

**The China International Energy Forum
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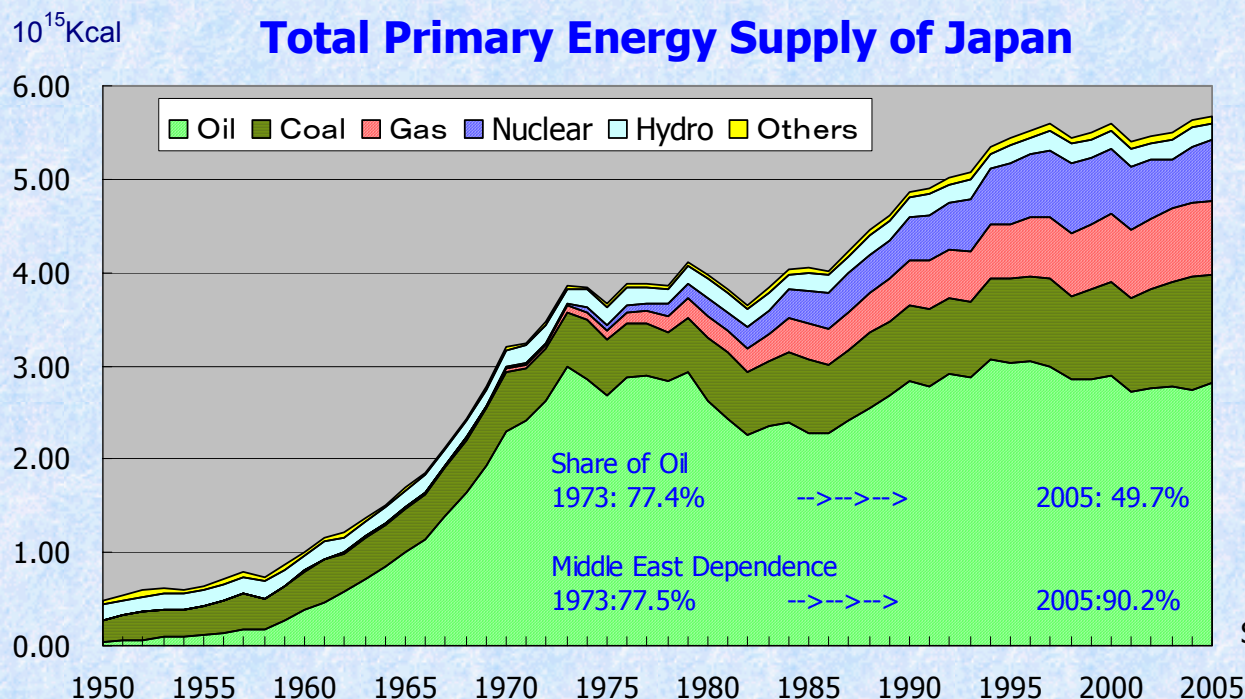
Japanese Experience Toward Energy Efficient Economy

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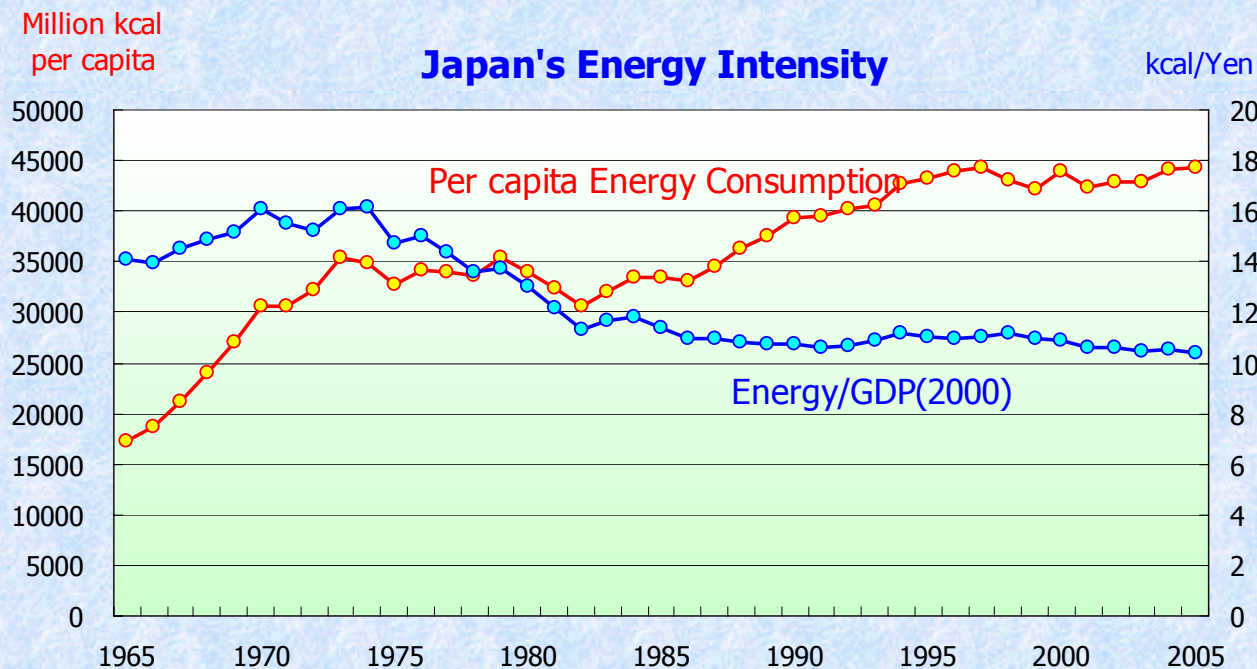
1.1 Japanese Experience

1. Facing the oil crisis, Japan implemented various counter policies.
Supply: Reducing oil dependency+Promoting Natural Gas and Nuclear
Demand: Diverting to Resource Saving Society
2. Japanese energy consumption gradually increased since mid-1980s with diminishing interest on energy conservation.



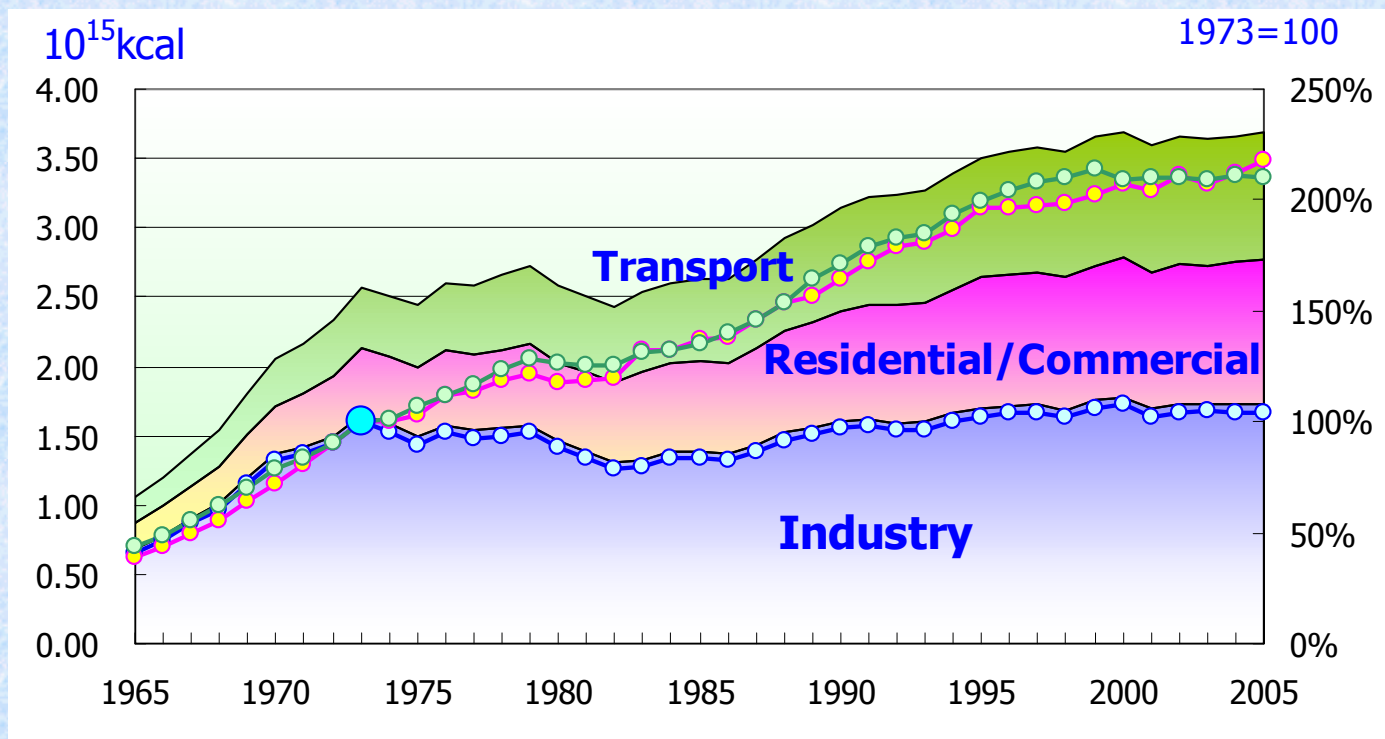
1.2 Energy Intensity

1. In 2005, Japan's energy intensity per GDP decreased down to 65% of 1973 reflecting structural changes in economy and energy conservation efforts.
2. Per capita energy consumption increased to 126% of 1973, though stabilizing in recent years.



1.3 Final Energy Consumption

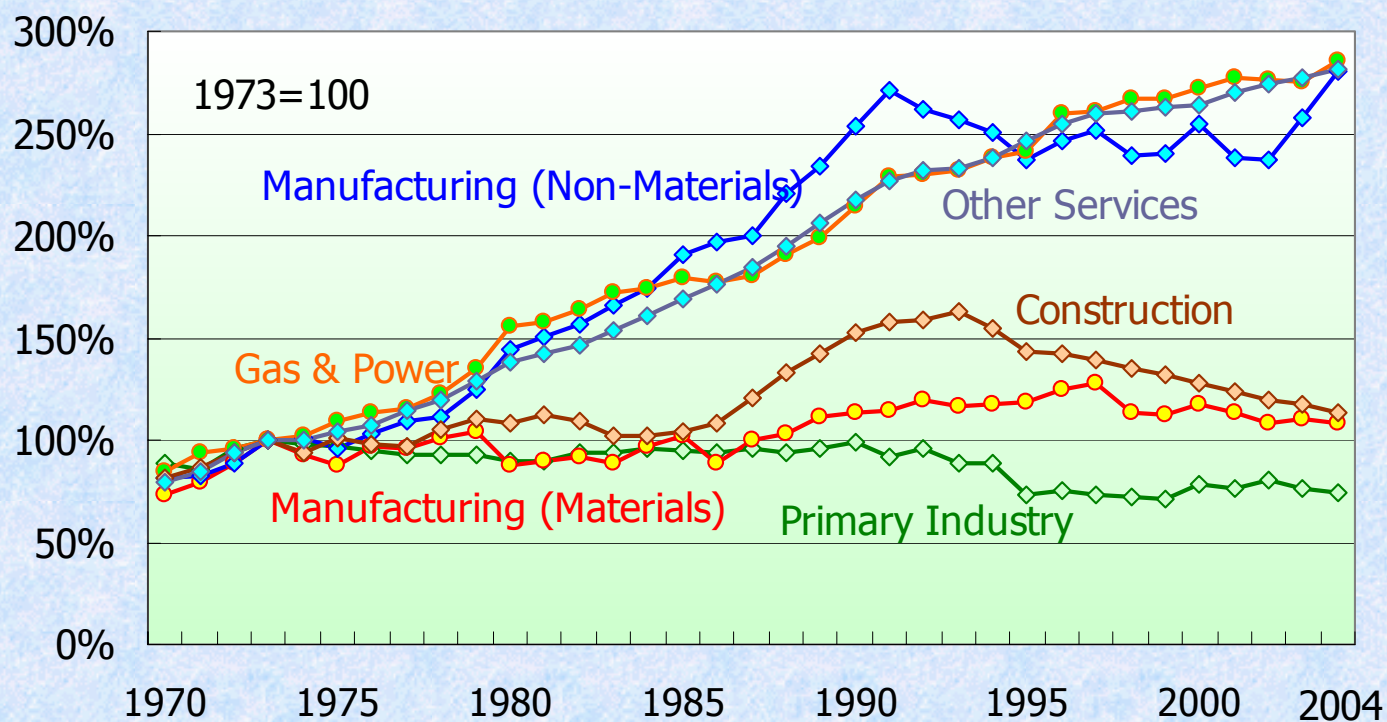
1. In 2005, energy consumption of the industrial sector remains at 104.1% of 1973.
2. However, energy consumption of other sectors has more than doubled during the same period.



Source: METI/IEEJ

1.4 Structural Change of Economy

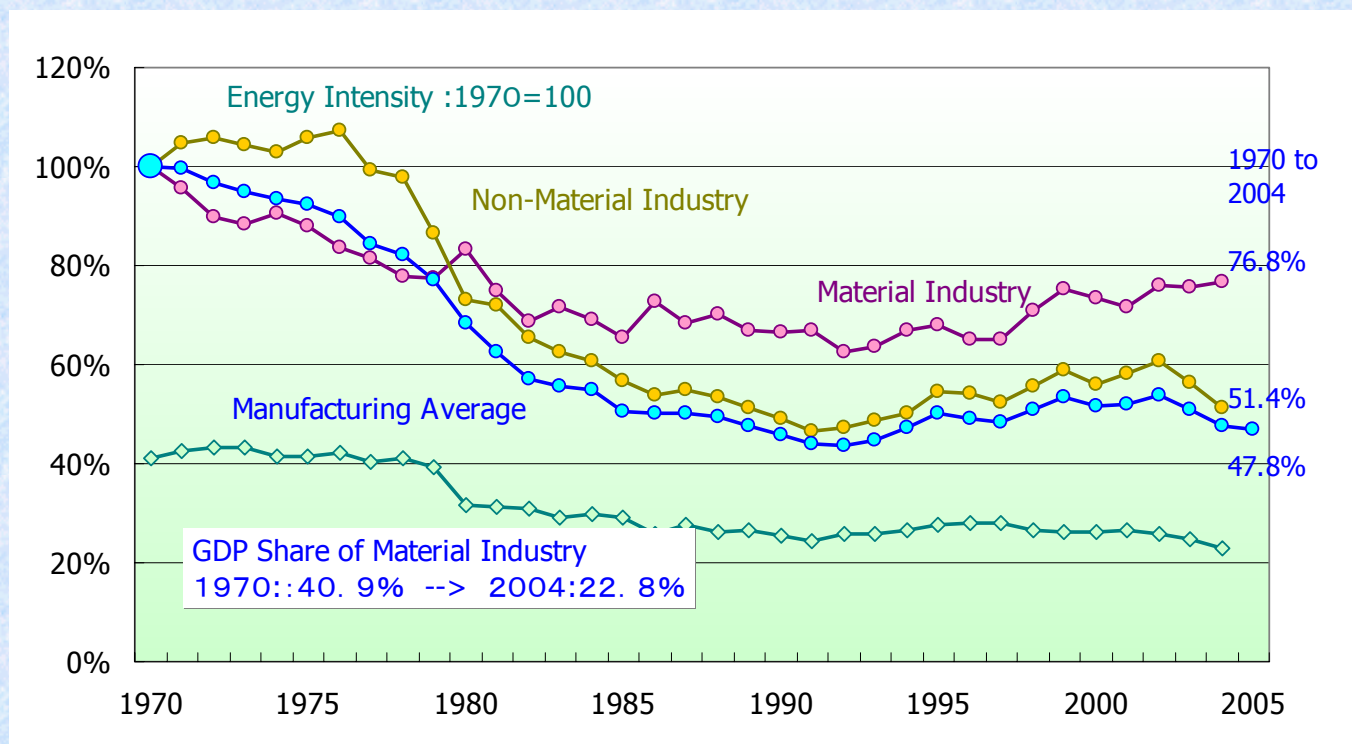
1. Shifting from Heavy and big industries to Light and thin industries.
2. Economic growth led by high-tech and service industries.



Source: ESRI "National Accounts of Japan"

1.5 Manufacturing Industry

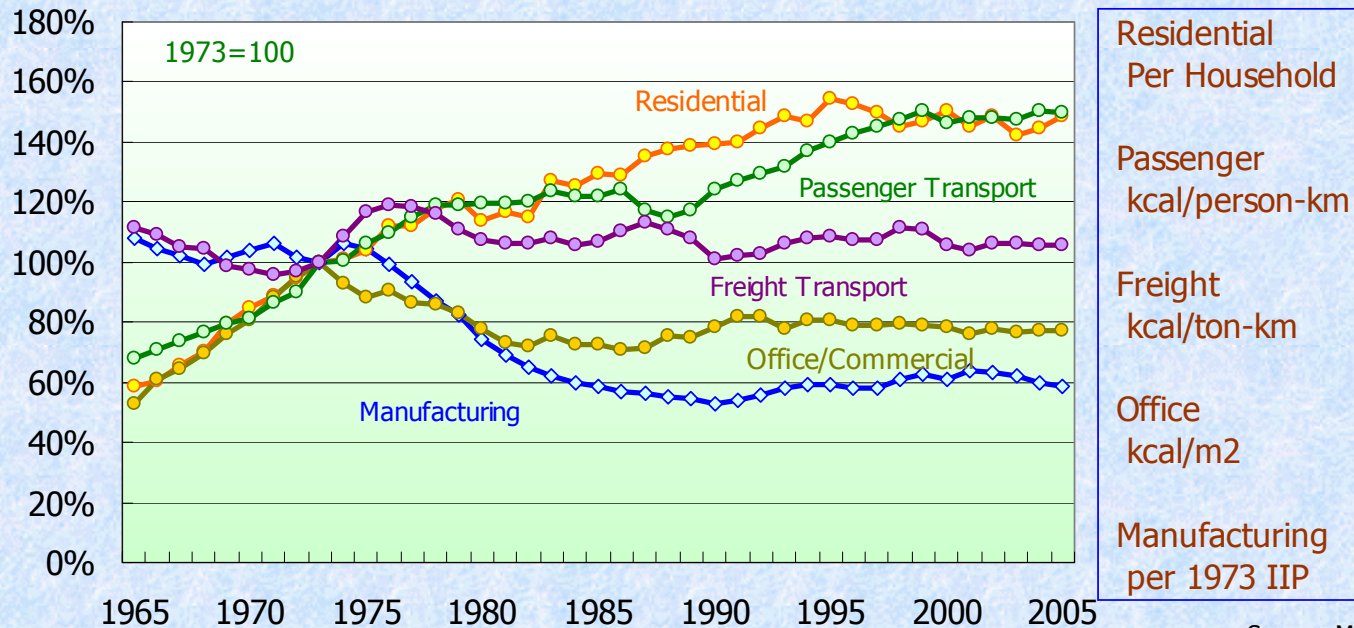
1. Energy intensity decreased more than 50% since 1970.
2. Sectoral intensity improvement contributed 38.2%, while structural change contributed 9.5%.



Source: ESRI "National Accounts of Japan"

1.6 Changes in Energy Intensity

1. Industrial sectors have steadily reduced energy intensity.
2. Household sectors with income growth tends to go for
 - x Larger house with more appliances
 - x Longer drive with bigger cars
 But, energy intensity at household started decreasing recently.
3. Transportation sector is affected by increase of air transport.



Source: METI/IEEJ

1.7 Summary

1. **Supply side policies and industrial policies have been mostly successful except that the ME dependence of oil has deteriorated now.**

2. **Rationalization of energy use has been successful. However, total energy consumption is increasing in transportation and residential/commercial sectors reflecting people's admiration toward high standard of living/working.**
 - 1) **Structural change of economy: OK**
 - 2) **Improving energy efficiency: OK**
 - 3) **Energy conservation: OK in the heavy energy use sectors, but questionable in other sectors**

2.1 Japanese Policy on EC

1. Numerical Targets for 2030 (June 2006)

- 1) Front runner program to improve energy efficiency over 30%
- 2) Reduce oil dependence below 40%
- 3) Next generation transport fuel to reduce oil dependence less than 80%
- 4) Nuclear based power with 30 – 40% or more of power generation
- 5) Comprehensive supply security raising equity oil ratio to 40%

ASEAN, China, Korea,
Japan, India, Australia,
New Zealand

2. East Asian Summit (January 2007 at Cebu) and EAS Energy Ministers Meeting (August 2007 at Singapore) agreed to take concrete action toward improving efficiency and conservation.

3. Cool Earth 50 proposed by former PM Abe (May 2007)

1) Target : 50% reduction of the world CO2 emission by 2050

- a. Innovative Technology Development
- b. Creation of Low-Carbon-Society

2) Principles for Post-Kyoto System

- a. Participation of all major emission countries
- b. Common but different responsibilities
- c. Win-win system for energy and environment →

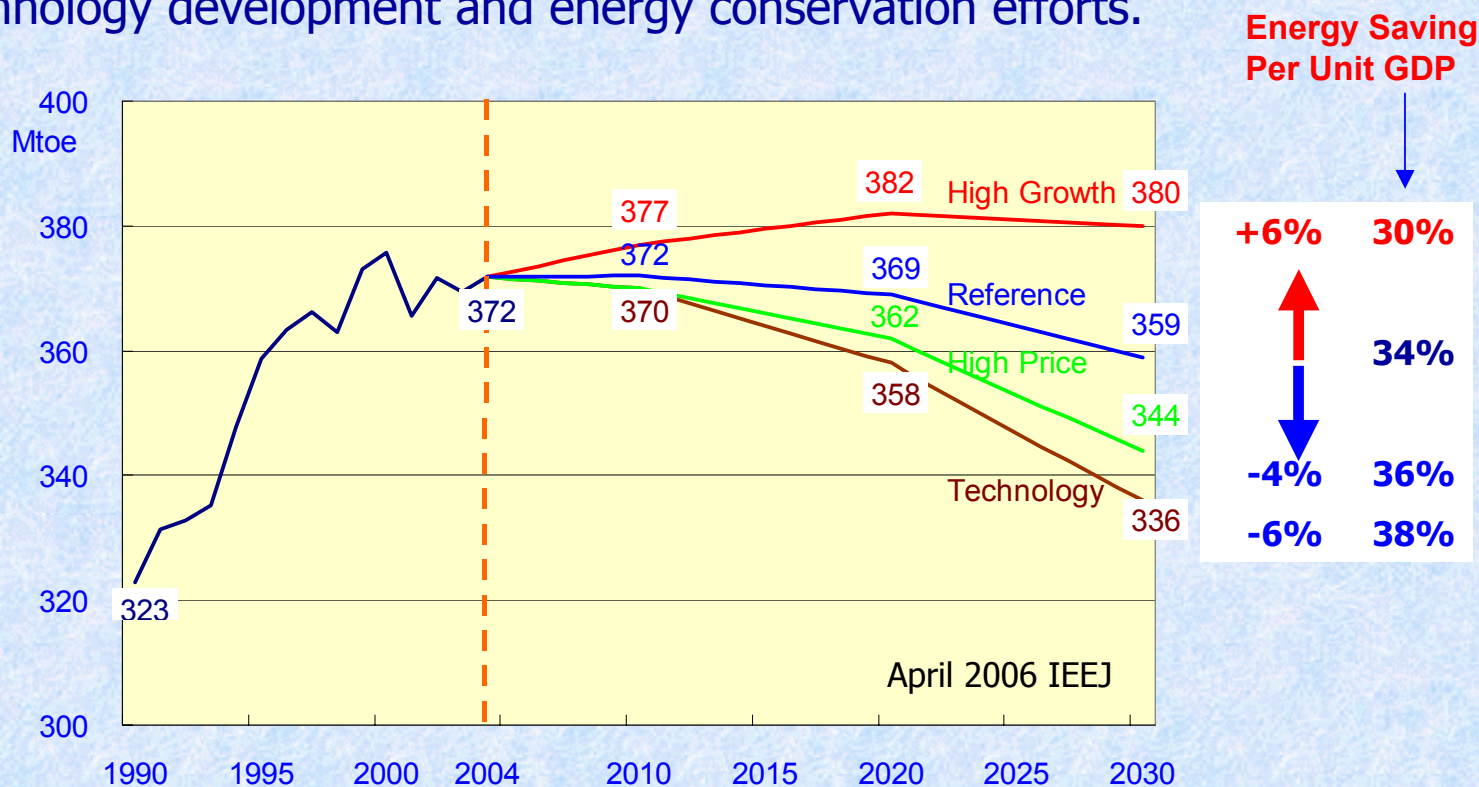
3) Observation of Kyoto Protocol

Reduce CO2 by 1kg a day per person

1. Funding mechanism to assist developing countries
2. Promote Cebu statement to improve energy efficiency and reduce fossil fuel use
3. Enhance international cooperation

2.2 Energy Outlook of Japan

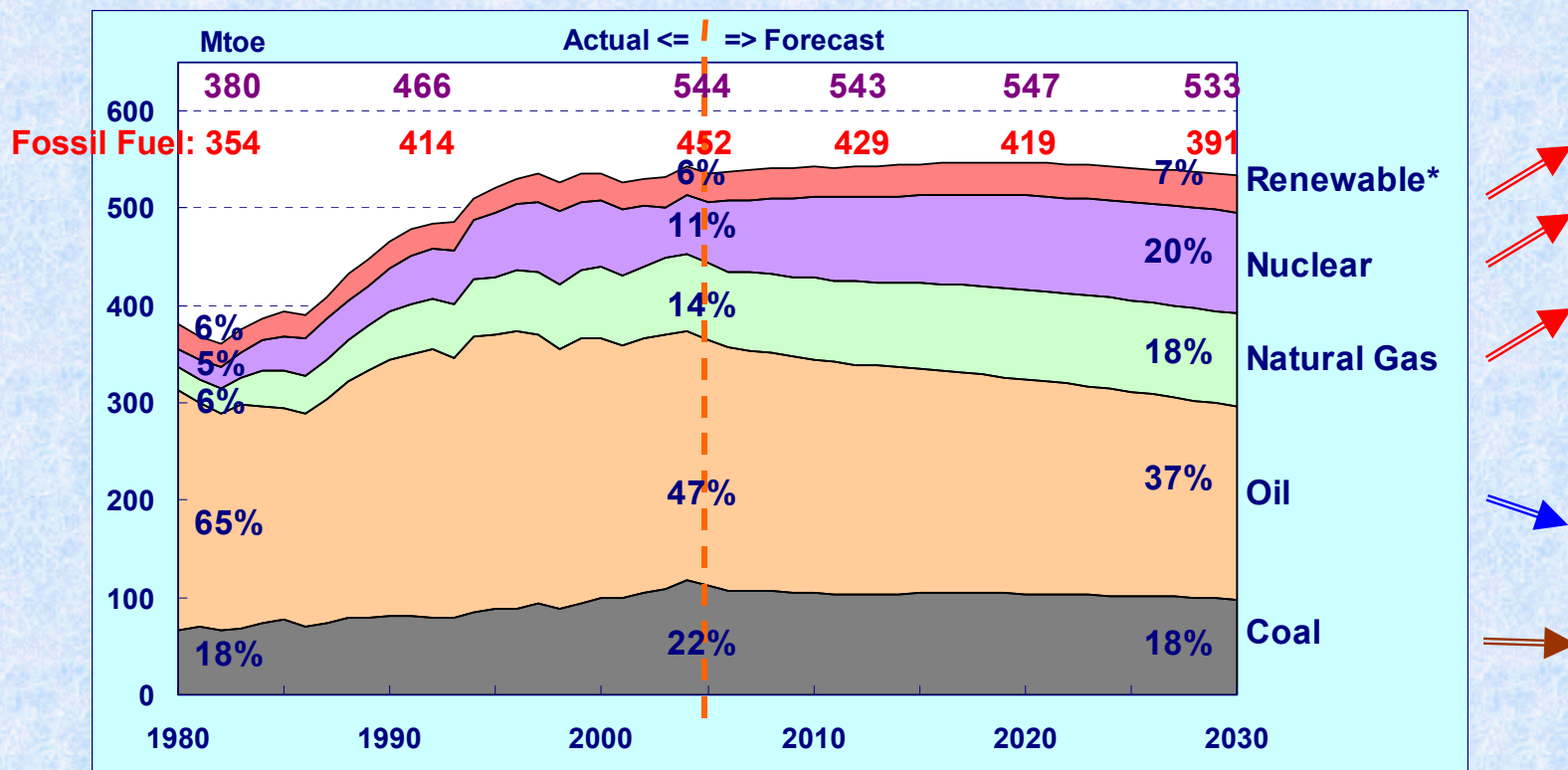
The new national target, 30% efficiency improvement, looks very ambitious. However, much more reduction will be possible through technology development and energy conservation efforts.



Source: IEEJ

2.3 Primary Energy Supply

1. Total consumption will be leveling off, while fossil energy consumption decreases substantially.
2. Oil demand decreases and Japan's oil dependency lowers to 37%.

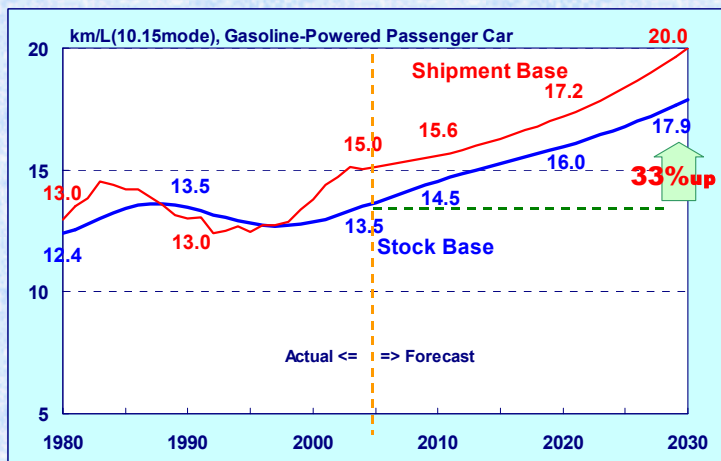


Source: IEEJ

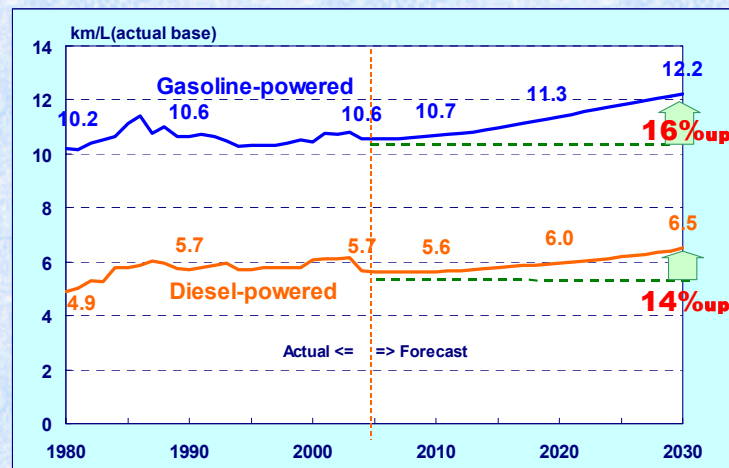
2.4 Fuel Efficiency of Motor Vehicles

1. Fuel efficiency of passenger car will improve substantially with increased options for efficient models led by the Top-runner program.
2. Improvement in the freight sector will be slower with the higher ratio of cargo load over the total weight compared to passenger cars.

Passenger Car



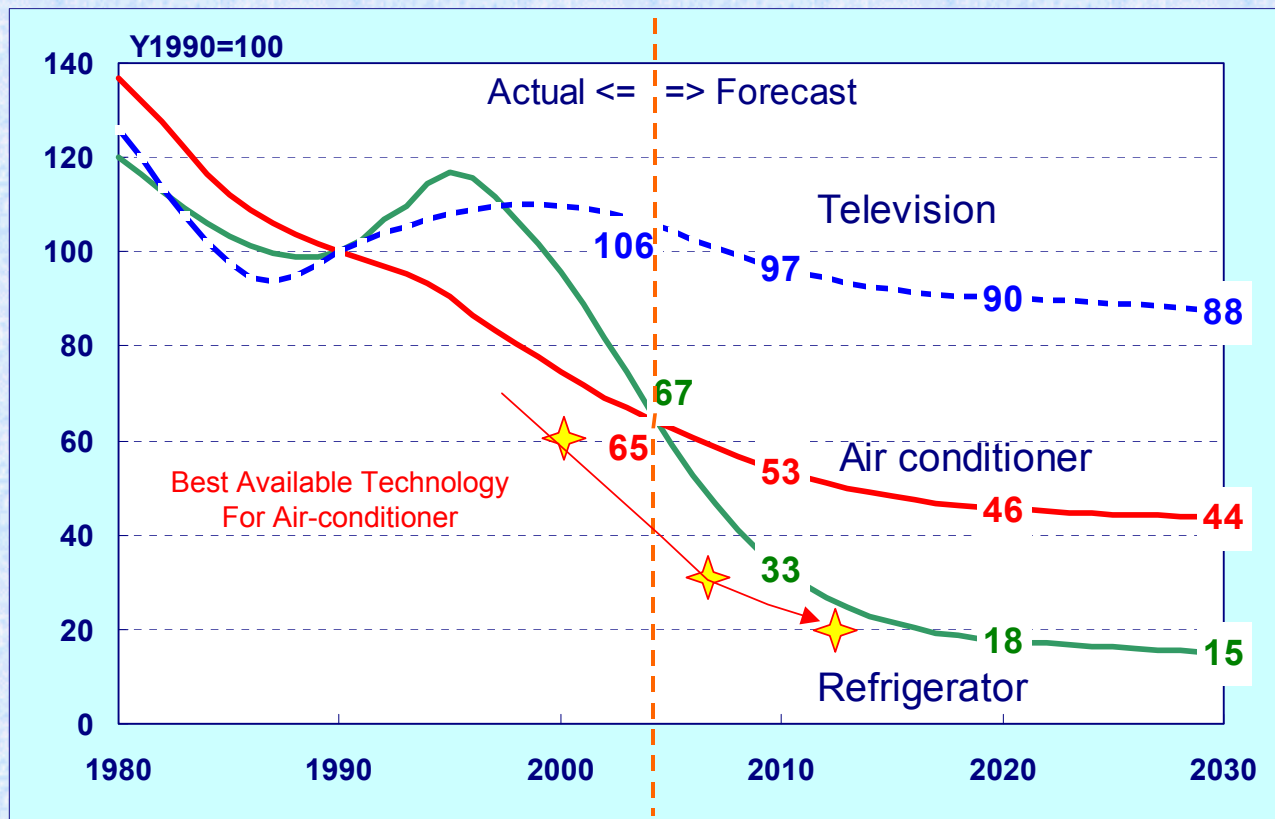
Truck/Lorry



Source: IEEJ

2.5 Efficiency of Home Appliances

Effect of the Top-runner program continues as stock replacement takes time.

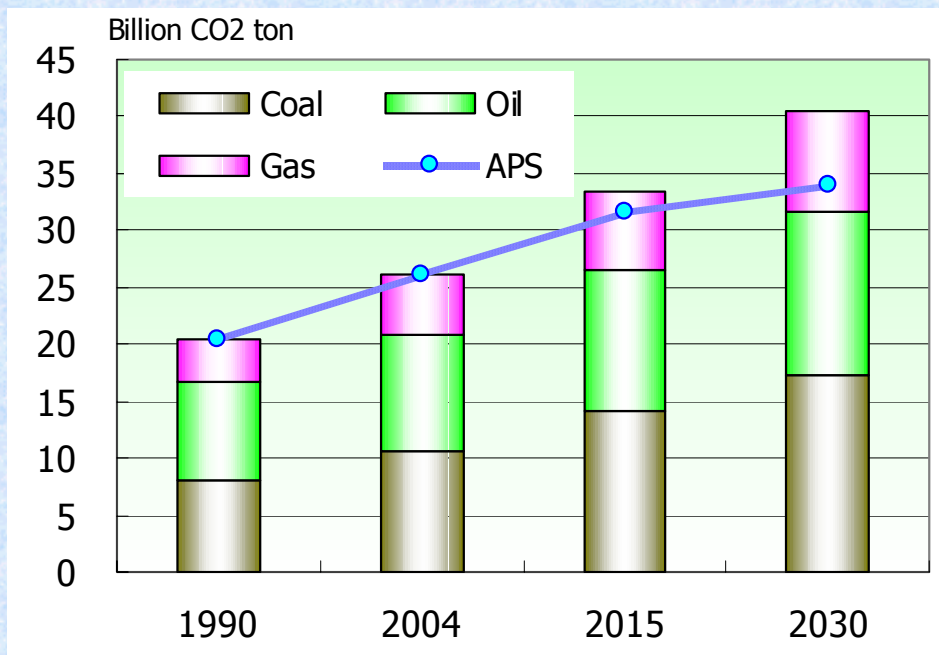


Source: IEEJ

2.6 Potential CO₂ Reduction by BAT

1. IEA forecasts CO₂ emission will increase 15 billion ton by 2030.
2. Introducing BAT, CO₂ emission may be reduced by 10-30% in each sector. (IEEJ's study)

CO₂ Emission Forecast (IEA 2006)



Potential CO₂ reduction in 2020 (Plausible case)

Unit: billion t-CO₂/year

Industry	Iron & Steel	.12
	Cement	.67
	Paper/Pulp	.14
EP	Coal	1.42
	Oil	.02
	Gas	.23
Transport	Personal Car	.54
Household	Refrigerator	.24
	Air-con	.15
	Lighting	.23
	Insulation	.07
Total		3.83

3.1 Energy Conservation Law

Factories

Guidelines

Heat/Power Loss Control
Waste H/P Recovery
Measurement/Record
Maintenance/Management

Target

Annual 1% improvement
(Unit energy management)

Registration according to size

Factories: Type-1
(Fuel:3000kl/y, Power:12 million kwh) →

Factories: Type-2
(Fuel:1500kl/y, Power:6 million kwh) →

Obligations

Energy Manager
Middle/Long Term Plan
Periodical Report

Energy Mgt Officer
Periodical Training
Periodical Report

Transport

Guidelines

Energy Efficient Vehicles
Eco-Drive/Load Factor
Modal Shift

Transport Business
Cargo Consignor (804) →

General Entities →

Energy Conservation/
Rationalization Plan
Periodical Report

Commuting on Public Transport

Building

Guidelines

Non-Residential Building →
(Over 2000m³)

Construction and
Renovation Plan

Products Motor Vehicles
Machines & Appliances

Guidelines

Front Runner Program →
Indication of Energy Efficiency

Hearing/Inspection

3.2 Energy Conservation Measures

- 1. Manufacturing Factories under ECL**
 - x Inspection → Rationalization Plan Guidance → Compliance Order
- 2. Front Runner Program & Energy Conservation Target**
 - x Fuel standard of automobile
 - x Energy conservation standard(ECS) at target year for electric equipment
- 3. Energy Saving Labeling System**
 - x EC Standard achievement (%) and annual power consumption
 - x Fuel Economy Standard of vehicles (Stickers)
- 4. Energy Efficient Retailer**
 - x Shop Logo as energy efficient product promotion stores
- 5. High Efficiency Boilers**
- 6. Reduction in Standby Power Consumption**
- 7. Superior energy conservation of residence/building**
- 8. Home/Building Energy Management System with IT**
- 9. Energy Service Company (ESCO) business**
- 10. Idling-stop of cars can improve fuel economy by 10%**
- 11. Traffic Management by Intelligent Transport System (ETC, VICS)**

For more details: <http://www.eccj.or.jp/summary/local0406/eng/index.html>

3.3 Top Runner Program

1. Japan's Top Runner Program has realized a substantial improvement of energy efficiency.

	Base Year	Target Year	Improvement	
			Target	Result
TV Sets	1997	2003	16.4%	25.7%
Video Cassette Recorders	1997	2003	58.7%	73.6%
Air Conditioners	1997	2004	66.1%	67.8%
Refrigerators	1998	2004	30.5%	55.2%
Freezers	1998	2004	22.9%	29.6%
Gasoline Passenger Cars	1995	2004	23.0%	22.0%

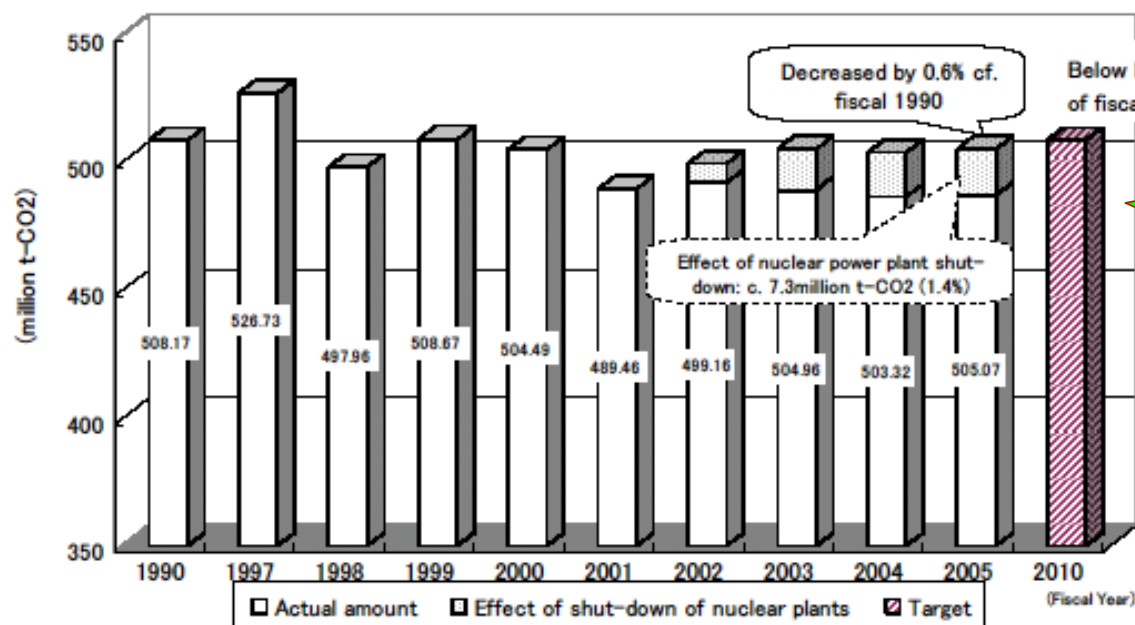
Source :ECCJ

- 2. There are 21 items listed under the program, of which targets of five items have been revised recently upon completion of the phase-1 program.** (Air conditioners, Refrigerators, Electric Toilet Seats, Vending Machines, DVD Players)
- 3. Top Runner approach is an incentive program to encourage technology development compared with bottom cutting approach.**

3.4 The Keidanren Voluntary Action Plan

(Japan Business Federation)

- 1. Goal: 36 sectors to reduce total CO₂ emission of 2010 below 1990.**
Covering 83% of industry and 44% of all Japan in terms of CO₂ emission.
- 2. Follow-up survey 2006 (Released annually)**
Of the 35 industries and energy converting sectors, 17 reported decline below 1990 level and 16 reported decline below 2004 level.
- 3. The Keidanren forecasts that CO₂ emission of 2010 will be 503 million ton-CO₂, which is 0.5% below that of 1990.**



900 Hints
Reducing GHG

Compiled and
disseminated by
Keidanren

Source: Nippon Keidanren

4.1 Summary ...

1. In the early stage, regulative approach is effective on large scale energy consuming industries.

- x It should be backed by clear rules and fair enforcement.
- x Energy conservation management (large and medium size plants)
- x Financial support for capital intensive/long life facilities and sub-commercial technologies/facilities

2. In the advanced stage, guideline/incentive approach is important.

- x Bench-mark and goal for medium/long term plan
- x Try every possible measures as a whole society removing sectoral boundaries

3. In the long run, technology development plays important role.

- x Developing energy conservation oriented technologies and products
- x Developing innovative technologies
- x Planting technologies in the society: top runner program

4. In the field where mass consumers play dominant role, social determination and government initiative are important.

- x Corporate social responsibility
- x Education of individuals toward resource conservation

4.2 ... and Conclusion

- 1. Energy conservation, creating negative demand, is essential for the sustainable development.**
- 2. No quick remedy is available, but persevering endeavor is required.**
- 3. To this end, create a society where Energy Conservation generates Money.**

“Mottainai” : Spirit of frugality with love to earth!

3R: Reduce, Reuse, Recycle

Thank you