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Geopolitics of Energy and Global Warming in Northeast Asia

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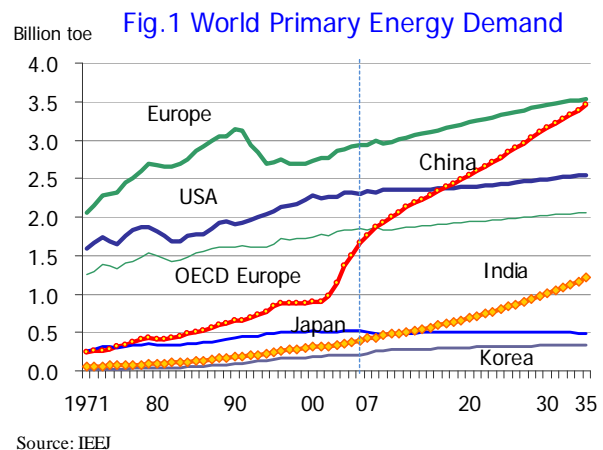
Energy Outlook of Northeast Asia

As highlighted by the visit of the US President Barack Obama to Asian countries last autumn and further demonstrated at the COP-15 conference in December, people central to the discussion on the world economy, energy and environment expect China to be a responsible global player in these three areas. Facing the financial crisis, it has become more apparent that, like the United States in the past, nations that provide a greater market for the world will become global powers. Thus, the burgeoning economies of China and India will surely add substantial pressure on world energy supply and create a substantial burden on world environment. Amid global expectations but with still low per capita income, these developing mega-powers are groping their way toward a right path.

According to the “IEEJ Asia/World Energy Outlook 2009” released by The Institute of Energy Economics, Japan (IEEJ) last October, China’s energy consumption will almost double during the projection period: from 1.77 billion tons of oil equivalent (toe) in 2007 to 3.45 billion toe in 2035. China’s energy consumption will exceed that of OECD Europe before 2010, the US before 2020, and catch up with the entire European continent around 2035.

India’s energy consumption may stay relatively moderate for the time being, though it could see growth similar to or even faster than China over the long run.

China’s great emergence will change the world, in particular the geopolitical balance among the Northeast Asian countries. Though China’s energy consumption had overtaken the sum of Japan and South Korea in the 1970s, China remained an oil and coal supplier to those two

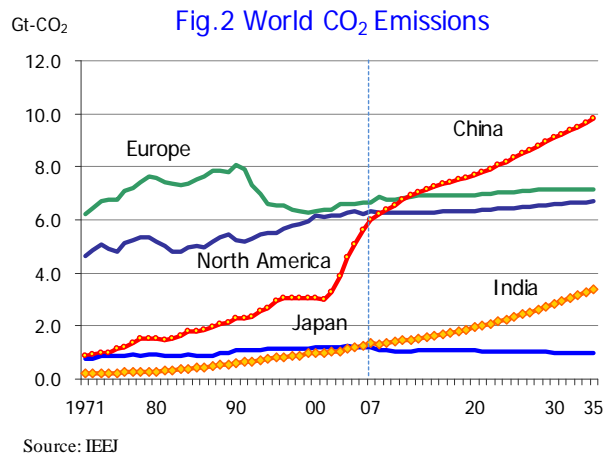


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nations during the 20th century. After the turn of the century, however, China started to aggressively modernize its economy in an energy intensive manner with motorization and electrification. China has become a strong competitor for Japan and Korea in the international oil market and is expected to dominate in the region as an overwhelmingly big consumer.

As far as the security of energy supply is concerned, neighbouring countries like Japan and Korea will be affected by the change of commodity flow, but they will not be fatally damaged. International markets are prepared for procurement of oil, gas and coal, though commodities are vulnerable to price change. These Northeast Asian countries will be able to secure incremental energy supply from the international market. They are financially stout enough to purchase necessary quantities and are well equipped with traditional security measures such as oil stockpiling and emergency response systems.

Another concern of the world is the substantial increase of CO₂ emissions from emerging countries. As China is the world's largest coal producing and consuming country, it is catching up with developed countries much earlier in terms of CO₂ emissions, though its energy consumption is not as high. China's CO₂ emissions have exceeded that of the United States in 2007 and will overtake the entire European continent around 2013.

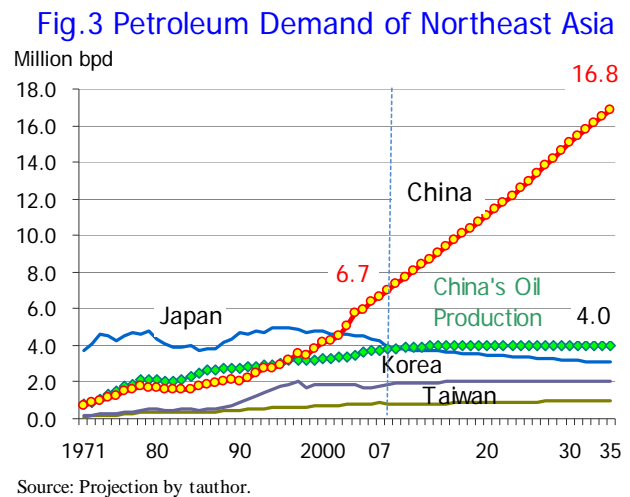


However, as its per capita income and energy consumption is still low, China's energy consumption and CO₂ emissions will continue to increase.

Changing Power Balance of the Oil Industry

On October 26–27, 2009, the Northeast Asia Petroleum Forum 2009 was held in Tokyo. Top executives and experts in the oil and gas industries as well as research institutes from Japan, Korea, and China attended and made presentations and discussions before some 350 participants.

When this forum was first held in Dalian in 2001, the Japanese oil market was the largest among the three countries. China was exporting Daqing crude oil to Japan and Korea though China was already a net oil-importing country. Since then, the structure of the oil market in Northeast Asia has drastically changed. A noteworthy aspect



of this year's forum was a common view that the oil demand outlook would be contrasting in Northeast Asia. This view was shared by all the participants from the three countries. In Japan and Korea, excess refining capacity will increase as the growth in oil demand will be either negative or only marginal. China will become a far bigger consumer and importer of oil and substantial capacity expansion will continue there. The neighbouring countries would by no means be unaffected from the torrent of oil flowing into China.

In recent years, oil industries in both Japan and South Korea are trying to gain a foothold overseas by exporting refined products, as their domestic markets have already matured. Japanese refining capacity is 4,835 thousand barrels per day (bpd) at present, of which one million bpd is said to be in excess. Oil demand will further decline and the excess may grow. As Japanese and Korean refiners desire, such excess capacity may be absorbed by the growing Chinese market, in particular because Japan and South Korea are heavily equipped with sophisticated cracking and desulphurization facilities.

For the time being, their high-grade facilities will be required to supply super low sulphur diesel gas oil for the expanding Chinese market to improve the air quality. However, Korea and Japan are facing fierce competition as China and other Asian countries are expanding refining capacity. Russia is also planning a new refinery on the Pacific coast as its East Siberia to Pacific Oil (ESPO) pipeline will be completed shortly. Then, Japanese and Korean refiners will be put in the position of being swing suppliers. They will be more exposed to rough fluctuations of the supply/demand balance as new facilities in emerging economies will be built stepwise on a huge scale. Without having indigenous oil production, the business of swing oil product exporters will be of high risk and low margin and will eventually bring uncertainties into their domestic markets.

Japanese refineries are relatively small in size compared with those being newly built, and will definitely become inefficient and obsolete as time elapses. As Nippon Oil and Nippon Mining stated in October at the press conference on their merger to create JX Holding Inc., older and smaller refineries are destined to be shut down one by one. Thus, the oil market structure and roles of players in Northeast Asia will certainly change in time. A soft landing of this structural change needs to be carefully considered to assure security and stability of oil supply in each market.

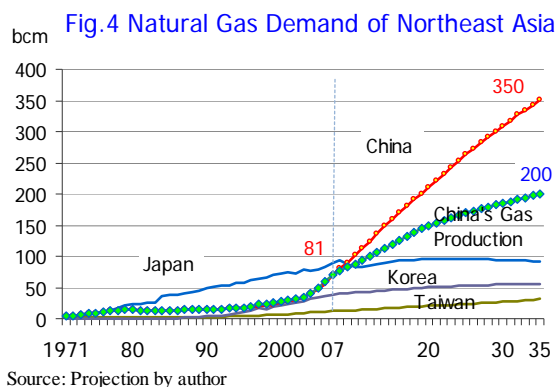
Regional cooperation on the upstream sector was also an agenda at the Forum. As China is aggressively investing abroad utilizing the ample funds generated from their domestic oil production, Japan and Korea are also aiming to raise the ratio of equity oil supply. Several participants suggested upstream cooperation in the adjacent areas such as Russia and Australia, in developing the frontier technologies, etc. However, considering substantial differences in background and capability of upstream industries in these countries, discussions for cooperation may need more fermentation before any specific program comes up.

Geopolitical Aspect of Regional Gas Pipelines

At the Euro-Asia Economic Forum held in Xi'an in November as a bi-annual activity of the Shanghai Cooperation Organization (SCO), plans of international gas pipelines bound to China were the focus at the energy sub-meeting.

In China, natural gas production has been growing rapidly in recent years as trunk lines and delivery networks are being developed nationwide. In addition to the reserves once stranded in the western desert, major discoveries have been made in China recently such as Puguang and Longgang gas fields. Unconventional gases such as CBM will also be developed extensively, according to a CNPC report at the Forum. Natural gas production will continue to grow, while imports are also expected to supply the fast increasing demand. The supply gap to call for natural gas import may amount to 50 - 70 billion cubic meters (bcm) by 2020, pending increasing speed of demand and supply.

On the supply side, several LNG receiving terminals are already in operation or under construction in China with a total capacity amounting to 14 million tonnes per annum (MTPA) of LNG or about 19 bcm per annum of natural gas. In addition, there are many plans for new sites. Among them, construction of LNG receiving terminals up to 25 MTPA or 37 bcm before 2020 seems to be plausible. Then, regarding import of piped



natural gas, PetroChina stated in August that it will increase purchase of natural gas from Turkmenistan from 30 bcm to 40 bcm per annum. Other import plans under study are a 30 bcm of imports from eastern Russia and some 5-10 bcm of imports from Myanmar.

Though natural gas demand is expected to increase fast, it may take a long time to absorb this big quantity. If all of the planned LNG terminals were put in operation, there would be only limited room for piped gas imports before 2020, or vice versa. It was also reported at the above forum that the current natural gas prices in China are on average around \$3.80 per MMBTU, which compares to the international LNG CIF prices dominating in Asia currently above \$8 per MMBTU. This huge gap makes it difficult to push forward natural gas import projects.

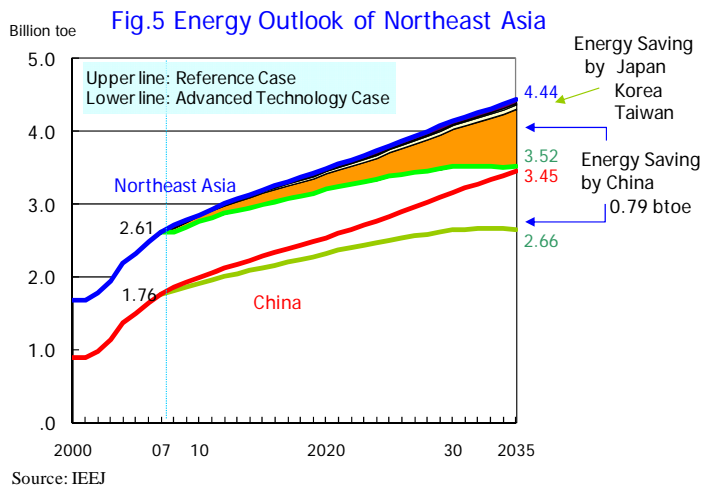
As the Central Asian gas pipeline was completed to Xinjinag in December 2009, the overall gas import pipeline plans may move forward only slowly. It should be noted that they are the driver to promote rural development along the pipeline route. We remember that construction of the West-East Gas pipeline has played a key role in the "Developing the West" campaign in China. The issue of minorities in the western territories being a sensitive political problem, the Chinese government needs a driver for economic development to mitigate the regional tensions. Thus, natural gas pipeline plans will be implemented with various thoughts and motives.

Regional Concern on Global Warming

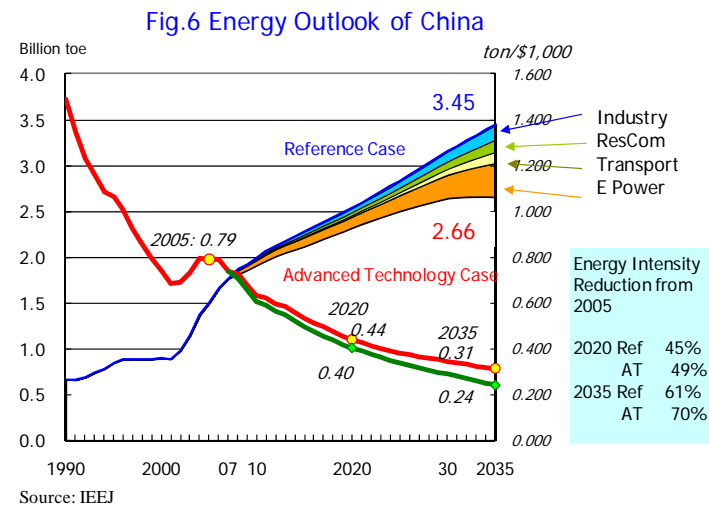
As revealed at the COP-15 conference in December, in the struggle to set out the post-Kyoto Protocol framework, the most serious issue is participation of the major emitting countries such as China and the United States. In considering regional cooperation, we should note that China, already the world largest CO₂ emitter, still has great potential to save energy consumption, while potential is marginal for developed countries such as Japan. According to the IEEJ study, the primary energy consumption of Northeast Asia, including Japan, Korea, China, and Taiwan, is forecast to grow from 2.61 billion toe to 4.44 billion toe between 2007 and 2035, but the latter could be reduced to 3.52 billion toe (21%) in the Advanced Technology Case. Of the total energy saving of 920 million toe, 790 million toe or 86% will occur in China.

China has been pursuing an aggressive energy conservation policy under the 11th Five-year Plan, aiming to reduce the energy intensity per GDP by 20% between 2005 and 2010; the progress by 2008 was 10.1% as reported at the Euro-Asia Economic Forum. In late November, the Chinese government stated that China will aim at 40 - 45percent reduction by 2020. This statement was welcomed by the world as a timely decision to push forward strongly the discussion at the COP-15. India also followed in early December stating they would work towards a 20 - 25 percent reduction of emissions during the same period. As president Obama said, the world needs a clear reduction target to counter global warming.

These ambitious statements are most welcome, yet the new targets remain moderate commitments. In IEEJ's Outlook, China's energy intensity per GDP is forecast to decrease 45% by 2020 in the Reference Case, and 49% in the Advanced Technology Case. In particular, efficiency improvement in the power sector is a pressing issue. Under the present Five-year Plan, China is shutting down small thermal power stations with generating capacity of less than 50 MW, which are the symbol of inefficiency in China. Despite the efforts, more than 40 percent of the existing coal-fired power



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stations are of capacities less than 300 MW. Power stations falling under this category are mostly of technologies adopted during the 1960s, and apparently obsolete and wasteful with energy efficiency of around 30%. (To be fair with China, thermal power stations in India are much smaller and very inefficient.) A thermal station of the latest technology “ultra-super critical” burning coal operates at energy efficiencies higher than 40%. An integrated gas combined cycle (IGCC) plant using coal-gasification technology, currently at the demonstration stage, aims at 50%. Adopting these modern systems, China has great potential to reduce energy intensity. However, it requires time and huge funds to replace existing plants that are operating as the core facilities of the electric power industry.

At the annual Tokyo Forum on the IEA World Energy Outlook held late November, Mr. Nobuo Tanaka, Executive Director of the IEA, was asked if the IEA has dropped the 550 ppm Scenario this year and now considers the 450 ppm Scenario to be practical and realistic. He answered that, thanks to the recent financial crisis and enhanced efforts of major countries, the outcome of the 550 ppm Scenario has become close to that of the Reference Scenario, though this is not shown in the published World Energy Outlook. However, he emphasized that a massive investment is still required to realize the 450 ppm Scenario, and it is by no means an easy scenario to materialize.

Since time and resources are limited, we should consider a regional emissions reduction system to maximize the effect.

Measures to Counter Global Warming

The 15th United Nations Climate Change Conference (COP-15) ended as a grand political show to demonstrate limited ability of the international organization. A unanimous agreement on a thorny accord by 192 members with different background and interest being simply impossible, the compromise agreement at the end was the most that could have been expected. The Climategate scandal may add perplexity to the international talks to follow. Nevertheless, world leaders from major developed and developing countries shared the view that the world should take actions against global warming and stated that they will curb greenhouse gas emissions. Although the reduction levels mentioned were not sufficient to achieve the goal of curbing the global temperature increase to less than 2 degree Celsius, as stated in the Copenhagen Accord, world leaders are now apparently moving toward emissions reduction.

To counter global warming, various measures have been adopted worldwide. They include new and innovative concepts such as emissions trading, CDM (Clean Development Mechanism), and JI (Joint Implementation) mechanisms developed under the Kyoto Protocol framework; international cooperation through bilateral and multilateral initiatives, as mentioned later; traditional methods through government regulations and policies promoting energy efficiency and conservation; and development of non-fossil fuels.

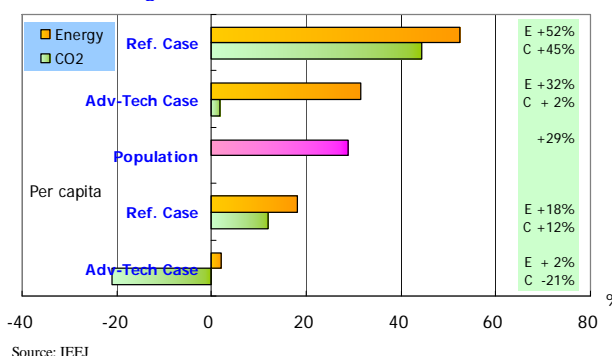
One controversial issue is the effectiveness of emission trading. Financial and trading people are the core proponents of the Cap & Trade system, and they emphasize the efficiency of trading systems to reduce emissions at low cost. Therefore it is necessary to set out a mandatory cap on each CO₂ emitter that is low enough to facilitate the system, but we have yet to find a just and equitable principle for setting a consistent and effective rule for capping. What we have are the political risks of modest restrictions or over-allocation of emission permits as well as the commercial risks of fierce speculation. After extensive efforts of emissions reduction, the economic recession could cause a surplus of emission rights leading to a market crash. Emissions trading is vulnerable to unjust, speculative financial games by non-compliance traders; it is yet to be proved as sustainable. There is also criticism that CDM projects provide a loophole for delayed action in developed countries. However, it is true that the CDM has created a great deal of emissions reduction projects in developing countries; otherwise they would not have materialized so quickly.

In contrast, global warming taxes such as carbon taxes are clearer on their role, the bearer of responsibility, and the extent of the burden. The role of taxes, however, should not be considered excessively as penalties to reduce emission, since the price effect on energy demand is generally small (-10 to -20 percent) and one-time only. Rather, taxes should be deemed as tools to raise the funds necessary for supporting sub-commercial activities such as R&D of fundamental technology and development of social infrastructure. Emissions trading would not necessarily provide incentives enough to promote innovative technologies. In general, explorative R&D of technologies accompanies a substantial risk of failure, and the cost during the experimental stage is beyond the scope of carbon credit, being several times higher than the commercial level. Thus, non-commercial initiatives are definitely necessary. However, the problem is that this kind of direct method tends to be political, arbitrary, and ineffective – not being tested through the market mechanism. It easily falls into a budget capturing game.

After all, there is no single perfect and decisive measure. We need to mobilize every conceivable means as applicable, setting up appropriate rules and regulations, supporting sub-commercial but necessary projects, and creating fair and equitable markets. This may resemble oriental medication; a combination of various medicines will eventually produce slow and steady effects.

In various studies, analysts say that a business-as-usual (BAU) scenario is not sustainable. However, as revealed at the COP-15 conference, an international agreement on a fair and equitable reduction framework seems difficult to achieve immediately. It is simply impossible to replace and upgrade huge amount of energy infrastructure in a decade or two. Time is too short

Fig.7 Increase between 2007 and 2035



to materialize the aggressive goal referred to in the international talks. Then, the world would likely follow the BAU scenario. We should consider this more seriously. As world energy consumption is forecast to grow 50% from 2007 to 2035, the biggest factor is population increase and urbanization in developing countries. While the world population increases 29% in the same period, per capita energy consumption will increase 18% for the Reference Case. The latter will increase only 2% in the Advanced Technology Case and per capita carbon emissions could be further reduced significantly by our efforts. From these observations, we need to consider the value of human civilization more broadly inclined toward a low carbon society.

Japan's Position and Experience

In Japan, the Hatoyama administration has proposed a 25 percent reduction of GHG emissions from the 1990 level, which seems very hard to achieve. Despite the controversy on the target, Japan's share of global emissions in 2020 is only 3.2 percent in the Reference Case projection. Additional efforts within Japan, like squeezing a dry towel, would bring just a nominal effect on global emissions. Under the circumstances, Japan's role in the global warming game will be more profound in the international cooperation to support developing countries, where greater potential exists for emissions reduction. Through domestic efforts, Japan may also demonstrate a model of a low carbon society and practical measures and paths to reach that goal.

In this regard, Japan has been promoting international cooperation to enhance energy efficiency and conservation (EE&C) and development of new and renewable energies (NRE) under various international frameworks; these include bilateral cooperation mainly with China, India, and the ASEAN countries; multilateral initiatives through the activities of the United Nations, APEC, ASEAN+3/+6, G8+3, East Asia Summit, etc; joint research at the Asia-Pacific Energy Research Centre (APEREC), Joint Oil Data Initiative (JODI), Economic Research Institute for ASEAN and East Asia (ERIA), etc; and international public and private cooperation, typically through Asia-Pacific Partnership (APP) activities.

Among others, Japan has launched an extensive cooperation program on energy efficiency and conservation with China in 2006; its 4th forum was held in Beijing last November. This activity offers a wide range of measures for energy conservation including energy management systems, energy efficiency standards and labelling, top-runner systems, model projects on commercial applications, matching of technologies and business partners, public/private forum on action plans and policy, joint studies and training programs. It has been successful to create many cooperative projects between Japan and China; 42 agreements were made in 2009. Under the program, IEEJ runs a joint study on energy conservation policy with ERI of NDRC. In addition to policy dialogue, this activity demonstrates a new form of international cooperation to develop climate change-related businesses.

A Model Low-carbon Society in Northeast Asia

Despite the extensive dialogue at the COP conferences, an immediate agreement on an effective numerical target and framework looks difficult. There are too many participants with a wide range of difference in background and interest, without an effective majority decision mechanism. The reduction target under discussion is far beyond the reach of existing technologies and systems. It is quite natural that responsible people are intimidated to make a commitment that requires application of untested, unproven technologies. Nevertheless, we need quick actions to counter global warming.

Under the circumstances, a small number of countries in proximity - such as Japan, Korea and China - may try to demonstrate a model regional framework, if not an agreed reduction target. These Northeast Asian countries are in a preferable position, as their economies are well industrialized and closely linked, their cultures are similar, and they have technologies, funds, and abilities to aim at a low-carbon society.

To counter global warming through international cooperation, we need a massive amount of technology transfer, R&D of innovative technologies, funds for investment in replacement/expansion of energy infrastructure, and revision of laws and institutions and administration systems, and so on. To facilitate these changes, several regional institutions may be established with functions as below; they would operate under the orientation and supervision of a regional summit committee.

- Centre for matching technologies and business partners:

The regional centre should be equipped with an extensive database and coordinating function. Research and training functions may also be attached to this centre. As energy reform cannot take place overnight, we need to apply top-notch technologies not to waste time. Therefore, this system must be operated under the principle that fair price must be paid for commercial technologies and intellectual property, although generous technology transfer and/or financial support are welcome.

- Organization for providing funds:

The regional financial organization specializing in construction of a low-carbon society should provide funds for developing innovative technologies and time-consuming projects. In addition to providing budgets or subsidies for R&D activities, it should supply loans with long term credit extending for 15 to 20 years at a low interest rate, which will substantially lower the threshold of capital intensive projects. Such funds are not commercially available but could be created with sovereign authorities. It would help mitigate the situation that many low carbon technologies are unaffordable for the developing countries where great potential of emissions reduction lies.

- Supervisory committee on emission trading:

The committee should prepare standard rulings and regulations, and supervise emission trading so that the market should function effectively on emissions reduction in a just and equitable manner. The most important role of the committee will be preparation of

a well-designed market with good balance between compliance traders who require stable incentives and non-compliance traders who are often inclined to speculative actions. Participants of the trading need to be protected from fear of market crash.

- Committee on international rulings and arbitration:

The committee with certain authority should mediate disputes quickly to avoid stranding of international projects. It may recommend member countries on preparation of appropriate laws and regulations, and also establish rules and model cases for international arbitration of cooperative projects.

Asia, with its mega-population, needs sustainable development. Northeast Asia should play a key role to promote the concerted efforts of the world, creating a prototype model of an international framework toward a low-carbon society with practicable schemes and institutions; such a model would be the envy of the rest of the world, a goal other nations would aspire to.

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