IEE JAPAN

Japan Energy Brief

No.16: November 2011

Published by The Institute of Energy Economics, Japan *Editor-in-Chief: Kensuke Kanekiyo and Akira Ishimura*
Inui Building Kachidoki, 13-1 Kachidoki 1-chome, Chuo-ku, Tokyo 104-0054 Japan
Homepage http://eneken.ieej.or.jp

Contents

Tight electricity supply likely to persist as nuclear plants are inoperative

The work to bring the ill-fated Fukushima Dai-ichi Nuclear Plant under control is proceeding faster than initially expected. The government lifted the 20-30 km Evacuation-Prepared Area designation on October 1, and announced a draft decontamination plan on October 30 to dispose of contaminated soil. In the revised work schedule announced on October 17, Tokyo Electric indicated that cold shutdown would be reached before the end of the year; i.e. the stable state where the temperature at the bottom of the reactor vessels is kept below 100℃ and the release of radioactive material to outside of the power plant premises is essentially controlled under a limit. However, nuclear plants after regular inspections are inoperative throughout Japan waiting for permission to resume operation. Tight electricity supply is likely to persist longer.

All nuclear power plants to stop by summer 2012

Of 54 nuclear power plants installed in Japan, only 11 are operating as of late November. Without resumption of nuclear plants after regular inspection, there will be a mere 6 reactors operating in January, and most likely will be none in summer 2012. As nuclear power is used to supply a quarter of Japan's electricity demand, a complete loss of these units will inevitably have a serious impact on electricity supply nationwide. Nevertheless, Junichi Ogasawara, Electricity Group Leader at the Institute of Energy Economics, Japan (IEEJ), advises that the prospect of restarting nuclear plants by next summer is dim.

The first reason for this is, even though several power companies have already started stress tests to evaluate safety margins of nuclear power plants currently shut-down, the procedure to treat their outcomes is yet to be established. The Nuclear and Industrial Safety Agency (NISA) of METI has formed a council consisting of 11 experts for evaluation of the stress test results. Its first meeting held on November 14 had a heated discussion on the evaluation criteria and method, but failed to proceed with the evaluation of the report submitted for the No.3 Unit of

the Ohi Power Station. Separately, NISA announced on October 30 specific subjects to be reviewed for safety in relation to earthquakes and tsunamis individually for 21 nuclear power plants at 9 locations. The results of this reassessment could have a material effect on the evaluation of the stress tests. As of this writing, investigation on the cause of the accident at the Fukushima Daiichi Plant has not yet started. It is likely to take sometime to develop guidelines on nuclear safety that could be accepted both on technical as well as institutional points of view.

Secondly, an area with an 8 to 10 km radius from a nuclear power plant has previously been set as a guideline for the Emergency Planning Zone (EPZ), a zone designated with an emphasis on preparing for specific nuclear safety measures in case of an accident. In October, the Nuclear Safety Commission of Japan (NSCJ), which is reviewing nuclear disaster prevention guidelines, proposed a plan of "expanding the applicable area to a circle with a 30 km radius from nuclear power plants." This will greatly enlarge the geographical area subject to the regional disaster prevention plan and will increase the number of local governments to be involved. It will, however, take considerable time to establish the new guidelines, develop relevant legal systems, and determine the applicable areas. Only when these preparations are completed, discussions with local stakeholders can be initiated. Timing is extremely tight for obtaining consent from local governments on resumption of nuclear plants operation before the peak demand season of next summer.

Government requests electricity conservation for coming winter

In view of the possibility that nuclear plants after regular inspection will be unable to resume operation this winter, the Japanese government announced on November 1 a request for electricity conservation during this winter heating season. As peak demand in winter is lower than that of summer, it is forecast that the national average reserve capacity will fall within the range of 2.4% for January and 2.2% for February, slightly below the 3% guideline for stable supply. (Peak demand is projected based on records for the winter 2010 or the estimates by individual electric utilities for the winter 2011, whichever is higher.)

Electricity Supply/Demand Outlook for the coming Winter and Summer

	January 2012			January 2012			August 2012				
								Demand =2010		Demand =2011	
	Supply Capability	Peak Demand	Supply Reserve Ratio	Supply Capability	Peak Demand	Supply Reserve Ratio	Supply Capability	Peak Demand	Supply Reserve Ratio	Peak Demand	Supply Reserve Ratio
	MW	MW	%	MW	MW	%	MW	MW	%	MW	%
Hokkaido	650	579	12.3	649	563	15.3	474	506	-6.4	485	-2.3
Tohoku	1,342	1,390	-3.4	1,364	1,370	-0.5	1,485	1,480	0.3	1,246	19.2
Tokyo	5,457	5,150	6.0	5,375	5,150	4.4	5,193	6,000	-13.4	4,922	5.5
Eastern Japan (50Hz)	7,449	7,119	4.6	7,388	7,083	4.3	7,152	7,986	-10.4	6,653	7.5
Chubu	2,487	2,342	6.2	2,487	2,342	6.2	2,750	2,709	1.5	2,520	9.1
Kansai	2,477	2,665	-7.1	2,412	2,665	-9.5	2,533	3,138	-19.3	2,784	-9.0
Hokuriku	561	528	6.2	559	528	5.9	565	573	-1.5	533	5.9
Chugoku	1,146	1,074	6.7	1,146	1,074	6.7	1,234	1,201	2.7	1,083	13.9
Shikoku	544	520	4.6	531	520	2.1	529	597	-11.3	544	-2.7
Kyushu	1,499	1,533	-2.2	1,506	1,474	2.2	1,534	1,750	-12.3	1,544	-0.6
Central/Western Japan (60Hz)	8,714	8,662	6.2	8,641	8,603	0.4	9,145	9,968	-8.3	9,008	1.5
Total	16,163	15,781	2.4	16,029	15,686	2.2	16,297	17,594	-9.2	15,661	4.1

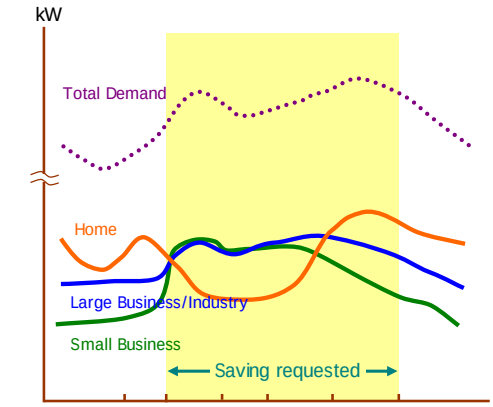
Source: Energy-Environment Council, Cabinet Ooffice

Among power companies, however, peak demand is anticipated to exceed supply capacity for Tohoku, Kansai and Kyushu EPCs. The shortage will be largest for Kansai EPC, whose nuclear dependency ratio exceeds 50%. Therefore, the government has requested the consumers in the Kansai EPC service area for voluntary electricity conservation with a targeted reduction of 10% or more year-on-year, and 5% or more for consumers in the Kyushu EPC service area, while it requested electricity conservation with no numerical targets for consumers in other areas. It is expected that Tohoku EPC will be able to get through its peak via relief

supplied from neighboring Tokyo and Hokkaido EPCs, and the government takes a specific posture not to press too much upon the disaster areas affected by the earthquakes and tsunamis. No compulsory regulations or planned blackouts based on the law will be enforced this coming winter.

Peak demand in the summer occurs early afternoon when the temperature is high, but peak demand in the winter occurs in the morning and evening when the temperature is low. The winter peak hours overlap with times when people are commuting or preparing meals at home, and thus different electricity saving measures are needed compared to the summer, where factories and businesses are required to cut down on electricity consumption.

Figure-1 Winter Electricity Demand (Weekday)



Source: METI

In light of this, METI has elaborately prepared and announced an "Electricity Saving Menu" and electricity conservation goals to suggest the types of effective electricity conservation means for customers with different patterns of electricity use. For example, specific electricity conservation measures are listed for each subsector, i.e., reviewing operation methods of pumps and fans (15%) and improving insulation of electric heating equipment (7%) in the manufacturing industry; regulating operation of air-conditioning (8-12%) and adjusting lighting (10%) in department stores and supermarkets; saving lighting (3%) and air-conditioning (1%) in medical institutions; and wearing warm clothes with room temperature set at 20℃ (7%) and turning off unnecessary lighting (6%) at residences. METI expects that a capacity margin above 3% could be secured through these fine-tuned countermeasures. In addition, electricity demand during the first half of the fiscal 2011 was comparatively low at minus 7.7% and peak demand minus 12.6% year-on-year, while there is some room, though tiny, to raise the load factor at thermal power generation on the supply side. Although there is a possibility that electricity supply and demand will be tight for a few days during the height of cold waves, the power companies should generally be able to ride through the winter.

Demand-side measures for the summer peak season in 2012

The real problem is the summer next year. As shown in the table, if the summer peak demand will revive like the extremely hot summer of 2010 while nuclear power plants will not resume operation, there will be a supply deficit of as much as 16.56 GW. Assuming a demand level similar to the summer of 2011 when economic activities were low reflecting the effects of earthquake and tsunami and conservation measures were taken extensively, a capacity margin of 4.1% will be secured as a nationwide average. However, supply deficits are anticipated in the service areas of Hokkaido, Kansai, Shikoku and Kyushu EPCs with high nuclear power ratios. In contrast, Tohoku EPC, which lost the majority of its thermal power in the tsunami, will have a balance with comfortable leeway brought by restoration of these capacities.

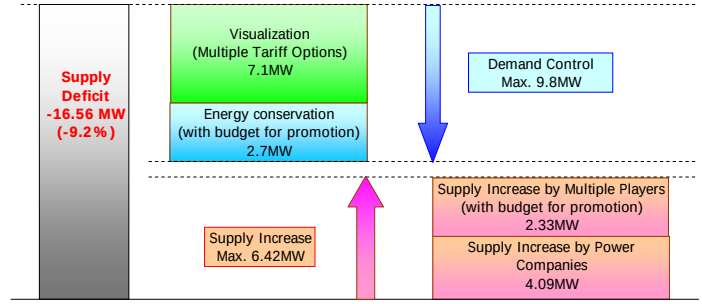
In response to this outlook, METI has decided that it will be more effective to establish the practice of electricity conservation within a reasonable scope through budget and institutional reforms, rather than triggering electricity use restrictions, and announced measures involving budgetary provisions worth a total of ¥579.4 billion. More specifically – taking the 16.56 GW supply deficit as the starting point – the plan expects electricity consumption to be reduced by

9.80 GW through demand control, while a 6.42 GW supply increase achieved by creating additional supply capacity. The breakdown of these measures is as follows:

On the demand side, 1) a saving of 7.10 GW could be achieved by making pricing information more comprehensive and using market mechanisms, such as lowering the contract maximum demand, revision of the electricity tariff menus, and expanded use of multiple tariff option contracts that can be invoked during peak periods or under a tight supply situation ; and 2) an additional 2.70 GW will be saved through subsidy-driven promotion of investments for introducing energy conservation equipment and systems, investing in energy conservation for residences, introducing HEMS/BEMS energy management systems, introducing lithium-ion storage batteries, and implementing energy conservation diagnosis.

On the supply side, an additional 4.09 GW will be obtained by improving supply capacity at power companies, together with another gain of 2.33 GW by promoting subsidy-driven introduction of technologies such as renewable energy, private generation and cogeneration, and home fuel cell systems. Continuing these measures and having them take root in the society will make it possible to expand the conservation effect through investments by customers from 2.70 GW in 2011 to 6.53 GW in 2014, to increase supplies by players other than power utilities from 2.33 GW to 3.99 GW for an aggregate incremental supply via the overall measures from 16.22 GW to 21.71 GW. In order to actualize these effects, regulatory and institutional reform action plans covering 26 items will be implemented.

Figure-2 Measures to cope with 2012 Summer Demand



Source: METI

As discussed above, the government is drawing on all policy measures available and working to minimize the peak electricity deficit, but it may take a little more time until the effects can be felt with a degree of certainty. With regard to restart of the nuclear power plants that have been shut down for regular inspection, it is understood that the NISA will evaluate the stress tests conducted by utility companies, and NSCJ will confirm its validity. On that basis, an overall judgment will be made at the government level, also taking into account whether it is possible to obtain understanding of local community and trust of the general public, while a practicable time schedule is yet to be shaped for carrying out these procedures.

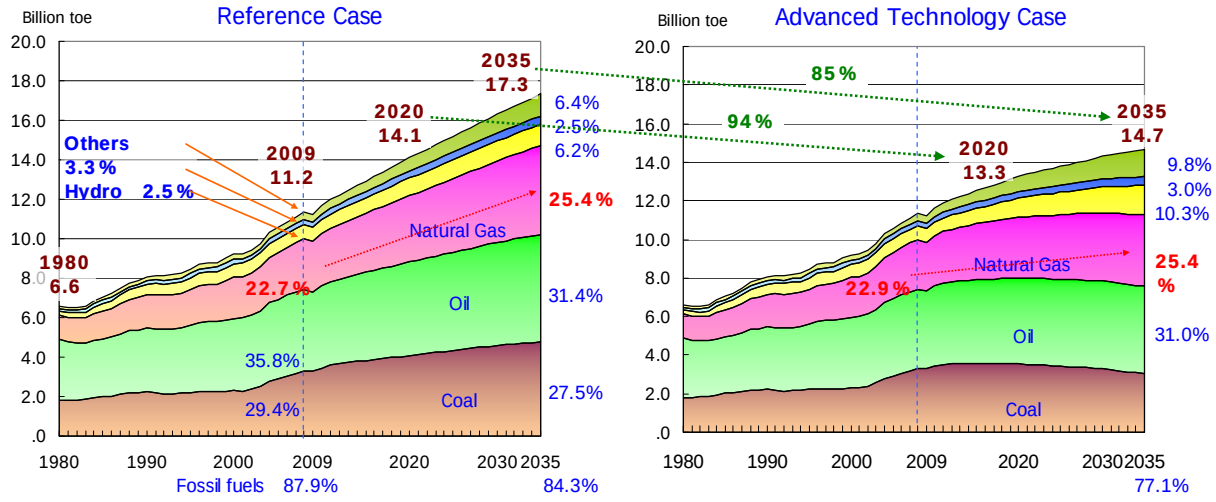
Growing uncertainty over international energy trends - IEEJ Asia/World Energy Outlook 2011 –

The IEEJ Asia/World Energy Outlook 2011 was presented at an open symposium held in Tokyo on October 26. For this year, the report has developed projections taking account of the worldwide policy movements toward energy security and global warming after experiencing the Great East Japan Earthquake of March 11 and the accident at the Fukushima Dai-ichi nuclear power station. Mr. Yuji Matsuo, Senior Researcher, Energy Data and Modelling Center, reported the analysis as below:

Under the assumptions that the world nuclear development would not be significantly affected despite the Fukushima accident, outcomes of the Reference Case and the Advanced Technology Case are mostly the same with those of the Outlook 2010, while the Low Nuclear

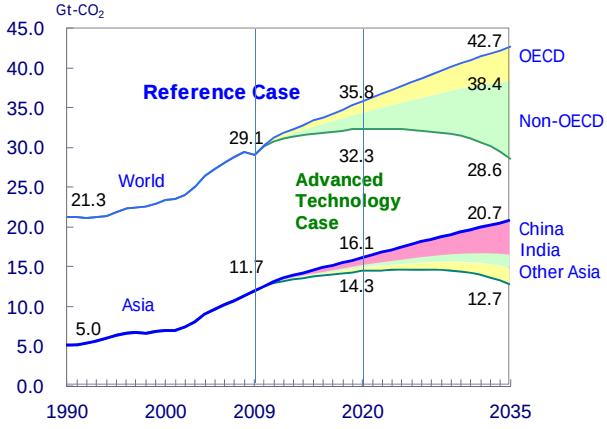
Case casts serious impacts on emissions reduction as discussed later. Under the Reference Case where the current trends of ongoing energy and environmental policies are extended, the world primary energy demand will increase from 11.2 billion tons oil equivalent (Btoe) in 2009 to 17.3 Btoe in 2035 at an annual growth rate of 1.7%. Asian energy demand will lead this trend expanding from 3.89 Btoe in 2009 to 7.51 Btoe in 2035, at an annual growth rate of 2.6%, with its global share rising from 34.7% to 43.5%. China and India are the key players; the combined energy growth of the two countries during the projection period, at an annual growth rate of 2.8%, amounts to 2.7 Btoe, or 45% of the world increase in energy consumption.

Figure-1 World Energy Outlook through 2035



Among energy sources, oil will account for the largest share even in 2035 at 31.4% of the total primary energy supply, growing at an annual 1.2%, while coal will continue to be the second largest energy source at 27.5% growing at 1.4%; although both of them will have decreased their shares from 35.8% and 29.4% in 2009, respectively. Natural gas consumption will show the fastest growth among fossil fuels, at an annual 2.2%, increasing its share from 22.7% to 26.0% supported by the expanding resource base in unconventional natural gas. Nuclear will increase at a moderate annual rate of 1.7%, while new and renewable energies will increase fastest at 4.3%. Nevertheless, fossil fuels continue to be dominant even in 2035, supplying 84% of the primary energy requirement.

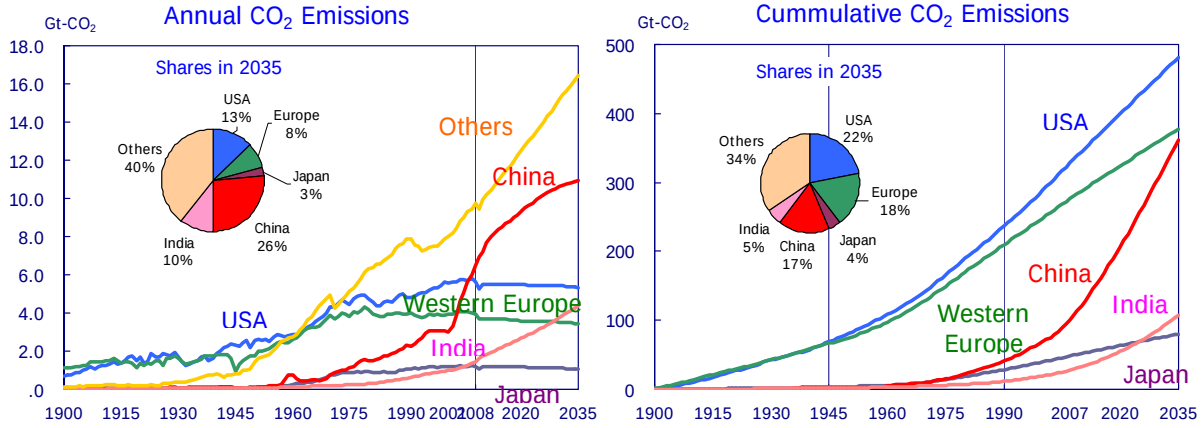
Figure-2 CO_2 Reduction by Region



Adopting advanced technologies extensively, the above primary energy demand will be curbed by 7% in 2020 and 35% in 2035 in the Advanced Technology Case. This is particularly important in terms of emissions reduction. As shown in Figure-2, the global CO_2 emissions will increase from 29.1 giga tons (Gt) in 2009 to 35.8 Gt in 2020 and 42.7 Gt in 2035. However, they will be reduced in the Advanced Technology Case down to 32.3 Gt in 2020 and 28.6 Gt in 2035; the latter being below the 2009 level. Emissions will increase mostly in Asia, i.e. 9.0 Gt out of the world total of 13.6 Gt, while great reduction potential exists in the non-OECD region, 9.8 Gt out of the world total of 14.1 Gt including Asia's 8.0 Gt. To realize this potential, the world needs to enhance dissemination and deployment of advanced technologies through international cooperation. It

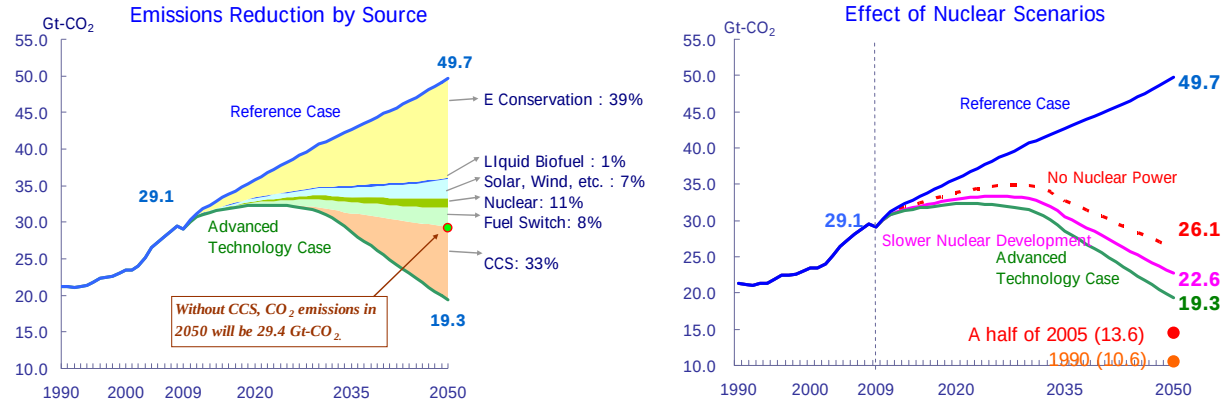
should be noted that China and India are projected to become the single largest and the third largest CO_2 emitters by 2035, while their cumulative amounts will also become significant. Advanced countries with high per capita energy consumption should endeavor reducing energy intensity while emerging countries with relatively low per capita energy consumption are urged to direct their economies toward less energy intensive structure in their development plans.

Figure-3 Annual and Cummulative CO_2 Emissions



The Outlook Team has also made a super long-term projection up to 2050, and examined effects of slower nuclear development anticipated in the wake of the Fukushima Dai-ichi accident. As shown in Figure-4, the global CO_2 emissions will continue to increase in the Reference Case to 49.7 Gt in 2050, or 2.3 times the 1990 level. Adopting every conceivable reduction measure would reduce this to 19.3 Gt. This is below the 1990 level but still substantially higher than the global target to halve the emissions. It should also be noted that the emission level would become much higher if the assumed carbon capture and storage (CCS) are not implemented as planned.

Figure -4 Super Long-term Projection and Low Nuclear Case



Further, in the cases where nuclear power development is substantially slowed down or nuclear power generation is totally stopped, by 2050, the global CO_2 emissions will increase by 3.3 Gt or 17% and by 6.8 Gt or 35%, respectively. Even with nuclear power generation projected without significant changes, it looks extremely challenging to achieve the target of halving the emissions by 2050 on the basis of merely extending the present way of thinking. A question then will be, "do we have the luxury of dropping nuclear altogether?" At any rate, we need to endeavor developing epoch making breakthroughs in technology and restructuring socio-economic systems in order to secure the sustainable development of the world.

The Japanese version of the IEEJ Outlook is available on the IEEJ website (for subscribers only at http://eneken.ieej.or.jp/data/3434_summary.pdf), and its English summary will be posted shortly.

IEA says door to 2 ℃ scenario is closing

At the joint IEA-IEEJ energy symposium held on November 16 in Tokyo, Ms. Maria van der Hoeven, the new Executive Director of the IEA, told that revision of nuclear energy policy will most affect the countries with least energy resources. In her portrayal of the IEA World Energy Outlook 2011, she discussed a specific analysis on the Japanese energy outlook and explained that, in the low nuclear case with no new reactors built beyond those already under construction, the share of nuclear power will decrease to 18% of the total power supply compared with 30% under the New Policy Scenario with modest nuclear increase and 53% under the Basic Energy Plan 2010 of Japan.

The Low Nuclear Case has an important implication for Japan's energy security as well as global warming policies. In addition, significant additional economic cost will be incurred in spending on imports of natural gas. Japan's gas import bill will double to $66 billion in 2035 under the New Policies Scenario. This will be further pushed up to $80 billion under the Low Nuclear Case. At present, if all the reactors are shut down, Japan will incur additional fuel cost of $3 billion per month as an immediate effect. Mr. Nobuo Tanaka, former Executive Director of the IEA and Special Advisor of IEEJ, commented on this point that other gas importing countries such as China are closely watching development in Japan as it has substantial impact on their energy import bill as well.

In a world full of uncertainty, one thing is sure: rising incomes and population will push energy needs higher. Some key trends are pointing in worrying directions, such as CO_2 emissions, energy efficiency and spending on oil imports. Policy actions are being affected while the world is trapped in financial instability and economic stagnation. In particular, global movements on the emissions reduction are slow though the direction is right. She warned that the door to the 2 ℃ scenario is closing. Without further action, by 2017, all CO_2 emissions permitted in the 450 Scenario will be "locked in" by existing plants, factories, buildings, etc.

Later that same day, she also spoke at the Advisory Committee for Natural Resources and Energy and advocated that energy policy should consider security, economics and sustainability, and that energy efficiency, renewable energy and nuclear are all essential to achieve the goal. Japan's energy self-sufficiency is extremely low among OECD countries, while costs of renewable energies remain high elsewhere in the world. If one is to say "no" to nuclear, its consequences including the significant replacement cost must be considered at the same time, while the decision solely rests with Japan.

Northeast Asian oil industry discusses strategies for cooperation

Northeast Asia Petroleum Forum 2011 was held in Seoul, Korea, on October 18 and 19. It was the 10th anniversary of the biannual conference, where stakeholders of petroleum industries in Japan, China, and Korea got together to facilitate cooperation among

oil-consuming countries in Northeast Asia. The forum started with a CEO session on "Issues of Global Oil Market and Strategies for Oil Industry in Northeast Asia," in which CEOs of Japanese, Korean, and Chinese oil corporations shared their views on oil markets and their strategic visions. Mr. Vladimir L. Likhachev of the Energy Research Institute of Russian Academy of Science, who took part in the session as an observer, also presented the outlook of petroleum development in eastern Russia. The forum covered issues and prospects of oil and gas industries in a number of realms. The following are brief reports on major discussions in the forum:

One of the most notable points was that most speakers regarded Northeast Asian oil markets as undergoing unprecedented and dramatic changes. Even in this year the oil industries had been facing rapidly changing situations including political destabilization of Middle East and North Africa, the Great East Japan Earthquake and resulting accidents at Fukushima Daiichi nuclear power plants, and volatile crude oil prices due to economic conditions in Europe and the US. This prompted many speakers to voice their opinion that it was crucial for oil-consuming countries to seek out strategic cooperation and collaborative actions. Japan delivered a vivid report on the disastrous consequences of the Great East Japan Earthquake and how the Japanese oil industry had responded to the situation, arguing for the need of revisiting the role of oil in developing future energy policies.

Mr. Jun Arai, President of Showa Shell Sekiyu, presents the emergency responses of the Japanese oil industry in the wake of the Great East Japan Earthquake.

Respective Northeast Asian countries reported brief summaries on trends of oil and natural gas in their countries as follows:

China: Oil demand will further grow due to continuing motorization and growing passenger and freight transportation resulting from economic expansion, causing an average annual demand growth of 7% in gasoline, 8% in jet fuel and kerosene, and 5% in diesel oil between now and 2015. China will import higher-standard oil products as its standards for transportation fuels will gradually be upgraded to the Euro-IV level. Annual demand for natural gas will increase to 320 Bcm by 2020 encouraged by the favorable government policies. On the other hand, domestic production of natural gas is projected to be 210 - 250 Bcm per annum leaving import demand at 70 - 110 Bcm annually.

Korea: With minuscule increase in oil demand, Korea is seeing intensified competition in the oil products market, specifically among service stations. Oil products are Korea's major strategic goods with exports of 50 billion dollars per annum, positioned at the third place in terms of nominal exports following ships and semiconductor products. Korea will further increase exports of oil products in order to make the most of the domestic refining capacity.

Japan: Oil will continue to be the most essential energy, although Japanese oil demand is declining by 0.1 million barrels per day (bpd) each year. As such, it is important for Japan to maintain the domestic supply chain of oil products robust and efficient starting from procurement of crude oil, refining, transportation, storage, and all the way to marketing.

Russia: It plans to boost oil exports to Northeast Asia making the total amounts exported to Asia Pacific markets 0.8 to 0.9 million bpd in 2020 and 1.1 to 1.5 million bpd in 2030. These appear to be rather conservative projections as Russia is already exporting nearly 1 million bpd from Sakhalin and Siberia.

Northeast Asian countries are becoming more dependent on imported energy and several speakers voiced their hopes for unconventional natural gas (UNG), a hot topic in energy industries. The problem with UNG is that only China can mass produce it in Northeast Asia and at full-scale after 2015. Rather, major impacts of UNG on Asia will materialize from a large amount of LNG flowing into Northeast Asia that is derived from UNG in other areas. The above prospect led the participants of the forum to earnest discussions on CBM-LNG projects already in progress in Australia as well as export projects of LNG derived from shale gas in the planning stage in North America. As LNG import into Northeast Asia is steadily increasing, one participant advocated that Northeast Asian purchasers should produce simple messages in unison concerning terms and conditions on LNG trade including prices. Joint development effort will also become indispensable in areas with high country risks. Pipeline transportation of natural gas from Russia to South Korea through North Korea, though it is a hot topic of late, was mostly regarded to be premature with arguments like "the project has too many uncertainties and it is too early to seriously study."

There were several other presentations on energy savings, as well as alternative fuel development projects and demonstration projects such as biofuels and fuel cell vehicles. During a report on natural gas vehicles, representatives from China and Korea asked a number of questions on infrastructure development and technical issues required to overcome for pervasive use of them.

The next forum will be held in China in 2013. Summary and materials of the forum will soon be shared on IEEJ's website.

Energy Committee Highlights

Government starts review of the Basic Energy Plan after the Fukushima accident

The Basic Energy Planning Subcommittee of the Advisory Committee for Natural Resources and Energy convened on October 3 their first meeting after the Great East Japan Earthquake, and started debating on revision of the Basic Energy Plan taking into account the accidents at the Fukushima Dai-ichi nuclear power plants. Current Basic Energy Plan, revised in June 2010, stipulates that the share of nuclear power of the electricity supply should be increased to about 50% by 2030 in order to create a low-carbon society, but this no longer seems viable as the accidents seriously damaged public confidence in nuclear power generation. Now the Japanese government is turning to a policy of lowering dependencies on nuclear generation. However, it remains to be seen if a viable scenario can be produced consistent with stable supply of electricity and global warming objectives. The largest and most important issue is positioning of nuclear power in the future energy mix.

Mr. Yukio Edano, Minister of METI, started the meeting by saying "the Fukushima Dai-ichi accidents have dramatically changed Japanese people's perception of and confidence in nuclear energy. I would urge you all to produce, through your discussion, what the government must do and how we proceed to the final target, rather than saying that the current situation leaves us no other choice but doing this and that" and "I asked a wide variety of experts to participate

in the discussion, but it does not mean I want you to seek out a point of compromise among different parties. I expect you to review energy policies through substantial discussions based on facts and evidence." The 25 committee members freely voiced their views and opinions following a briefing on the current Basic Energy Plan and ongoing examination of energy policies at a ministerial-level Energy and Environment Council. The subcommittee's primary objective is to identify all views and opinions first as it would not be an easy task to forge a consensus among members in a short period of time. The committee is scheduled to submit the first report to the Council by the end of year.

The second meeting was held on October 26, in which most of the committee members submitted their opinions in writing, and five members presented their opinions before the committee. Professor Kikkawa of Hitotsubashi University said "unless we can resolve the backend issues (reprocessing of spent nuclear fuel), nuclear energy would remain a transitional energy option merely available till around 2050 for the entire human race", while giving a word of warning, "Japan is a country poor in natural resources and as such, ought not to casually abandon the nuclear option." He suggested that, in considering energy structure of Japan for 2030, we should first estimate 1) the share of renewable energies, 2) the progress in power saving through energy conservation, and 3) the progress in emission reduction (zero-emission) technology of coal fired power plants; and then the share of nuclear energy should be derived by subtracting these potentials. Mr. Tetsunari Iida, Executive Director of the Institute for Sustainable Energy Policies argued that issues on restart of nuclear power plants and supply and demand issues should be separated by pointing out that "enhancing demand side management (DSM) and reinforcing peak power supply capacity will be sufficient to manage the short-term electric power supply balance." Ms. Hisa Anan, Director General of Shodanren, Japan's nationwide network of consumer groups, proposed a zero nuclear society calling for 1) drastic review of the safety measures and consent of local society as the prerequisites if restart of the existing nuclear reactors was unavoidably required, and 2) decommissioning of aged nuclear reactors.

The third meeting was held on November 9 and six members made presentations. Professor Satoshi Tanaka of Tokyo University and President of Atomic Energy Society of Japan argued for examination of the energy strategy based on a geopolitical viewpoint saying "an energy option once thrown away would never be taken back." Mr. Hideyuki Ban, Co-Director of Citizens' Nuclear Information Center, asserted that nuclear power does not have a national consensus; Japan should withdraw from nuclear considering the risks of radioactive leakage, severe accidents and waste disposal. Professor Tatsuo Hatta of Osaka University disclosed his view that the energy best mix should be pursued subject to selection by the market, and the role of the government is to prepare a proper market design.

Mr. Masakazu Toyoda, Chairman of IEEJ, submitted a written opinion with the following viewpoints, which he is scheduled to speak about at a later date.

1. Due to the Fukushima Dai-ichi accidents, Japanese people now have much less confidence in nuclear power generation. The government must place the highest priority on first reassuring the public and implementing safety measures on all types of energy as the basis of energy policies as well as activities of energy industries. Then the government should endeavor to establish a "safer nuclear power generation," because each type of energy has its own merits and demerits and the risk of entirely abandoning nuclear power will be significant in pursuit of stable energy supply and global environment.
2. Japan has no cure-all solution on energy security as it is a country poor in natural resources and is isolated in energy supply structure with no international pipeline or electricity interlink. The government, therefore, must explore all possibilities such as beefing up

overseas development of resources, using the dialogue between energy producing and consuming countries, and maintaining, securing, and enriching technologies for domestic energy (renewable energy) and quasi-domestic energy (nuclear energy) as well as energy conservation.

3. The government is forced to reduce nuclear power dependency even while maintaining the long term target of greenhouse gas (GHG) reduction by 2030 and 2050 as the international commitment. To this end, the national technology development plan must be revised along with a drastic improvement on the support systems. For the post-Kyoto Protocol negotiations on GHG emissions, Japan should review the reduction target for 2020 taking into account the global trend and the reality of increasing emissions after the Fukushima accidents, and take an initiative in negotiating a realistic framework agreeable by most countries. In addition, "adaptation" measures must also be reinforced to counter aggravation of global warming in the interim.
4. It is feared that the closure of nuclear reactors will cause power shortage, a steep rise in fuel (LNG) costs, increased CO_2 emissions, slow-down of GDP growth, and a rise in unemployment, with no energy option that can replace nuclear energy in the short term. Therefore, the Japanese government is urged to restart the nuclear power stations on the precondition of assured safety.
5. For the medium- to long-term aspect, the government must develop several scenarios by combining 1) more comfortable energy saving, 2) cleaner fossil fuels, 3) lower cost renewable energy, and 4) safer nuclear energy, and identify the best combination through quantitative and objective evaluations.

The Subcommittee will meet several times within the year and will deepen discussions from the New Year to produce options for best-mix by next spring. The material will be posted for national debate in Japan, and the revised Basic Energy Plan will be finalized for incorporation into the "Innovative Energy and Environment Strategy" by the ministerial-level Energy and Environment Council. For the time being, however, the subcommittee will spend its time mostly on qualitative arguments, and discussions on policy options and best-mix scenarios based on quantitative analyses will have to wait rather long.

Dismantling Fukushima to take three decades

On October 28, the Atomic Energy Commission of the Cabinet Office announced a draft roadmap for decommissioning and dismantling the Fukushima Dai-ichi Nuclear Power Plant. The draft plan outlines that it will take at least thirty years to complete dismantling the reactors and plant buildings. Tokyo EPC will draw up detailed plans based on the final report on the roadmap to be completed by yearend, and will embark on the decommissioning process as soon as the cold shutdown state is achieved. The revised work schedule to contain the crippled nuclear reactors at Fukushima Dai-ichi announced by Tokyo EPC on October 17 indicates that such a state of the reactors will be achieved by the end of this year, allowing the initial steps of the decommissioning process to start early next year.

A total of 1,496 fuel rods are held in the damaged four reactors, and another 3,108 fuel rods stored in the spent fuel storage pools. Melted fuel rods are thought to have fallen to the bottom of the pressure vessels causing some leakage into containment vessels at the No. 1, No.2 and No. 3 reactors, which were in operation at the time of the earthquake and tsunami. The roadmap at this time is developed referring to the decommissioning process at the Three Mile Island nuclear power plant in the United States following the 1979 accident and other materials. Decommissioning at Fukushima will begin with decontaminating the interiors of the reactor buildings, repairing the damaged containment vessels and refilling them with water.

Equipment to suction up the melted fuel rods will be inserted into the reactors and extraction will start around 2021. Cranes normally used to extract spent fuel rods were destroyed in the hydrogen explosions that ripped through the No. 1, No. 3 and No. 4 reactor buildings. They will be replaced with new cranes and extraction of stored fuel rods will start around 2014. The dismantling process is scheduled to be completed sometime after 2041, although unexpected developments may still crop up as the extent of damage to the nuclear reactors and fuel rods is yet to be fully assessed.

The draft report emphasizes the importance of all parties, i.e. the government, research institutions, Tokyo EPC and equipment manufacturers, jointly tackling the challenges by setting up a headquarters for research and development and collaborating closely with overseas partners as well. Hajimu Yamana, Professor at Kyoto University who headed the special committee in drawing up the draft, commented "we envision the extraction of fuel rods to be completed in about five years once the decommissioning process is launched. We hope to complete the decommissioning process within the usual time frame supposed for normal nuclear reactors, but it may take longer."

Energy News in Japan & Asia

Hokkaido EPC constructs first LNG power station

Hokkaido Electric Power Co., Inc. announced on October 11 that the company will construct its first LNG fired thermal power station near Sapporo to start operation in 2021. Its LNG receiving facility will be located at Ishikariwan-Shinko (Ishikari Bay New Port), Ishikari City, next to the LNG terminal of Hokkaido Gas Co., Ltd. (Kitagas) currently under construction.

Both companies signed the same day an agreement on joint use of the receiving terminal of Kitagas; Hokkaido EPC will construct LNG tanks next to the yard of Kitagas, LNG will be received at the sea berth of Kitagas, regasified there and then piped to the power station located on the opposite side (Otaru City) across a canal. The LNG receiving facility will be operated by Kitagas under contract.

Construction of the Ishikariwan-Shinko combined cycle gas turbine (CCGT) power station will start in 2015. The initial generating capacity will be 500 MW to start power supply in 2021; it will be expanded to 1,600 MW eventually. Mr. Osamu Sakai, Managing Director, explains that the plant site is selected in view of its proximity to the demand center with favorable port facility, and hopes that the station will contribute to diversification of electricity sources. Hokkaido EPC currently operates power stations with a total generating capacity of 8,260 MW, consisting of 25% nuclear, 19% hydro, 29% coal, 24% oil, and a small amount of geothermal. The new station will increase the company's generating capacity by 19% when fully completed.

Tokyo Met-Gov to promote introduction of smart grid

The Tokyo Metropolitan Government (TMG) has decided to provide a grant to Mitsubishi Estate Co., Ltd. for its pilot project to introduce a smart grid next year in the business district around the Tokyo Station. The Tokyo government seeks to develop a next-generation power grid, or "smart grid," to efficiently manage the power supply and demand of major office building clusters in Tokyo.

The project by Mitsubishi aims to integrate large PV installations at buildings with residual heat recovery from waste water to achieve minimal dependence on the grid electricity. Tokyo seeks to employ the know-how obtained in this experiment in the development of smart grids

in Shinjuku, Shibuya, Shinagawa and other major business districts in the capital.

In its growth strategy, the TMG aims to invite five hundred or more foreign enterprises every year to the capital's major business districts under a promotional campaign of "Asian Headquarters Special Zone." After the Great East Japan Earthquake, however, it is considered essential for a successful campaign to secure reliable lifeline systems that function at the time of disasters. In addition to the plan to construct a natural gas-fired power plant in Tokyo Bay to help sustain its functions as Japan's capital even in a major earthquake, the TMG now seeks to build a disaster-proof city by establishing a smart grid as a systemic support. The smart grid is expected to help efficiently control the power supply and demand for office buildings, which account for 35% of power consumption in Tokyo, to promote introduction of renewable energy, energy conservation and higher efficiency, and to eventually reduce concentration of demand on the grid power.

A smart grid will substantially reinforce Tokyo's disaster-response capabilities, i.e. in the event of power supply disruptions, electronic appliances with lower priority will automatically be switched off and minimal power will be secured through efficient interchange of electricity from city gas-based cogeneration, renewable energy, and distributed power sources including batteries. As a downside of this concept, while a smart grid promises reduction in the amount of power purchased and consumed, it will consequently require spending on more expensive energy sources, such as renewables and batteries. The great challenge will be how to balance the advantages of securing energy supply against disasters and overall economics.

APERC Letter

APERC Presents findings to the APEC Ministerial Conference on Transportation and Energy

APERC President Kenji Kobayashi was invited to present recent APERC research findings on urban transportation energy efficiency at the APEC Ministerial Conference on Transportation and Energy in San Francisco on 13 September 2011. The conference brought together for the first time APEC energy and transportation ministers, as well as many other distinguished government and business leaders, to discuss cooperative efforts to promote energy efficient transportation.

Mr. Kobayashi's presentation drew on APERC's research for the Cooperative Energy Efficiency Design for Sustainability (CEEDS) Phase 3 project, which is focused on energy efficient urban transportation. APERC's research focuses on energy saving potential in urban transportation in developing APEC economies. His talk focused in particular on the potential of better urban planning to achieve long-term improvements in urban transportation energy efficiency.

It is widely recognized that growing wealth and urban populations in developing economies will lead to growing demand for urban transport energy. However, the planning of infrastructure and housing to meet the growth in urban population strongly influences the patterns of urban transport energy use. In mature cities, urban transportation energy use per person varies widely from city to city, with the more dense 'compact' cities having far lower transport energy use than low-density 'sprawling' cities. Because of their rapid growth, many developing economy cities are now at an important crossroads, where they can choose to grow in a compact, energy-efficient manner, or in a sprawling oil-dependent manner. APERC's research indicates that the expected savings in urban transport energy use from better urban

planning ranges from 30 to 50% by 2050.

Mr. Kobayashi's message made clear that the time for action is now, since once the developing economy cities mature, the patterns of urban transport and transport energy use become very difficult to change. Every city that grows without better urban design is a lost opportunity for energy savings.

APERC Research Contributes to APEC's Decision on a Revised Energy Intensity Improvement Goal

The APEC Leaders have agreed to "aspire to reduce APEC's aggregate energy intensity by 45 percent by 2035". This goal is one of the steps to promote 'green growth' contained in the Honolulu Declaration of the APEC Economic Leaders dated 13 November 2011. Leaders participating in the Honolulu meeting included the Prime Ministers or Presidents of most APEC economies. Energy intensity is defined as energy demand per unit of GDP.

The goal revises upward the previous APEC-wide goal of at least 25 per cent improvement by 2030 (with 2005 as the base year) adopted by the leaders at their 2007 meeting in Sydney. The revision process was initiated after APERC's 2009 APEC Energy Demand and Supply Outlook 4th Edition found that the earlier goal was likely to be far surpassed under business-as-usual. In their June 2010 Fukui Declaration, the APEC Energy Ministers called upon the APEC Energy Working Group (EWG) to assess the potential for reducing the target beyond the goal already agreed, with assistance from APERC. APERC subsequently provided research support to the EWG, which recommended the revised goal.

More information on IEEJ can be found by clicking below

IEEJ Calendar of Events

Energy Indicators of Japan

IEEJ Homepage Top

Back numbers of the IEEJ Japan Energy Brief