IEEJ e-NEWSLETTER

No. 36

(Based on Japanese No. 127)

Published: April 25, 2014

The Institute of Energy Economics, Japan

IEEJ e-Newsletter Editor: Yukari Yamashita, Director

IEEJ Newsletter Editor: Ken Koyama, Managing Director

Inui Bldg. Kachidoki, 13-1 Kachidoki 1-chome, Chuo-ku, Tokyo 104-0054

Tel: +81-3-5547-0211 Fax: +81-3-5547-0223

Contents

Summary

【Energy Market and Policy Trends】

1. Trends in the Global Natural Gas and LNG Markets

There is growing interest in the future LNG pricing system of Asia. The parties concerned are expected to work toward achieving a rational pricing system and improving market liquidity by abolishing the Destination Clause.

2. The Framework beyond 2020 and the Role of Credits

It is not yet clear whether flexibility measures such as credits can be used in the framework beyond 2020. As this will greatly affect the framework, the handling of credits in the upcoming negotiations must be closely monitored.

【Global Watch】

3. China Watching: Strengthened Efforts for the Long-term Framework Negotiations

China is strengthening its efforts for the negotiations for the framework beyond 2020. The key points must be closely monitored: the progress in US-China collaboration for the international negotiations, and domestically, whether or not total volume control will be introduced in the next 5-year plan.

4. US Watching: Debate on the Crude Oil Export and Estimated Cost for Midstream Infrastructure

The discussions on lifting the oil export ban are gathering attention. Building the pipelines and refineries required to distribute the increasing volume of shale oil for consumption within the country will require huge investments, and their development will also affect the discussions on lifting the ban.

5. EU Watching: Power to Gas

Power to Gas, in which hydrogen and natural gas are produced from renewable electricity, could become the dark horse among the different fuels for European next-generation vehicles.

1. Trends in the Global Natural Gas and LNG Markets

Tetsuo Morikawa, Manager
Gas Group,
Coal & Gas Subunit,
Fossil Fuels & Electric Power Industry Unit

On March 18, Professor Jonathan Stern of the Oxford Institute for Energy Studies, a distinguished researcher on the natural gas market, lectured about the natural gas pricing in the Asian market at the IEEJ. This was a timely topic as the Asia Premium of LNG is becoming a serious issue. The lecture presented the following three scenarios for the natural gas (LNG) pricing system in Asia.

First is the Contractual Impasse scenario, in which Asian buyers remain cautious about committing to oil-linked long-term contracts, hampering the launch of new projects and causing Asia's demand for LNG to stagnate. Second is the Smooth Contractual Transition scenario, in which long-term contracts are signed based on a hybrid pricing system, and a hub is formed in Asia by 2020. Third is the Contractual Train Wreck scenario, in which Japanese buyers refuse the oil-linked pricing and bring the case to court, and following a few years of confusion, the pricing system transforms from oil-linked to the hub pricing. Professor Stern views the Smooth Contractual Transition scenario as the most desirable.

While the course of Asia's LNG pricing remains uncertain, these three scenarios provided an interesting stimulus to the discussions among the Asian and global market players, and there was a lively Q&A session at the seminars after the lecture.

To analyze the future of the natural gas (LNG) pricing system of Asia, it is necessary to recognize the following realities: (1) the large number and volume of oil-linked contracts, (2) the inherent flexibility and diversity, though insufficient, of oil-linked pricing, (3) the lack of a domestic wholesale gas price index, (4) the diversity in gas fundamentals, such as supply, demand and price, among the importing countries, (5) the high potential for demand growth in Asia, and (6) the limited number of alternative sources. Considering these factors, it might be reasonable to assume that oil-linked pricing, albeit irrational, will largely remain for the next ten years, while the pricing systems become increasingly diversified. However, if the supply-demand environment changes dramatically and the current pricing fail to adapt, the author expects Asia's pricing to accelerate from the oil-linked to the hub (spot) pricing.

Toward 2020, the Asian LNG market is likely to weaken with vast new capacities in the coming years and uncertainties on the demand side, especially on the slowdown of the Chinese and Indian economies. For Asia to achieve the Smooth Contractual Transition scenario, it is important not only to achieve a rational pricing system but also to improve market liquidity by abolishing the Destination Clause. Market players and policy authorities in Asia must make coordinated efforts.

2. The Framework beyond 2020 and the Role of Credits

Hiroki Kudo, Senior Research Fellow
Global Environment and Sustainable Development Unit

From March 10 to 14, the second session of the "Ad Hoc Working Group on the Durban Platform for Enhanced Action (ADP)" of the UNFCCC was held. The sessions mainly discussed which factors should be included in the agreement on the framework beyond 2020 which is scheduled to be concluded by 2015, and what information the draft voluntarily commitment of each country should contain. There was a sharp difference in views between the developed countries, which argue that the draft commitment should focus only on GHG emissions reduction (easing), and the developing countries which claim that it should also include aid for developing countries, showing once again that the process toward the Paris agreement will not be easy.

It is still not clear which issues the countries will agree to include in the agreement and the draft commitment. But what is clear at this point is that each country will, based on its own situation, determine and declare by 2015 its own contribution (which is expected to include a reduction target) to the "easing". This means that each country must consider how to set and achieve its own GHG emissions reduction target beyond 2020.

Let us now look at the role of emissions reduction credits as a means for each country's target-setting. The Kyoto Protocol included the use of credit systems such as CDM and JI, through which a country can use the reduction made by other countries to meet its own emissions reduction target. Being able to combine its own efforts and the use of credits for meeting the target gave each country flexibility and high cost-efficiency in planning the strategies. For the framework beyond 2020, however, it has not yet been decided whether to allow the use of credits. Whether or not to include the credits in the draft commitment, which must be submitted soon, will be left to each country's discretion. The US is recognizing the use of credits in drafting its target, but the EU has not decided how to handle the credits in the EUETS beyond 2020. Further, it is not clear whether the Joint Credit Mechanism (JCM) which Japan is independently promoting will be validated in the future.

The new framework will also include the targets set by developing countries. Thus, if the emissions credits from a project in a developing country are to be used, it will be necessary to build a separate monitoring system to avoid double counting between the countries. On the other hand, setting a target without using credits could raise a country's emissions reduction costs and discourage the setting of ambitious targets. To determine the possibility for reaching an agreement in 2015, Japan must continue to monitor if and how the countries will use credits in their targets, and how the other countries will react to it, while strengthening ties with the US which is positive about using credits.

3. China Watching: Strengthened Efforts for the Long-term Framework Negotiations

Li Zhidong, Visiting Researcher
Professor at Graduate School, Nagaoka University of Technology

As the negotiations on the global warming prevention framework beyond 2020 intensify in the build-up toward COP21, China is strengthening its efforts for both international negotiations and domestic measures. At the end of January 2010, the Chinese government answered the question on whether China will participate in the Kyoto Protocol by submitting a voluntary action plan to the UN to reduce its per GDP CO2 emissions by 40-45% from 2005 levels by 2020. Further, in 2012, China stated that the negotiations on the framework beyond 2020 should comply with the principles and rules of the Framework Convention, especially those concerning fairness, common but differentiated responsibilities and respective capabilities (CBDR/RC). At the ADP (Ad Hoc Working Group on the Durban Platform for Enhanced Action) held in mid-March this year, lead negotiator Su Wei stated that "the countries other than the developed countries must take various preventive actions", while emphasizing that "China will continue to firmly advocate the CBDR/RC principle". This stance was reconfirmed at a working conference on saving energy, reducing emissions and tackling climate change held on March 21 by Prime Minister Li Keqiang.

The key point of the upcoming negotiations is the collaboration between the US and China. So far, the two countries have taken opposing positions, with the US refusing to participate in the framework without the major carbon-emitter China, and China arguing that the US should join the framework with a high total volume reduction target. However, with the launch of the Xi-Li leadership and the Second Obama Administration, the countries released the US-China Joint Statement on Climate Change in April 2013, recognizing that collaboration between the two countries in the multilateral negotiations on preventing global warming and specific actions could become the key for deepening bilateral relations. Ten months later, in February 2014, the countries released another joint statement, confirming that they will steadily collaborate in five agreed areas: (1) emission reductions from heavy duty and other vehicles, (2) smart grid, (3) carbon capture, utilization and storage (CCUS), (4) collecting and managing greenhouse gas (GHG) emissions data, and (5) energy efficiency in buildings and industry. The countries also decided to enhance the sharing of information regarding their respective post-2020 plans to limit GHG emissions, and reaffirmed their commitment to contribute significantly to the adoption of the long-term framework at COP21 scheduled to be held in Paris in 2015.

Domestically, the low-carbon society experiment launched in 2010 has now been expanded to 42 areas including six provinces, four direct-controlled municipalities and 32 cities. Carbon emissions are set to peak by 2020 in 15 of those areas including Beijing and Shanghai, where PM2.5 pollution is severe, and by 2030 in other areas at the latest. Further, to establish an integrated domestic emissions trading market by around 2020, regional trading experiments have been launched in seven regions. In February, the National Development and Reform Commission issued a notice requiring those entities with GHG emissions of 13,000 tonnes or more (CO2-equivalent) or energy consumption of 5,000 tonnes or more (coal-equivalent) as of 2010 to report their annual GHG emissions. At the same time, a group for guiding the collection of statistics on climate change countermeasures, consisting of 18 government offices, including the National Bureau of Statistics, and three industry organizations, was launched to gather the necessary statistics for the nationwide introduction of total volume control and the emissions trading system. All these measures are targeted for the framework negotiations. The highlight in the near-term is whether the carbon tax (tax rate TBD) included in the Twelfth 5-year Plan will indeed be introduced by 2015, and whether the total volume control of carbon emissions will be included in the next 5-year plan which starts in 2016.

4. US Watching: Debate on the Crude Oil Export and Estimated Cost for Midstream Infrastructure

Ayako Sugino, Senior Researcher
Coal & Gas Subunit
Fossil Fuels & Electric Power Industry Unit

At the start of 2014, the US Congress began discussing the possibility of oil exports in the future. So far, an amendment to the Export Control Act, which bans the export of domestically produced crude oil in principle, has not been proposed, and only a few hearings have been held. In the discussions in general, US oil producers are strongly demanding that the export ban be lifted. In contrast, even within the same oil industry, the refineries which are profiting from the relatively low domestic oil prices are opposing the lifting of the ban; thus, the industry does not have a unanimous opinion.

With the increase in shale oil (tight oil) production following the shale gas boom, US domestic oil production has been increasing since 2010 and the import dependency ratio has dropped from 72.5% in 2006 to 54.3% in 2013. Nevertheless, the US is still a net oil importer, and according to the Energy Information Administration (EIA)'s "Annual Energy Outlook (AEO) 2014", domestic oil production is expected to peak in 2020 and start declining from 2021. As a result, the import dependency ratio is likely to slowly rise again, and so, objectively speaking, energy security is not guaranteed. Nevertheless, there is an economic factor that justifies lifting the ban: the huge costs required to build the transportation and refining infrastructure necessary to distribute shale oil, which is produced in nonconventional regions, throughout the country. Those in the oil industry who oppose the lifting of the ban are of course the pipeline and refinery operators who had the foresight and have already finished investing in the transportation and refinery infrastructure for shale oil.

Regarding the transportation infrastructure investments related to the shale boom, a report on a survey by the Interstate Natural Gas Association of America was released on March 18. The report estimates the plant investment that would be necessary to avoid the risk of a drop in production in the US and Canada caused by a decline in development investment due to the lack of midstream infrastructure (gathering pipelines, oil and gas separators, transportation pipelines, refining and shipping facilities), calculated based on the reserves and the estimated production potential of oil, NGL and natural gas considering the demand and price of oil and gas within the region.

According to the analysis, between 2014 and 2035, the US and Canada will need additional transportation capacity of 42.9 billion cubic feet/day for natural gas pipelines, 10.2 million barrels/day for oil pipelines, and 3.6 million barrels/day for NGL pipelines. The total amount of plant investment needed for these pipelines and midstream facilities is 313.1 billion dollars for natural gas, 56 billion dollars for NGL, and 271.8 billion dollars for crude oil. For reference, 271.8 billion dollars divided by the cumulative oil demand estimate of AEO2014 for 2014-2035 would, by simple calculation, raise the product price by 17.7 dollars/barrel.

The ban is not likely to be lifted soon by legislative action, due partly to the two-year election cycle. However, the longer the discussions continue and the more the midstream investments increase, the more that operators are likely to turn against lifting the ban within the oil industry, resulting in the continuation of the current system which requires huge amounts of plant investment.

5. EU Watching: Power to Gas

Wataru Fujisaki, Senior Researcher
Global Energy Group 1
Strategy Research Unit

Last month, a temporary ban on cars was imposed in Paris and its suburbs to combat air pollution for the first time in 20 years. The concentration of PM10 particles has reportedly reached 147 micrograms, similar to the level in Beijing where air pollution is severe. The next day, March 17, drivers with even number plates were ordered off the roads, and public transport including subways and buses was made free for the public. Diesel vehicles, which are thought to cause the pollution, are popular in France due to low fuel prices and high fuel economy, accounting for 60% of the country's passenger car fleet. To alleviate air pollution, it is necessary to make the vehicles themselves generate less pollution.

Europe is now conducting demonstration experiments with next-generation vehicles, namely electric vehicles (EVs) and fuel cell vehicles (FCVs). As current technology cannot deliver a long enough cruising distance for EVs, their usage may be limited to short-distance trips. Meanwhile, FCVs do meet the current vehicle standards in terms of charging time and cruising distance, but face the hurdle of constructing hydrogen stations. While Toyota and Honda are scheduled to launch their FCVs in 2015, the question remains as to who will build the hydrogen stations before such vehicles are widely introduced. Some expect gasoline hybrids to continue to be the mainstream for some time, and it is still unclear which next-generation vehicle will become dominant.

One notable effort with next-generation vehicles is the e-gas project of Germany's Audi. Also known as “Power to Gas”, the project involves generating hydrogen from excess electricity produced by wind power, which is then mixed with carbon dioxide to produce methane gas. By injecting the methane gas into natural gas transportation pipelines, it is possible to use carbon-free gas anywhere. One great advantage of this solution is that it can be done using existing natural gas transportation pipelines and CNG stations, without having to build new large-scale infrastructure. The hybrid vehicle of natural gas and gasoline that Audi has developed for this project has a total cruising distance of 1300 km (400 km on natural gas and 900 km on gasoline), which is sufficient for practical use. Generating little NOx and no PM when traveling on natural gas, the vehicles can help alleviate air pollution and if manufactured in large volume, could be produced at about the same cost as existing cars.

Power to Gas naturally has its weaknesses. The gas supply is limited as it is generated from excess wind electricity, and some say that the solution could even become unnecessary when enough transmission grids are built to distribute all the wind electricity. The low energy conversion efficiency of electricity to hydrogen is also a challenge. However, the vehicle itself, a hybrid vehicle of natural gas and gasoline, is cheap and could sell well depending on the price of natural gas. Power to Gas could grab the spotlight as the next-generation vehicle before the fuel cell vehicle era arrives.

More information on IEEJ can be found by clicking below.

Past IEEJ Events

Energy Indicators of Japan

IEEJ Homepage Top

Back Numbers of *IEEJ e-Newsletter*