APEC Seminar on Energy Supply & Demand Outlook
June 11, 2007 Tokyo

Energy Trend of Asia & Japan

-- Updated : June 2007 --

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IEEJ's long-term forecasts on Japan, Asia and world energy outlook are listed on IEEJ's home page.
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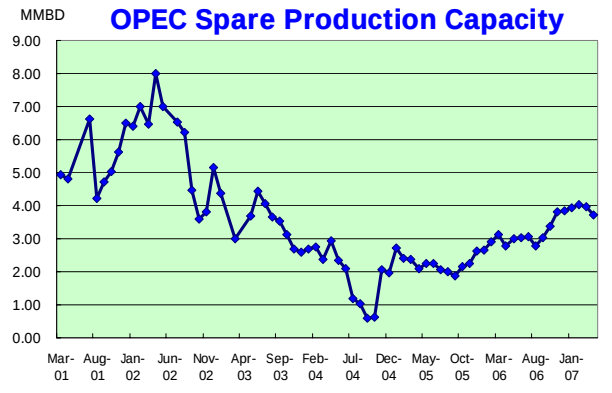
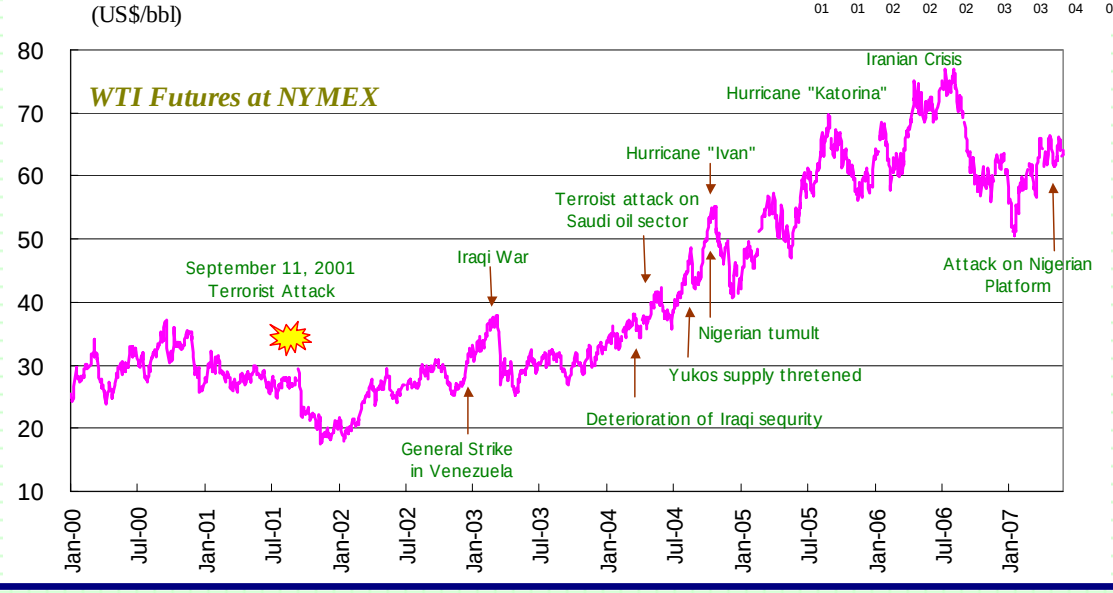
1.1 Oil Price Skyrocketing

Oil Price has been skyrocketing since 2003 reflecting

1. Strong demand surge in US plus emerging economies such as China and India.
2. Shrinkage of surplus supply capacity in upstream, downstream and US gas & power market.
3. Speculation by money funds.

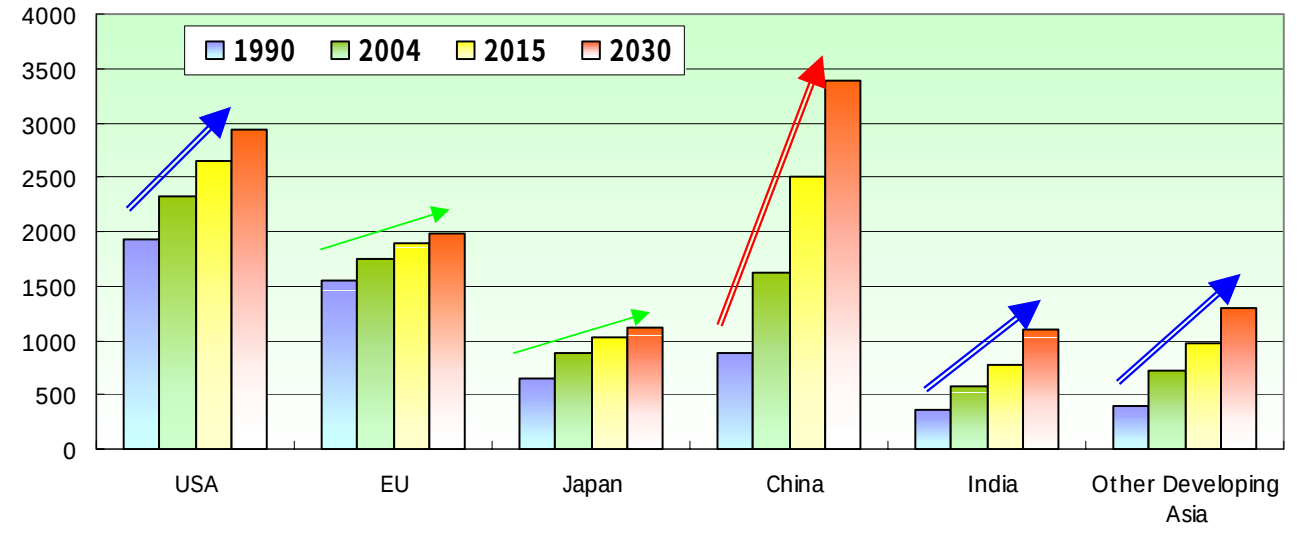




1.3 World Energy Outlook

IEA World Energy Outlook 2006

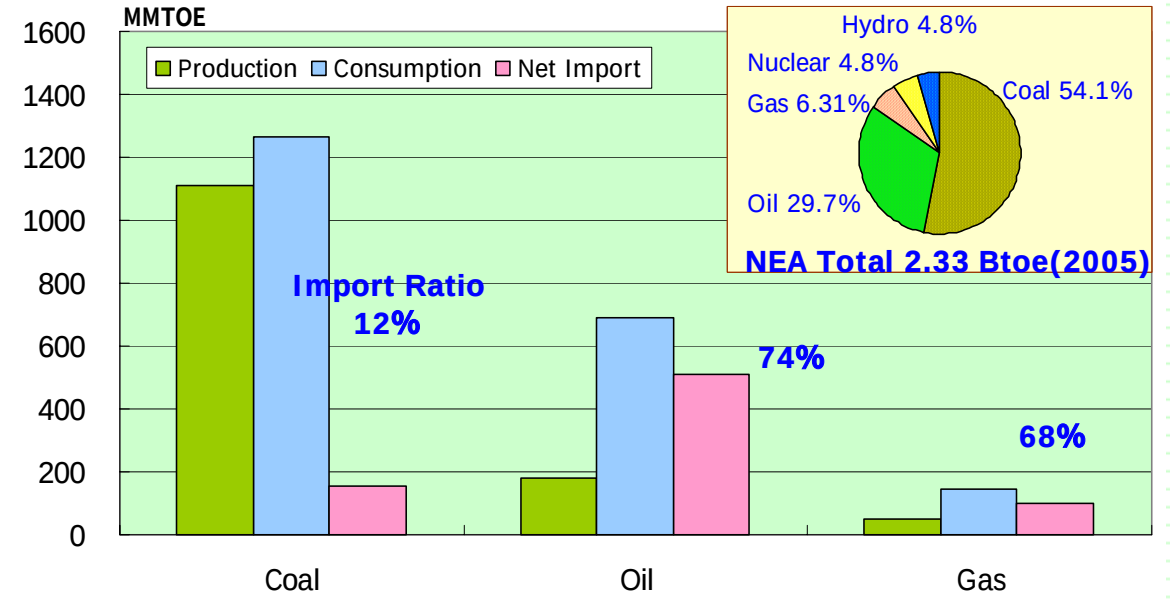
1. In the Reference Case, energy consumption is forecast to grow substantially in US and developing countries, while they remain modest in Japan and Europe.
2. Energy consumption of Asia will grow fast; China alone will exceed USA sometime in the 2020s.
3. IEA casts serious concern if this Reference Case is sustainable or not.



1.4 Energy Import Dependence

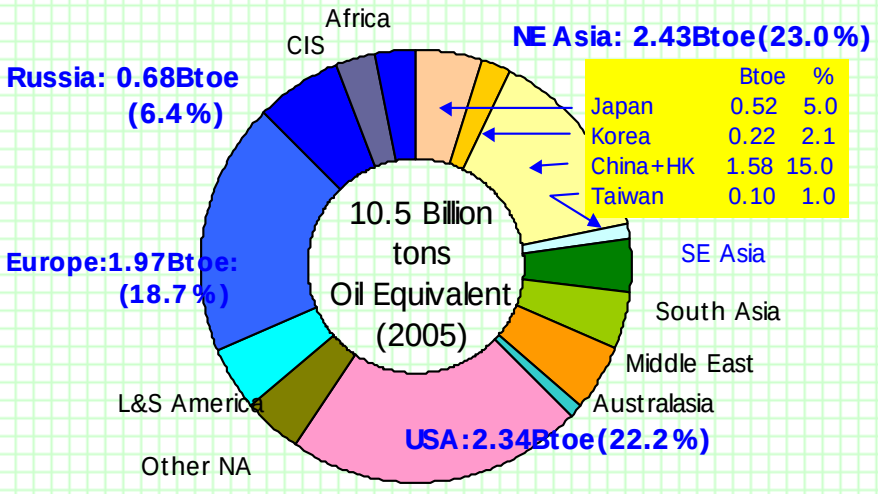
Oil and gas import dependence is high in Northeast Asia.

1. China's oil import is expanding rapidly, causing serious concern of the world.
2. China started natural gas (LNG) import in 2006. China plans to expand LNG import in the coastal industrial areas.
3. Coal is imported only by Japan & Korea. China is self-sufficient on coal but will increase coal import in the southern provinces that are remote from the northern supply center.



1.2 Asia in the World

1. Northeast Asia is one of the three major energy market of the world together with North America and Europe.
2. Asian energy consumption is expanding rapidly driven by the fast growth of China and India.
   a. Asia-Pacific will be a golden market of the 21st century
   b. Stable energy supply is an important policy objective.

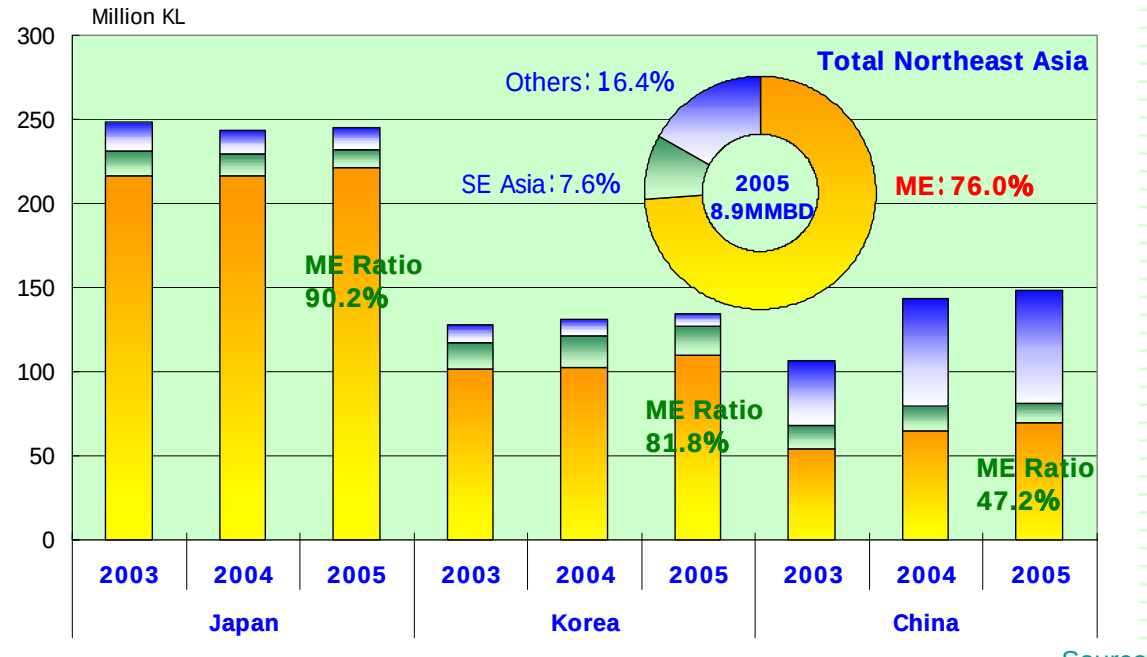


Energy Total	Oil Equiv. 00 to 05	
	Btoe	%
Japan	5.2	102
China	15.8	161
India	3.9	121
Other Asia	13.1	125
US, Europe, Others	67.4	105
World	105.4	114
Oil		
Japan	2.4	96
China	3.4	146
India	1.2	109
Other Asia	2.9	141
US, Europe, Others	28.4	104
World	38.4	109

1.5 Middle East Dependence of Oil

Northeast Asia depends on the Middle East 3/4 of oil Import

1. This causes vulnerability of supply and other issues such as the Asian Premium of the Middle East crude oils.
2. As China's oil import increases, the Middle East dependence of the region will increase inevitably.



Source: National statistics

1.6 Oil Price and Asian Market

1. Asian Premium: ME crudes are priced $1/Bbl higher for Asia

a. Middle East is the only reliable source as the mega-supplier

b. Upward price pressure will continue as China and India keep increase import

c. Effective cure is to develop new supply sources

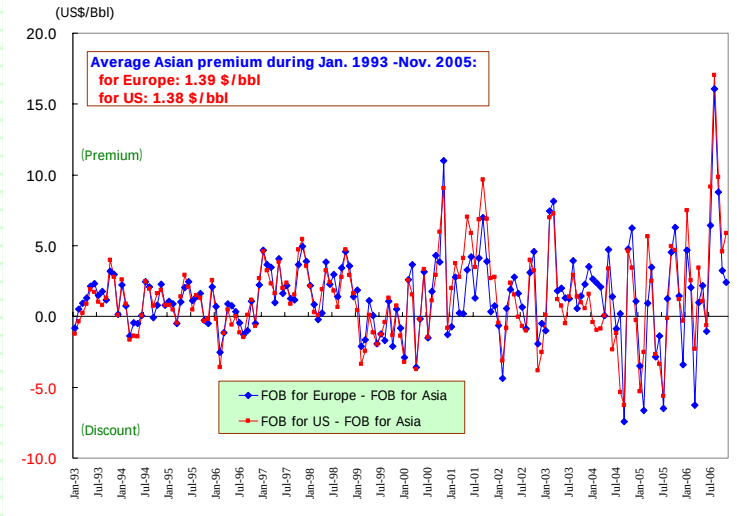
2. Expanding Light-Heavy Spread

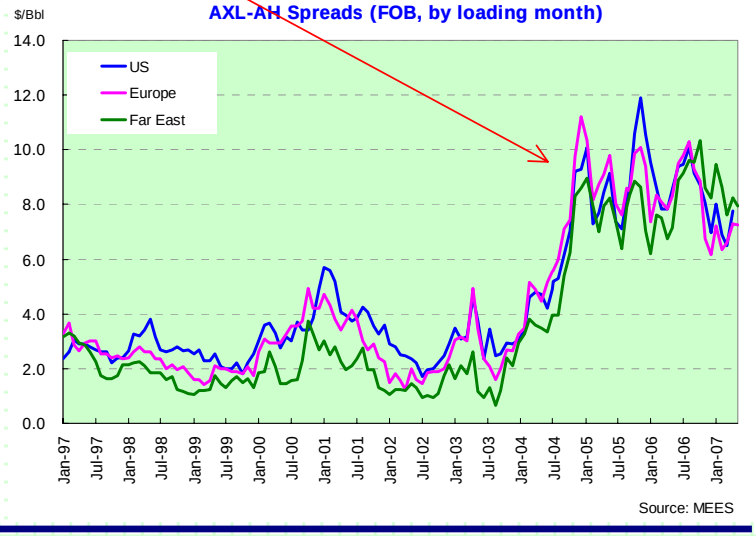
a. Major demand increase for lighter products

b. US and China competing for lighter crude oils in the Atlantic basin

c. Lack of downstream investment for upgrading

China's Crude Import	2003	2004	2005
Middle East	50.9%	45.4%	47.2%
SEA	13.2%	10.3%	7.4%
Africa & Others	35.9%	44.3%	45.4%
Total (MMt)	91.13	122.82	148.10



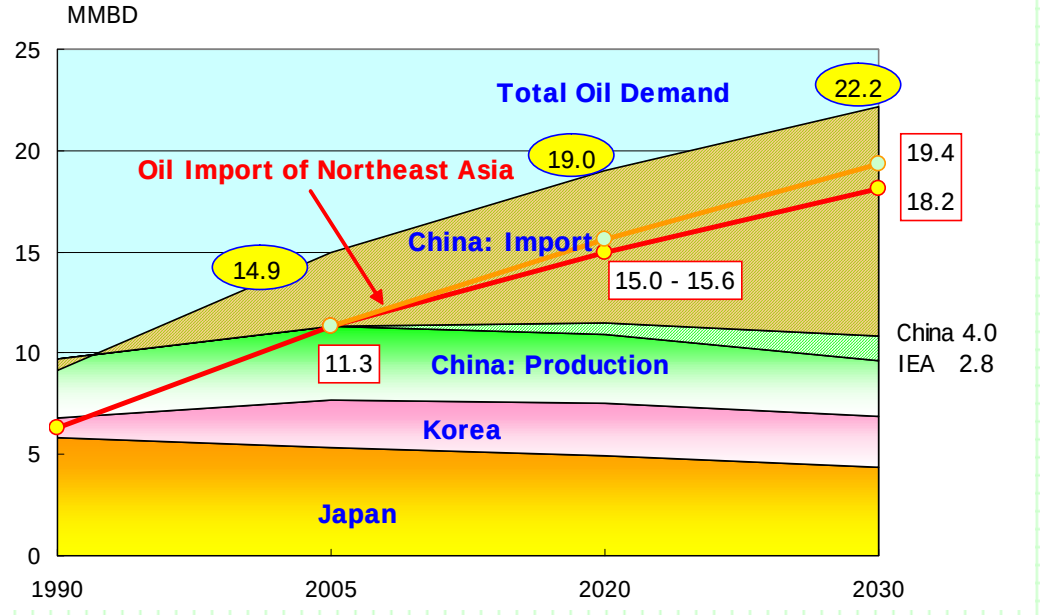


Source: MEES

1.7 Petroleum Outlook of NE Asia

Oil import of Northeast Asia will increase 4 MMBD by 2020.

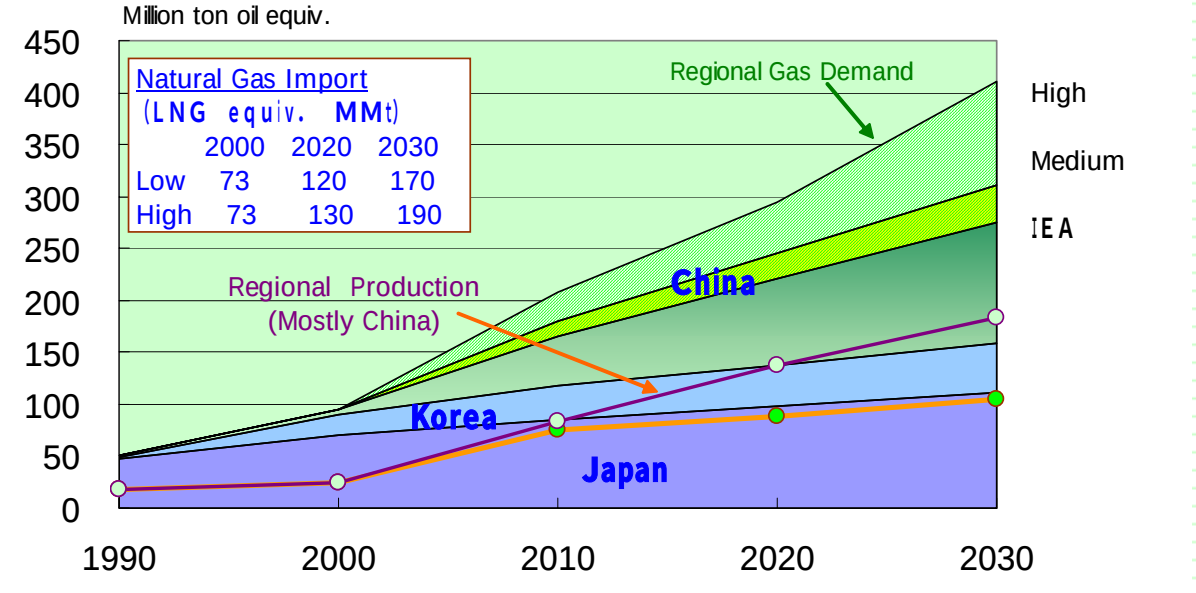
- Oil consumption of Japan is apparently decreasing, while that of Korea may increase moderately for a while before turning downward.
- Since China' s domestic oil production would be more or less leveling off, China's incremental oil demand needs to be supplied by import, which will increase 4 MMBD by 2020 and 7 - 8 MMBD by 2030.



1.8 Natural Gas Outlook of NE Asia

China's gas demand is growing fast, while IEA forecasts slower growth.

1. China's gas import will also increase fast as
   a. East-West gas pipeline has spurred natural gas demand.
   b. Switching to natural gas is expected to improve environment.
2. About 20 LNG terminal projects have been listed in China. However, skyrocketing gas price may cause delay of import projects.



1.9 Facts and Concerns

Facts

1. East Asia is a world-class energy market.
2. Fast growing demand for oil and gas has to be imported, as indigenous production is leveling off.

Issues and Concerns on Energy

1. Security
   - x Preparedness for sudden turbulence
   - x Need of huge incremental supply
   - x Increase of Middle East dependence
   - x Congestion and piracy in Malacca straight

2. Sustainability
   - x High energy intensity
   - x Environment pollution
   - x Promotion of nuclear and renewable energies

3. Stability of Market
   - x Soaring and unstable energy price
   - x Lack of fluid international market

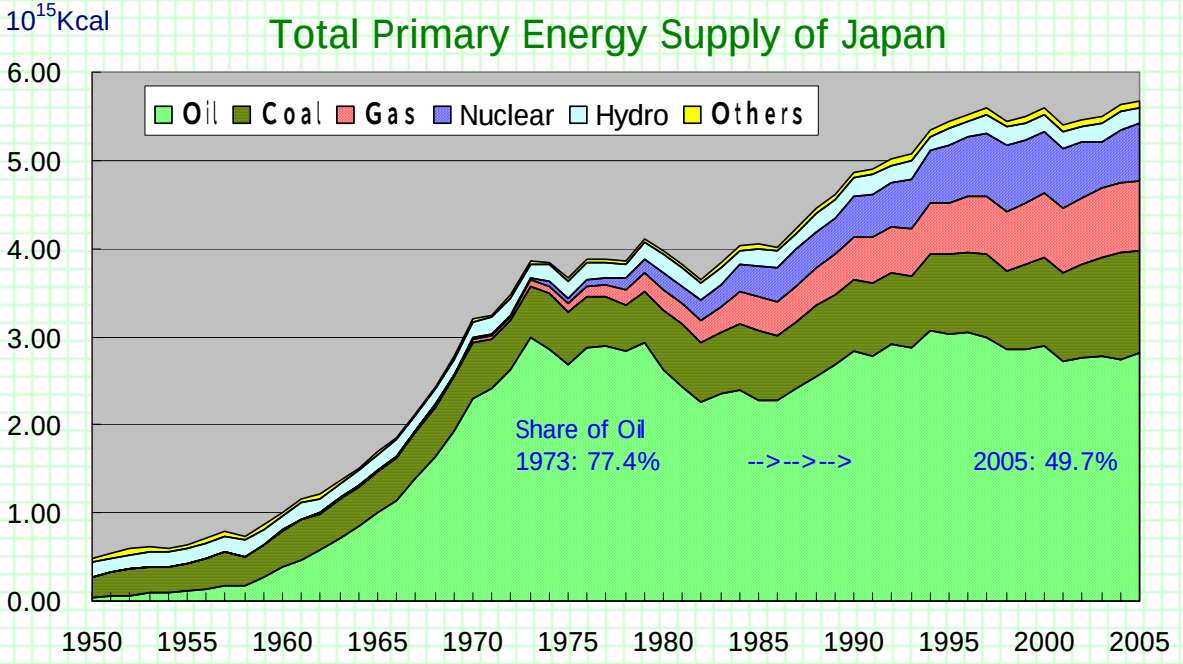
2.1 Japanese Experience

1. Facing the oil crisis, Japan implemented various counter policies.

Supply: Reducing oil dependency+Promoting Natural Gas and Nuclear

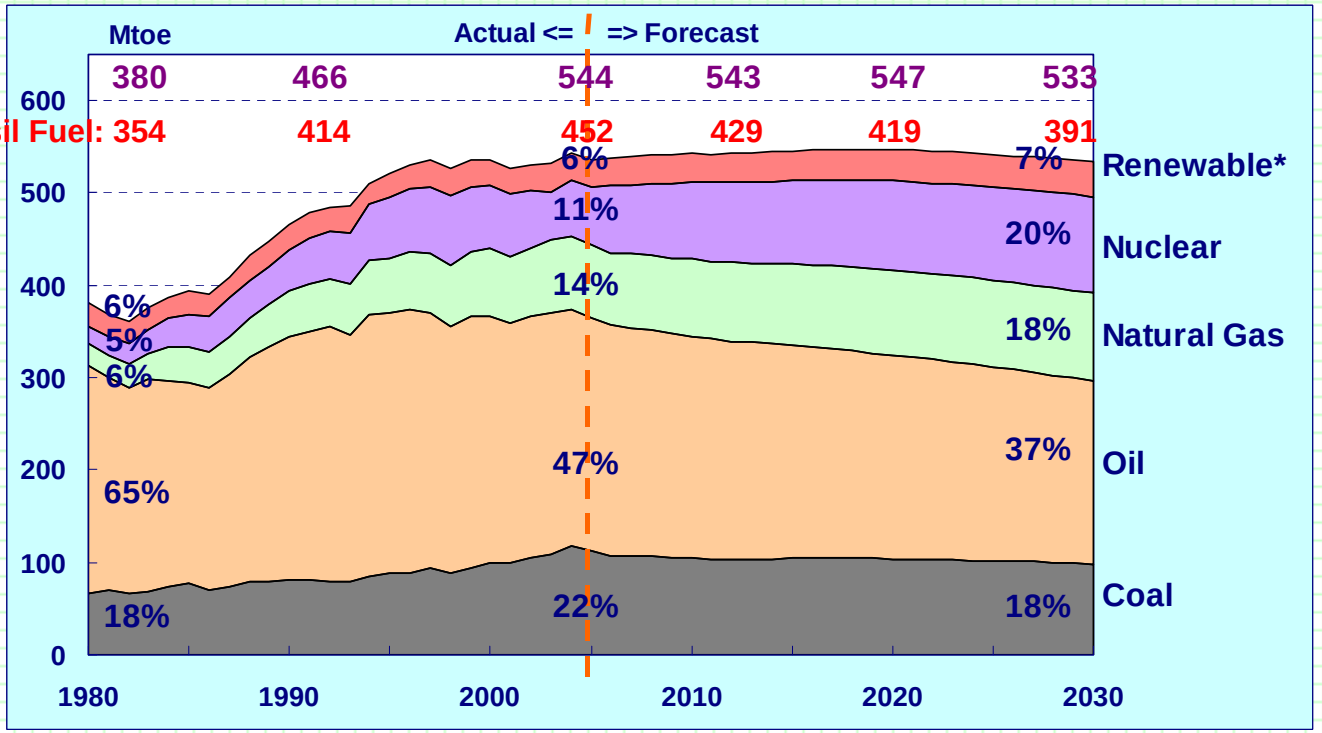
Demand: Diverting to Resource Saving Society

2. Japanese energy consumption gradually increased since mid-1980s with diminishing interest on energy conservation.



2.2 Primary Energy Supply

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



2.3 New National Energy Strategy

1. Objective

1) Establish trustworthy energy security for the national economy.
2) Resolve energy and environment issues to provide basis for sustainable development.
3) Contribute to global efforts to overcome energy issues.

Japanese Cabinet Endorsed on May 31, 2006

2. Basic Strategy

1) Construct world most advanced energy structure
2) Accelerate diplomatic efforts on energy and environment cooperation
3) Strengthen emergency response ability

3. Numerical Targets for 2030

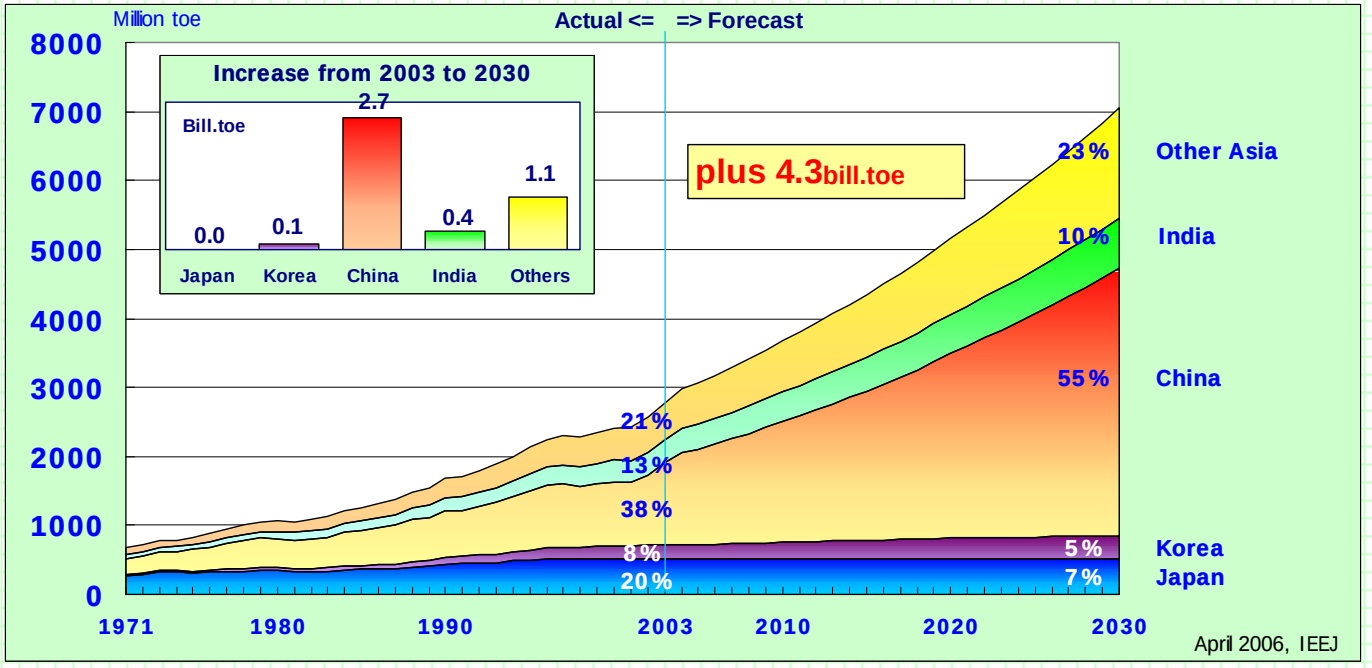
1) Front runner program to improve energy efficiency over 30%
2) Oil dependence below 40%
3) Next generation transport fuel to reduce mineral oil component less than 80%
4) Nuclear based power with 30 – 40% or more of power generation
5) Comprehensive supply security raising equity oil ratio to 40%

4. Other Targets

1) Asian energy cooperation
2) Innovation on new and renewable energy
3) Super long term route map for energy technology development
4) Coordination of administrative and institutional circumstance

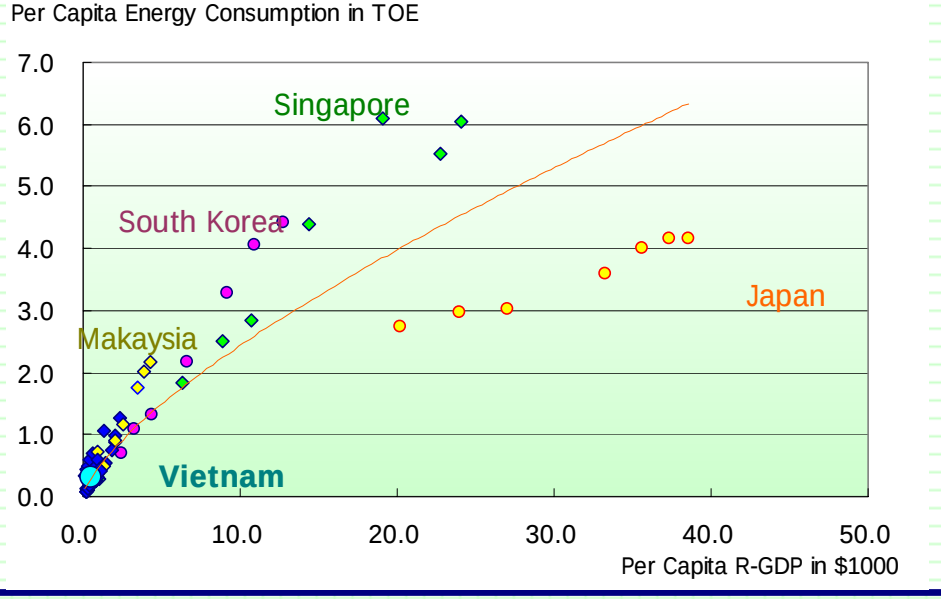
3.1 Energy Outlook of Asia

1. While energy consumption will be leveling off in Japan, it will more than double by 2030 in developing Asia.
2. Recent action in Japan
   - x Energy Policy Recommendation to PM Koizumi (May 18)
   - x New National Energy Strategy (May 31)



3.2 Asian Energy Consumption

1. Developed Asian countries may be divided into energy intensive and non-intensive groups; Japan is the typical model of the latter.
2. The downstream sector of the oil and gas industry (refining and petrochemicals) plays an important role in Singapore, South Korea and Malaysia, bringing them relatively energy intensive.
3. Japan has these industries as well as other energy intensive industries like steel mill. However, growth of hi-tech, light energy type industries has overwhelmed in Japan in the past three decades bringing it to an energy effective economy.



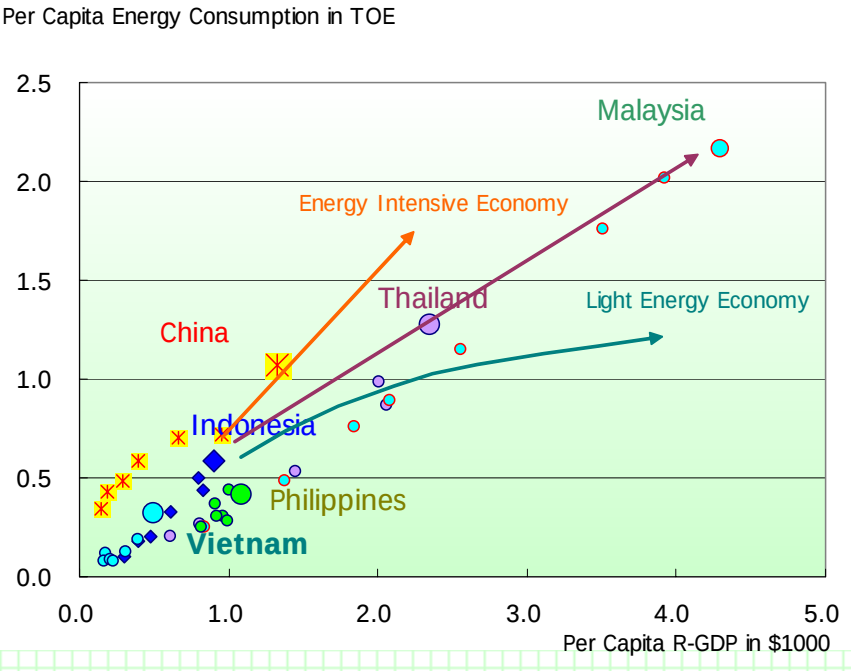
3.3 Energy Consumption of ASEAN

1. Energy demand of ASEAN countries will be considerably different pending policy selection on economic structure and people's life style on energy conservation.

2. In the early stage of industrial development, however, we need to construct the platform for development, i.e. social infrastructure, which requires energy consuming materials and feedstock. Energy intensity of an economy may be higher before reaching the cruising altitude.

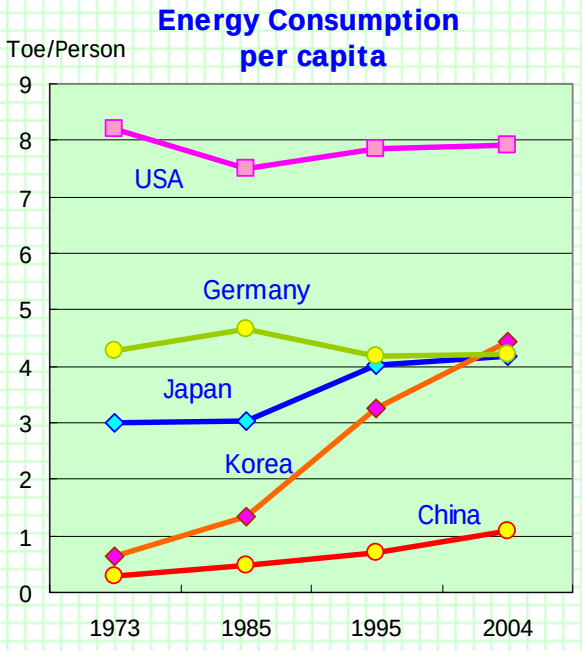
3. Per Capita Energy Consumption

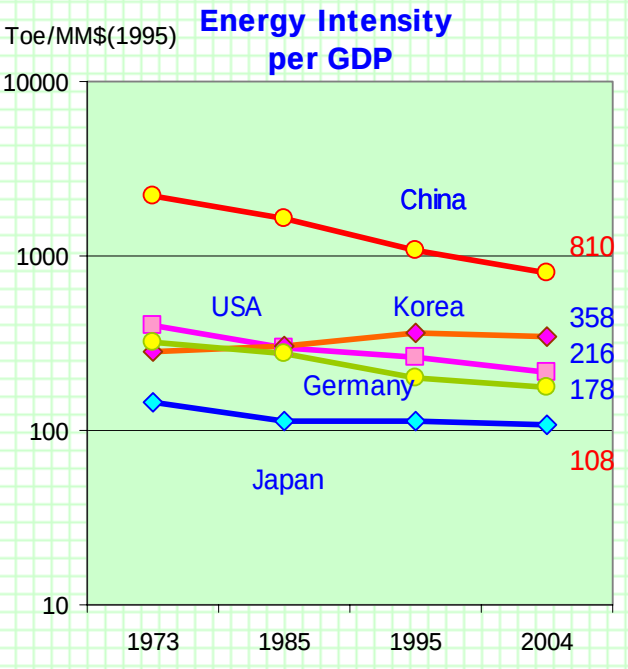
Vietnam :0.28 TOE
Thailand : 1.2 TOE
Malaysia : 2.2 TOE
Japan : 4.0 TOE



4.1 Energy Intensity of NEA

1. Per capita energy consumption is almost same in Japan, Korea and Germany, while it is substantially high in USA and low in China.
2. Energy intensity is improving but still considerably high in China, which suggests great room for rationalization.
3. Energy intensity is high in Korea reflecting its economic structure.

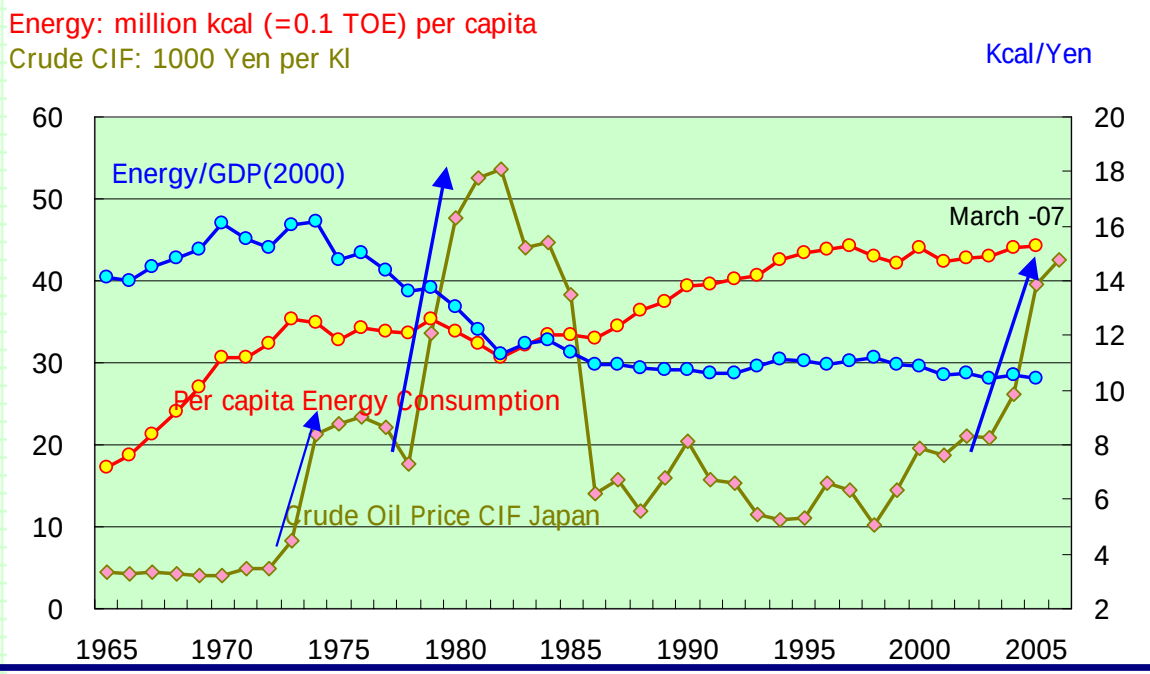




4.2 Momentum for Conservation

Worldwide concern on energy will divert the society toward energy conservation and smart life.

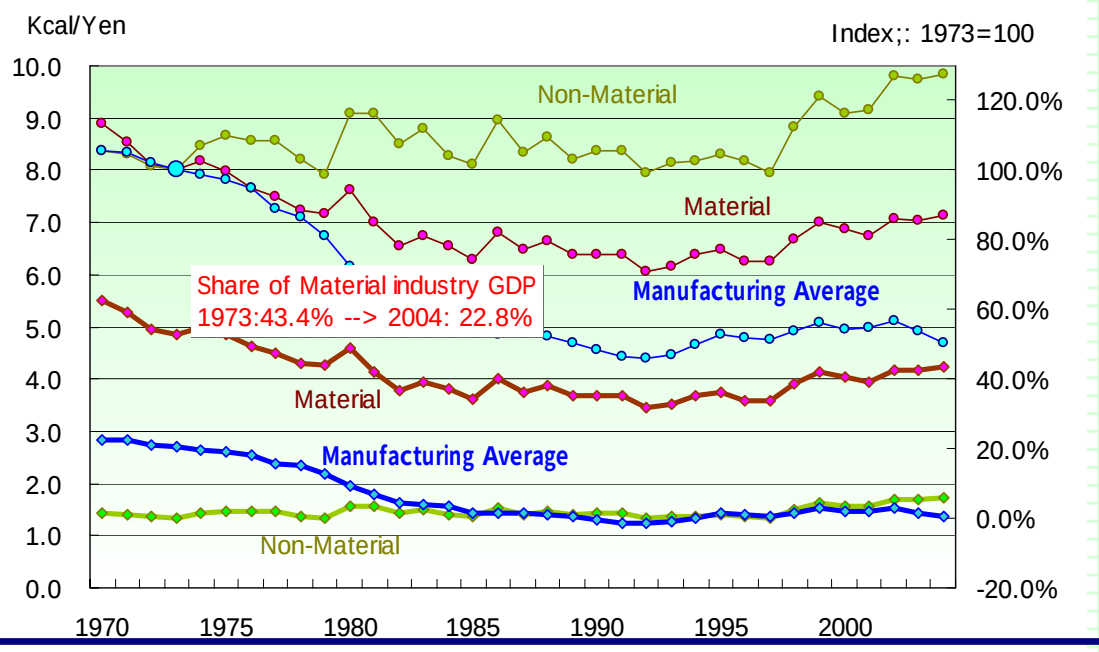
1. Japan's energy intensity improved substantially following the abrupt price hike brought by the oil crisis of the 1970s.
2. The recent soaring of energy prices together with concern on GHG emission will drive the country for another challenge on energy conservation.



4.3 Economic Structure

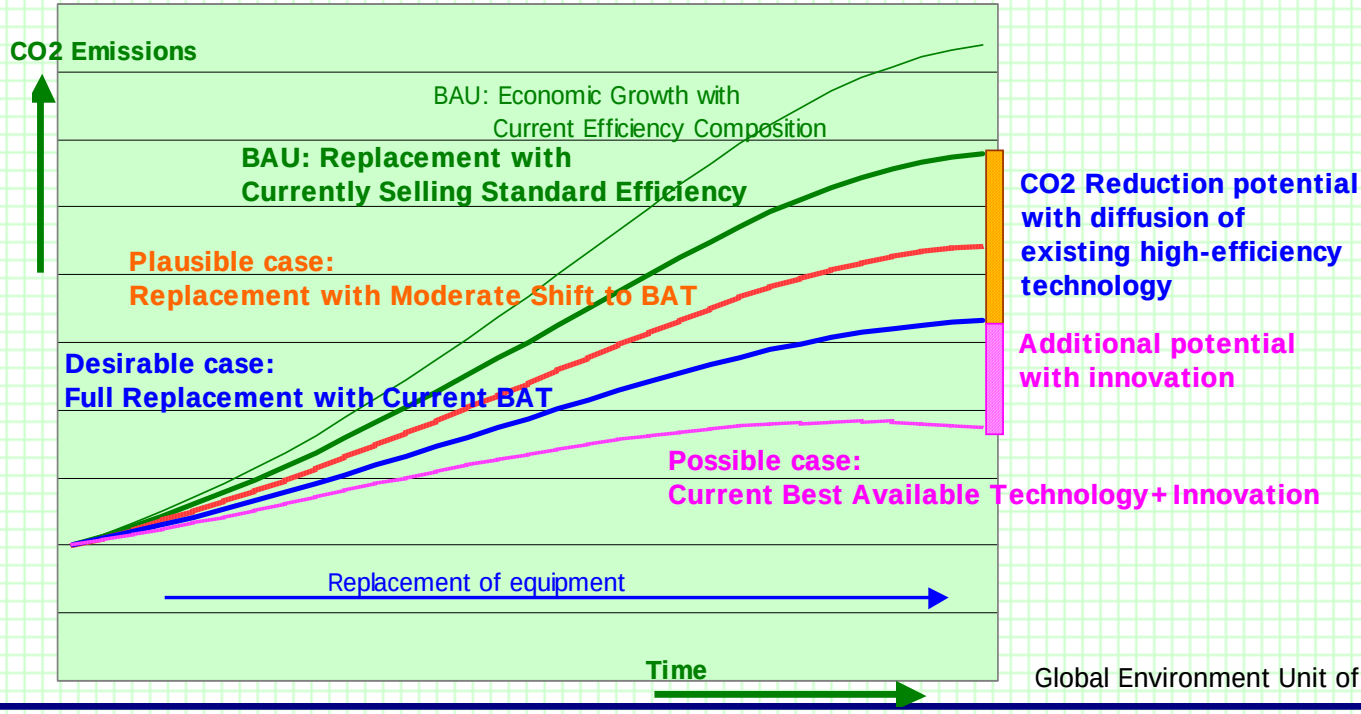
Economic structure will give substantial impact on energy demand.

- In case of Japan, among manufacturing industries, the share of the material industries (steel, cement, paper & pulp and chemicals) in terms of GDP decreased from 43.4% in 1973 to 22.8% in 2004.
- Thus, the energy intensity of the manufacturing industry has improved much better than the improvement in the material industries.



4.4 Energy Conservation Potential

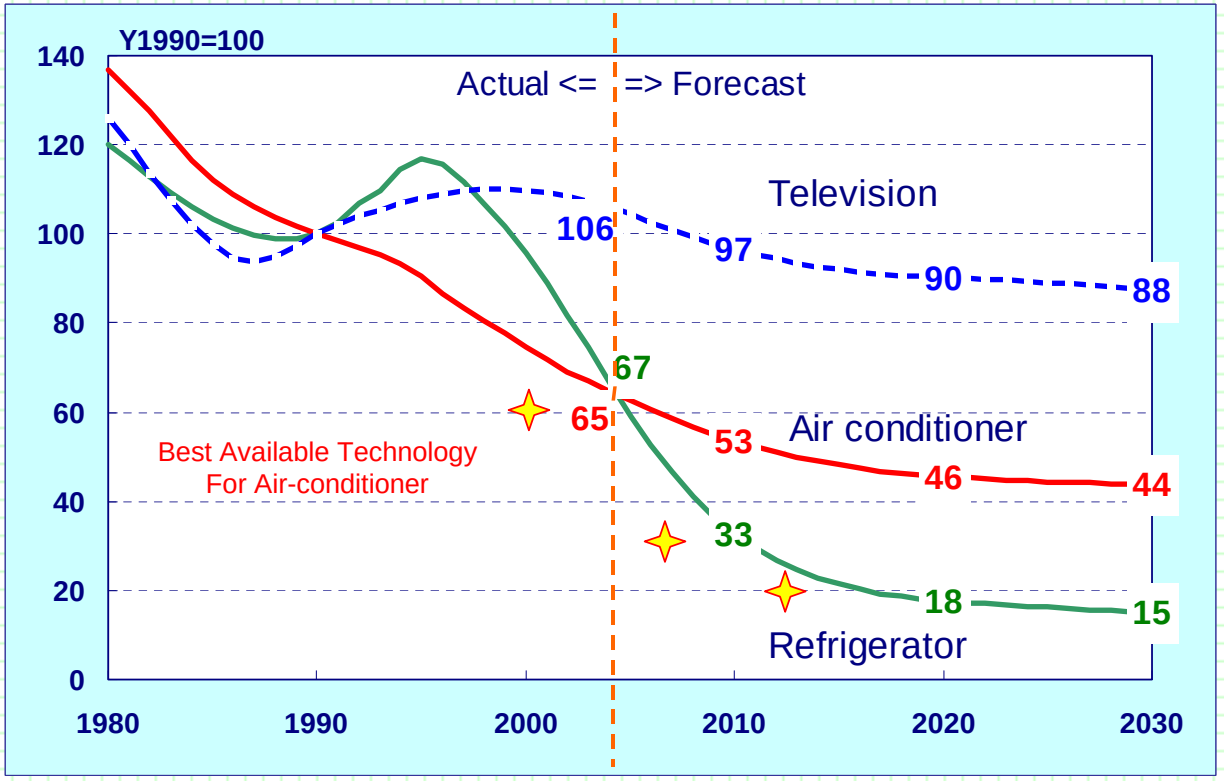
1. Concept of energy conservation potential by BAT (Best Available Technology) may be illustrated as below.
2. In realizing the potential, technology, policy and social willingness are the most important factors.



Global Environment Unit of IEEJ

4.5 Efficiency of Home Appliances

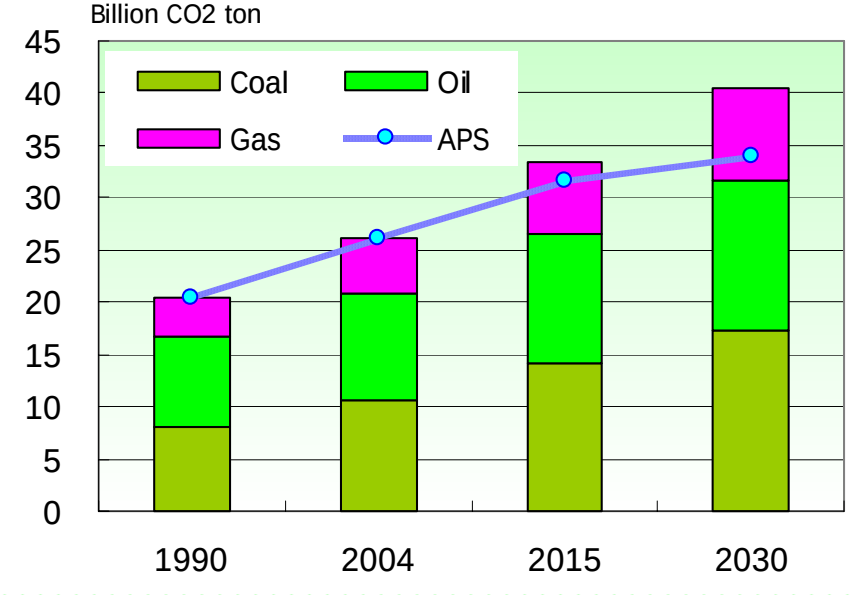
Effect of the Top-runner program continues as stock replacement takes time.



4.6 Potential CO_2 Reduction by BAT

1. IEA forecasts CO_2 emission would increase 15 billion ton by 2030 for the Reference Case, which would not be sustainable. Hence, Alternative Policy Scenario.
2. Introducing BAT, CO_2 emission could be reduced by 10-30% in each sector according to IEEJ's study.

CO_2 Emission by Source (IEA 2006)



Potential CO_2 reduction in 2020 (Plausible case)

Unit: billion t-CO_2/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

4.7 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 → Obligations

Factories: Type-1
(Fuel:3000kl/y, Power:12 million kwh) →
- Energy Manager
- Middle/Long Term Plan
- Periodical Report

Factories: Type-2
(Fuel:1500kl/y, Power:6 million kwh) →
- Energy Mgt Officer
- Periodical Training
- Periodical Report

Transport

Guidelines
- Energy Efficient Vehicles
- Eco-Drive/Load Factor
- Modal Shift

Transport Business
Cargo Consignor
(Above specified size) →
- Energy Conservation/ Rationalization Plan
- Periodical Report

General Entities → Commuting on Public Transport

Building

Guidelines

Non-Residential Building
(Over 2000m³) →
- Construction and Renovation Plan

Products

Motor Vehicles
Machines & Appliances

Guidelines

Top Runner Program
Indication of Energy Efficiency → Hearing/Inspection

5.1 Japan's CO_2 Emission is Decreasing

1. Fuel source CO_2 Emission of Japan, now passing its peak, will gradually decrease by 2030 to the level 1% lower than 1990 as energy demand declines and non-fossil energy use increases.
2. This will be further enhanced by technology development.

Compared to 1990	Compared to 2004
+6%	-8%
-1%	-14%
-7%	-19%
-15%	-26%

5.2 Agenda for International Dialogue

1. Supplier/Consumer Dialogue

- x Transparency on supply/demand outlook
- x Collaboration in upstream investment and infrastructure building
- x Technology development, energy transit issues, etc.

2. Consumer / Consumer Dialogue

- x Energy conservation and rational use
- x Rational market design and infrastructure building
- x Technology development

3. Global Energy-Environment System: Post Kyoto Protocol

- x Participation of every stakeholders
  - → Integration of KP(Top-down) and APP(Bottom-up) approaches
- x Harmonizing interests of developed and developing countries.

5.3 Quest for Sustainable Development

1. Asia with mega population is emerging as the world biggest energy market. However, energy/environment issues would become great hindrances to the sustained development.
2. International cooperation, not a mere talk but real action, is needed to secure a feasible path for sustained development through:

a. Slowing down energy demand growth rationalizing energy use
   → Technology development/transfer and promotion of energy conservation and environment improvement

b. Strengthening emergency response ability
   → Strategic oil reserve and international response system

c. Promoting mega projects on supply and infrastructure development
   →Developing east Russian resources, pipelines and sea-lane safety, etc.

Let us capitalize human wisdom and will to this end!

Thank you

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