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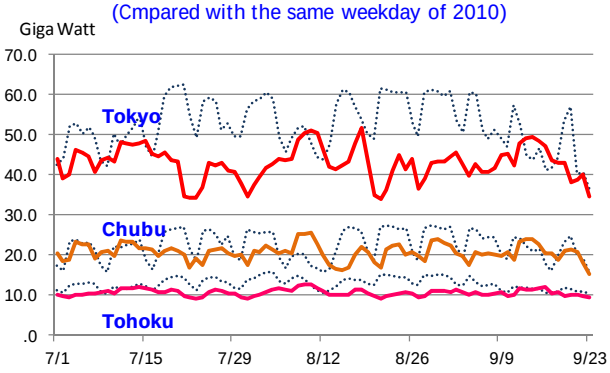
Japan rode over summer with nationwide power saving

In eastern Japan, Order on Electricity Use Restrictions was enforced from July 1 to cope with the loss of power sources caused by the March earthquake and tsunami. The Order was lifted on September 9th, on schedule in the service areas of Tohoku Electric, and almost two weeks earlier than the scheduled date of September 22 in the service areas of Tokyo Electric. The government had set out an electricity saving target of 15% for this summer in eastern Japan, mandated compliance by large power users, and requested that small and medium size customers work hard to achieve the target. In addition to the conservation efforts by consumers, helped by temperatures lower than an average year, peak electricity demand was lower than last year by 16.5% (10.1 MW) for Tokyo Electric and by 19.8% (3.1 MW) for Tohoku Electric. As a result, the summer peak demand season ended without any planned outages envisaged under the electricity restriction order.

Table-1 2011 Peak Electricity Demand
(Cmpared with the same weekday of 2010)



However, the power supply balance of this summer was not maintained eventless. The No. 1 reactor (1.175 GW) at the Oh-i Nuclear Power Plant of Kansai Electric and the No. 1 unit (1.1 GW) at the Misumi Coal-thermal Plant of Chugoku Electric encountered mechanical troubles in July and were shut down. Several old thermal plants and other facilities that had been brought online to compensate for the loss of power supply also encountered troubles and were shut down. In addition, a total of 24 hydro power plants of Tohoku Electric were damaged (total capacity approx. 1.0 GW) by the intense rainfall which struck the Tohoku Region in late August, and were withdrawn from the supply line. At Tohoku Electric, in addition to the nuclear and thermal power plants on the Pacific coast damaged by the March tsunami, there was a series of problems with other thermal and hydro power plants. However, thanks to

relief supplies from Tokyo and Hokkaido Electrics and to the reduced demand through the saving effort, the company managed to make it through the peak summer period. Meanwhile, by the beginning of September, Tokyo Electric completed installation of all seven generators it urgently ordered, and acquired a total of 1.5 GW of additional supply capacity. Although Tokyo Electric originally anticipated a shortage of generation capacity, it was able to secure a reserve margin roughly exceeding 10%, which enabled relief supplies to Tohoku and Chubu Electrics, both short on supply. However, the prospect of restarting nuclear power plants after periodic inspection is nowhere in sight. Apart from the formal approval by the Governor of Hokkaido in August for commercial operation of the No. 3 Unit (0.91 GW) at the Tomari Nuclear Power Station of Hokkaido Electric, which had been running in operation phase after periodic inspection, no other nuclear plants are likely to restart as yet.

The previous administration of Prime Minister Naoto Kan established a policy of introducing "stress tests" as a means of determining whether nuclear plants can be restarted. The policy assumes a procedure whereby the results of evaluating the plants' margin of resistance to anticipated disasters are verified by the Nuclear and Industrial Safety Agency (NISA) of METI, to be further checked by the Nuclear Safety Commission under direct control of the Cabinet Office to see if the reactor in question could be restarted.

However, at present, the final decision on resumption of a nuclear power station is delegated to the local governments of jurisdiction. Fukui Prefecture, where the majority of nuclear power plants of western Japan are located, requested the national government to provide it with "provisional safety standards" for determining whether currently suspended plants could be restarted, but it reportedly has not received any response that satisfies it. If the current situation continues, only six out of Japan's 54 nuclear power plants will be operating at the end of the year, of which five plants other than Tomari No. 3 will all be stopped before June 2012. Japan somehow made it through the summer peak electricity demand season this year, but now faces the question whether it can ride out the coming winter demand. Fuel procurement costs are expected to increase further beyond the previous estimate by the IEEJ (¥3.5 trillion), and increases in electricity rates are now being mentioned as a realistic possibility.

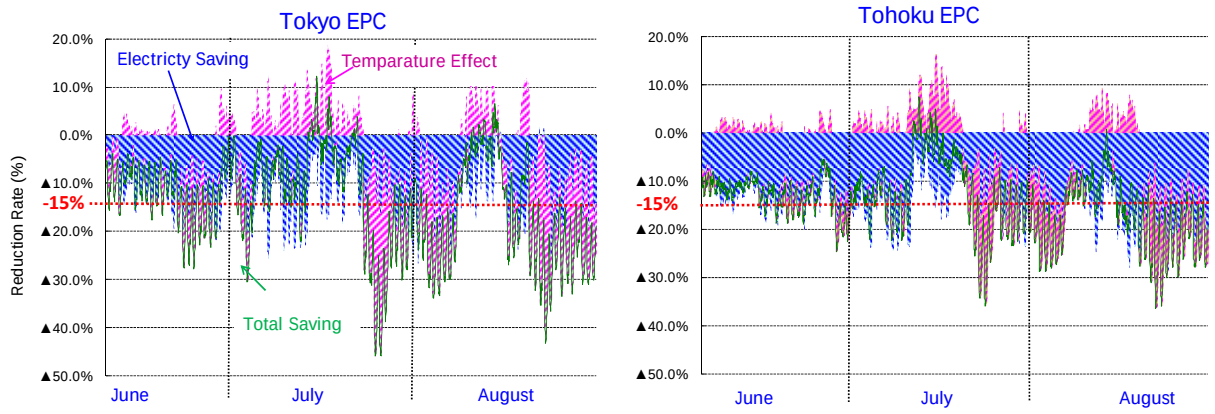
15% reduction from last year in peak electricity demand

Because of abundant rainfall and the lower-than-usual temperatures in the summer of 2011 , it is difficult to determine the effectiveness of efforts by Japanese users to save electricity consumption. Yu Nagatomi (Researcher, EDMC, IEEJ) has estimated the net electricity saving rates based on an analysis which corrects this year's electricity demand in the Tokyo Electric and Tohoku Electric service areas for the differences in temperatures. Based on a regression analysis of the differences in temperature and the differences in electricity demand between last year and this year, the temperature sensitivity of electricity demand during the peak period was estimated to be 1.17% per one degree C for June, 2.50% for July and 2.53% for August in the Tokyo Electric service area. As the temperature in July and August is generally higher than that in June and air-conditioning is widely used, the temperature sensitivity tends to be higher in these months. In the Tohoku Electric service area, which is located north of Tokyo and has intermountain regions with fairly low temperatures, the temperature sensitivity was estimated to be roughly half that in the Tokyo Electric service area, i.e., 0.49% in June, 1.39% in July and 1.27% in August.

The electricity demand net of the temperature effect applying this method is graphed below, which indicates that the initial target is mostly achieved through the efforts of public relations by government agencies and utilities. In the calculation results, the electricity saving rates

during the peak period in the Tokyo Electric service area, after correcting for temperature, were 13.5% in June, 13.9% in July and 14.6% in August. The rates in the Tohoku Electric service area were 14.0% in June, 13.4% in July and 17.6% in August. The government's electricity use restrictions were put into effect on July 1, and the electricity saving rates increased in and after July due to private companies proactively taking measures such as rotational plant operation. In addition, the electricity saving rate is even higher in the Tohoku Electric service area due to measures such as extended holidays, primarily in the "Obon" Buddhist festival season in August.

Table 2 Net Electricity Saving after Deducting Temparature Effect



However, it is evident that electricity saving slackens on days when there is a significant rise in temperature, despite the electricity saving measures in effect. There is also a tendency for the electricity saving rate to slacken when temperatures rise on a holiday. Compared with the trend on weekdays, when electricity savings at offices and factories are generally rigorous, it is difficult to achieve the same degree of rigor at home. It is presumed that many companies will continue the electricity saving measures they implemented this summer, but the degree to which society will accept measures such as shifting work hours and holidays, which were implemented as a means to avoid an emergency, remains to be seen. On the other hand, electricity demand in July was minus 10.5% for Tohoku Electric and minus 10.0% for Tokyo Electric year-on-year, showing that there was a significant curtailing effect on peak electricity demand. If the 15% reduction in peak electricity demand continues to next year and beyond, the capacity ratio will improve and there will be a significant rationalization of the power supply structure in Japan.

The generating cost of nuclear power plants is ¥7-12/kWh

The costs of nuclear generation are being widely debated in the wake of the recent nuclear accident. In the estimates released in 2004, the Electricity Industry Committee of the Advisory Committee for Natural Resources and Energy calculated the cost of nuclear generation to be ¥5.3/kWh, which was considered comparable to the cost of coal-fired thermal generation at ¥5.7/kWh and that of LNG-fired thermal at ¥6.2/kWh. Also, the IEA estimation of power generating cost by source for Japan (the 2010 version) was roughly on a par with the above estimates. Assuming the discount rate for capital costs to be between 5% and 10%, costs of nuclear power generation are estimated between 5.0 to 7.5 U.S. cents/kWh, whereas natural gas-fired generating will cost 9.5 to 10.5 U.S. cents/kWh. Against the foregoing findings, at a meeting of the Japan Atomic Energy Commission (JAEC) in September 2010, Professor Kenichi Oshima of Ritsumeikan University sparked a debate by announcing that he had conducted an

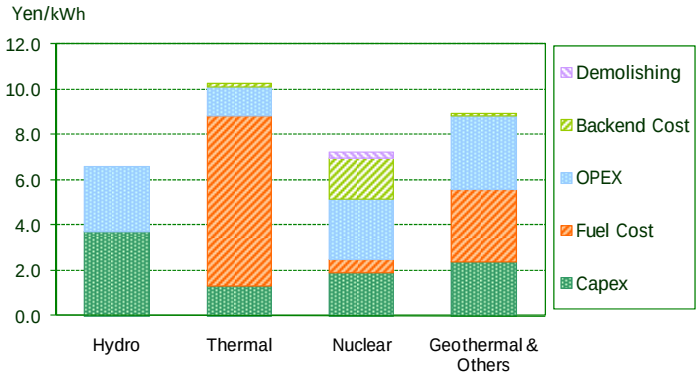
analysis based on annual securities reports of power companies, and estimated that if the costs of pumped hydro generation needed to maintain the high operation factor of nuclear power plants is included, nuclear generating costs in the past (1970-2007) were ¥12.2/kWh, far higher than the thermal generating costs of ¥9.90 for the same period.

Prompted by this situation, Mr. Yuji Matsuo (Senior Researcher, EDMC, IEEJ) and Mr. Keigo Akimoto (System Research Group Leader, Research Institute of Innovative Technology for the Earth (RITE)), reported on nuclear generating costs at a meeting of the JAEC on September 13.

Mr. Matsuo reported that: "Two approaches are widely used to evaluate the cost of power by generation method, i.e. one is an estimate using theoretical models and the other is based on annual securities reports. Although the latter method has certain limitations coming from the methodology itself, it can draw out useful information in comparing the costs of thermal power versus nuclear power based on the historical record." He then presented estimates based on annual securities reports of 12 power companies over the last five years.[1]

According to the analysis, the average generating costs of the 12 companies over five years were estimated to be ¥10.2/kWh for thermal, ¥7.2/kWh for nuclear, and ¥8.9/kWh for geothermal and others (alternative energy), concluding that thermal generation has the highest cost. At ¥7.5/kWh, the fuel portion accounted for 74% of thermal power generation costs, evidently reflecting the impact of high fuel prices in recent years.

Table-3 Generating Costs by Source



The ¥7.2/kWh generating costs for nuclear are comprised of ¥1.9/kWh capital costs, ¥0.6/kWh fuel costs, ¥2.7/kWh operating and administration costs, ¥1.8/kWh backend costs, and ¥0.3/kWh demolishing costs. Fuel costs are extremely low compared to thermal power generation, but the backend costs (costs incurred for transport, storage, reprocessing and disposal of spent fuel) make a substantial cost element. Although the IEA estimates that backend costs are 0.23 U.S. cents/kWh, this may be too low based on the track record in Japan. On the other hand, electric companies may have not fully appropriated those funds in their past annual reports to cover the backend and demolishing costs to be incurred in the future. There may be differences between the costs calculated on annual reports and the actual costs to be incurred.

Compared with the Oshima analysis, the above estimates for thermal generating costs are about the same, but there is a major difference in nuclear generating costs. Since Oshima's estimates include capital costs incurred in the high interest era when nuclear power plants were initially introduced to Japan (1970-1985), there is a considerable deviation from the actual record of capital costs in the last five years. Oshima's estimates have also assigned disproportionately high costs of project development and site acquisition to nuclear power. Therefore, the differences with Oshima's estimation are ¥1.7 for capital costs, ¥1.2 for development, and ¥0.5 for site acquisition, and the cost for pumped hydro also amounts to ¥1.2 to make up a total difference of about ¥5 (¥12.2 vs. ¥7.2)/kWh.

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[1] The Japanese version of the report is available at the IEEJ website (members only). http://eneken.ieej.or.jp/data/4043.pdf

Mr. Matsuo summarized the above analysis by saying, "There are items which are impossible to evaluate accurately now using the data appearing on the past annual reports. For example, once a serious accident occurs beyond a hypothetical level, it may incur significantly higher costs for reinforcing safety measures, compensation for damages, and backend treatment and demolishing. As these costs are yet to be appropriated in reviewing the Fukushima Daiichi accident, their impact should never be ignored. Nevertheless, Oshima's estimation is regarded to be excessive because all of the reported costs for pumped hydro, project development, siting and other like activities are ascribed solely to nuclear power generation. While it is true that nuclear power incurs these costs to a certain extent, we must develop accurate cost assessments allocating these costs among various power sources on a fair and rational basis."

Meanwhile, Mr. Keigo Akimoto of RITE reported that if the plant operation factor for nuclear power plants is assumed to be 60-85% (while the government had aimed to raise it to 90%), generating costs are estimated to be ¥5.1-7.4/kWh, and if power transmission costs are also included, the figures will become ¥8.1-12.5/kWh. He pointed out, "As an inordinate rise in electricity costs hurts international competitiveness of industry and causes flights of Japanese industry to foreign countries, it is important to analyze Japan's energy situation prudently based on accurate cost information."

Previously, costs of nuclear power have been calculated assuming high plant operating factors as the base load power. On the other hand, the government has mandated that nuclear power plants be periodically inspected and serviced every 13 months. Under the current regulation, the theoretical capacity factor excluding test operations can never be higher than 81%. The Fukushima Daiichi accident occurred following the Great East Japan Earthquake, just when a governmental review had begun to ease the existing checkup procedures. The question of what framework to use in calculating the costs of nuclear power generation will likely involve considerable debate, including examination of the role of nuclear power in a balance with other power sources, as well as its costs and regulatory systems. The debate regarding the generating costs of different sources is expected to continue at the Energy and Environment Council.

Renewable Energy Act introduces new system next year

On August 26, the Japanese Diet approved the "Act on Purchase of Renewable Energy Sourced Electricity by Electric Utilities" (the "Act") to take effect from July 1, 2012. The Act obligates Japanese electric utilities to purchase electricity generated from renewable energy sources including solar photovoltaic (PV), wind power, hydro power, geothermal and biomass at fixed Feed-in-Tariff (FIT) prices, which are higher than normal contractual prices, and applicable for a fixed period of 10 years for residential PV power and for 15 to 20 years in the case of commercial photovoltaic power or other renewable energy power generators. The extra costs incurred by electric utilities in the purchase of renewable electricity will be recouped through a surcharge added on top of the normal electricity bill to end users. Concerning the pricing, the existing rates of 42 yen/kWh will be applied for sellers of excess power from residential PV systems only, and 34 yen/kWh for double generation users with a combination of fuel cells and PV. Purchase prices of 15-20 yen/kWh are expected on other types of renewable electricity. The sum of the surcharges will amount to 0.5 yen/kWh on average according to METI.

The type of scheme such as above is considered as one of the most positive measures to accelerate introduction of renewable energy and is already adopted by dozens of countries in the world. Japan introduced a surplus power buyback program on solar energy in 2009 to

successfully reactivate the stagnant domestic solar energy market. The Act substantially expands the scope in terms of energy sources to include all renewables such as wind, hydro, geothermal and biomass, and designates all of generated electricity as purchaseable.

Japan used to lead the world in the development of solar and other renewable energies after the oil crises of 1970s, but it has recently been lagging behind for a number of reasons. The Japanese government is pinning its hopes on the Act to make a comeback on the setbacks.

There are, however, some issues to be resolved if the new scheme is to promote renewable energies in Japan. First of all, reasonable and definitive introduction targets must be established for each of the renewable energy sources as the theoretical basis for purchase prices and other configurations of the scheme. The Japanese government will have to specify the targets along with a timetable for the implementation of the Act by next July when it will take effect.

The prices and other terms and conditions for power purchase agreements will be notified by the Minister of METI on the basis of opinion by the "Procurement Price Calculation Committee" an advisory body to be newly established under the Agency for Natural Resources and Energy, METI, consisting of five members appointed by METI with the approval of the Diet, and it will submit recommendation on the purchase scheme to METI. The scheme it recommends will be the key to the success of the new power purchase program. It must provide incentives to enter the market, but at the same time avoid detrimental effects on electricity prices as well as excessive profits for renewable energy power suppliers. Hitting the right balance on this requirement could be difficult, and a certain amount of trial and error may be required as practiced by leading European countries in a frequent review of their schemes. While the FIT scheme has failed in Spain, Germany is known for an elaborate pricing structure and other conditions indicating difficulties in designing appropriate schemes.

There is another hitch as well. Although the program obligates electric utilities to accept renewable energy power generation systems to be connected to the grid, they are exempted from such obligations when "it is deemed to impede undisturbed supply of electricity." In fact, renewable energy power generation capacities in Hokkaido and Tohoku areas, where large potentials on wind and other resources exist, have already hit the ceiling that regional electric utilities have set for undisturbed supply of electricity, rendering the Act ineffective to accelerate introduction of renewable energies. Consensus building through open discussions is required on the definition of "difficulties" that will have significant impacts on newly emerging businesses. In addition, a variety of undertaking is required to relax the receiving limits including structural reform of the electric industry, upgrading of grid infrastructure, and development of devices and systems that can transform intermittent power into a stable source of electricity supply. The Act allows a reduced rate of surcharge for electric-furnace steel producers and other heavy industrial users of electricity, while many have voiced their concerns over the fairness of the program. Careful design is required in this regard as well. It must take into account costs as well as quality of products and services to be provided by renewable energy power generation. There is surely much to be done in the ten months before the enforcement of the Act.

Green power certification on steady increase

The Green Energy Certification Center (GECC), an affiliated organization of IEEJ, serves as the official body for certification of green power generation and heat use as assessed by an independent committee formed with third party experts. Green power and green heat certificates represent added environmental values accounting for the use of environment-friendly renewable energies. Energy users can purchase them to take part indirectly in the promotion of green electricity and green heat. GECC was established in 2008 at the occasion of G8 Toyako Summit, expanding the scope of the former Green Electricity Certification Center, to cover heat in addition to electricity aiming at wider use of green energies.

In fiscal 2010, GECC certified a total of 270 million kWh of green power, recording a historical high. More green electricity facilities were certified in 2010 in comparison with the previous fiscal year, in terms of both capacity and the number of projects; the former was a result of increased photovoltaic and biomass power generation, and the latter owed to subsidies introduced last year by the national and local governments which boosted the number of new installations of residential photovoltaic systems. The number of green power certificate issuers rose to 51 organizations in 2010.

Record of Green Electricity Certified

Fiscal Year	Facilities		Amount of Electricity	
	Project	Capacity	Project	Amount
		kW		million kWh
2001	2	15900	3	1158
2002	1	7650	9	29112
2003	2	3295	12	32801
2004	9	28,215	20	39,216
2005	22	53,641	34	50,480
2006	20	22,851	71	114,263
2007	30	94,972	120	87,371
2008	50	*161,633*	205	238,113
2009	264	50,698	343	233,396
2010	*498*	103,844	*473*	*270,545*

Note: The largest capacity increase was recorded in 2008 as a big biomass electricity generation project was registered, while PV has increased significantly in 2010 reflecting the enhanced incentives.

Source: IEEJ

The green thermal energy certification previously addressed only solar thermal use by way of solar hot water supply systems with circulation control and solar central heating cum hot water systems. In 2010, its scope was expanded to include snow and ice energy and woody biomass thermal energy, resulting in an increased level of the society's interest in green certificates. While only three solar thermal projects were granted green certificates in 2009 covering a total heat collection area of 163m2, seven projects obtained certificates in 2010 for a heat collection area of 1,819m2. In addition, four biomass projects received certificates amounting to a total boiler capacity of 82,734kW.

IEEJ has worked to set out application procedures and certification rules for green energies with a perspective that it is essential to support promotion of renewables in the long run, although the program is yet to make financial contributions to IEEJ's books. In Japan, the accident at the Fukushima nuclear power plant seems to have triggered an increased momentum among private firms and individual consumers toward introducing renewable energies. The number of application for green certificates is increasing much more rapidly this year. Longstanding efforts by IEEJ to lay down the groundwork now appear to flourish into a system supporting public actions.

Phil Owen says a lot of work should be done toward COP-17

At the IEEJ Energy Seminar held on September 16 in Tokyo, Mr. Phil Wynn Owen, Director General, International Climate Change & Energy Efficiency, Department of Energy & Climate Change, UK, explained the UK strategy for climate change and energy. Before his presentation, the British Ambassador to Japan H.E. Mr. David Warren introduced Mr. Owen to the audience and stated that there were plenty of possibilities Japan and Britain could jointly develop in technologies and businesses toward realization of a low carbon world. He hoped that Japan

would recover from the recent tragedy soon and combat the climate change hand in hand with the UK.

Mr. Owen presented the energy outlook of the UK up to 2050, with strong initiatives to target reducing the GHG emissions by 80% from the 1990 level. The electricity sector will play a central role in reducing emissions; the core policies for the power sector comprise promotion of renewable energies, support of CCS and construction of nuclear power stations on the supply side and improved energy efficiencies and demand management through smart meters on the demand side. He said that, as 25% of the generating capacity will become obsolete and close in the next decade while investment cycles on energy equipment are long, a decision made now is critically important for the global temperature of 2050. We need to make a massive effort on all fronts if we are to achieve the twin goals of decarbonisation and energy security. The UK government is additionally providing tailored support programs through various measures such as Renewable Obligations, Green Investment Bank, Green Deal for funding, etc.

He emphasized that, to combat the climate change, it is critical that the international community agree on the Kyoto Protocol 2 at the COP-17 to be held on November 28 through December 9 in Durban, South Africa. A single global rule should be pursued, on the condition that large emitters such as China and the US should join. A lot of work needs to be done within the few months left to make progress for implementation of the agreements previously made at Cancun.

Energy Committee Highlights

Government approves interim report for energy strategy

The second meeting of the Energy-Environment Council, chaired by Koichiro Gemba, then State Minister for National Policy, was held on July 29. The meeting discussed and adopted "Immediate Energy Supply-Demand Stabilization Measures", as well as an interim compilation of discussion points for the formulation of "Innovative Strategy for Energy and the Environment", both of which were subsequently approved by the Cabinet on August 15.[2] The paper for immediate measures sets out a three year time table for mobilizing almost 50 specific policies to address near-term energy supply issues by employing such measures as enhanced utilization of private power generation plants, promotion of co-generation, review and reform of the present electricity supply systems, etc., along with a list of regulatory and system reforms on energy administration accordingly required. The specific timetable and policy lists are to be fleshed out and finalized within this autumn, which will then be reflected into the FY 2011 third supplementary budget and the FY 2012 budget.

The paper on Immediate Measures warns that, if no nuclear unit is allowed to restart after the respective shutdown for regular inspection, there are risks of a 10% power shortage and a 20% cost increase incurred by additional procurement of fossil fuels in the summer of 2012. To

[2] These papers in English are available at the website of NPU at http://www.npu.go.jp/policy/policy09/pdf/20110908/20110908_en.pdf and http://www.npu.go.jp/policy/policy09/pdf/20110908/20110908_02_en.pdf.

avoid planned power outages and to prevent facile cost pass-along by the power utilities, the government needs to implement various policy measures immediately, beginning from as early as this autumn, to improve the structure and diversify the sources of power supply. To this end, the government intends to prioritize policies; from transforming the demand structure to cut-down the peak electricity requirement, multiplication of power sources by employing every available entity, review of regulations and institutions on the electricity administration system with a view to rationalizing the demand structure and diversifying the electricity supply, and to the implementation of comprehensive measures for nuclear safety. The three year policy timetable includes, for example, relaxation of conditions on back-up power supply contracts for private power plants, rules for power transmission service (wheeling), promotion of co-generation and fuel cell systems, development of regional gas pipeline networks, accelerated introduction of smart meters, preparation for heat transaction systems, and so on.

According to the interim compilation, the basic concept of the Innovative Energy and Environment Strategy needs to be laid out by the end of this year and the strategy itself be established within next year, which comprises the new Basic Energy Plan, the Green Innovation Strategy, and the Energy-environment Industry Strategy. It places the concept of shifting to a distributed energy system as the driver for economic growth by stimulating private investment. Missions and priority issues will be discussed on the six important sectors as reported in the July edition of the Japan Energy Brief. The present Basic Energy Plan needs to be reviewed from scratch to establish a new energy best mix, including formulation of scenarios toward reduced nuclear dependence and thorough examination of past nuclear policies. The Green Innovation Strategy will also be reinforced and advanced.

For examination of electricity supply cost by source, the government will create a sub-committee under the Energy-Environment Council of the National Policy Unit. The sub-committee will study total costs including cost for policies and accident responses. For this purpose, the Nuclear Sub-committee of the Council heard from two experts on September 13 as explained in the preceding article. Based on the study, the Council will comprehensively review possible nuclear policies, and develop scenarios toward lowering the nuclear dependency and pathways for policy implementation, to finalize the plan after nationwide debates. The Council will set up a plan to create a desirable electricity industry system including unbundling of power generation and transmission, and prepare an institution to strictly separate the utility sector (power transmission/distribution and nuclear power) and the competitive business sector (power generation and retail marketing) by around 2020.

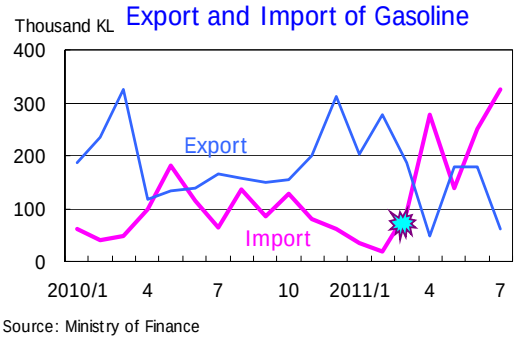
The new Basic Energy Plan will be formulated jointly by the Council and the Advisory Committee for Natural Resources and Energy (ACNRE) under METI. The Green Innovation Plan for research and development of innovative technologies on renewable energies, energy efficiency and conservation, cleaner fossil fuels, electricity supply systems, etc., will be developed under the Council. The nuclear power policy will be developed, based on the strategies set out as above, by the Minister in charge of nuclear power.

Energy News in Japan & Asia

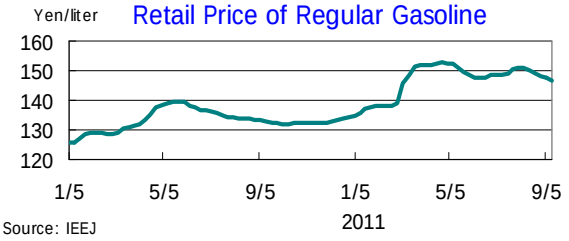
Gasoline Import increases fast since the earthquake

Japan's gasoline import has been increasing markedly since the March earthquake. It was running relatively slowly before the earthquake at about a half of the previous year's pace. It has increased significantly after the earthquake, up to more than double the preceding year for the period of March through April. It has jumped to 325,100 KL or five-fold compared with the previous year in July.

The major cause of the increase is the earthquake and tsunami, which disabled several refineries in the eastern Japan. In particular, the Sendai Refinery of JX Energy was seriously damaged. Since it is the only refinery located in the Tohoku region, other oil companies also relied on it to supply gasoline for the quake-hit region. Although the refinery restarted product shipping in May, it is expected to resume refining operations only in the next year; currently it is operating just as a large oil depot. Other oil companies have reopend their oil depots in the region one after another, but have to obtain gasoline supplies from sources elsewhere.



Source: Ministry of Finance



Source: IEEJ

Furthermore, the extraordnary appreciation of the Yen of late has helped the trend. Compared with the price for imported gasoline, the domestic spot market prices were running high by about five Yen per liter. The gap has since widened to ten Yen per liter in August, encouraging traders to sharply increase gasoline imports. The above circumstance is having a strong impact on the market, and the retail gasoline price has recorded five consecutive weeks of decline by the middle of September, according to IEEJ's market survey unit.

IHI and K-Line announce LNG driven freighter ships

Kawasaki Kisen Kaisha, Ltd. (K-Line) on July 25 announced that the company was in the process of developing vehicle carriers using LNG as its fuel jointly with Kawasaki Heavy Industries, Ltd (KHI) and Det Norske Veritas AS (DNV), the leading ship classification society based in Norway. Compared with conventional heavy-fuel driven ships, the new ship can reduce emissions of CO_2 by 40%, NOx by 90% and SOx by 100%. K-Line plans to put the ship into operation in 2016 in the European waters such as the North Sea and Baltic Sea.

The ship is designed to carry 2,000 vehicles, with two 5,000kW engines modified from the KHI's own gas engine series and two 300m^3 LNG tanks. The introduction of LNG driven ships is urged by stricter regulations being introduced on marine fuel quality to reduce air pollution. The sulfur content of the maritime fuel is to be restricted to below 0.1% from 2012 on the US coasts and from 2015 in Europe. The NOx emission limit is also being reduced by 80% from the present level, enforceable from 2016 in the same waters. To accommodate these regulations, various measures have been developed in Europe, in particular in Scandinavian countries. In Norway, about 30 small LNG supply bases were developed and began fuel supply for ferryboats since 2008. In Sweden, an LNG supply facility is under construction for operation within this year, and six domestic freighters are being modified to use this new fuel.

In the meantime, IHI Marine United, the shipbuilding arm of the IHI Corporation, also announced on August 31 that the company had completed a basic design of an ocean going container carrier equipped with dual fuel engines to use LNG and heavy fuel oil. As the regulated areas on SOx emission is going to be expanded in the coastal waters from 2016, the ship is designed to use LNG when sailing in such waters. The ship will be equipped with a

pair of the proprietary, slosh-free IHI-SPB type LNG tanks. The tank size will be limited to less than 2,000m3 to minimize the reduction of the container carrying capacity, while allowing the voyage on LNG for as far as 2,000 nautical miles.

Tokyo Met-gov't to build one giga-Watt gas-fired power plant

On August 2, the Tokyo Metropolitan Government held its first meeting of the Conference on "Tokyo Natural Gas-Fired Thermal Plant Project" after an announcement of its plan to construct a one giga-Watt gas-fired power plant in the Tokyo Bay area. The project team will make proposals to the national government, at the same time, with regard to regulations on, and reform of, the power industry based on their study on the project formation and site selection for the project.

After the meeting, Vice Governor Naoki Inose commented, "Our aim is to construct the power plant in world record time," and explained the scheme as follows:

The accident at the Fukushima Daiichi Nuclear Power Plant led to a major power loss, which revealed absence of a firm government policy for stable energy supply, arousing concerns over the flight of domestic enterprises to overseas. It is important that the Tokyo Metropolitan Government extends a strong message towards industry to assure electricity supply by proactively pushing ahead its power plant construction plan.

To this end, it is necessary to establish a power supply system based on the local production for local consumption principle. While constructing the one giga-Watt class power plant, Tokyo will also enhance distributed energy systems at large hospitals and public facilities by way of district combined heat (hot/cool) and power (CHP), which are similar to the system adopted at the Roppongi Hills office/hotel complex.

Thanks to the shale gas revolution, global natural gas supply is on a remarkable increasing trend. A natural gas-fired plant emits significantly less amount of carbon dioxide (CO_2), sulfur oxide (SO_X) and nitrogen oxide (NO_X), and can be sited on a relatively limited space. Therefore, a combined cycle gas turbine (CCGT) power system is the most advantageous immediate option. The energy shift to natural energy sources such as solar and wind power is desirable but can not happen overnight, while incurring the problem of unstable supply which is not easy to resolve.

At the second meeting of the project team held on September 14, five candidate sites along the Tokyo Bay were proposed, having taken into account the power grid connection, fuel procurement and surrounding environment. Vice Governor Inose insisted on three objectives of the project, which are; 1) establishing an energy supply system based on the principle of local production for local consumption; 2) replacing aged thermal plants that impose a high environmental burden; and 3) deregulating new entries to the electricity market and establishing a model electricity market with increased elasticity. The Tokyo Metropolitan Government will provide the land for the power plant but will not allocate any public funds for construction. Instead, it plans to finance the project through investment funds from and to consign operations to the private sector. The generated electricity will be used to power subway trains and public facilities owned by the Municipal Government (consuming approximately 800,000 kW), as well as sold in the market. Due to the limited availability of land, fuel gas will be supplied via pipelines owned by Tokyo Gas. Meanwhile, preliminary studies have been launched to survey the world LNG market and other aspects of fuel procurement. Details of the fuel procurement scheme are yet to be formulated.

37th EGNRET Meeting held in Chinese Taipei

The 37th EGNRET (Expert Group on New and Renewable Energy Technology) meeting was held for August 22~23, 2011 in Taipei. Mr. Jin-Sheng Su, Director, Energy Technology Division, Bureau of Energy, Ministry of Economic Affairs (MOEA), Chinese Taipei, mentioned in his opening address that the Japanese Tohoku earthquake and tsunami had caused serious nuclear accidents, having significant impacts on the energy policy/strategy throughout the world. He mentioned that developing new and renewable energy technologies is likely to be one of the best solutions to overcome the energy shortage, as expansion of nuclear power may slowdown worldwide. Dr. Hom-Ti Lee, the chair, also emphasized the mission of the EGNRET to facilitate increased use of new and renewable energy technologies in the APEC region.

Mr. Kenji Kobayashi, President of APERC, explained progress in APEC economies of the Peer Review on Energy Efficiency (PREE) and the Peer Review on Low Carbon Energy Supply (PRLCE). He invited remaining economies to positively participate in the projects for sharing experiences and knowledge and learning "high-performance" strategies from their peer reviews, which illustrate the method of setting goals, formulating action plans, and improving effectiveness of existing policies for promotion of energy efficiencies and development of low carbon energy supply.

Professor S.Y. Wu from Feng Chia University, Chinese Taipei, made a presentation on "APEC Research Network for Advanced Bio-hydrogen Technology": the project is supported by APEC and funded by Chinese Taipei. It aims to develop advanced technologies for bio-hydrogen production, also providing an exchange platform for APEC experts. The program includes (1) setting up a website (http://www.apec-bioH2.org), (2) organizing a symposium (11th International Conference on Clean Energy, http://www.icce2011.org.tw), and (3) setting up a non-food feedstock bio-hydrogen pilot plant for research and training courses at Feng Chia University.

Seven economies reported on their new and renewable energies activities, including Canada, Japan, Korea, Singapore, Thailand, the USA, and Chinese Taipei. On the two EGNRET projects, the USA reported on "Using Smart Grids to Enhance Use of Energy Efficiency and Renewable Energy Technologies" and Chinese Taipei on "Addressing Challenges of Advanced Metering Infrastructure (AMI) Deployment in APEC".

The USA project pointed out, having surveyed 16 member economies, importance of identifying benefits of smart grids, which also found challenges broadly in technological, societal, business and financial aspects. It proposes five areas of potential activities for priority consideration, which are policy goals, education, interoperability, methods and workshops, and roadmaps. It concludes that, incorporating the observed best practices of smart grid in the electricity supply/demand infrastructure, individual APEC economies as well as the APEC whole region will be able to enjoy economic and environmental benefits in the long run.

The Chinese Taipei project aims to; (1) investigate and confer the development strategies and current status of AMI in APEC economies, (2) indentify effective AMI polices and best practices,

(3) offer guidelines to economies and industry for AMI deployment, (4) provide recommendations for power network upgrading and smart grid integration, and (5) increase awareness and effectiveness of AMI. A workshop on the project was held subsequently on August 24~25.

Reviewing the general progress of ongoing projects and their sub-effects, it is recognized that provision of more detailed information is desired to promote further cooperation either for developing projects or upgrading activities.

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