October 21, 2003

3. Energy Policies in Japan

日本のエネルギー政策

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JAPAN'S ENERGY POLICY—OUTLINE AND PERSPECTIVE

Agency of Natural Resources and Energy

October, 2002

Ⅰ. Japan's Current Energy Policy Targets and Goals

(1) Energy is the basic resource that is indispensable for all our social and economic activities. Stable and efficient supply of energy is imperative to realize sustainable economic development. On the other hand, energy consumption is closely related to CO_2 emissions and to other environmental problems. Therefore, fundamental goal of Japanese energy policy is to simultaneously attain the 3Es, i.e. – energy security, environmental protection, and economic efficiency.

(2) First, securing stable supply of energy is critical for Japan of which energy self-sufficiency is persistently low. This policy goal is particularly important to address rapidly glowing energy demand in the residential/commercial and transportation sectors. It is also crucial taking into account the rapidly growing energy demand in Asian region and its increased dependence on oil from Middle East.

(3) Second, reducing CO_2 emissions originating from energy sector is posing great challenge for Japanese energy policy. At the Third Conference of Parties to the UN Framework Convention on Climate Change (COP3) held in December 1997, Japan committed to achieve the target of 6% reduction of the total average GHG emissions from 2008 to 2012 in comparison with those in 1990. Due to the fact that almost 90% of total GHG emissions come from CO_2 emissions of energy sector origin, the Japanese government has set the target to stabilize the CO_2 emissions at 1990 FY level.

In June 2002, after deliberations in the Diet, the government entrusted the United Nations with a document formally accepting the Kyoto Protocol.

(4) Third, in conjunction with globalization of Japanese economy, comprehensive structural reform needs to be pursued to make its industries more powerful and internationally competitive. From this viewpoint, the energy sector is under growing pressure to further reduce costs and to establish a more efficient supply system.

(5) Simultaneous achievement of these policy goals is not at all easy because they often contradict each other. Furthermore, energy situation has substantially changed since 1998.as follows:

a) Change of people's lifestyle has caused rapid increase of energy consumption in the residential and passenger transport sectors. Due to that, CO_2 emissions from energy origin in 2000 have increased about 10% over '90 level.

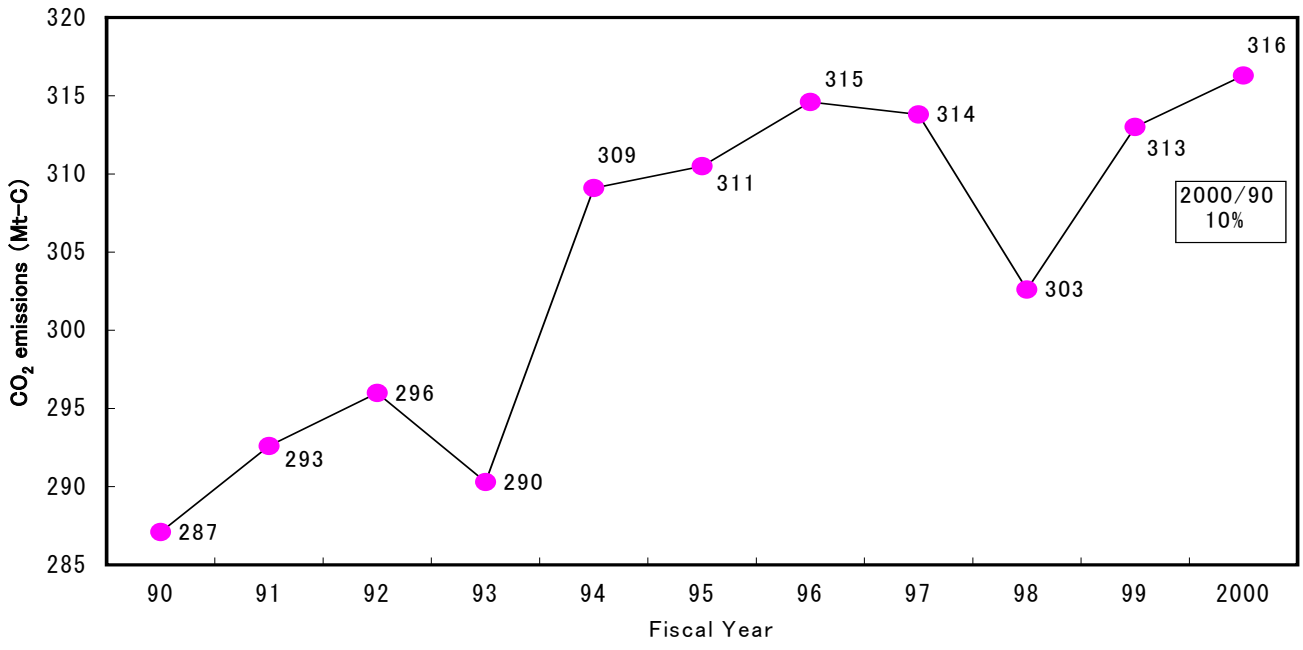
b) Deregulation of energy industry sector has raised cost sensitivity, which has made simultaneous achievement of 3Es more difficult.

c) Construction of some nuclear power generation has been postponed under the influence of the accident of JCO Co. in Tokai village in '99, and so on.

d) From economic reasons, the share of coal is rapidly increasing in energy supply, while nuclear and renewable energy show only a slow increase in these days.

(6) In order to achieve 3Es under these changes of circumstances, it became inevitable to review the overall energy policy. For this purpose, the advisory committee for natural resources and energy was set up in April 2000. After intensive consideration at the committee and relevant sub-committees, it submitted a report of comprehensive review of energy policy and long-term energy supply/demand outlook in July 2001 replacing the former development in 1998 just after COP3.

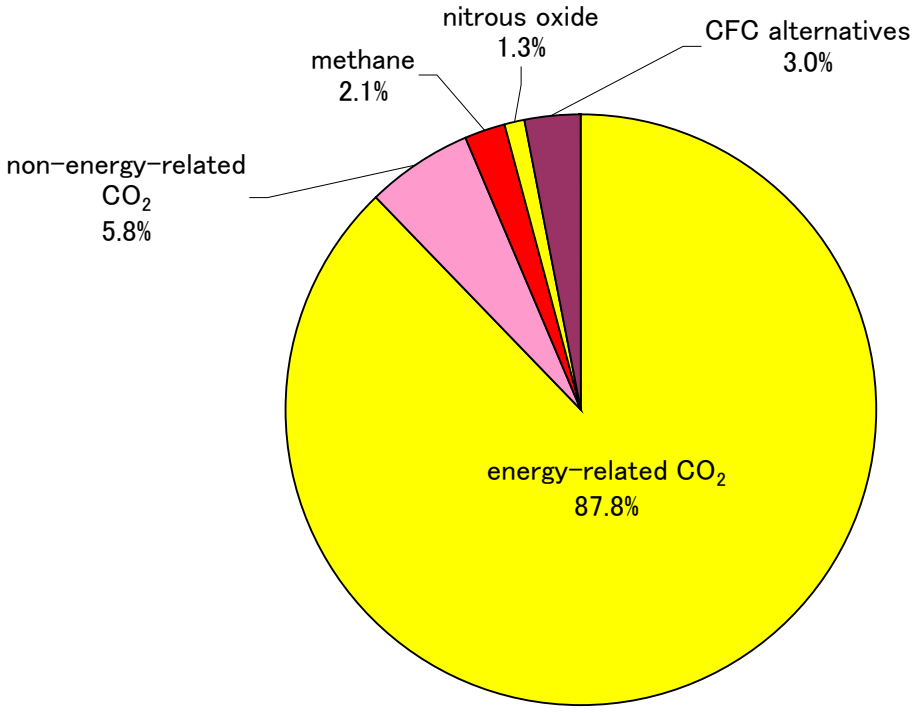
CO_2 emissions originating from energy sector in Japan



Greenhouse gases (figure next to ▲ show the breakdown of a 6% reduction)

▲2.5%	Reduction of CO_2, methane and nitrous oxide emissions 【Breakdown】 0%: Reduction of energy-related CO_2 emissions ▲0.5%: Reduction of the emission of methane, nitrous oxide, etc. ▲2.5%: Technological innovation and more efforts of the people
▲3.9%	Land utilization reforms and the absorption by the forests
＋2.0%	Reduction of the emission of CFC alternatives (HFC, PFC, SF_6)
Residual (▲1.6%)	Joint Implementation with other countries, CO_2 Emissions Trading and Clean Development Mechanism and so forth

Greenhouse gases emissions in Japan (FY1999)



Source: Ministry of the Environment

Ⅱ. Energy Situation

Ⅱ-1. Energy Demand

After the two oil crises in the 1970's, energy consumption in Japan was curbed through the promotion of energy efficiency and it recorded minus growth, while after 1986, energy demand grew, reflecting low energy prices.

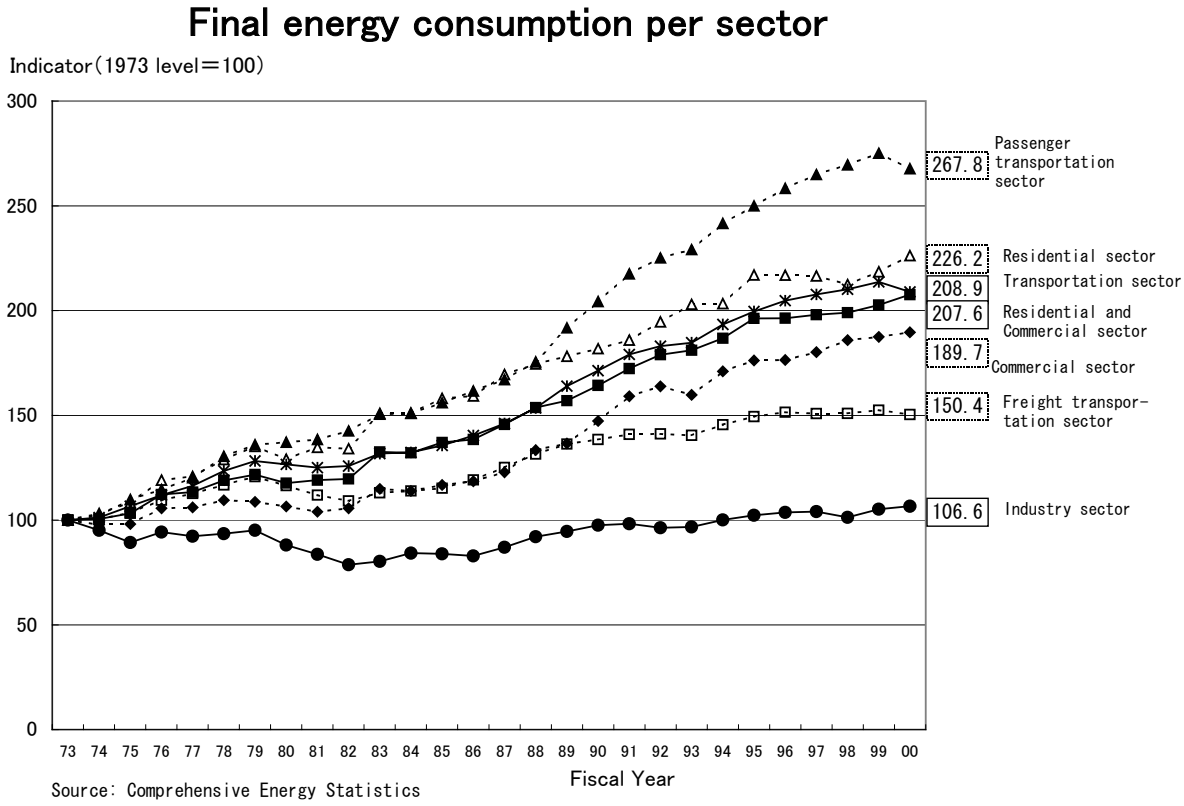
In 1998, due to recession, overall consumption decreased temporarily over the previous year level. However, reflecting economic recovery, final energy consumption reached 15,615 PJ in 1999, 15,729 PJ in 2000, up 2.8%, 0.7% over the previous year, respectively.

On the other hand, while energy demand in the industrial sector has been almost stable between 1973 and 2000, energy demand in the residential/commercial sector and transport sector has almost doubled in the same period.

Energy consumption (10^2PJ) and growth rate from the previous year (%) in Japan

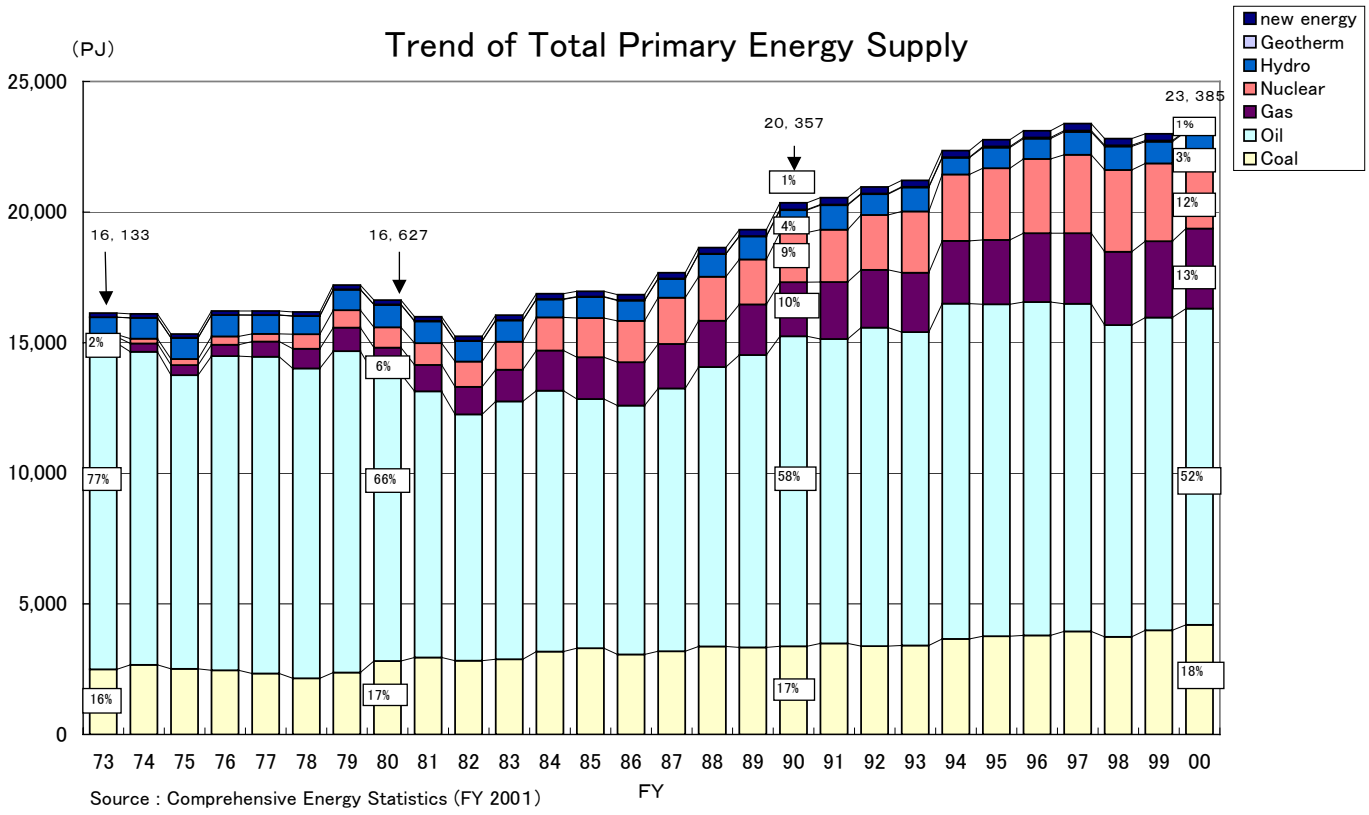
Fiscal Year	1973	79	86	90	91	92	93	94	95	96	97	98	99	2000	00/90
Final energy Consumption	111	117	114	135	139	139	140	146	150	152	153	152	156	157	
		0.9	▲0.4	4.4	2.6	0.4	0.7	3.7	3.2	1.3	0.8	▲0.9	2.8	0.7	16.4%
Industry Sector	73	69	60	71	72	70	70	73	74	75	76	74	77	78	
		▲0.8	▲1.9	4.1	0.7	▲2.0	0.4	3.5	2.2	1.3	0.4	▲2.6	3.8	1.3	9.3%
Residential & commercial sector	20	24	28	33	35	36	36	38	39	39	40	40	41	42	
		3.3	1.9	4.4	4.9	3.9	1.1	3.2	5.0	0.1	0.9	0.5	1.8	2.4	26.4%
Transportation Sector	18	23	26	31	33	33	34	35	36	37	38	38	39	38	
		4.2	1.3	5.1	4.6	2.2	0.9	4.7	3.2	2.6	1.5	1.1	1.7	▲2.2	22.0%

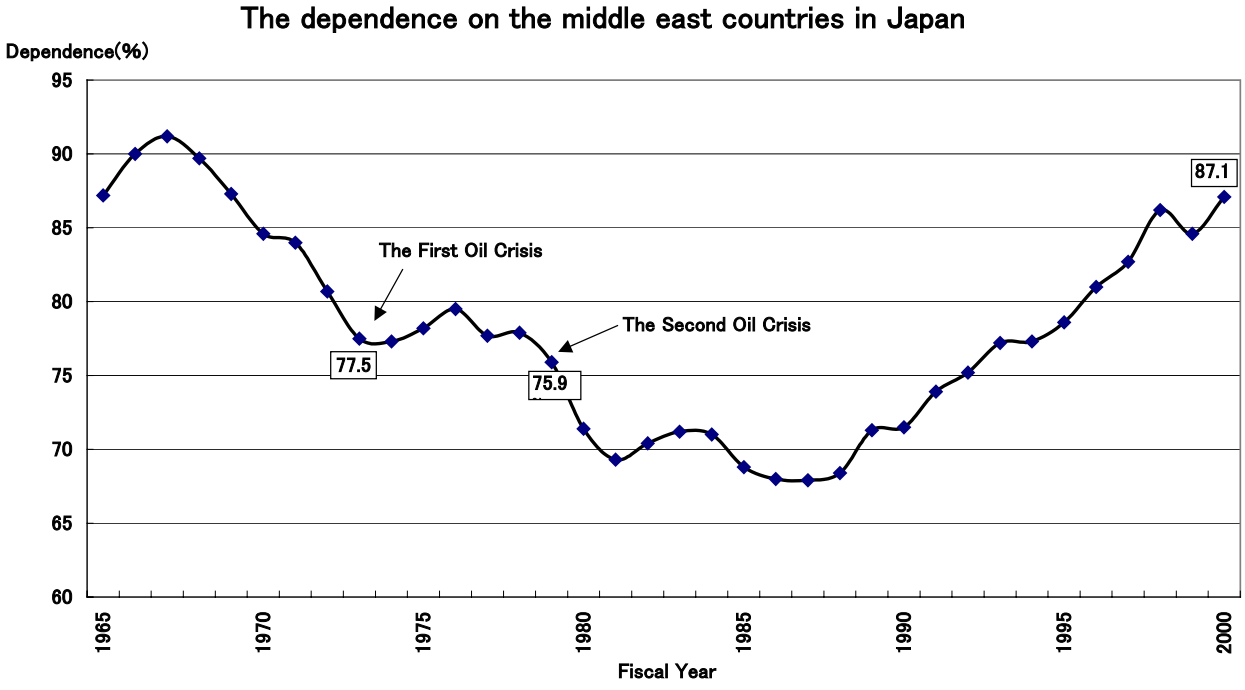
Source : Comprehensive Energy Statistics (FY2001)



Ⅱ-2. Energy Supply

Japan lacks natural energy resources and has a weak energy supply/demand structure. Since the two oil crises in the 1970s, Japan has promoted the introduction of oil-alternative energy. As a result, oil dependency declined from 77% in 1973 to 52% in 2000 and the share of nuclear energy in total primary energy supply increased from 0.6% in 1973 to 12% in 2000, and that of natural gas, from 1.5% in 1973 to 13% in 2000.

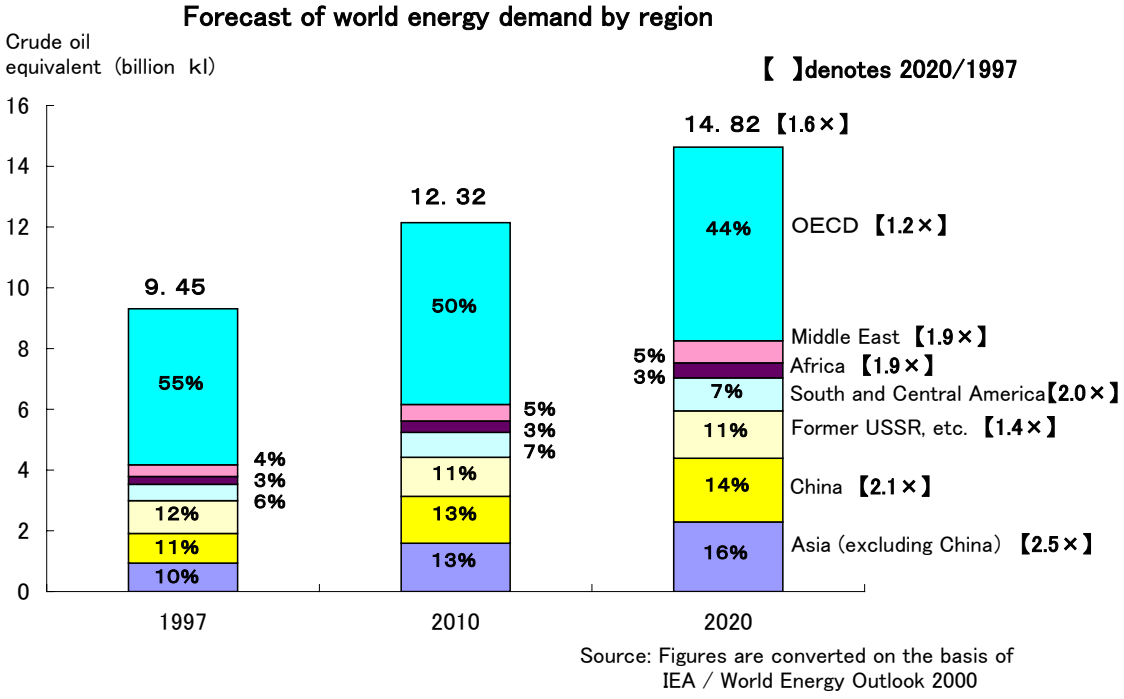




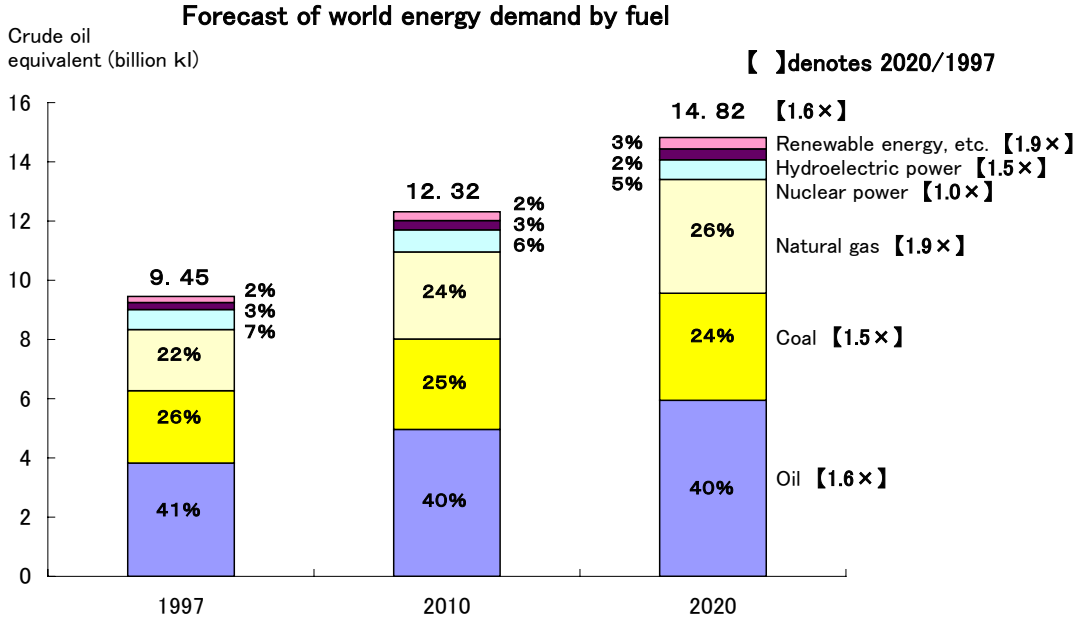
Source:Yearbook of Production, Supply and Demand of Petroleum,Coal and Coke(MITI)

Ⅱ-3. The circumstances of Asian energy demand

Energy demand (especially of oil) in Asia region is expected to increase considerably, and substantial expansion of energy dependence (especially oil) on the other region in fairly worried. This problem gets energy security weakened and the amount of emission of CO_2 increased.

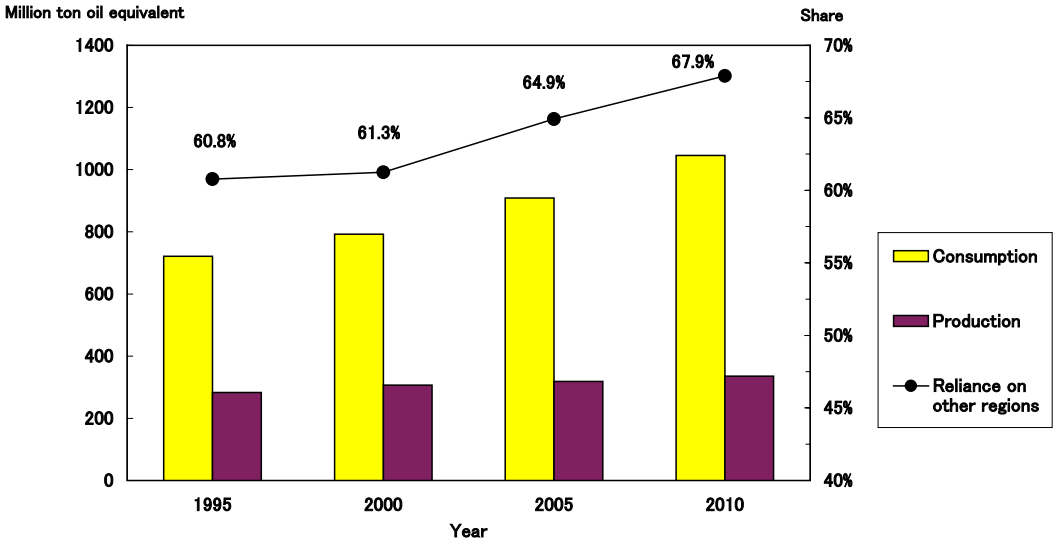


Source: Figures are converted on the basis of IEA / World Energy Outlook 2000



Source: Figures are converted on the basis of IEA / World Energy Outlook 2000

Projected Asia's oil consumption, production and reliance on other regions



Source: Asia Pacific Energy Research Centre(APERC) "Energy Demand and Supply Outlook Energy Balance Tables"
Note:Asian region includes Japan, China, Korea, Taiwan, ASEAN(Association of Southeast Asian Nations

Ⅲ. The Long-Term Energy Supply/Demand Outlook

Ⅲ-1. Introduction

The most recent Long-Term Energy Supply/Demand Outlook was developed in July 2001 by the Advisory Committee for Natural Resources and Energy, the advisory board of the Minister of Economy, Trade and Industry. Its purpose is to show the future outlook and goals of energy supply/demand and specify policies and measures to achieve them. This has replaced previous outlook development in June 1998 just after COP3 to show blue point to achieve the Kyoto target.

Ⅲ-2. Summary of the Current Outlook

(1) Outline of the Base Case

"Base Case" is the outlook in FY2010 in which current policy framework introduced after COP3 is maintained.

But energy demand in residential sector and passenger transportation sector is expected to grow rapidly. In addition, on the supply side, the share of non-fossil fuel energy such as nuclear and new and renewable energy will be lower than expected in the previous policy case. On the other hand, the share of coal will substantially increase due to its low price.

As a result, under this scenario, Final Energy Consumption in FY2010 will reach to 409 million kl (crude oil equivalent), which is slightly over 400 million kl, the previous policy

case. And, it is estimated that CO_2 emissions originating from energy sources will reach to 307 million t-C, which is 20 million t-C or 7% over 287 million t-C of FY1990 level.

(2) Future Concrete Policies for the Basic Goal

As is obvious from the above forecast, implementation of current policies and measures would not be enough to achieve the policy target, namely, stabilization of CO_2 emissions at FY1990 level. In order to further reduce 20 million t-C of CO_2 emissions, additional policies and measures must be undertaken.

What needs to be done first is further promotion of energy conservation. Energy conservation policy, which maintains the economic welfare of national economy to the maximum extent possible, is the best energy security policy. It is also the best environment policy because the reduction of energy consumption does not emit any CO_2.

Next, new energy needs to be vigorously promoted. While new energies such as photovoltaic power, wind power and waste power tend to be extensive and also be affected by national conditions, they have such advantages as indigenous energy and non-CO_2 emitting energy.

If basic policy goals can not be achieved by these policies, further policies and measures for fuel switching in the power sector would need to be implemented.

a) Energy Efficiency

Implementation of the current policies including Top-Runner Program and Keidanren Voluntary Action Program could reduce 50 million kl from the BAU (Business-As-Usual) case without any policies and measures.

Additional measures that are equivalent to reduce of 7 million kl would reduce CO_2 emissions by 6 million t-C from Base Case.

- Introduction of residential/commercial energy management systems
- Expansion of Top-Runner Program
- Accelerating introduction of vehicles meeting Top-Runner standards

b) New Energy

Under current program, introduction of the new energy is estimated at just 8.78 million kl, far below the target of the 19.1 million kl.

Additional measures needs to be implemented to achieve the above target, which would reduce CO_2 emissions by 9 millions t-C from Base Case.

- Wider use of clean energy vehicles
- Consideration of measures to expand new energy market in the electricity sector (ex quota system with green certificates)
- Introduction of equipment and machinery using new energy in the public sector

c) Fuel Switching

Despite the above efforts, further 5 million t-C needs to be reduced from Base Case in order to stabilize CO_2 emissions at 1990 level. To this end, fuel switching in the electricity sector, from coal to natural gas, for example, is indispensable.
In order to encourage fuel switching, the cost differential between the least expensive fuel, i.e., coal and other fuel such as natural gas needs to be addressed through various measures such as subsidies, regulatory measures, taxation, and voluntary action. In selecting specific option, such factor as international energy price, domestic energy situation, international negotiation of the Problem of Global Warming would need to be fully taken into account.

d) Natural gas
In order to expand natural gas use, additional measures are considered with a view to reducing natural gas prices , developing pipeline infrastructure and exploring new form of gas utilization such as GTL and DME.

e) Nuclear Power Promotion
10-13 additional nuclear power plants need to be developed from the viewpoint of energy security and environmental protection, for which the highest safety is the prerequisite. For this purpose, solid technical basis for nuclear safety needs to be developed. Information related to necessity and safety of nuclear should be widely provided to general public.

f) Reviewing expenditure program of special accounts for energy.
With a view to achieve effective reduction of CO_2 emissions through energy efficiency policies, renewable energy policies and energy RD&D policies, the current resources should be utilized fully and effectively. For this purpose, current expenditure program of special accounts for energy was examined.

g) RD&D
Long-term strategic support should be provided for energy RD&D in high priority areas.

h) International Cooperation
With a view to securing stable supply of energy in Asian region, international cooperation in such areas as the oil stockpiling regional development of oil alternative energy, energy efficiency, and new energy need to be promoted. And also it is needed to
Promote cooperation with oil-producing countries in Middle East, on which Japan and other Asian region depend for great deal of oil.

Total Energy Consumption Outlook by Sector

(unit : million kl of crude oil equivalent)

FY / Sector	1990		2000		2010			
					Base Case		Policy Case	
		Share %		Share %		Share %		Share %
Industry	183	52.5	200	49.3	187	45.8	About 185	About 46
Total	85	24.4	108	26.5	126	30.8	About 120	About 30
Residential	46	13.3	58	14.2	60	14.7	About 58	About 14
Commercial	39	11.2	50	12.3	66	16.1	About 63	About 16
Transportation	80	23.0	98	24.1	96	23.4	About 94	About 24
Total	349	100	406	100	409	100	About 400	100

Total Primary Energy Supply Outlook

(unit : million kl of crude oil equivalent)

FY / Sector	1990		2000		2010			
					Base Case		Policy Case	
TPES	526		604		622		About 602	
Form of energy	Quantity	Share %	Quantity	Share %	Quantity	Share %	Quantity	Share %
Oil	306	58.3	313	51.8	280	45.0	About 271	About 45
Coal	87	16.6	108	17.9	136	21.9	About 114	About 19
Natural Gas	53	10.1	79	13.1	82	13.2	About 83	About 14
Nuclear	49	9.4	75	12.4	93	15.0	About 93	About 15
Hydro	22	4.2	21	3.4	20	3.2	About 20	About 3
Geothermal	1	0.1	1	0.2	1	0.2	About 1	About0.2
New energy	7	1.3	7	1.1	10	1.6	About 20	About 3
Renewable*	29	5.6	29	4.8	30	4.8	40	About 7

* Renewable includes New energy, Hydro and Geothermal.

Energy-Origin CO_2 Emissions Outlook

(unit:million t-C)

FY	1990	2000	2010	
			Base Case	Policy Case
CO2 Emissions (Growth rate compared to 1990)	287	316 (10%)	307 (7%)	Around 287

※These results are estimated under given assumption, so they should be taken with some flexibility.

Target supply of electricity

(unit：10,000kW)

	1990		2000		2010	
	Capacity		Capacity		Capacity (Policy Case)	
		Share(%)		Share(%)		Share(%)
Coal	1,223	7.1	2,922	12.8	3,155～4,413	12.3～16.2
LNG	3,839	22.3	5,722	25.0	6,606～6,696	24.6～26.1
Oil and other	5,347	31.1	5,248	22.9	4,908～5,111	18.8～19.4
Nuclear energy	3,148	18.3	4,492	19.6	5,755～6,185	22.7～24.1
Hydro power	3,632	21.1	4,478	19.5	4,810	17.7～19.0
Ordinary	1,931	11.2	2,008	8.8	2,069	7.6～8.2
Pumped	1,701	9.9	2,471	10.8	2,741	10.1～10.8
Geothermal energy	24	0.1	52	0.2	54	0.2
Total	17,212	100	22,913	100	25,288～27,229	100

(unit：100 million kWh)

	1990		2000		2010	
	Electricity		Electricity		Electricity (Policy Case)	
		Share(%)		Share(%)		Share(%)
Coal	719	9.7	1,732	18.4	About 1,599	About 16
LNG	1,639	22.2	2,479	26.4	About 2,549	About 26
Oil and other	2,108	28.6	1,005	10.7	About 533	About 5
Nuclear energy	2,014	27.3	3,129	34.3	4,186	About 42
Hydro power	881	11.9	904	9.6	952	About 10
Ordinary	788	10.7	779	8.3	803	About 8
Pumped	93	1.3	125	1.3	149	About 1
Geothermal energy	15	0.2	33	0.4	37	About 0.4
New energy	－	－	23	0.2	115	About 1
Total	7,376	100	9,396	100	About 9970	100

Ⅳ. The Basic Law on Energy Policy Making

In June 2002, the Basic Law on Energy Policy Making was newly established by lawmaker-initiated legislation. The objective of the Law is to indicate the general direction of future energy policies, and it is comprised of the following items.

(1) Basic policies on measures concerning energy supply and demand
- Securing a stable supply of energy
- Adapting to the environment
- Utilizing market principles

* In utilizing market principles, full consideration will be given to supply policy goals as "Securing a stable supply of energy" and "Adapting to the environment."

(2) Responsibilities of national and local public bodies as well as enterprises

(a) In line with the basic policies, the government is responsible for comprehensively drawing up and implementing measures related to energy supply and demand. The government will also make efforts to use articles and goods that help reduce the environmental impact resulting from energy use.

(b) Local public bodies are responsible for carrying out measures in accordance with government measures. They will also make efforts to use articles and goods that help reduce the environmental impact of energy use.

(c) Enterprises are responsible, while demonstrating ingenuity and creativity, for using energy in ways that increase the efficiency of energy use, for stabilizing the energy supply, and for helping to conserve both the regional and the global environment. At the same time, they are responsible for cooperating with measures imposed by the government and local public bodies.

(3) Efforts by the public

With using energy, the Japanese people will strive to rationalize such use and to utilize new energy to the maximum extent possible.

(4) Submission of reports to the Diet

Each year, the government must submit a report to the Diet, giving an overview of measures concerning energy supply and demand that have been implemented.

(5) Drawing up of a basic plan for energy supply and demand

The government will draw up a basic plan on energy. (The Minister of Economy, Trade and Industry will solicit the views of the heads of relevant administrative organs, as well as the views of the Advisory Committee for Resources and Energy,

draw up a draft, and have it decided at a Cabinet meeting. The Minister will also promptly report on the said plan to the Diet.) The said basic plan on energy must be re-examined at least once every three years, and modified as necessary.

(6) Promotion on international cooperation

(7) Dissemination of knowledge and information on energy, etc.