

Oil Market of Today and Tomorrow*

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It is a great honor for me to have the opportunity to make a presentation about “Oil Market of Today and Tomorrow” from a Japanese viewpoint. I would like first to discuss the “peak-oil” theory and its implication for Asian countries; then to explain Japan’s new energy strategy, and finally to describe the current and future development of Japan’s oil market and key related issues.

“Peak-Oil” Theory and Asia

With regard to the “peak-oil” theory, the question of when we will reach the peak or a plateau in the world’s oil production is being hotly debated. An analysis made by the IEA in 2004 projected that the world’s oil production including non-conventional oil will reach its peak or plateau around 2030 in the base case. It seems to me, however, that nobody can predict precisely when this will happen, because it depends upon geological, technical, economic and political factors.



Long-term Scenario of World Oil Production (IEA, 2004)

Recoverable Reserves	Remaining Reserves <small>(in 1996, Trillion Bbl)</small>	Peak Oil Year	Peak Oil Demand <small>(Mil. B/D)</small>
Low Case	1.7	2013-17	96
Base Case	2.6	2028-32	2121
High Case	3.2	2033-37	142

* This speech was addressed at the 11th Annual Asia Oil & Gas Conference held in Kuala Lumpur on June 11-13, 2006.

Nonetheless, it is an undeniable fact that so-called “easy oil” is running out in most developed countries as well as in many producing countries of Asia. For this reason, there is no question that the Middle East and Africa will play an increasingly important role as oil suppliers to Asia in the coming years. From the producer’s viewpoint, it may be reasonable not to expand their production capacity too hastily, so long as they can keep their market share with crude oil prices remaining at a relatively high level. If this is the reality, then it is likely that we will reach the peak or plateau much earlier than 2030 as projected by the IEA’s base scenario.

This has important policy implications for oil importing countries like Japan. Although I fully agree with the view that the issue is not the availability of oil resources but its deliverability, we need to prepare for the peak-oil scenario from the standpoint of risk management in the face of an uncertain future. I think that this is very similar to the case of global warming, because its impact is global and it will have devastating consequences when it actually happens in the future.

Asian countries, therefore, need to make all possible efforts to promote energy conservation as well as to diversify their supply sources, because this region is going to face increasingly serious energy shortages both in the short run and the long run. Robust economic growth and rapid motorization are going to push up the demand for oil in the developing countries of Asia, but the supply capability of oil is very limited due to relatively poor reserve bases. In this respect, developing the oil and gas resources of Sakhalin and East Siberia could help Asia reduce its high dependency on Middle East oil and gas.

Japan’s New Energy Strategy

Next I would like to touch on the Japan’s new energy strategy. I can say that we are now witnessing a major shift in policy that has more to do with energy security than with the economic efficiency of the energy market. As we were able to enjoy very cheap oil prices during the period from 1985 to 2000, the Japanese public and policy makers until recently paid little attention to energy security.

Japan's New National Energy Strategy(1) (Policy Targets in 2030)



- 1) To improve energy efficiency by 30%**
- 2) To reduce oil dependency from the current 50% to less than 40%**
- 3) To introduce 20% of alternative fuels in transportation sector**
- 4) To increase share of equity oil in total oil imports from the current 15% to 40%**

I think, however, that this perception has now changed dramatically as a result of sharp increases in oil prices as well as rapid surges in China's oil imports. Particularly in recent years we have seen that Chinese national oil companies with the support of the Chinese government have been seeking aggressively to acquire oil and gas resources overseas in all parts of the world. There is no question that this active resource diplomacy being pursued by China has given rise to major concerns about Japan's future energy supply. In addition, these concerns are unfortunately being intensified by China's recent activities of exploration and development of oil and gas fields in the East China Sea.

Meanwhile, the question of how to reduce CO2 emissions has become a very important policy target for Japan since the coming into force of the Kyoto Protocol in February 2005. According to this treaty, Japan is obliged to reduce its GHG emissions in 2010 by 6% compared with the level in 1990. Frankly speaking, this will be a very difficult target to achieve, because the current level of GHG emissions in Japan is already 7-8% higher than it was in 1990.

Under these circumstances, the Energy Committee of METI has just announced "The New National Energy Strategy", in which main policy targets have been set to accomplish by 2030. The major points are as follows.

- 1) To improve the efficiency of energy consumption per GDP by 30%.**
- 2) To reduce oil dependency from the current 50% to less than 40%.**
- 3) To introduce 20% of alternative fuels in the transportation sector.**

- 4) To increase the share of equity oil in total crude oil imports from 15% to 40%.
- 5) To increase the share of nuclear power in total power generation from the current 30% to 30-40% or more, and to establish the nuclear fuel cycle technology.
- 6) To strengthen international cooperation particularly in Asia by promoting transfers of know-how and technology in areas such as energy conservation, environmental protection and oil stockpiling.
- 7) To encourage technological innovation in alternative energy and energy conservation technologies such as Fuel Cell, GTL and DME, etc.

These targets are certainly very challenging, but we need to do our utmost to achieve them.

Japan's New National Energy Strategy(2) (Policy Targets in 2030)

- 5) To increase share of nuclear in power generation to 30-40% or more, and establish the nuclear fuel cycle technology
- 6) To strengthen international cooperation in Asia by promoting know-how and technology transfer
- 7) To encourage technological innovation and development in the energy industry

Japan's Oil Market and its Challenges

Next I would like to describe the current and future development of Japan's oil market and its challenges as well as its implications for the Asian market. I would like to emphasize three major points. The first is how to cope with structural changes of oil product demand. The second is how to address more stringent environmental regulations. The third is how to make use of spare refining capacity.

Challenges for Japanese Oil Industry

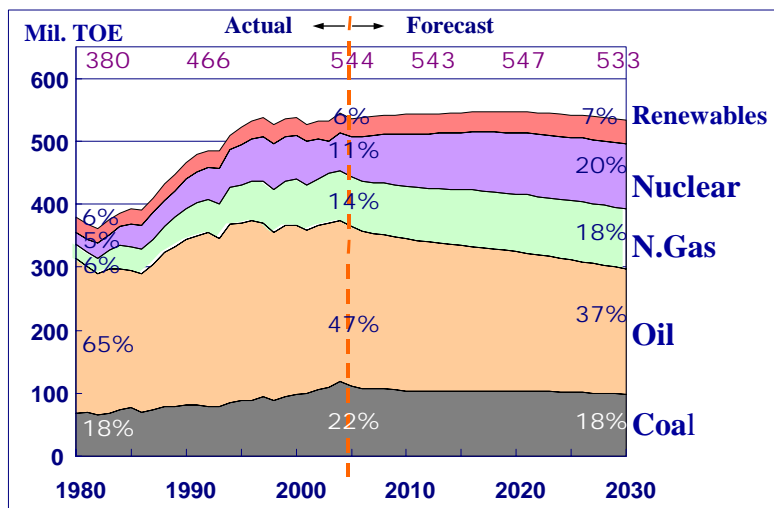


- How to cope with structural changes of oil product demand
- How to address more stringent environmental regulation
- How to make use of spare refining capacity

According to a recent forecast made by our Institute, primary energy demand in Japan is projected to remain almost flat until 2030, and the share of oil will decline from the current 47% to 37% in 2030. On the other hand, nuclear and natural gas will increase the share of primary energy demand. As far as total oil demand is concerned, this more or less reached its peak in around 2000 and has already started to decline gradually. This is the result of the country's matured economy with a shrinking population and significant improvement in the fuel efficiency of vehicles, as well as the switchover from oil to natural gas or electricity.



Prospect of Primary Energy Demand in Japan

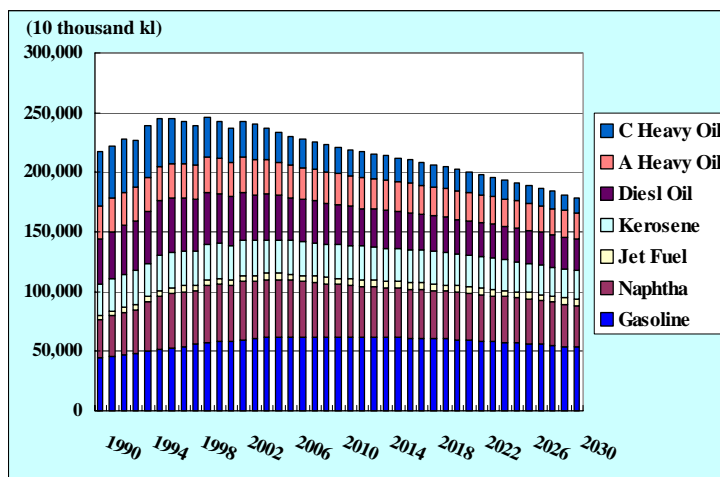


If we look at the demands for each oil product, we can observe a wide range of different trends. Gasoline demand, for example, is projected to increase slightly for next few years and then to enter a period of gradual decline. On the other hand, demand for naphtha, diesel and heavy

fuel oil will decline sharply by about 2-3 % per annum until 2010, and 1-2 % per annum thereafter. It will be a big challenge for Japanese oil refiners to find ways of coping with these structural changes in product demand.



Prospect of Oil Product Demand in Japan

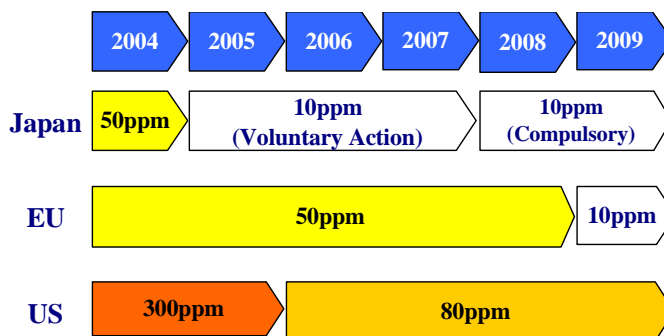


Source: IEEJ, 2006

The second challenge for Japanese refiners is how to address environmental problems. In the field of the conventional air pollution such as SO_x, NO_x and PM (Particulate Materials), the Japanese refining industry is the front-runner in the world. It voluntarily started to supply almost sulfur-free gasoline and diesel oil with less than 10 ppm content in 2005, well in advance of its obligation to do so in 2008 when mandatory regulation will come into force.

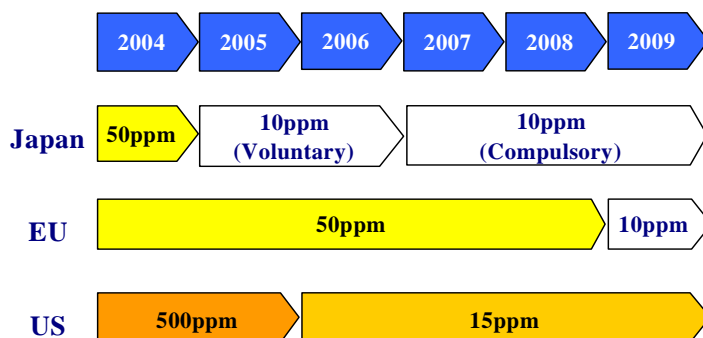


Sulfur Regulation of Gasoline in Japan, EU & US





Sulfur Regulation of Diesel Oil in Japan, EU & US



The Japanese refining industry now has to make even greater efforts to reduce CO₂ emissions from automobiles to tackle the global warming issue, because the government has set the target of introducing half a million kiloliters of biomass fuel by 2010. This volume is about one percent of the total gasoline demand, and the most probable candidate is believed to be imported bio-ethanol.

However, Japanese refiners are reluctant to mix bio-ethanol with gasoline directly, because it is very costly to retrofit distribution facilities for handling bio-ethanol. Instead, they have proposed mixing ETBE (Ethyl Tertiary-Butyl Ether) produced from bio-ethanol. The government is currently examining the availability of bio-ethanol and attempting to determine whether ETBE can clear related safety standards and regulations as a new chemical material.

The third challenge for the Japanese refiners is how to make use of the spare refining capacity of their high-upgrading facilities for export of products. As has already been pointed out by many informed observers, one of the main reasons for the current high crude oil price is the supply constraint on oil products in the global market, particularly in the US. As you may remember, when serious gasoline shortages occurred in the US in the wake of Hurricane Katrina last September, Japanese refiners took quick action to export high-quality gasoline to the US Gulf region, thus contributing to stabilization of the oil market.

As already mentioned, gasoline is the only oil product whose demand is projected not to decline for next few years. Since gasoline is the most profitable oil product in Japan, all Japanese oil companies make greatest efforts to supply gasoline domestically. For this reason,

it is highly likely that a wide range of middle distillates and heavy fuel oil will become more available in the Asian market from Japan in the short and medium term. Oil demand in Asia, especially in China, is expected to increase rapidly, and countries in this region are likely to face constraints on refining capacity. This means that there will be business opportunities for Japanese refiners to export oil products. It is well known that Japan's leading oil company is now refining 40,000 B/D of crude oil for PetroChina on the basis of an annual contract, and this may be regarded as a kind of product export.

From the business point of view, oil companies will now have to make the vital strategic decision on how much refining capacity should be maintained in the situation of shrinking domestic demand for oil products in the long run. During the last 15 years, Japanese refiners have struggled to reduce excess capacity and have succeeded in cutting refinery output by about one million B/D. As a result, the annual utilization rate of refineries has been improved from 75% in 1990 to 85% in 2004. It should be kept in mind, however, that this is still relatively low in comparison with the rates in the US and EU.

With regard to refining capacity, Japanese refiners are now faced with a choice of two directions. One is to reduce capacity in response to the declining demand for all oil products, including that for gasoline in the near future. The other is to make greatest possible use of excess capacity as export refineries. I would like to emphasize that in both cases, the demand tendency in Japan will require deep and thorough cracking of heavy residue, and that this in turn will make a wide range of middle distillates available to the Asian market. In this respect, I think that the Japanese refining industry will be more integrated with the Asian oil market in coming years.

Japan's New Oil Policy

Finally, taking account of the above-mentioned situations, I would like to touch on the new government policy concerning the oil industry which has just been decided by the respective governmental committee. I have myself been involved in the discussion process as a member of the committee. The major points are as follows.

Japan's New Oil Policy (1)



- **To strengthen government's supports for exploration & development overseas**
- **To expand measures to streamline and upgrade multi- and complex refineries**
- **To advance R&D of innovative technologies to make use of non-conventional oil**

Firstly, to strengthen governmental support in supplying risk money for overseas exploration and development activities by Japanese oil companies.

Secondly, to expand measures to streamline and upgrade multi- and complex refineries beyond the level of individual refineries and company units, because most of their cost reduction measures have been already taken in the past.

Thirdly, to advance R&D of innovative technologies to make use of non-conventional oil such as heavy oil, oil sand, ultra-heavy residue, etc.

Japan's New Oil Policy (2)



- **To introduce bio-ethanol and GTL for transportation fuels**
- **To newly build governmental stockpile of oil products**

Fourthly, to diversify transportation fuels by introducing ETBE produced from imported bio-ethanol in 2008, and promote technological development of GTL.

Finally, to create new governmental oil product stockpiles of gasoline, kerosene and diesel oil in order to provide for future supply shortages of oil products.

Concluding Remarks

In conclusion, I would like to emphasize the importance of strengthening interdependency between Asia and the Middle East, because Asian oil consuming countries including Japan need security of oil supply while the Middle East oil producers need security of oil demand.

In this connection, the two regions can establish a win-win relationship by complementing each other as partners. In recent years, many joint projects in the energy sector have been put into operation or are under construction or planning in the framework of cooperative investments between Asia and the Middle Eastern countries. In order to further promote such mutually beneficial investments, producer-consumer dialogue through various channels can play a vital role. As a good example, the International Energy Forum (IEF) headquartered in Riyadh, Saudi Arabia, is expected to contribute to building a stable oil market.

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