

Contents

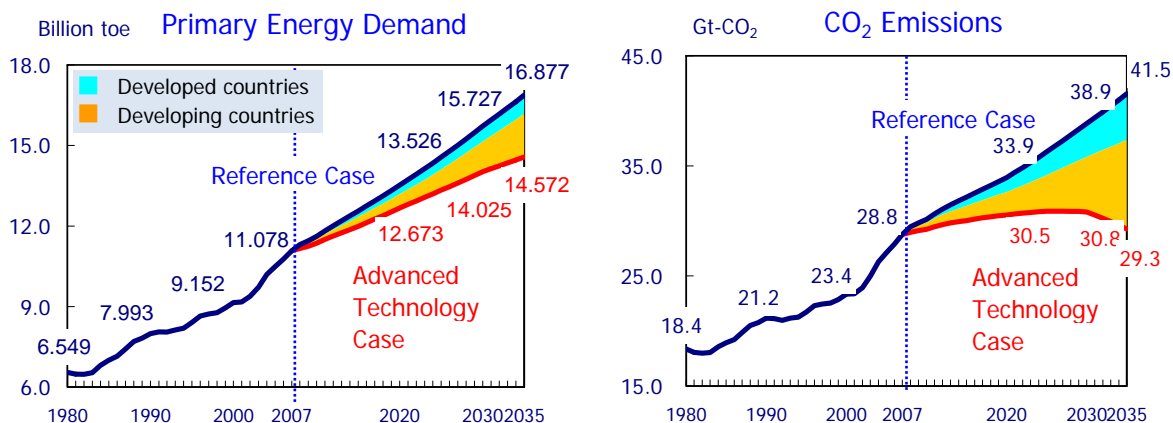
1. World CO₂ emissions may peak out by 2030 - IEEJ Energy Outlook 2009 -
2. Northeast Asian oil industry discusses regional cooperation
3. Review Team for Mid-Term target achievement
4. Nuclear Energy SC has third meeting
5. Japan-China Energy Conservation Forum was held in Beijing
6. Nippon Oil and Nippon Mining release final merger plan
7. City gas for industrial use records sharp decline
8. APERC News

World CO₂ emissions may peak out by 2030 - IEEJ Energy Outlook 2009

The Institute of Energy Economics, Japan (IEEJ) announced the “IEEJ Asia/World Energy Outlook 2009” at its Energy Symposium held on October 23. According to the analysis by the IEEJ Energy Model, in an Advanced Technology Case where CO₂ reduction technologies are widely spread, (1) global CO₂ emissions will peak out before 2030 and (2) the wide use of energy efficiency and conservation technologies in emerging countries is expected to play a significant role in controlling CO₂ emissions. In developing economies in Asia, including China and India, rapid economic growth will significantly increase the demand for fossil fuels. Their dependency on imported oil, in particular, will grow, which in turn will lead to a dramatic increase in their CO₂ emissions. Therefore, establishing the best mix of energy uses, securing oil and gas resources and strengthening measures against global warming through technology transfer will become important challenges for Asia.

The Japanese version of the IEEJ Outlook is available on the IEEJ website (for members only), and its English summary will be posted soon.

Figure-1 World Primary Energy Consumption and CO₂ Emissions



Key forecast points:

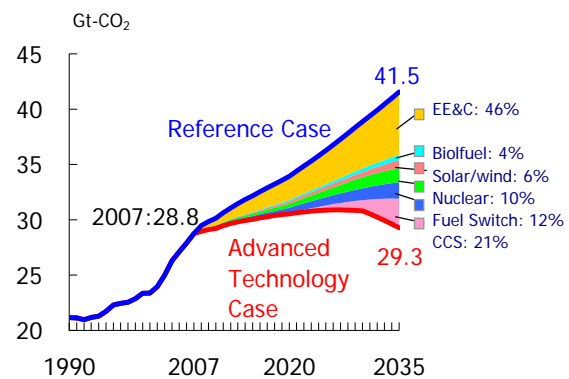
1) In the Reference Case, the global primary energy consumption will grow from 11.1 billion toe (tons oil equivalent) in 2007 to 16.9 billion toe in 2035; with ninety percent of the growth generated by developing countries. In addition, fossil fuels will account for 79% of the overall incremental consumption of energy, thereby maintaining their current position as a major energy source.

2) Global CO₂ emissions will grow from 28.8 Gt (Giga tons) in 2007 to 33.9 Gt in 2020 (a 60% increase from the 1990 level of 21.2 Gt) and to 41.5 Gt in 2035 (an increase of 96% from 1990). The increases in emissions by 2020, the target year for the discussions on the Post-Kyoto Protocol framework, are expected to be 300 million tons in the developed countries and 4.9 Gt in the developing countries as compared to the 2007 levels. This makes it imperative to reinforce measures to curb emissions in developing countries.

3) In the Advanced Technology Case, where low-carbon technologies are to be deployed worldwide, global CO₂ emissions will peak out in 2026, while emissions in Asia will peak out in 2030. Global CO₂ emissions in 2035 will be 12.3 Gt lower than those in the Reference Case; of which 4.2 Gt will come from developed nations, while an 8.1 Gt reduction is expected from developing nations. Asia's reduction of 6.8 Gt below the Reference Case accounts for about 60% of the global cuts; suggesting the technology transfer and technological cooperation will be essential.

4) In the process of building a low-carbon society, initiatives such as energy efficiency and conservation, nuclear energy, renewable energy, fuel switching, and carbon capture and sequestration (CCS) will play a central role.

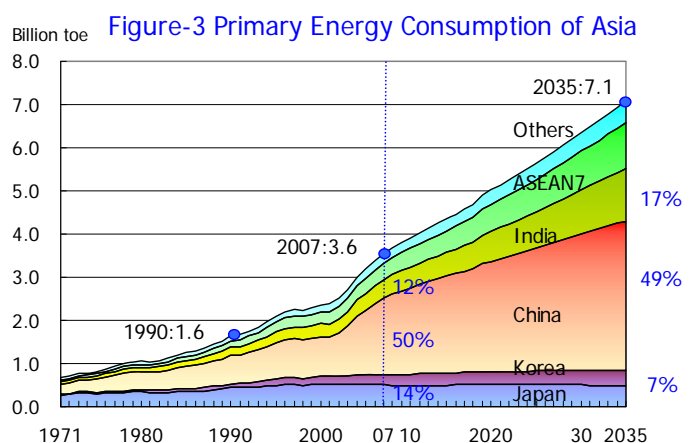
Figure-2 CO₂ Emission Reduction by Source



Energy trends in Asia (excluding Middle East):

1) Asia's primary energy consumption will reach 7.08 billion toe in 2035, accounting for 42% of the global consumption. Eighty-two percent of Asia's incremental energy use will come from fossil fuels. Coal consumption in Asia, in particular, will show a drastic increase, accounting for 90% of the global incremental coal consumption.

2) In Asia, while progress in industrialization and motorization will increase oil demand, oil production in the region will not grow at a comparable pace. Thus, the net oil import of Asia will grow from 15 million bpd (barrels per day) in 2007 to 35 million bpd in 2035, which in turn will lead to a jump of its import dependency from 67% to 84% in the same period.



3) As income levels in Asian countries go up and urbanization progresses, electrification will accelerate and electricity consumption will increase to 2.5 times the current level in the next 28 years. Power sources for the increased demand will be supplied mainly with coal-fired power generation, for which the resource is abundant and highly economical (accounting for 57% of Asia's total power generation). Natural gas-fired power generation is also expected to grow steadily (taking up 17%) as it provides higher generation efficiency and is more environmentally sound. Nuclear power generation will also expand rapidly, and of the expected global incremental nuclear power generation capacity of 210 million kW, 137 million-kW will be built in Asia.

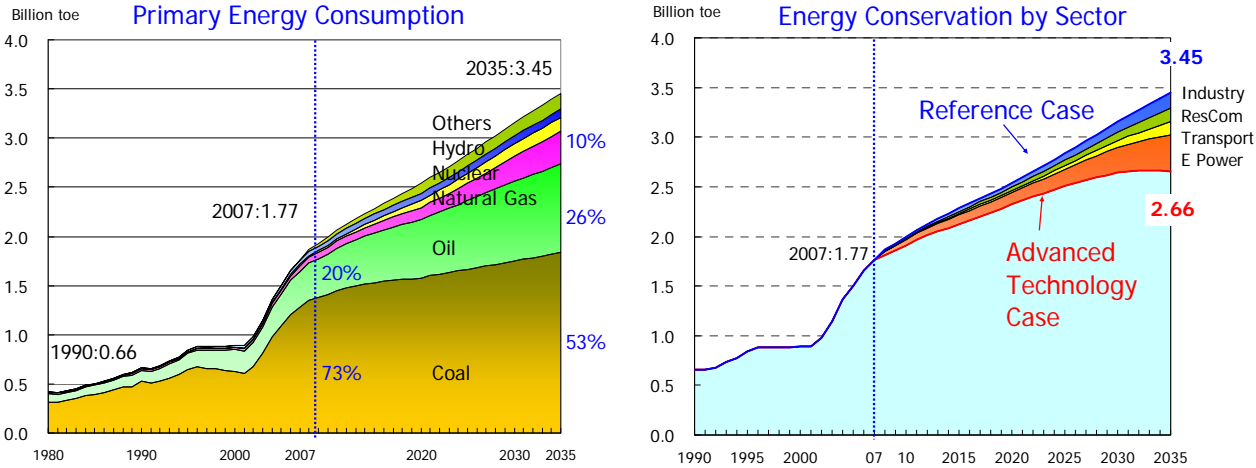
4) In the Asian developing countries, rising income levels will accelerate motorization, increasing car ownership from 200 million units in 2007 to 620 million units in 2035. Although the use of clean-energy cars will become more widespread and fuel efficiency will continue to improve, partly due to consumption increase in other sectors, the overall oil consumption in Asia will nearly double from 22.6 million bpd in 2007 to 42.2 million bpd in 2035.

Trends in China:

1) China's primary energy consumption will grow from 1.77 billion toe in 2007 to 3.45 billion toe in 2035, accounting for 21% of global energy use. By 2035, China's energy consumption will be 7 times that of Japan, its CO₂ emissions will be 8 times that of Japan, and China will lead the world on both accounts.

2) China's dramatic progress in motorization will boost its oil demand from 7.4 million bpd in 2007 to 18.8 million bpd in 2035. As the domestic oil production cannot be expected to increase as much, the country's dependency on imported oil will inevitably grow from 48% in 2007 to 79% in 2035.

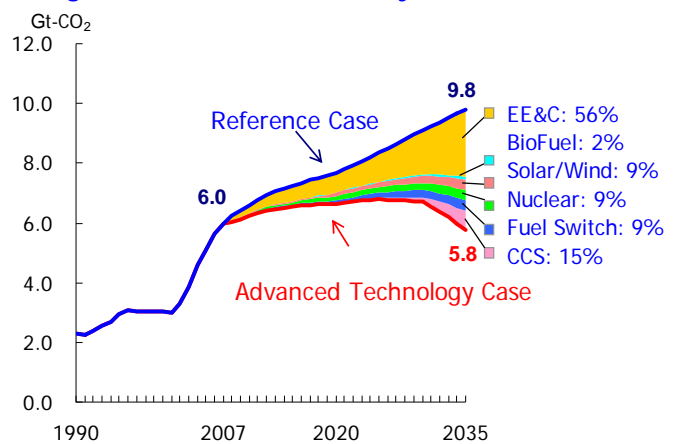
Figure-4 China's Energy Consumption and Potential Energy Conservation



3) Coal demand, mainly for power generation, will grow from 1.29 billion toe in 2007 to 1.83 billion toe in 2035. Although the share of coal in the country's overall energy consumption will decrease from the current level of 73% to 53%, coal will remain the largest energy source. Steel production, which was 490 million tons in 2007 and consumes huge amounts of coal, will peak in the near future and then gradually decline to slightly below 400 million tons by 2035. Cement output will also decrease, while coal consumption for industrial use will gradually decline.

4) In the Advanced Technology Case, owing to the introduction of innovative technologies, primary energy consumption will peak out in 2033, and 800 million toe of energy will be saved in 2035 (a decrease of 23%) in comparison with the Reference Case. China's CO₂ emissions will peak out in 2030 through energy saving initiatives and wide use of non-fossil energy sources including nuclear power, but without taking CCS into account. If CCS is introduced, the country's emissions will peak out much earlier in 2025.

Figure-5 CO₂ Reduction by Sector: China



Implications:

1) Given the rapid increase in CO₂ emissions anticipated in Asia, transfer of advanced energy saving technologies to Asian countries will be effective from the viewpoints of cost/benefit for the entire region and contribution to the improvement of Asia's environmental problems. Japan should seek to contribute to worldwide efforts to fight against global warming and cooperate toward sustainable growth of the Asian economy by taking thorough measures to reduce its CO₂ emissions at home and by transferring its advanced energy conservation technologies to Asian countries for their active use.

2) As oil demand increases in Asia with a resultant greater dependence on imported oil, stable energy supply becomes a very important issue. It is critical that an emergency response system be built and strengthened to respond to short-term supply disruptions, and an international oil market be developed with reinforced functions and greater transparency, which allows flexible responses to varying supply/demand conditions. In addition, it is imperative that Asia's relationships with the Middle East be strengthened as it is becoming increasingly important as a major oil supplier, and that domestic self-help efforts be made by Asian countries themselves. On the other hand, there is a risk that excessive pursuit of interest by a single country could undermine the region's energy security. Because countries in Asia share mutual interests as energy consumers, it is essential that they work together to reinforce the stable supply of energy as a shared challenge facing the entire region.

3) Ultimately, fossil fuels are finite resources and generate greenhouse gases when consumed. On the other hand, given their economic rationality, practicality, and the lead-time required to commercialize innovative technologies, it is important to seek effective use of fossil fuels. From the viewpoints of energy security, environmental preservation, as well as economic benefits, it is imperative that a stable supply of fossil fuels be secured and they be used in a clean and highly efficient manner.

Under the circumstances, the roles that Japan should play are extremely significant as it enjoys advantages in technological and economic strengths and has outstanding abilities to design systems and institutions. It is hoped that Japan's future energy strategy shall include the following factors as its major pillars: further development and utilization of its superb energy saving and environmental technologies, which can play a central role in achieving economic development on the basis of the harmony of 3E; and pursuit of strengthening the foundation of its economy to be built on technological excellence.

Northeast Asian Oil Industry Discusses Regional Cooperation

On October 26–27, the Northeast Asia Petroleum Forum 2009 was held at the Keidanren-Kaikan in Tokyo.¹ Top executives and experts in oil and gas industries as well as research institutes from Japan, Korea, and China made presentations and discussions before some 350 participants.

In the opening CEO Session, Mr. Akihiko Tembo, President of Petroleum Association of Japan, Mr. Kang-Hyun Oh, Chairman of Korea Petroleum Association, and Mr. Wang Yilin, Vice President of CNPC, presented their views and thoughts on “Challenges and Strategies of Oil Industry in Northeast Asia”. Various presentations and discussions took place in the following sessions on trends and prospects concerning subjects such as the refined petroleum product market, upstream activities, natural gas supply and demand, or activities to counter global warming as they relate to the Northeast Asia region. The proceedings will become available on the IEEJ website shortly.



A noteworthy aspect of this year’s forum was a common view that the oil demand outlook would be contrasting in Northeast Asia; a view shared by representatives from the three countries. In Japan and Korea, excess refining capacity will further exacerbate as the growth in oil demand will be either negative or only marginal, while in China, substantial capacity expansion will continue as the country’s oil demand grows rapidly. It is likely that the above view will become a common premise for

the future discussion of the oil industry outlook in Northeast Asia. More specifically, the oil industries in both Japan and South Korea are trying to gain a foothold overseas by exporting products or embarking on upstream projects, as their domestic markets have already matured. They are, however, facing fierce competition as other Asian countries including China as well as Middle Eastern countries are rapidly expanding their refining capacity, while the access to resources is hotly contested in the upstream sector. At the same time, supported by robust domestic demand, the Chinese oil industry has been building relationships with oil producing countries and international majors in the downstream sector while steadily expanding its business overseas in combined efforts with the Chinese government. Under a policy of “Turning Crisis into Opportunities”, China has been aggressively investing abroad utilizing the ample funds generated from their domestic oil production not only for expansion of their reserves, but also for other goals such as the purchase of a stake in Singapore Petroleum Company, and so forth. Given the tangled supply and demand pictures and trends in the three countries, it will be interesting to observe how the jigsaw puzzle of the Northeast Asian oil industry will develop in the future.

¹ The Northeast Asia Petroleum Forum of three countries - Japan, Korea and China - is cosponsored by the Institute of Energy Economics, Japan (IEEJ), Korea Energy Economics Institute (KEEI) and Petroleum Economics Commission of China Petroleum Society. The forum has been meeting every two years on a rotating basis since 2001.

In terms of common challenges facing the three countries, the issues of energy security, crude oil markets, and global warming were raised. As China's oil import dependency exceeded 50% last year, the stable supply of oil has become an urgent and crucial concern. In China, the water content at the Daqing and Shengli oil fields that were developed some 40 years ago has almost reached 90%, causing a severe production decline, while the development of replacement oil fields is becoming increasingly difficult. Consequently, a Chinese representative forecasts that China's dependence on foreign oil will reach 67.8% by 2020. Regarding oil supply security, a South Korean presenter announced a target of bringing the ratio of crude oil developed by the country from the current level of about 6% of the total petroleum consumption up to 40% by 2030.

It was pointed out that crude oil prices that had been seriously affected by financial speculation need to be stabilized and that the so-called "Asian Premium" on the Middle East crude oils has been expanding lately. Cooperation among the three countries in procuring oil and natural gas was called for to correct this unfair situation. Meanwhile, with regard to global warming, various reports were presented on efforts being made by the three countries toward building a low-carbon society including issues, challenges and achievements. It was particularly impressive that China has shown a change of attitude in this respect. At the last Beijing Forum held in 2007, the discussions mainly focused on air pollution and China's other local environmental problems. At this year's forum, presentations were made with stress on China's efforts to develop renewable energies such as wind power, CCS, or shifting from coal to natural gas. It was mentioned that a one percent shift from coal to gas in the country's energy consumption, combined with efficiency improvement in the use of coal, could lead to a reduction of 500 million tons of CO₂ annually.

As specific areas for collaboration, proposals were made such as expanding intra-regional trades of oil and LNG, joint transportation and stock-piling programs, R&D cooperation in refining technology, technological cooperation on energy efficiency and conservation, and new energy development, as well as collaboration and alliance in the upstream business, and so on. Regarding expansion of the regional oil products trade, it was emphasized that a proper business environment should be developed with the private sector playing a central role. On technology cooperation, it was stressed that the governments should take the initiative in building a legal foundation to protect intellectual properties including patents. As for upstream projects, the importance of joint exploration activities as well as technological exchanges capitalizing on the inherent strengths of the three countries was pointed out. As an initial step to that end, a proposal was made to implement a joint training program for engineers. In other areas, it was suggested to strengthen relationships and enhance cooperation with Russia and Australia, whose presence in the Far Eastern oil and natural gas markets is increasing.

As the energy/oil supply-demand situation varies from country to country, the oil and gas industries in Northeast Asia are expected to overcome their challenges and contribute to the regional development through "cooperation and competition". The next Northeast Asia Petroleum Forum will be held in Seoul, Korea, in 2011, two years from now.

Committee Highlights

Review Team for Mid-Term Target Achievement

Following the speech made by Prime Minister Yukio Hatoyama on September 22 at the

United Nations Summit on Climate Change, the DPJ regime launched a “Vice Ministerial Review Team” headed by the Minister of the Environment, Sakihito Ozawa, as Director of Secretariat, under the Ministerial Committee on Global Warming, to examine the economic impacts of measures against global warming. The Team then commissioned model-based analyses to a task force chaired by Kyoto University Professor, Kazuhiro Ueta, to be completed in time to meet the COP15 debates scheduled for December. After several intense meetings the task force announced an interim report draft in the last meeting held on November 19. This task force comprises the same five research institutions involved in the previous study made under the former Aso administration, namely, the National Institute for Environmental Studies (NIES), the Research Institute of Innovative Technology for the Earth (RITE), the Institute of Energy Economics, Japan (IEEJ), the Japan Center for Economic Research (JCER) and the Keio Economic Observatory (KEO).

The task force was asked to carry out the following tasks; (a) analyze four scenarios with varied CO2 reduction rates achieved purely through domestic efforts, namely, 10%, 15%, 20% and 25% compared to 1990 levels, (b) conduct a sensitivity analysis on the macro-framework parameters such as crude steel production, transportation demand, nuclear power generation or oil prices, after establishing common premises, (c) develop a number of common scenarios enabling choice on policy measures against global warming, including the mandatory purchase of all types of power generated from natural energy, a 10% share of renewables in the total energy supply, a Global Warming Tax and a Cap-and-Trade emissions trading system. Multiple scenarios would also be examined in terms of the use of the Global Warming Tax.

The interim report presented on November 19 summarized the results of economic impact analyses done by three institutions of NIES, JCER, and KEO (see Table 1), calculated on the basis of an average economic growth rate of about 1.3%. The results in general found that “while the 25% reduction of GHG would inevitably increase the cost on households, such cost burdens would become lower as the amount of carbon credits purchased from abroad increases”. However, the estimated cost for an average household widely varies among the research institutions, ranging from 3.4% of annual income (170,000 yen) to 15.9% (765,000 yen). This variation was caused by the different assumptions used in the analysis models where the KEO analysis based its cases on the assumption that the carbon tax income should be used to redeem the government bonds, while JCER and NIES analyzed their scenarios by assuming a lump-sum reimbursement to domestic accounts or appropriation to public investment in lieu of tax revenue.

Table-1 Impact of 25% Emissions Reduction

| Domestic Reduction | 10% | 15% | 20% | 25% |
|-----------------------------|------|------|-------|-------|
| Purchase of Emission Rights | 15% | 10% | 5% | 0% |
| RGDP | % | % | % | % |
| JCER: CGE | -0.8 | -1.3 | -2.1 | -3.1 |
| NIES: AIM=CGE | -0.9 | -1.4 | -2.9 | -3.2 |
| KEO : KEO Model | -1.3 | -2.2 | -3.6 | -5.6 |
| Disposable Income | % | % | % | % |
| JCER: CGE | -1.2 | -1.9 | -2.9 | -4.4 |
| NIES : AIM=CGE | -0.6 | -1.3 | -3.1 | -3.4 |
| KEO : KEO Model | -5.9 | -8.6 | -12.0 | -15.9 |

Earlier on, the task force commented publicly that the former administration’s announcement that “a 25% reduction of GHG emissions would cost each household an annual burden of 360,000 yen” represented improper handling of numbers. In the last study, the CGE model used by JCER estimated a loss in real disposable income of 220,000 yen and a rise in energy bills by 140,000 yen, while the NIES model came up with 440,000 yen and 110,000 yen, and the KEO model came up with 770,000 yen and 130,000 yen, respectively, showing substantial discrepancies. Only the JCER estimates, the lowest of the three, were considered in the announcement, accompanied by a mistake of wrongly adding up the real disposable income loss and increased energy costs. The latest estimation by NIES, based on a lump-sum reimbursement to domestic accounts, found that the cost to households would be substantially reduced from the previous 440,000 yen to 130,000 yen.

Among the four reduction scenarios, the higher the amount of carbon credits purchased from abroad, the lower the impact of cost burdens. This is because the cost of emission credits from overseas was assumed to be US\$ 50 (about 4,500 yen) per ton of CO₂ equivalent, and much lower than the cost of domestic reduction effort at an estimated 10,000 yen to as high as 80,000 yen per ton.

Table-2 Sensitivity Analysis (Million t-CO₂)

| | +10% | -10% |
|--------------------------|---------|---------|
| Crude Steel Production | +20 | -20 |
| Transport Demand | +20~+23 | -20~-23 |
| Crude Oil Price | -0.4 | +0.4 |
| Nuclear Power Generation | -24 | +24 |

Additionally, the results of sensitivity analyses done by the IEEJ model and the RITE model on the exogenous variables (macro-framework parameters) were as shown in Table 2. As Japan's CO₂ emission is forecast to be 1,070 million t-CO₂ for 2020 in the foregoing IEEJ Outlook 2009 for the Reference Case, a 10% fluctuation of each factor except for crude oil price would give an impact of about 2% on the total emissions.

As the reported estimation results above contained different assumptions on parameters such as the usage of the Global Warming Tax income or the marginal CO₂ reduction costs, it was decided that a formal report to the government would be compiled after necessary adjustments.

Nuclear Energy SC has the third meeting

The third meeting of the Special Subcommittee on International Affairs was held on October 2 to mainly deliberate on the present status of the nuclear proliferation issue and Japan's role in the efforts toward the peaceful utilization of nuclear energy. Members discussed that it is important for Japan to promote development of nuclear technologies with enhanced counter-proliferation characteristics, while maintaining the international community's trust concerning its unique position among non-nuclear states where Japan is granted the right to engage in reprocessing and enrichment of nuclear fuel.

Now that the Hatoyama Administration has taken office, members also pointed out that the new government will need to clearly indicate how it will formulate the new policies corresponding to its mid-term target of reducing GHG emissions by 25%, as well as new international programs to be developed under the concept of the East Asian Community. Some of the members also pointed out the importance of more serious discussion on allocating necessary funds for the technology development that will be positioned as the platform of Japan's international leadership.

During the discussion, the IEEJ Chairman and CEO Masahisa Naitoh stressed that the Subcommittee should compile within this year a comprehensive draft of a nuclear development plan to be incorporated into the policy of the new regime, so that a coherent message could be dispatched at various occasions such as G-8 Leaders meetings and NPT conferences that are planned for the next year.

Energy in Japan & Asia

Japan-China Energy Conservation forum was held in Beijing

On November 8, the 4th Japan-China Energy Conservation Forum was held in Beijing. The forum was launched in May 2006 after an intensive discussion by METI Minister Nikai and Ambassador Wan Yi (both at that time) to reinstate bilateral energy cooperation, as the traditional energy export-import based cooperation of the two countries virtually ended in the early 2000s as China became an energy importing country.

The forum has been held every year visiting each other country with attendance of ministers and many top-notch experts--almost one thousand participants in total each time. They have exchanged views and opinions on energy efficiency and conservation, and in particular launched number of joint projects/studies between central/local government offices, business firms and academies of both countries. This year, 42 cooperation agreements were signed at the occasion of the forum, which is a substantial increase from the 19 signed last year. These include projects on efficiency improvement of coal thermal stations, dyeing factories, environment protection projects applying high-tech energy management systems, a technology alliance on micro-hydro power, and so on. The Institute of Energy Economics, Japan (IEEJ) and Energy Research Institute (ERI) of NDRC, China, have also renewed their joint study agreement on energy efficiency and conservation policy in China.

Nippon Oil and Nippon Mining releases final merger plan

On October 30, Nippon Oil Corporation and Nippon Mining Holdings, Inc. released their final merger plan. They will integrate businesses as of April 1, 2010 under a new company "JX Holding, Inc." whose subsidiaries will be collectively called "JX Group." Refining, upstream and mining sector operations will be integrated in July 2010 as subsidiaries of the holding company. However, their marketing sectors currently run under "ENEOS" and "JOMO" brands will be maintained for the time being before final integration.

The JX Group will become the largest oil company in Japan; their combined marketing share of petroleum product sales was 32.9% in the fiscal year 2008. Mr. S. Nishio, president of Nippon Oil scheduled as chairman of JX Holding, and Mr. M. Takahagi, president of Nippon Mining scheduled as president of the new company, stated that the new group will pursue aggressive strategies for global growth maximizing corporate value. As the Japanese oil industry is suffering from a severe over-capacity, the group plans to streamline their refining capacity, currently at 1,792 thousand bpd, by 400,000 bpd by March 2011 and another 200,000 bpd by March 2015. Japanese refining capacity is 4,835 thousand bpd at present, of which one million bpd is said to be in excess facing a rapid decline in oil demand.

City Gas for industrial use records sharp decline

During the first half of FY2009 (April through September), Japan's city gas sales recorded a historic loss of 8.5 percent from the previous year. Among sectors, the industrial demand has been affected most seriously by the Lehman shock that severely affected the Japanese economy since last year, showing a two-digit decline of an annual -13.8 percent.

Three major companies covering industrial/commercial centers of Japan recorded a greater decline than average; Tokyo Gas -9.6%, Osaka Gas -9.5% and Toho Gas -10.0%. In particular, their industrial demand was most seriously affected recording a -16.5% decline. As the industrial sector has become the single largest demand sector for city gas companies, this tendency needs to be closely watched to schedule near term procurement of LNG.

City Gas sales (April -September)

| | Billion m ³ | % |
|-------------|------------------------|-------|
| Residential | 3.69 | -1.4 |
| Biz/Com | 2.36 | -4.4 |
| Industry | 7.87 | -13.8 |
| Others | 1.37 | 0.2 |
| Total | 15.29 | -8.5 |

Source: The Japan Gas Association

APERC News

The Asia Pacific Energy Research Centre (APERC) is a research arm of APEC providing energy research and capacity-building support. Asia-Pacific Economic Cooperation, or APEC, is a multi-lateral organization whose primary goal is to support sustainable economic growth and prosperity in the Asia-Pacific region. Twenty-one economies on both sides of the Pacific are members, including Japan, China, the United States, Russia, and Mexico. APERC is administratively-affiliated with IEEJ. Researchers from twelve different APEC economies are currently engaged in the preparation of various studies on energy in the APEC region. Publications of APERC may be downloaded free of charge from their website at <http://www.ieej.or.jp/aperc/>.

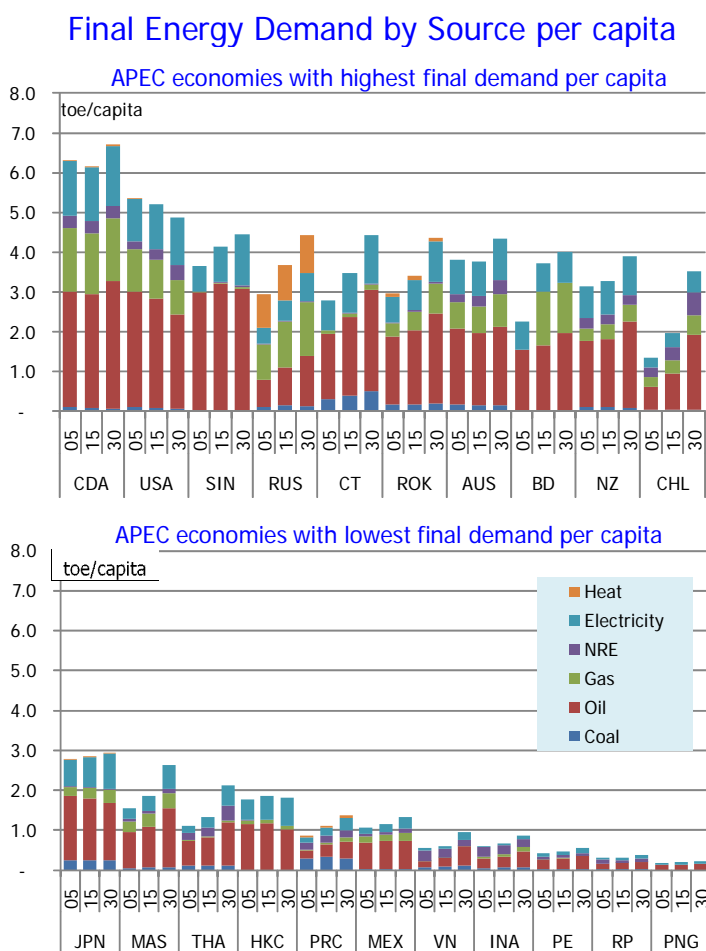
APERC releases APEC Energy Demand and Supply Outlook

APERC released its latest analysis of long-term energy demand and supply in the APEC region in early November. The publication, *APEC Energy Demand and Supply Outlook 4th Edition*, provides projections to the year 2030, along with discussion of the energy challenges facing the APEC region and individual APEC economies. Although APERC's outlook covers some of the same economies as IEEJ's (see article p. 1), APERC's analysis focuses in greater depth on the APEC economies. The two outlooks were managed separately, although there was some sharing of resources between APERC and IEEJ.

Volume 1 of the APERC Outlook discusses the challenges facing the APEC region as a whole and compares the individual economies. Volume 2 has sections discussing the outlook for each of the 21 economies in detail. For example, per capita final energy demand in each APEC economy is projected as shown here. The projections suggest that there will continue to be wide discrepancies in per capita energy demand between economies, however, energy demand in the developing economies, such as Chile (CHL), Malaysia (MAS), Thailand (THA), China (PRC), and Vietnam (VT) will grow most rapidly.

The report concludes that under business-as-usual assumptions:

- Rising levels of oil imports will mean that oil security remains a major threat to the economy of the APEC region;
- The current economic crisis increases the risk that inadequate investment in energy infrastructure will threaten energy security of supply and price stability as the economy recovers;
- The aspirational goal agreed to by APEC leaders in their 2007 Sydney Declaration -- to improve energy intensity by at least 25% by 2030 compared to 2005 -- can be easily met even under business-as-usual assumptions;



- However, rising greenhouse gas emissions will mean that business-as-usual scenario is still environmentally unsustainable;
- Many APEC governments are responding aggressively to the threats posed by oil security and climate change, but more effort is needed;
- Since new technologies can have a ‘game changing’ role in dealing with these threats, government policies that are supportive of research and entrepreneurship are needed.

APERC Releases Understanding Energy in China – Geographies of Energy Efficiency

In September, APERC released the second report in its series on *Understanding Energy in China*. The first report provided an overview of a number of important energy issues, and this second report now delivers a deeper look into one of those issues – energy efficiency.

Geographies of Energy Efficiency introduces readers to China’s recent policies to promote energy efficiency and to the legal and institutional framework that has been established to implement those policies (Chapter 1). After describing the challenge of implementing these policies across diverse regions, industrial sectors and firms (Chapter 2), the report then takes a closer look at implementation activities in five sectors (Chapters 3 – 7).

Through an examination of implementation activities, the report identifies achievements and obstacles in China’s strategy of using energy efficiency to improve energy security and environmental protection without sacrificing economic growth. Specific findings of the report include:

- All provinces have taken some measures towards achieving their energy intensity reduction goals, and many provinces are on track to deliver their share of the national 20% reduction.
- An evaluation system has been introduced to monitor the progress of government agencies and key enterprises. It will reward those that meet energy saving targets and penalize underperformers.
- A variety of goals and strategies are used to match energy efficiency implementation activities to the needs of diverse provinces and sectors, including shutting down inefficient industrial facilities; encouraging manufacturers to produce energy-efficient products in energy-efficient facilities; and enforcing building and appliance standards for the residential and commercial sectors.
- The experiences gained in implementing the energy efficiency programs of the current 11th Five-Year Plan will guide future energy efficiency programs, as China strives to create a resource-conserving and environmentally-friendly development path.

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