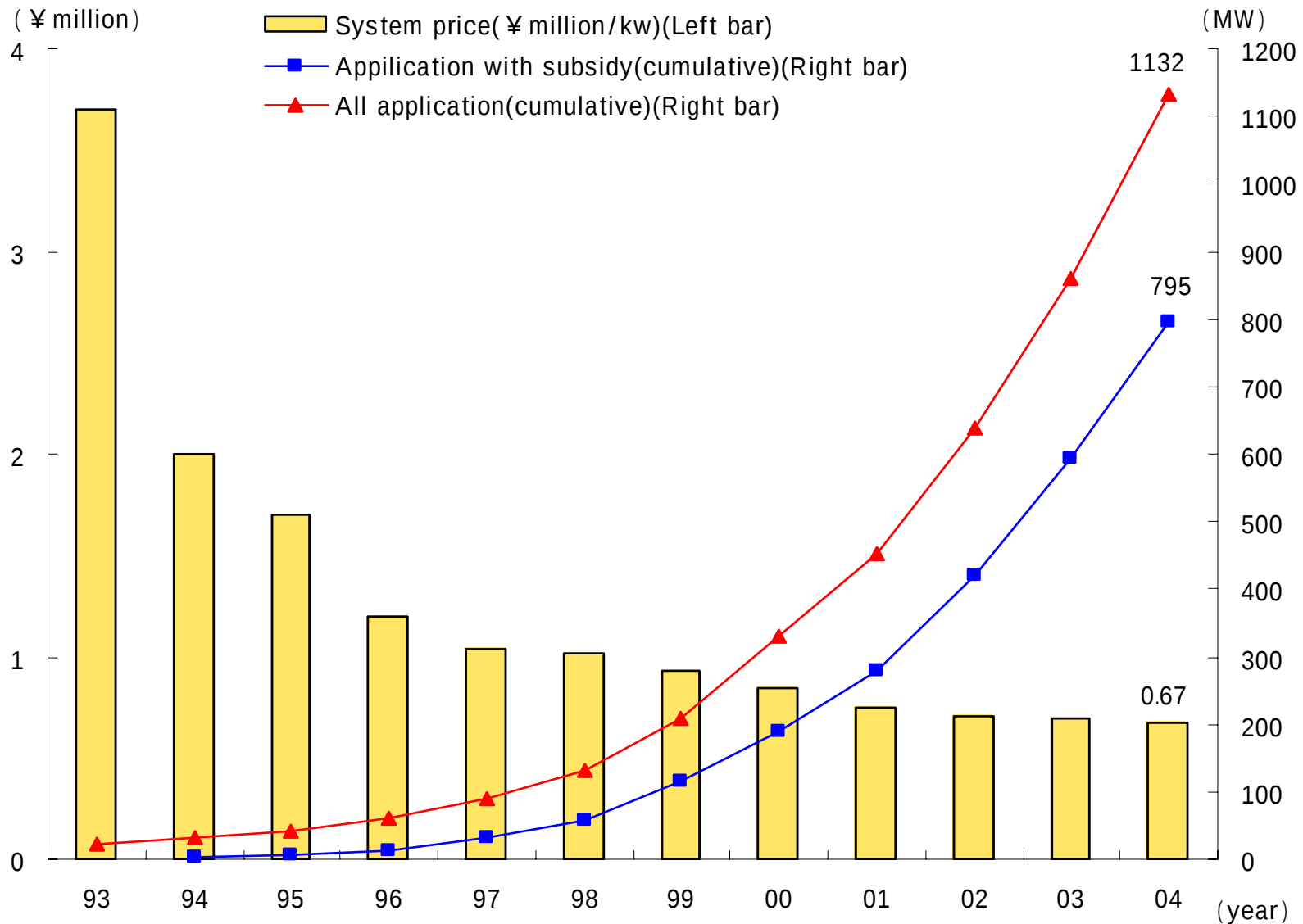
Photovoltaic Application in the World



Source : METI

(3)Technology Photovoltaic

Photovoltaic Application in Japan



(3)Technology

Fuel Cell

Fuel Cell Applications

For
Households



FUEL CELL

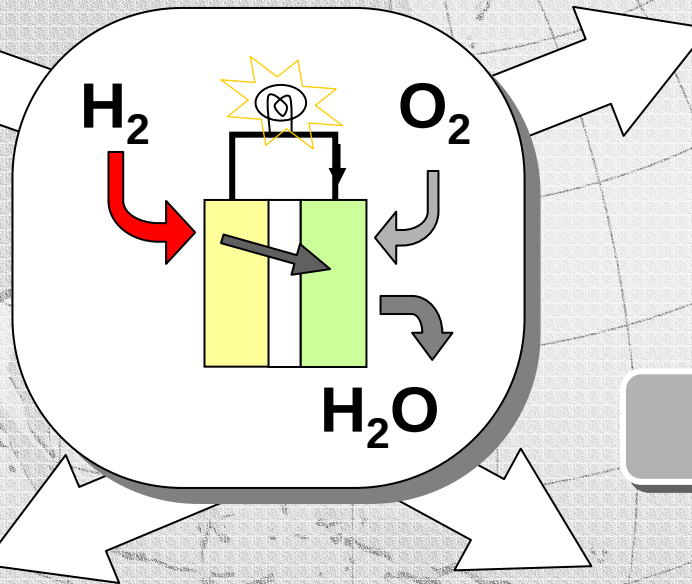
For Vehicles



For Mobile
Computers



For Industry



(3)Technology Fuel Cell

Japan's Targets and Policies

FCV

2010 50,000

2020 5M

2030 15M

Stationary PEFC

2010 2.1GW

2020 10 GW

2030 12.5 GW

2002 -

R&D Stage

2005-

Introduction Stage

2010-

Diffusion Stage

2020-

Full-Scale
Diffusion Stage

Infra

Demonstration
Project

Step-by-step
Construction

Grow
Naturally

Codes

Review of
Regulations

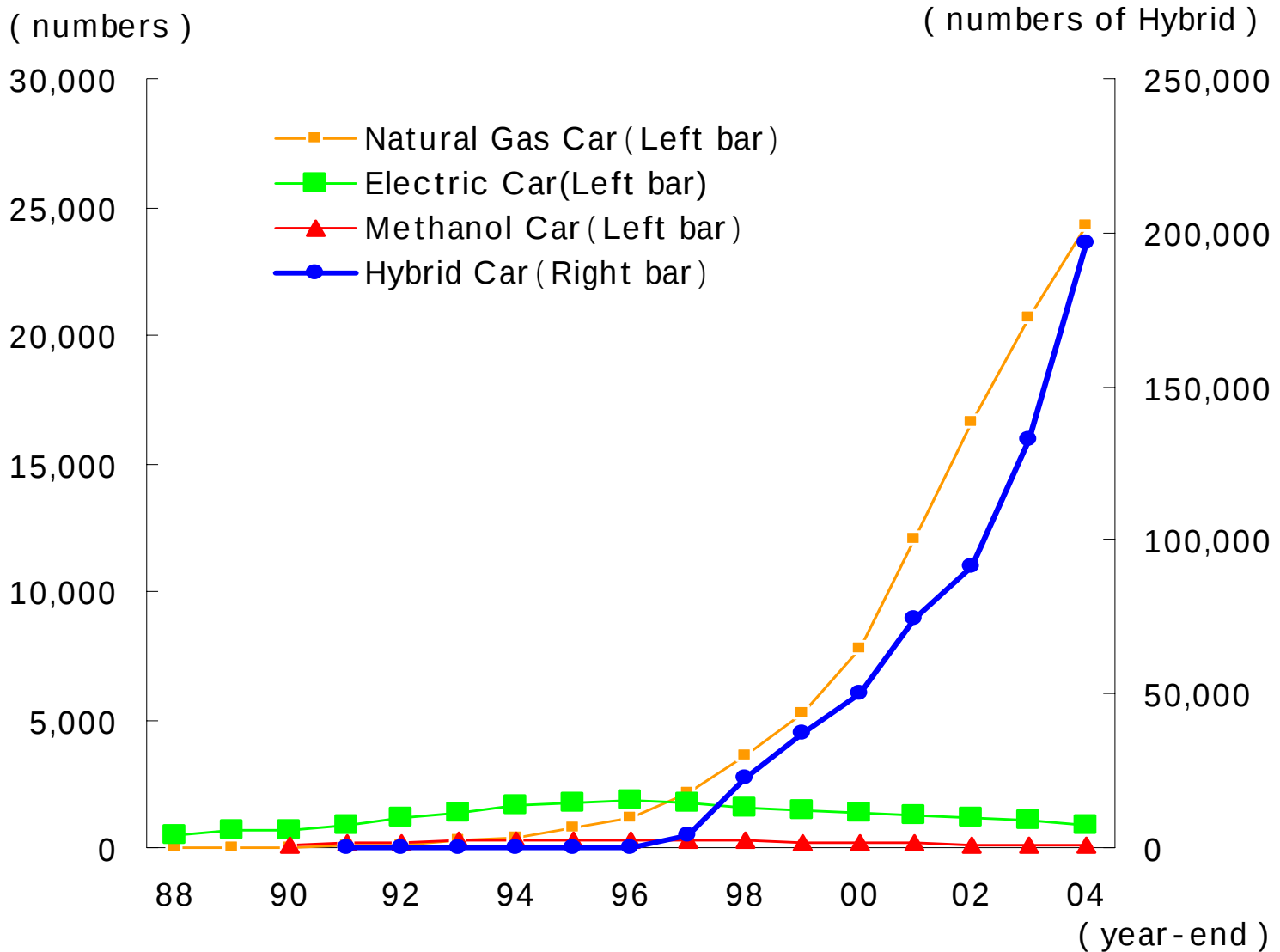
R&D

R&D on
FC and H₂

Further R&D

(3)Technology Hybrid Car

Clean Energy Cars in Japan



(3)Technology

Heat pump

Figure 1: Closed cycle, electric-motor-driven vapour compression heat pump

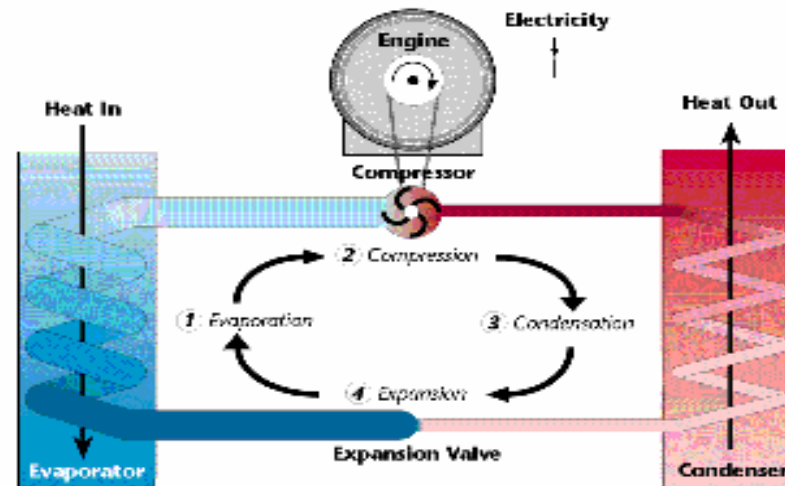


Figure 2: Closed cycle, engine-driven vapour compression heat pump.

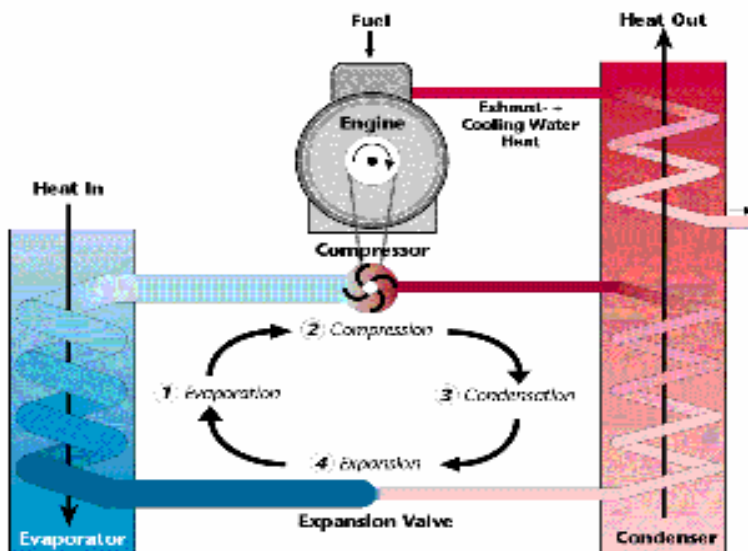


Figure 3: Absorption heat pump

