 

# IEEJ e-NEWSLETTER

*No. 1*

(Based on Japanese ver. No. 103)

**Published: April 13, 2012**

**The Institute of Energy Economics, Japan**

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## 1. Discussions at the Fundamental Issues Subcommittee of the Advisory Committee for Natural Resources and Energy

Different energy mix options were discussed. In consideration of the 3E policy and feasibility, IEEJ Chairman & CEO Masakazu Toyoda suggested that the desirable mix of power sources for 2030 should be 25% nuclear power, 25% renewable energy, 35% thermal power, and 15% energy conservation and cogeneration.

## 2. Reform of the Electric Power System

Since presentations by the electric power companies took longer than planned, the Second Expert Committee on Electric Power System Reforms had little time to discuss demand-side measures. Attention should be paid to the possibility of new entries to the power generation market regarding LNG procurement, the merits and demerits of complete deregulation, and whether consumers have freedom of choice of power sources.

## 3. Nuclear Security Summit

The second Nuclear Security Summit was held in Seoul, South Korea. It is important for Asia to strengthen safety measures for nuclear power including nuclear security, since the number of nuclear power stations is expected to increase significantly. Japan must cooperate and make full use of the lessons learned from the Fukushima Daiichi accident.

## 4. Japanese Renewable Energy Industry Exploring New Frontiers

Full-scale experimental research on floating wind turbines is due to start this year. Japan, which lags behind other countries in land-based wind power, will explore this new frontier. Japan also intends to catch up in the area of solar panels, which is currently dominated by China, with the next-generation technology.

## 5. ME Watching: Behind-the-Scenes Maneuvers in MENA

The situation in the MENA countries remains uncertain. Concerns include the split of rebel forces in Syria, the relations between Syria and Iraq, anti-government movements in Bahrain and Saudi Arabia, the domestic situation under the new Yemeni government, and the presidential election in Egypt.

## 6. Russia Watching: How to Align with Russia's Asia-Pacific Strategy

The new Putin administration which will start in May this year aims to strengthen its presence in the Asia-Pacific region, taking advantage of the APEC meeting in Vladivostok in September. Its most powerful driving force is its energy industry. Japan needs to align and integrate its energy strategy with its diplomatic strategy toward Russia, considering the whole of Asia.

## 7. China Watching: 12$^{th}$ Five-Year Plan for the Photovoltaic Power Facility Industry

The Ministry of Industry and Information Technology of China announced the 12$^{th}$ Five-Year Plan for the Photovoltaic Power Facility Industry on February 24. The Plan sets targets and policies for technological development and cost reduction, and will encourage the domestic generation of photovoltaic power and turn it into a new strategic industry capable of competing on the international market.

# 1. Discussions at the Fundamental Issues Subcommittee of the Advisory Committee for Natural Resources and Energy

**Shigeru Suehiro**, Manager, Senior Economist
Energy Demand Supply and Forecast Analysis Group
Energy Data and Modelling Center

The Fundamental Issues Subcommittee held its 14th to 17th meetings between March 7 and 27, and continued to discuss revisions to the Basic Energy Plan. At the 14th meeting, the progress of deliberations at the New Framework for Nuclear Energy Policy meeting of the Atomic Energy Commission was reported. From the 15th meeting, various power source mixes were discussed. The options will be quantitatively analyzed using economic models, and submitted in draft form to the Energy and Environment Council after the Golden Week holidays.

At the 14th meeting, AEC Chairman Shunsuke Kondo gave a presentation and was asked many questions regarding responsibility, safety, waste disposal and recycling. He pointed out that despite differences in opinion concerning nuclear policy, we unanimously agree that utmost effort is needed to: (1) strongly support the residents affected by the disaster by providing quick, thorough health control and decontamination, (2) decommission the reactors that caused the accident and provide compensation for damages, and (3) identify the causes of the accident and improve the safety mechanisms.

At the 15th meeting, each Subcommittee member proposed a draft energy mix as inputs to the final energy mix options, and the members agreed that both quantitative and qualitative aspects should be discussed. At the start of the meeting, several members opposed the inclusion of quantitative options, stating that the policy review should set qualitative guidelines for the options and directions of the policy. In response, many argued that a quantitative analysis is essential for meaningful discussions, and that it is not possible to establish a policy based only on qualitative options. Consequently, the members agreed that "the limitations of models must be taken into account when conducting quantitative analyses."

Masakazu Toyoda, Chairman & CEO of the IEEJ, suggested a power source mix with 25% nuclear energy, 25% renewable energies, 35% thermal power (with accelerated shift to LNG) and 15% energy conservation and cogeneration for 2030 as a desirable scenario in view of the 3E policy and feasibility.

In the 16th meeting, the energy mix proposals from the members were consolidated based on similarity to reduce the number of options. One member pointed out that "most proposals are very similar regarding the handling of energy conservation and cogeneration, despite significant differences of opinion concerning nuclear power and renewable energies".

In the 17th meeting, the final energy mix option was presented by the organizer in draft form. Several members opposed quantitative discussions, and so the meeting agreed to discuss both quantitative and qualitative aspects and incorporate their results into the energy mix option. The participants agreed to prepare three options, each with a different percentage of nuclear power of 0%, 20-25% and 35%, but all with the same ratio of energy conservation of 10% and in-house power generation and cogeneration of 15%. The Subcommittee plans to submit these energy mix options to the Energy and Environment Council after the Golden Week holidays after analyzing qualitative scenarios and economic models.

## 2. Reform of the Electric Power System

**Junichi Ogasawara**, Senior Economist, Manager
Electric Power Group, Electric Power & Coal Unit

On March 6, the Expert Committee on Electric Power System Reforms held its second meeting to discuss the utilization of demand-side measures. The agenda, which consisted of (1) new measures to reduce demand (flexible tariff system), (2) measures to facilitate consumers' choice, and (3) universal services, was hardly discussed due to lack of time, since the presentations by the Tokyo Municipal Government and the representatives of suppliers and consumers and questions to the electricity companies took longer than planned. As a member of this Expert Committee, I summarize the opinions expressed at the meeting below.

Firstly, regarding consumers' choice, it is necessary to check the conditions for entering the Japanese electric power market. When deregulating the electricity industry, it is important to create a solid foundation for competition, as happened in the UK where opening of the electric power market encouraged highly cost-competitive gas thermal power companies to enter the power generation sector. However, prospects for new entries in the Japanese power generation sector are limited since Japan imports fossil fuels and so a company must be able to import LNG directly in order to enter the market.

Secondly, cost-benefit analysis shows that market full opening incurs a high cost of migration yet produces only limited results in enhancing competition. However, it is difficult to find objections to market full opening to reverse the government's policy of boosting consumers' choice of energy, as stated in the Energy and Environment Council.

Thirdly, regarding energy conservation by consumers, the results of corporate power-saving measures show major differences in spending by each company on power-saving, and so requiring the same level of power-saving could impose a substantial burden on some companies. Unlike the popular image, there are rules in the current system that make it difficult for wholesale power markets and consumers to trade the electricity that has been saved, and thus efforts should focus on electric power companies providing flexible programs to help companies implement low-cost power-saving measures.

Lastly, while whether or not consumers should have the right to choose a power source is itself a topic for discussion, consumers actually already can choose renewable energies by using Tradable Green Certificates (TGC). I am involved in the authorization process, but TGCs are seldom chosen in practice.

## 3. Nuclear Security Summit

**Tomoko Murakami**, Group Manager
Nuclear Energy Group, Strategic Research Unit

On March 26 and 27, the second Nuclear Security Summit was held in Seoul. At the Summit, the heads of various companies reported on their progress and future plans for enhancing nuclear security, as agreed in the first Summit held in Washington DC in April 2010. Comprehensive means to ensure nuclear safety, including the prevention of radiation terrorism, were also discussed.

South Korea, which hosted the event and is striving to reduce the nuclear threat on the Korean Peninsula, chose to focus the Summit on "reducing the quantity of plutonium and enriched uranium inventory of each country with unspecified control status", thus sending a strong message to North Korea without specifically naming it. South Korea's message was timely since North Korea ranked the lowest among 32 countries in the Nuclear Materials Security Index, which was a survey conducted by an American NGO, the Nuclear Threat Initiative (NTI), prior to the Summit in January 2012. In the survey, 6 of the 10 lowest-ranking countries were in Asia, including, in addition to North Korea which ranked 32nd, Pakistan at 31st, Vietnam at 29th, India at 28th, China at 27th, and Japan at 23rd. Clearly, American and European countries have low opinions of nuclear management systems in Asia.

Japan considered this Summit an occasion to share knowledge and lessons learned from the Fukushima Daiichi nuclear accident with the international community to enhance nuclear security, and to explain measures taken and future initiatives for international cooperation and strengthening ties with other countries. Japan is keen to play a greater role in the nuclear security of Asia, especially as the country responsible for the Fukushima accident that triggered discussions not only on the safety standards of nuclear plants worldwide but also on armed threats including terrorism. Accordingly, Prime Minister Noda's presentation included the establishment of the Integrated Support Center for Nuclear Nonproliferation and Nuclear Security in December 2010 as well as the major achievements of the US-Japan Nuclear Security Work Group, which held three meetings from January 2011.

With more countries, especially emerging nations, expected to introduce nuclear power, there are concerns over the risk of nuclear terrorism by non-government groups. Safety verifications conducted in major countries after Fukushima and comparison between those countries revealed much greater differences in awareness and attitude toward antiterrorism measures than the safety standards of their nuclear plants. Antiterrorism is an issue of national security and defense rather than energy, and thus it is harder to build international cooperation among countries on this issue compared with energy. To improve the nuclear security of Japan and other countries in Asia, it is vital to recognize such difficulties and to continue to share information, engage in dialog, and send messages accompanied by action.

## 4. Japanese Renewable Energy Industry Exploring New Frontiers

**Hisashi Hoshi**, Board Member, Director
New and Renewable Energy & International Cooperation Unit

Full-scale experimental research on floating wind turbines has started in Japan. In March, a consortium of 10 Japanese companies including Marubeni and the University of Tokyo was awarded a contract for experimental research by the Ministry of Economy, Trade and Industry. In the first phase of the project which will start this year, a 2 MW floating wind turbine and a floating transformer station will be installed off the coast of Fukushima prefecture. Two 7 MW wind turbines will then be added in the second phase from 2013 to 2015. The research aims to establish a business model for floating offshore wind power generation and to develop it into one of Japan's major export industries.

Offshore wind turbine projects are becoming a centre of focus these days, mainly due to reduced availability of space onshore and technological limit of enlarging turbine sizes for efficiency. Large-scale offshore projects are already ongoing in Europe, particularly in the UK. China also launched a 100 MW wind farm after the Shanghai Expo, and aims to achieve 5 GW by 2015.

It may, however, look quite challenging for Japan, which only has limited experiences of offshore technologies as opposed to international rivals, to attempt to establish floating offshore wind turbine technologies. For one thing it is because Japan must use the floating type to utilize offshore wind resources since the deep seas surrounding Japan limit the installation of bottom-fixed systems. In fact at the test sites 20 to 40 kilometers offshore, the water is as deep as 100 to 150 meters.

Another reason strategically more important is that Japanese turbine makers are far behind major competitors in the land based turbine market. Japanese turbine manufacturers have only a 3% share of the world market and only 20% even in the domestic market. Challenging the virgin frontier will be the only way to allow Japan to start from the same position as rival countries.

It is the case with solar panels as well. Following the Sunshine Plan of the 1970s, Japan was a world leader in the solar panel industry until the early 2000s, but now lags far behind China which was late to enter this business. It looks as far as crystalline silicon based technologies dominate the solar panel market, chances are very slim that Japanese players would overcome the situation. Japan, therefore, must seek opportunities in the field of next generation technologies such as quantum dot and dye-sensitized solar cells. Good news is that the University of Tokyo has recently set new records for conversion efficiency in the areas.

Japan's future in renewable energy industry lies in the new frontiers.

## 5. ME Watching: Behind-the-Scenes Maneuvers in MENA

**Koichiro Tanaka**, Board Member
Director of JIME Center

The Arab Spring of 2011 is now a year old and renewed troubles are emerging in countries such as Iraq, Syria, Egypt, and Yemen.

Iraq, which has been relegated to a corner of the Arab World since the end of the Gulf war, successfully hosted the Arab League Summit in its capital, Baghdad, on March 29. However, the Summit scarcely helped solve Iraq's need to improve relations with Gulf nations including Saudi Arabia and Qatar because of differences in attitude towards the Assad regime of Syria. Iraq remains vulnerable to domestic and external shocks, and the current Syrian crisis could spread and cause difficulties for Lebanon and Turkey as well. While the United Nations' peace plan for a ceasefire is heading towards failure, there are deep rifts among the Syrian opposition parties. The Friends of Syria meeting is unlikely to eliminate concerns over the prevailing situation.

Of the participating countries of the Gulf Cooperation Council, Bahrain and Saudi Arabia are still beset by domestic tension. Bahrain has embraced the first anniversary of the crackdown of protesters by national security forces; although it appeared to have domestic order under control, anti-government protests have surged in recent months, with rising casualties in conflicts between demonstrators and armed security forces. On March 9, a rally attracted tens of thousands of anti-government demonstrators. Clearly, the political and security reforms promised by Bahraini King Hamad are insufficient to stop the unrest. Meanwhile, in Saudi Arabia's Eastern Province Shia Muslim residents of Qatif City started a sporadic series of protests, resulting in clashes with security forces and reports of casualties among the demonstrators.

In Yemen, President Abd Rabu Mansour Hadi took over from Ali Abdullah Saleh in the recent national election, but faces bleak prospects. His new cabinet, which is dominated by officials from the south of the country, is facing boycotts led by supporters of the previous president, as well as other domestic crises: Al-Qaeda in the Arabian Peninsula has been carrying out armed attacks in what used to be South Yemen, and the Houthi group is stoking anti-government activities near the northern border with Saudi Arabia. The future of Yemen is highly uncertain.

On May 23 and 24, Egypt will hold its first-ever presidential election with genuine multiple candidates, marking a step toward reform for the country. Nevertheless, there is a growing wary of the Islamists becoming more influential and increasing their presence following the recent parliamentary election. Elections in Tunisia and Egypt are anticipated to become role models for free and fair elections.

## 6. Russia Watching: How to Align with Russia's Asia-Pacific Strategy

**Shoichi Itoh**, Senior Researcher
International Strategy Analysis Group, Strategy Research Unit

Vladimir Putin, Russia's incumbent prime minister, was re-elected as president in the general election on March 4 as expected, and will be inaugurated in May. According to constitutional amendments introduced at the end of 2008, the presidential term is six years, with a maximum of two consecutive terms, if re-elected. Russia intends to accelerate its advance into Asia Pacific, using the 2012 APEC Russian summit in Vladivostok in September as a stepping stone. Japan must therefore urgently clarify its strategy toward Russia.

About a week before the presidential election, Putin wrote an article entitled "Russia and the Changing World" for a major Russian newspaper in which he failed to mention Japan at all. Putin seeks to elevate Russia's role in the Asia-Pacific region, emphasizing that China's economic expansion is not a threat to Russia, but that Russia needs to strengthen cooperative relations with China to boost economic development in Siberia and the Far Eastern region. However, in the context of current Sino-Russia relations, it would be premature to assume that he places more weight on China than Japan at face value.

Russia knows that increasing exports of petroleum and natural gas are its biggest leverage for reinforcing its presence in the Asia-Pacific region. Russia has no choice but to depend on energy development for economic progress in Siberia and the Far Eastern region which border on China. Since his 2000 presidential inauguration, Putin has consistently warned that leaving these far-flung Russian territories in a backward state would be a great loss of geopolitical advantage that would benefit China with her enormous population.

Russia is keen to strengthen its economic relations as well as diplomatic relations with China, which has become its biggest trade partner. But this link creates an enormous dilemma for Russia in its Asia-Pacific strategy. Stronger economic relations between nations do not necessarily increase diplomatic trust. Moscow is concerned that China is overshadowing Siberia and the Far Eastern region. On the other hand, it should be noted that as Russia increasingly focuses on relations with China, the country must strengthen their ties with China's neighboring countries, including Japan, from a geopolitical standpoint.

Gazprom and the Russian Ministry of Energy are hurriedly revising the Eastern Gas Program, and Russia is urging Japan to invest in the natural gas fields in Sakhalin, the Far Eastern inland region, and eastern Siberia. One of them is Kovykta, the biggest gas field in eastern Siberia, which will be the key to Russia's economic development once the export route from its wells to China has been obtained, while it is reported that Russia is reluctant to let China's CNPC take part in developing the Kovykta gas field.

Russia's diplomatic and energy strategies are two sides of the same coin. Japan must analyze Russia's geopolitical game, and then coordinate its energy strategy and diplomacy toward Russia in view of securing the stability of the entire Northeast Asian region.

## 7. China Watching: 12th Five-Year Plan for the Photovoltaic Power Facility Industry

**Li Zhidong**, Visiting Researcher
Professor at Nagaoka University of Technology

Chinese Premier Wen Jiabao announced in the Report on the Work of the Government 2012 that the country will focus on developing renewable energy and a strong photovoltaic power facility industry. The report was adopted by the National People's Congress which ended on March 14. Prior to the announcement, the 12th Five-Year Plan for the Photovoltaic Power Facility Industry was published by the Ministry of Industry and Information Technology on February 24. The aims of the Plan are to support the installation and expansion of photovoltaic power generation in the country, and to enable it to compete on the international market. The Plan expressly sets targets for technological development and cost reduction, as well as relevant policy measures. In addition, the National Energy Administration, which is responsible for managing domestic energy targets, is considering raising the country's solar energy generation capacity to 50 GW by 2020.

A key index of the technological performance of solar cells is the efficiency of converting solar energy to electricity. The total area conversion efficiency of solar cells (how much energy is captured per unit area of cell surface) manufactured by medium-sized Chinese manufacturers is 17-19% for monocrystalline silicon solar cells, 15-17% for polycrystalline silicon cells, and 6-8% for thin film solar cells. The National Energy Administration and other agencies are promoting distributed photovoltaic generation, termed the "Golden Sun Project". In this project, candidates for financial aid for 2012 include crystalline silicon solar cells with a total area conversion efficiency of 14.5% or more and non-silicon thin film cells with at least 7% efficiency (of which CIGS accounts for 10%). The Plan also proposes raising the conversion efficiency to 21% for monocrystalline silicon cells, to 19% for polycrystalline silicon cells, and to 12% for thin film cells, by 2015.

The biggest challenge for photovoltaic power generation is price competitiveness. In the Golden Sun Project, the Chinese government is granting a subsidy of 7,000 yuan per kW of distributed photovoltaic power generation in 2012, and has set the standard sale price of electricity (equivalent of FIT) of 1 yuan per kWh for the power grids of non-subsidized large-scale photovoltaic power plants. Standard sale prices of electric power generated by other sources are: 0.46 yuan per kWh for coal-fired (which is kept low as a policy price), from 0.57 yuan (Beijing, fueled by pipeline gas) to 0.72 yuan (coastal regions, fueled by LNG) for gas, 0.54 yuan for onshore and 0.62–0.74 for offshore wind power. The Plan also suggests lowering the cost of solar cells to 7,000 yuan per kW in 2015 and 5,000 yuan in 2020, the cost of cell installation to 13,000 yuan in 2015 and 10,000 yuan in 2020, and the cost of power generation to 0.8 yuan per kWh in 2015 and 0.6 yuan in 2020. If achieved, China will be even more cost competitive in both domestic electric power and on the international solar cell market.

As policy measures, the Plan promotes the development of core technology through collaboration between industry and academia, as well as product standardization for solar cell panels and inverters, and grid connection standards. Other aims include participating in establishing international standards, as well as reforming domestic systems for quality authentication and production monitoring. Moreover, the Plan aims to nurture industry-leading manufacturers with an annual capacity of 5 GW, and to help midsize

counterparts with 1 GW capacity to get ahead through tightening acceptance standards for companies and encouraging corporate reorganization such as through mergers and acquisitions. On the demand side, the Plan includes measures to reform the domestic FIT system, while maintaining government financial aid such as the Golden Sun Project and supporting a financial policy for them. Regarding the increasing trade friction with the West, China has identified the causes as the price advantage of its products and the country's high dependency on overseas markets. The Plan argues that the problem should be addressed by increasing domestic demand, strengthening domestic industrial organizations, enhancing independent managerial ability, and readjusting the Chinese export insurance mechanism.

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