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## Innovative break through is necessary to reduce CO<sub>2</sub> emissions - IEEJ Asia/World Energy Outlook 2010 -

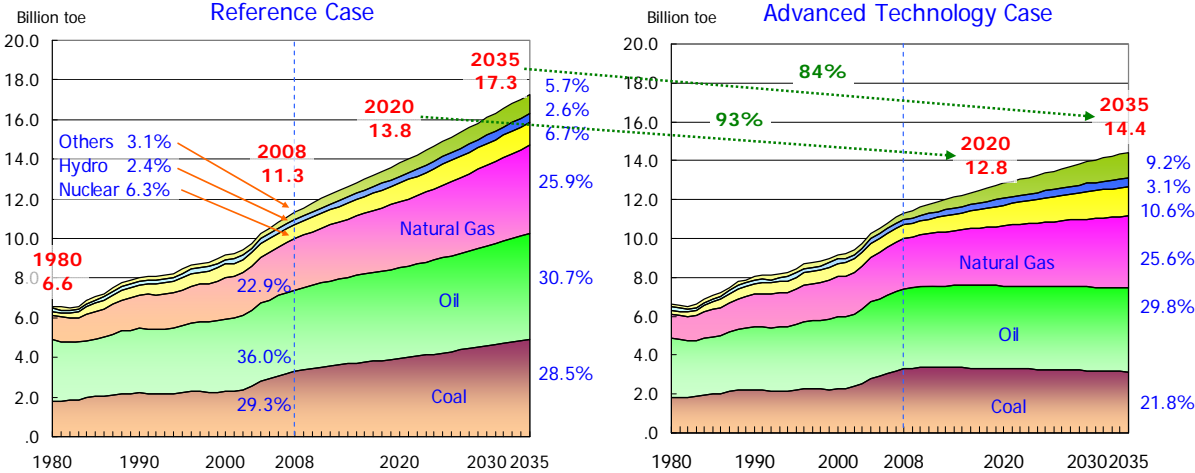
The IEEJ Asia/World Energy Outlook was presented on November 1 at an open symposium held in Tokyo. Mr. Yuji Matsuo, Senior Researcher, Energy Data and Modeling Unit, reported the analysis up to 2035 on behalf of the Outlook Project Team. Major findings are discussed below:

Of the two main scenarios analyzed, the Reference Case considers an extension of past trends and reflects current energy and environmental policies as they take effect over time. According to the scenario, the world primary energy demand will expand from 11.3 billion tons oil equivalent (Btoe) in 2008 to 17.3 Btoe in 2035. Fossil fuels account for 79% of the incremental primary energy consumption during this period, and continue to be the dominant energy source. Asian energy demand will increase substantially from 3.74 Btoe in 2008 to 7.38 Btoe in 2035, led chiefly by increases in China and India. The combined energy demand growth of the two countries during the projection period amounts to 2.7 Btoe, taking up 46% of the total world increases. Outlook for respective energy sources will be as follows;

- Oil will account for the largest share of the total primary energy supply at 30.7% in 2035, driven by transport demand, though its average annual growth rate will be relatively moderate at 1.0% through 2035.
- Coal will be used mainly in power and industry sectors. Its demand will grow at an annual rate of 1.5% and will represent the second largest share of the total supply at 28.5% in 2035.
- Natural gas demand will show the fastest growth among fossil fuels at an annual rate of 2.0%, backed by its lower environmental burden and the expanded resource base enabled by developments of non-conventional natural gas. The share of natural gas will increase from 22.9% in 2008 to 25.9% in 2035.
- Nuclear and renewable energies will show a faster growth at annual rates of 1.8% and 3.8% through 2035, respectively, although their shares in the total primary energy demand remain low at 6.7% and 5.7% in 2035.

Global CO<sub>2</sub> emissions in the Reference Case projection will increase from 29.4 giga tons (Gt) in 2008 to 34.7 Gt in 2020, a 64% rise from the 1990 level, and 42.9 Gt in 2035, up 102% from the 1990 level. CO<sub>2</sub> emissions of developed countries will register a moderate increase of 0.15 Gt by 2020 and 0.26 Gt by 2035 from 2008, but those of developing countries will substantially expand by 5.1 Gt and 13.2 Gt, both by 2035. Since this scenario is not environmentally sustainable, it is an urgent issue for the world to address the enormous CO<sub>2</sub> emissions to be generated in developing countries.

Figure 1 World Energy Outlook through 2035



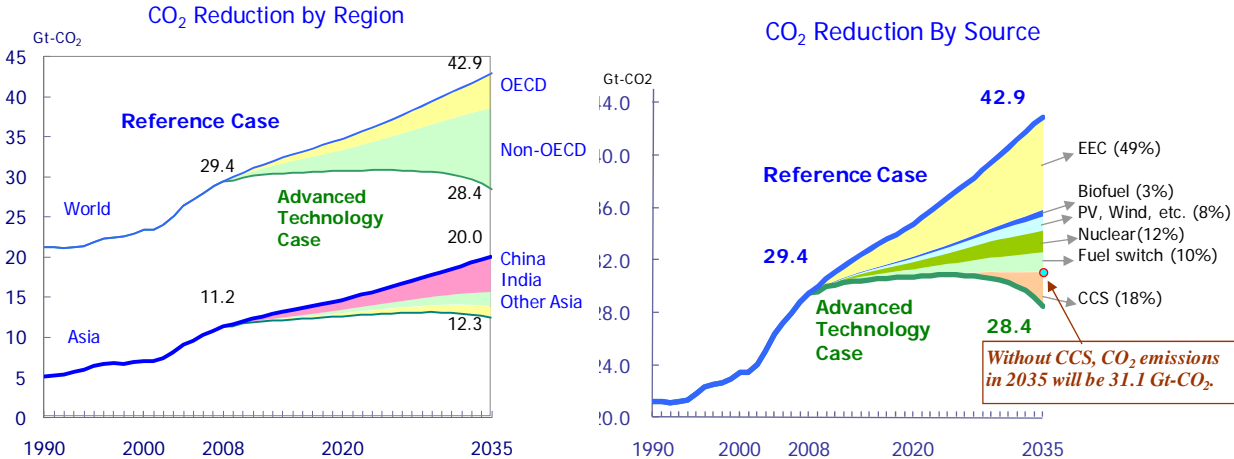
Compared with the above projection, a scenario with extensive use of low-carbon technologies is expected to lower CO<sub>2</sub> emissions significantly. In the Advanced Technology Case where advanced technologies will be widely deployed around the world, fossil fuel consumption will become substantially lower in 2035; from 14.7 Btoe to 11.1 Btoe in volume and 85% to 77% in their combined share of the total energy. Nuclear and renewable energies will increase at a robust annual pace of 2.9% and 4.9%, respectively, through 2035. Nuclear will reach a 10.6% share of the primary energy supply in 2035, up from 6.3% in 2008, and renewable energies will reach 9.2% in 2035 from 3.2% in 2008. The Reference Case scenario of increasing nuclear capacity by 226 giga watts (GW) from the present 389 GW to 615 GW in 2035 requires construction of 170 units of nuclear plants with 1.3 GW generating capacity. Under the Advanced Technology scenario, it needs to be further expanded to 826 GW. In addition to active construction in China and India, nuclear power generation will be introduced to many other Asian countries such as Vietnam, Indonesia and Thailand. Asia will become the world largest nuclear power center with 40% of the world total capacity for the Reference Case and 44% for the Advanced Technology Case.

The IEEJ projection for the Advanced Technology Case assumes plausible introduction of best available and near commercial technologies, while many of other projections such as IEA-WEO develop scenarios to achieve a targeted emissions reduction, for example, to halve the emissions amount. It is noteworthy that, in the IEEJ model, natural gas is expected to play an important bridging role toward a low-carbon society compared with more widely cited target-oriented projections. Natural gas consumption will increase from 2.9 trillion cubic meters (Tcm) in 2008 to 5.0 Tcm in 2035 for the Reference Case, though it may be reduced to 4.1 Tcm in the Advanced Technology Case.

Effect of technology progress is more noticeable for GHG emissions. Developing low-carbon technologies proactively, the world CO<sub>2</sub> emissions in 2035 would be reduced by

14.5 Gt, or 34% less than the Reference Case. Global CO<sub>2</sub> emissions will reach its peak in 2024, those of Asia in 2029, while CO<sub>2</sub> emissions of OECD countries will continuously decline after peaking in 2007 at 12.8 Gt. Of the total reduction in CO<sub>2</sub> emissions, those achieved in developed countries account for 4.4 Gt and developing countries 10.1 Gt. Thus, the CO<sub>2</sub> emissions reduction in developing countries will be nearly double that of developed countries. Asia's CO<sub>2</sub> emissions reduction will reach 7.7 Gt, accounting for approximately 50% of the world total reduction, indicating that reduction potential is extremely high in Asia. To materialize this, it is important for Asian countries to enhance collaboration among themselves and with developed countries for development and deployment of advanced technologies.

Figure-2 World CO<sub>2</sub> Outlook through 2035

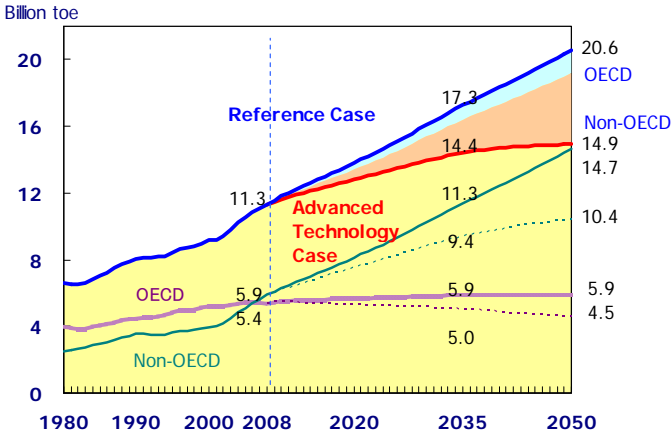


Of the expected world CO<sub>2</sub> reduction of 14.5 Gt by 2035, energy conservation will contribute for reduction of 7.0 Gt, or 49% of the total reduction, followed by nuclear power at 1.7 Gt (12%), renewable energy 1.6 Gt (11%), fuel switching 1.5 Gt (10%) and Carbon Capture and Storage (CCS) 2.6 Gt (18%). It should be noted that, if CCS was not introduced in a substantial scale, the world CO<sub>2</sub> emissions in 2035 would exceed the present level as shown in Figure-2. However, CCS is a technology yet to be verified technically, economically and socially. Unlike intellectual technologies, CCS entails massive civil and geological engineering work involving many stakeholders, while its environmental impact is yet to be discussed. If CCS is not deployed in time, natural gas may have to play a much greater role than projected above.

This year, the IEEJ team also made a projection for a super-long term through 2050 to assess effect of clean energy technology diffusion on global energy supply and demand and CO<sub>2</sub> emissions, by further extrapolating the above-discussed analysis. Dr. Ryoichi Komiyama, Visiting Researcher and Associate Professor of Tokyo University presented the gist of the projection as follows:

Under the Reference Case projection, the global energy demand will reach 20.6 Btoe in 2050. Energy consumption of the OECD countries will be leveling off, while that of developing countries

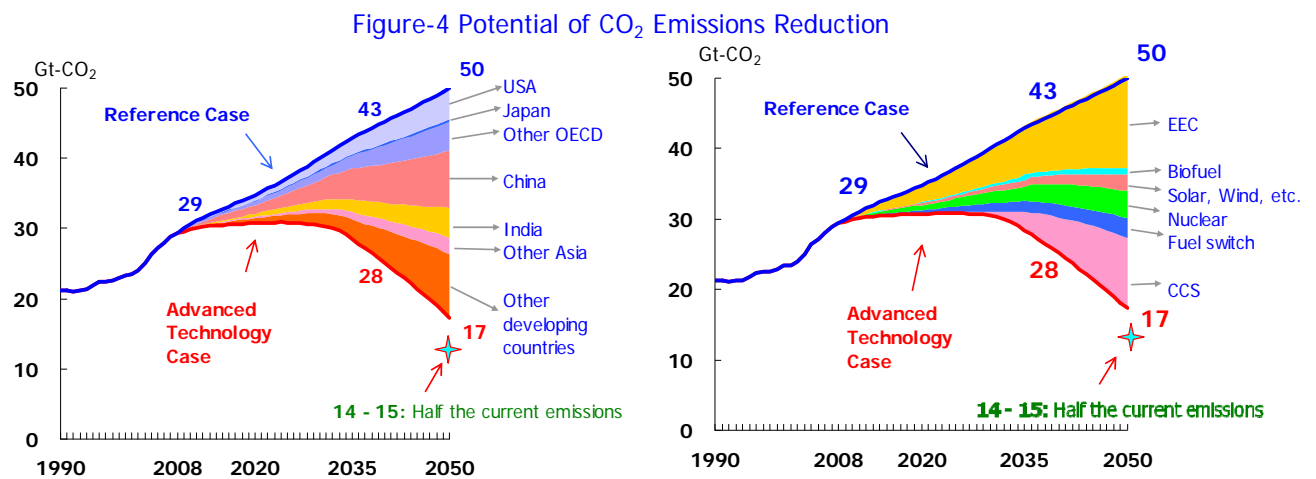
Figure-3 World Energy Outlook through 2050



will expand by almost 6 Btoe from now and reach 14.7 Btoe in 2050. World fossil fuel consumption will keep growing through the projection period and reach a dominating share of 84% of the total primary energy supply in 2050.

In the Advanced Technology Case, the world energy demand in 2050 will be curbed by 5.7 Btoe or 28% from the above projection, of which reduction in developing countries will account for 4.3 Btoe or 75%. Fossil fuel consumption reaches its peak in 2035 and declines thereafter. However, it will still be the dominant energy source making up 69% of the total primary energy supply in 2050. Natural gas consumption will show a steady increase through 2050 for both the Reference Case and Advanced Technology Case projections. Investments in development of natural gas resources and infrastructure need to be continued. All in all, efficient use of fossil fuels, or energy efficiency and conservation, and securing stable supply will continue to be important policy agenda.

In the power generation mix, non-fossil fuels such as nuclear and renewables will make up 31% of the total in 2050 in the Reference Case, while their share will be 59% in the Advanced Technology Case. Under the latter scenario, non-fossil fuels will amount to 66% in 2050 for developed countries and 54% for developing countries. Renewable energy use will significantly increase; the installed capacity of wind mills will expand by 15 times the current level, solar photovoltaics 135 times, solar thermal sources 1,190 times and biomass 5 times.

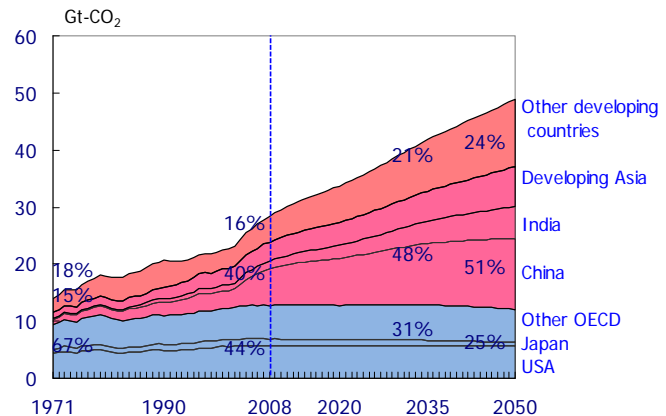


By 2050, the world annual CO<sub>2</sub> emissions will increase to 50 Gt in the Reference Case, but will be reduced to 17 Gt in the Advanced Technology Case. By then, compared with the 2008 level, CO<sub>2</sub> emissions will be reduced by 75% in the developed countries. By contrast, it will decrease by only 17% in developing countries. Despite substantial efforts, reduction in CO<sub>2</sub> emissions will remain short of the widely discussed target, to halve it by 2050. Without CCS, it will stay at an even higher level of 27 Gt. Much effort needs to be made to enhance RD&D to advance commercial application of innovative technologies as well as to attempt breakthroughs in technology and reform of socio-economic systems.

As shown in Figure-5 of Reference Case projection, CO<sub>2</sub> emissions in Asian developing countries are forecast to increase much faster than the world average, while they generally face constraints on technologies and funds to curb emissions. Asia should establish a regional cooperation framework to jointly explore cost effective options and prepare appropriate investment conditions for emissions reduction in Asia as a whole. In this regard, Japan should play a principal role to support global and regional efforts.

Ensuring comprehensive energy security will also be an important issue in Asia, as energy demand grows and import dependence rises sharply. In addition to strengthening emergency response capability not only of oil but also for other energies, energy efficiency and energy diversification should be enhanced. Among others, a complementary energy system should be created that enables maximum utilization of intermittent renewable energies; for example, smart energy grids. Intensifying cooperative endeavor, Asian countries should aim at maximizing the common interest as a major energy consuming region in the world.

Figure-5 Outlook of CO<sub>2</sub> Emissions: Reference Case



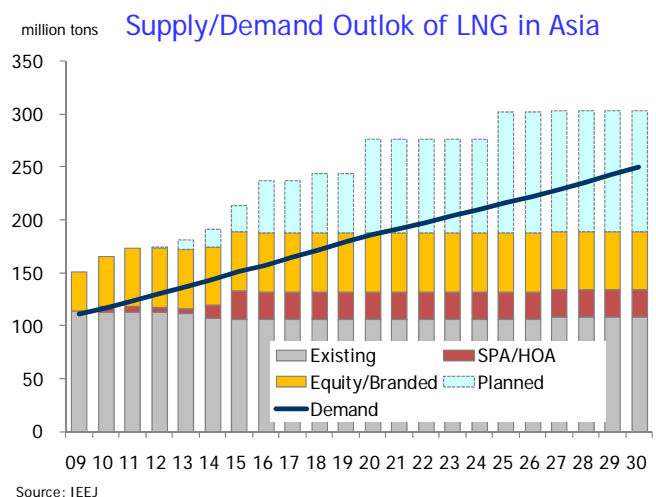
The Japanese version of the IEEJ Outlook is available on the IEEJ website (for subscribers only at <http://eneken.iej.or.jp/press/press101029b.pdf>), and its English summary will be posted soon.

## Qatari-Japan Energy Seminar discusses natural gas perspectives

The 4th Joint Qatari-Japanese Energy Seminar hosted by IEEJ was held in Tokyo on September 29, 2010, with attendance of more than 300 participants. The semi-annual joint seminar has been held alternately in Japan and Qatar since the autumn of 2009. H.E. Mr. Abdulla H. Salatt, Senior Technical Advisor to Deputy Premier, Minister's office, Member of the Board-Qatar Petroleum, headed the Qatar delegation. The delegation provided six presentations on Qatar's current and future supply of oil and natural gas and their GTL initiative including "Potential Partnership between Qatar Petroleum International (QPI) in Projects in and outside Japan" by Mr. Nasser K. Al-Jaidah, CEO, Qatar Petroleum International and "Qatari LNG to Japan: Actual Status & Future Prospects" by Mr. Ahmed Yousef A. Al-Khulaifi, COO, Qatargas LNG.

On Japanese side, Mr. Koji Morita, Senior Research Fellow, IEEJ, delivered an address, "The Current Status of LNG: Uncertainty from Japan." The following are his comments on LNG supply and demand outlook in Asia and the role that Qatar is expected to play.

- LNG demand in Asia will grow 2.25 times from 111 million tons in 2009 to 250 million tons by 2030. The growth in demand will be met by ample supply since a number of LNG projects are planned.
- In the short to medium terms, it continues to be a buyer's market until Equity/Branded LNG runs short. In the long term, key concerns include whether new projects will be completed as planned in a timely manner to meet growing demand.



Equity/Branded LNG, or portfolio LNG, is LNG supplies not tied-up in long term contracts with specific buyers. It freely flows to three major markets in the world, namely Europe, Asia, and the United States, depending on market conditions. Weakening supply and demand in Europe turned the flow to Asia and now the additional supply presumably amounts to 20 - 30 million tons per year. Major sources are the Middle East and African countries.

The revised Basic Energy Plan that the Japanese government released in June 2010 stated that declining fossil fuel consumption in Japan would drive natural gas consumption down by 2030 to 77% against 2007's level. In other words, LNG import to Japan will be around 50 million tons in 2030. Power generated with LNG would be down to half the current level in the same period with capacity utilization of natural gas fired power plants down to 30% and required LNG to 20 million tons. However, the Electric Power Supply Plan of FY 2010, which is applicable till 2019, projects that LNG demand for power generation in 2019 will only slightly decline to 87% of the 2007 level. Penetration of renewable energies will put a new role on LNG power generation to compensate for their intermittent output as well. Natural gas may play a major role as a bridging energy since it emits a relatively small amount of CO<sub>2</sub> among fossil fuels and as such, it remains to be seen if LNG demand in Japan will show such a large decline as targeted in the Basic Energy Plan.

Future LNG prices will have a significant influence on whether or not LNG can play its expected roles. Prices of LNG for Asia are historically linked to crude oil prices and, as a result, it is rather expensive compared to LNG for Europe and the United States. Australian suppliers are now negotiating with users in the Asia Pacific market to form stable as well as competitive LNG prices. Qatar's cooperation is critical to keep LNG's price competitive in medium and long terms. Qatar will have to rethink its pricing strategies if it wants to expand its markets and sales in the Asia Pacific region. It would then create a Win-Win relationship between Qatar and Japan.

The next seminar will be held in Doha, Qatar next spring. Proceedings of the Seminar are found on IEEJ's website: <http://eneken.ieej.or.jp/en/whatsnew/QatarSeminar100929.htm>.

## **Energy Committee Highlights**

### **Emission trading is toughest issue for Global Warming Law**

At a cabinet meeting on October 8, the Japanese government decided to resubmit to the current Diet session the Bill of the Basic Act on Global Warming Countermeasures (Global Warming Law), which was aborted during the last ordinary Diet session, without any changes in the content. However, since deliberations on other issues are anticipated to take time and the ruling parties do not hold the majority, it is feared that the bill may again fail to pass the current session.

Under such circumstances as above, a full-fledged examination on the three major policies under the Global Warming Law has started; namely, (1) a feed-in tariff system for renewable energy, (2) an environmental tax, and (3) an emissions trading system. However, during an informal gathering with the government representatives, the Japan Business Federation or Keidanren pointed out that "the three policies will not only deprive companies of competitiveness and funds for research and development, but the discussions themselves will also undermine corporate confidence in investment," expressing strong opposition. There has been a growing gap between industry and the government, especially on environmental tax and emission trading as their detail conditions and the extent of burdens remain unclear.

Among the three policies, the feed-in tariff system for renewable energy has taken rough shape in July toward possible implementation. Presently, finer policy design is being prepared by the Subcommittee on the Feed-in Tariff System of the Advisory Committee on Energy and Natural Resources. Major agendas include the scope of renewable energy sources applicable for buy-back, treatment of the RPS Law, and harmonization with a number of on-going subsidy programs. Above all, how to handle biomass power generation is a remaining issue, since there are many kinds of biomass fuels which will be subject to the system. Despite the remaining tasks, the government and industry are largely in alignment on this program.

On the other hand, the greatest challenge is the emissions trading system. Although the Ministry of the Environment (MOE) has announced a top-down system based on the EU-ETS method to cap the total emissions amount, industry is voicing strong objections for fear of the risk of hampered competitiveness and a drain of national wealth. The Ministry of Economy, Trade and Industry (METI) had launched a review on challenges faced by EU-ETS at its Industrial Structure Council and compiled a draft appraisal in September that argued "the effect of the top-down method ought to be limited for Japan where marginal reduction cost is substantially higher than that in Europe." In essence, METI firmly and squarely denied the EU-ETS method.

In response, MOE proposed a top-down model at a meeting of Central Environment Council held on October 18th. The proposal included the following: (1) setting emission caps for individual companies at levels achievable by using existing energy-saving technologies (2) setting fuel efficiency limits on power generation output for electric power companies whose emission amounts are affected by economic fluctuations because power supply is obligatory.

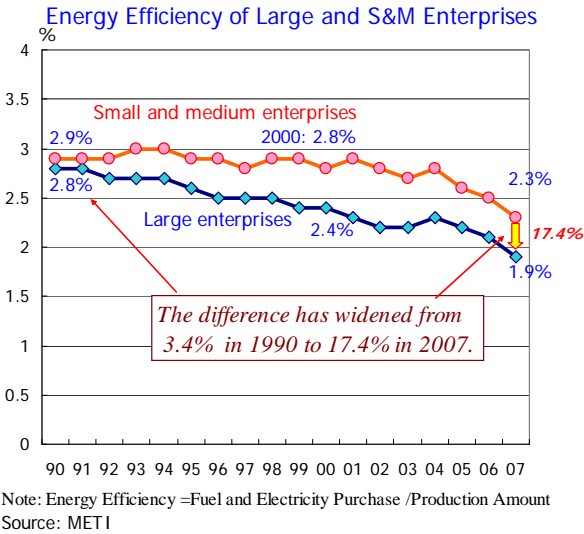
Against this proposal, committee members representing electric power, gas, and automobile industries submitted a joint statement of position that stated "we share a strong anxiety because discussions have been made only on detailed contents of the domestic emissions trading scheme, while its objectives and effects of the institution as the starting point of the discussion are left unclear.", and "impacts on people's lives and industry activities should also be considered as an effect of policy mix integrated with other policies." Further, the position paper demands that in examining the introduction of the program, economic growth, stable employment and secure energy supply must be positioned as major premises. It also requests that policy designers include elements such as contribution to global emissions reduction, promotion of technology development and diffusion of effective technologies as the roles of the program. On this discussion, an MOE officer commented that its proposal also assumes determination of reduction obligations at a level achievable by applying existing technologies.

Meanwhile, on October 25th, METI's working group meeting on the policy approach of the Global Environment Subcommittee of the Industrial Structure Council made a counter-proposal against MOE's proposal. It uses a bottom-up approach of aggregating achievable targets set by individual companies. The proposal emphasizes that (1) it is necessary to establish a standard procedure applicable to the bottom-up method, (2) by setting bottom-up targets backed by potential technological introduction, counter global warming measures should be formulated giving priorities to domestic industries and jobs, and ensuring that environment and economy move forward hand in hand, and (3) it is preferable to focus on voluntary reduction efforts with due consideration to performance of economy and circumstance for investment from medium and long-term perspectives rather than prioritizing short-term gain by adopting emissions trading. With regard to the target setting, it stipulates that (1) capping the total emission amount alone may hinder expansion of growing industries and low-carbon products, (2) any enterprise can choose a method of capping based on either the total emissions

or energy intensity indexes, (3) any enterprise should be allowed to formulate its own reduction targets on the basis of possible technology introduction, and evaluate and verify the results every year, and then, (4) the underachieved target must be compensated for using emission credit mechanism in order to ensure achievement of the goal.

In addition, METI proposed creation of a subsidy program for small and medium-sized enterprises (SMEs) as they generally lag behind improvement of energy efficiency because of slow investment. The subsidy program intends to promote the introduction of high-efficiency boilers by SMEs by offering an amount equal to “two years’ equivalent of emission reduction times twice the international carbon market prices.”

Concerning environmental tax, METI has reversed its previous opposition up to last year and shifted toward its introduction. METI and MOE are in an implicit agreement that the revenues gained by raising the Coal and Petroleum Tax be used as a fund for implementing counter-global warming measures. However, the two ministries are vying with each other over the matter of whether the environmental tax should be handled in a special account under METI or incorporated into the general revenue and imposed as the environmental tax under control of MOE. The Democratic Party of Japan has set up a project team and started a study toward introduction of the environmental tax in the next fiscal year. Amid serious revenue shortfalls, however, outcome of the issue remains unclear.



### Gasification will significantly reduce emissions

At the meeting of the Working Group on Gasification and Efficient Use of Natural Gas established by METI for a study of the role of natural gas toward a low-carbon society, Professor Takao Kashiwagi, the Chair, stated that the issue of applicable fuel efficiency in power generation should be squarely discussed in order to set out the standard to evaluate the effects of co-generation in CO<sub>2</sub> emissions reduction. There is a dispute on its definition between the electric power industry and the city gas industry as to whether the fuel intensity of the whole power generation or that of thermal power generation should be applied in the exercise of efficiency determination.

At the first working group meeting held on October 29, Mr. Junichi Ogasawara, Senior Researcher of IEEJ, made a presentation on the effects of gasifying industrial thermal demand and efficient use of natural gas. He explained that, as an issue in promoting co-generation, evaluation of emissions reduction effect will change significantly depending on the emission coefficient to be applied. He also explained that support of plant operating expenses will be helpful to encourage gasified co-generation.

Representing large users, Mr. Yasushi Hirata of Bridgestone Corporation, the leading tire and rubber products producer, explained that the company has increased the ratio of natural gas use from 20% in 2002 to 80% in 2009, and if infrastructure and other conditions become ready, his company will further increase gas use. On promotion of co-generation, he requested that various measurement methods in effect among the voluntary emission reduction plan of the



Business Federation of Japan, the emission trading system implemented by the Tokyo Metropolitan Government, etc., should be aligned to apply the thermal power generation efficiency. He also requested creation of a system that enables sale of surplus power at the same price as purchased power, appropriation of contract conditions for supplemental power purchase to backup factory owned power generation, and amplification of support of operating expenses.

Mr. Isamu Ikeda, Director of Chugai Ro Co., Ltd, a leading producer of industrial furnaces, explained that industrial furnaces use 60% of the industrial thermal consumption, while natural gas fuels only 40% of them. In addition to fuel switching, combined use of "Regenerative burners" will reduce CO<sub>2</sub> emissions by 50%. However, since high technology is required, it is rarely deployed outside the metropolitan gas supply areas. This technology should be extensively adopted nationwide with collaboration of furnace makers and smaller city gas suppliers.

The working group plans to survey needs and issues relating to gasification by interviewing large energy users and appliance venders, and also collecting information from overseas on co-generation promotion policies and progress of its regional development. The final report will be completed in February of next year.

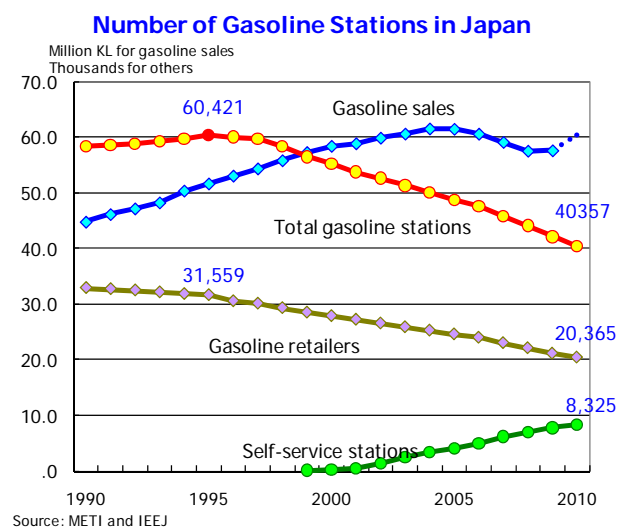
## Energy News in Japan & Asia

### Sharp decrease of gasoline stations may occur in 2013

The attrition rate of gasoline stations in Japan may accelerate after 2013. The number of Japanese gasoline stations peaked out in fiscal year 1994 (at the end of March 1995) at 60,421 and has declined ever since to 40,357 at the end of March 2010. Additional concerns are rising on the matter with an amendment to ministerial ordinances on the Fire Service Law that the Ministry of Internal Affairs and Communications made this June to prevent leakage of hazardous materials from aged underground tanks.

The amendment stipulates that FRP lining or electric anti-corrosion treatment should be applied to "those tanks lying underground for 50 years or more, with a shell thickness of 6 mm or less and thus deemed to present a particularly high risk of corrosion." It also mandates that underground tanks 40 years or more of age and made of 8 mm or less thick steel having a high risk of corrosion be equipped with precision level gauges to detect leaks." The amendment will take effect in 2013 after a two-year grace period.

The Association of Petroleum Products Retailers in Japan, or Zensekiren, conducted a survey and reported that the amendment would be applicable to 15.5% of the nationwide underground tanks in 2013 with 1.5% being 50 years or more in age and 14.0% being 40-50 years in age, respectively. Another 16.6% of tanks surveyed were 30 or more years old, indicating approximately 30% of all underground tanks will be subjected to the amended regulation in the near future.



Estimated cost of required treatment will be 3-10 million yen per facility, incurring too much of a burden to mostly small station owners. In fact, 22.1% of gasoline stations surveyed by Zensekiren answered that they would get out of the business when their tanks become subjected to the new regulation.

The record-breaking hot summer of 2010 pushed up sales of gasoline by nearly 10% over the previous year. But, old and small full-service stations faced an uphill battle while the windfall revenue gains were mostly enjoyed by newer self-service stations. Tighter regulation with amended Fire Service Law will cause a shakeout of small gasoline stations with aging facilities, starting in 2013.

### **Chubu Electric Power Company constructs 60 % heat efficiency plant**

On September 14, Chubu Electric Power Company announced that it would decommission aging Units 1 to 4 (oil-fired, total capacity 1,190 MW) at the Nishi-Nagoya Thermal Power Station and newly construct a 2,200 MW LNG-fired gas turbine combined cycle (GTCC) plant in their place. It will have the world's highest level of generating efficiency, at 60 percent, and will be a dual fuel type that can be fueled with oil in times of tight LNG supply.

The new plant will receive LNG from Chita Thermal Power Station just across the Bay of Ise. Chubu Electric is constructing an underwater pipeline jointly with Toho Gas connecting LNG terminals and power stations located on both sides of the Bay. The undersea tunnel for the pipeline extending for 13.3km was completed on October 25, 2010; the new pipeline is scheduled to be completed in 2013.

The Nishi-Nagoya Thermal Power Station is an oil-fired plant that commenced operations in 1970. Under the Chubu Electric's refurbishment plan, the new GTCC plant will be put into operation in 2019. The company estimates that it can substantially mitigate CO<sub>2</sub> emissions and fuel consumption by operating high-efficiency plants and reducing operations at other older plants with lower efficiencies. It predicts that, for the same electricity demand, the company's LNG consumption will decrease by 400,000 tons annually due to improved efficiency. It procured 10.0 million tons of LNG in 2008.

Meanwhile, the company has upgraded the berthing capacity of the Chita LNG terminal, completing in June this year. Thus, it became the first port in Japan to receive a Q-Max class vessel from Qatar, the world's largest LNG carrier with a capacity of 260,000 cubic meters.

### **Osaka Gas begins direct use of sewage based biogas**

On October 12, Osaka Gas launched a demonstration project to use biogas derived from sewage sludge; the biogas is refined to city gas quality at a sewage plant and directly fed into the city gas distribution pipes. Although there have been examples in the past of delivering biogas to city gas manufacturing plants for use as raw material, this is the first attempt to feed locally refined biogas directly from a sewage treatment plant into city gas distribution pipes. Eight-hundred thousand cubic meters of biogas, an equivalent of gas consumption in two thousand average households, will be received annually, reducing 1,200 tons of CO<sub>2</sub> emissions every year.

Kobe City constructed a facility at the Higashinada Sewage Treatment Plant to refine digestion gas containing 60 percent methane, produced in the sewage treatment process, into biogas with methane content of over 97 percent. In April 2008, it initiated a project to fuel natural gas vehicles. In pursuit of more effective applications of biogas, Kobe City joined hands with Osaka Gas and Shinko Environmental Solutions, which provides the refining

technology, and considered how it could be supplied as city gas.

At the ceremony held to celebrate its completion, President Ozaki of Osaka Gas said, "There are many sewage treatment plants that generate biogas throughout the Osaka Metropolitan district and I would like to promote talks with local governments on use as raw material for city gas and other purposes." Tokyo Gas is also working towards accepting biogas from food residuals in its distribution pipes, scheduled to start in the near future.

## **APERC Letter**

### **APEC Leaders Take Action in Response to APERC Research Findings**

Responding to APERC research findings, APEC Leaders meeting in Yokohama have directed APEC to "assess the potential for reducing the energy intensity of economic output in APEC economies between 2005 and 2030, beyond the 25 percent aspirational goal already agreed to by the APEC Leaders in 2007". APERC's research suggests that the current 25 percent energy intensity improvement goal will be exceeded under business-as-usual assumptions, but will be inadequate to address the challenges of climate change and oil security.

The Leaders of the 21 APEC economies, who include Chinese President Hu Jintao, US President Barack Obama, and Japanese Prime Minister Naoto Kan, met in Yokohama, Japan on 13-14 November 2010. The instruction on the energy intensity goal is included the Growth Strategy for the APEC region, which the Leaders adopted ([http://www.apec2010.go.jp/en/docs/aelmdeclaration2010\\_e04.pdf](http://www.apec2010.go.jp/en/docs/aelmdeclaration2010_e04.pdf)).

At their earlier 2007 meeting in Sydney, Australia ([http://www.apec.org/apec/leaders\\_declarations/2007/aelm\\_climatechange.html](http://www.apec.org/apec/leaders_declarations/2007/aelm_climatechange.html)), the APEC Leaders recognized the importance of improving energy efficiency as a cost-effective way to enhance energy security and address greenhouse gas emissions while promoting economic growth and development. They adopted a specific goal "to work towards achieving an APEC-wide regional aspirational goal of a reduction in energy intensity of at least 25 per cent by 2030 (with 2005 as the base year)". Energy intensity refers to energy use per dollar of GDP.

APERC's modeling in 2009 for the APEC Energy Demand and Supply Outlook 4th Edition suggested that the APEC region's energy intensity will improve by 38% under business-as-usual assumptions between 2005 and 2030. Over the same time period, APEC's greenhouse gas emissions are likely to increase by about 40% and APEC's oil imports are likely to increase by about 70%.

Because of the interest in these findings, APERC did further investigations as part of its 2010 Pathways to Energy Sustainability project. The Pathways project found that APEC energy intensity had historically improved by 31% over the 25 year period from 1980 to 2005; that due to recent policy initiatives of the APEC economies, the rate of improvement had increased in 2006 and 2007; and that modeling work by the International Energy Agency and the US Energy Information Administration agreed very closely with APERC's regarding projected levels of energy intensity improvement.

At their meeting in Fukui, Japan, in June 2010, the APEC Energy Ministers considered APERC's findings and directed the APEC Energy Working Group (EWG) to "assess the potential for reducing the energy intensity...beyond the 25% aspiration goal already agreed by the APEC Leaders" with assistance from APERC and other APEC expert groups. The APEC Leaders have echoed this instruction.

APERC looks forward to assisting the APEC EWG with their assessment of the energy efficiency goal.

APERC's Outlook and Pathways reports are available for downloading at <http://www.iej.or.jp/aperc/>.

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