



2014 SUMMIT REPORT



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ENERGY SUMMIT

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Charting the Course to a Secure and Cleaner Energy Future



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Front cover photos (bottom, left to right): Taro Kono (House of Representatives, Japan), Melody Meyer (Chevron Asia Pacific Exploration and Production Company), Vice Minister Cho Tae-yul (Ministry of Foreign Affairs, Republic of Korea), Vice Minister Susilo Siswoutomo (Ministry of Energy and Mineral Resources, Indonesia), and Lin Chengge (Expert Committee, State Nuclear Power Technology Corporation, People's Republic of China)

Back cover photos (left to right): Kim Hyo-Sun (Korea Gas Corporation), Chen Weidong (CNOOC Energy Economics Institute), Admiral Dennis C. Blair (Sasakawa Peace Foundation USA; Board of Directors, The National Bureau of Asian Research), Anthony Jude (Asian Development Bank), and Sonn Yang-Hoon (Korea Energy Economics Institute)



PACIFIC ENERGY SUMMIT

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Charting the Course to Energy and Environmental Security



Admiral Dennis C. Blair (Sasakawa Peace Foundation USA; Board of Directors, The National Bureau of Asian Research) was co-chair of the 2014 Pacific Energy Summit and provided opening remarks.

“We seek innovative market solutions to two goals that are in inherent tension: on the one hand, producing more energy and raising standards of living for all of the people in the region, and, on the other hand, reducing pollution and especially greenhouse gas emissions.”

— **Admiral Dennis C. Blair**, *Chairman, Sasakawa Peace Foundation USA; Member of the Board of Directors, The National Bureau of Asian Research*

The Asia-Pacific is ground zero for global energy and environmental security challenges, and the path the region charts in addressing these challenges will drive the world’s energy outlook. As a result of demographics and high economic growth rates, the Asia-Pacific has emerged as the global demand center for world energy markets. Countries in the region are striving to build the necessary infrastructure and secure supplies to meet rising demand while addressing the increasing urgency of environmental security. Meanwhile, policy considerations are necessarily in flux due to rapidly changing market dynamics, technological change, natural disasters, and geopolitical developments. While each country’s energy needs and natural endowments are unique, all are profoundly affected by developments in key consuming and producing nations, domestic and international politics, and the pace and scale of technological change. In order for governments, industry, and citizens to optimize energy and environmental outcomes in this rapidly changing environment, it is essential for countries to work together to build transparent and

flexible markets capable of responding rapidly and resiliently.

The 2014 Pacific Energy Summit gathered leading experts from industry, government, and the research community to find solutions to energy and environmental challenges around the theme of “Charting the Course to a Secure and Cleaner Energy Future.” Discussions focused on finding the best mix of policies, markets, and innovations for optimizing energy and environmental outcomes. Particular attention was given to identifying opportunities for stakeholders to pursue complementary strategies for achieving the goal of a clean and abundant energy future.

In his opening remarks, **Admiral Dennis C. Blair**, Chairman of the Sasakawa Peace Foundation USA and Member of the NBR Board of Directors, touched on the importance of global access to reliable and adequate energy supplies that are free from interruption and price increases, while also preserving the health of citizens and the environment. Exploring the best strategies for balancing these varied elements of “energy security” is a key objective of the Summit.

To pursue the multifaceted goal of energy security, countries must work to support an energy mix that can meet their needs at an acceptable cost. Cooperation between countries as well as between the varied actors in the energy sector is essential to achieve the goals of secure and cleaner energy, and the Pacific Energy Summit aims to promote such cooperation. As **Cho Tae-yul**, Vice Minister of Foreign Affairs for the Republic of Korea, emphasized, “None of us can tackle all these challenges alone. All the stakeholders, public and private sectors alike, should work together to ensure a secure and clean energy future in the region.” The Summit strives to provide a forum for achieving these

goals, one where participants can “share ideas on the energy policy, energy market, environmental related energy issues, and international cooperation,” as described by **Sonn Yang-Hoon**, President of Korea Energy Economics Institute (KEEI) in his Summit remarks. Given the urgency of the energy and environmental challenges faced worldwide, with global energy demand projected to increase by one-third between 2011 and 2035, and record-high global carbon dioxide (CO₂) emissions from fossil-fuel combustion in 2012, cooperation is absolutely critical.



Sonn Yang-Hoon (Korea Energy Economics Institute) was co-chair of the Summit.

KEY FINDINGS

Increasing Regional Cooperation

- Due to technological innovation, North America has the potential to become a significant exporter of oil and gas and will be net energy self-sufficient by 2020. This new development has opened the door for increased energy trade and cooperation across the Pacific.
- The scale and scope of the energy relationship between Asia and North America will hinge not only on Asian demand and infrastructure development but also on the resolution of critical policy questions in the United States and Canada regarding increasing exports of oil, gas, and coal.
- Asia-Pacific countries already cooperate bilaterally and regionally in various multilateral forums. However, local and national governments could work more closely together to deepen their energy interdependence and should expand their dialogue in existing institutions to focus on common challenges relating to energy security and climate change. Independent actors like the Asian Development Bank (ADB) can assist with building such cooperation, particularly when there are clear economic benefits from key energy projects.
- Approaching energy and environmental challenges from a regional perspective could allow countries to leverage scarce resources and knowledge, as well as increase the scope for improving efficiency, facilitating and deploying innovative technology developments, and incorporating a wider variety of strategies to ensure energy and environmental security.
- Russia has targeted Asia as the chief market for expanding its energy exports. This could lead to Russia becoming an important new energy supplier for China and other Northeast Asian consumers.

Shifting Strategies for Energy and Environmental Security

- Import dependence is rising in emerging Asia to keep pace with demand, placing new fiscal pressures on governments subsidizing energy consumption and the need for new infrastructure.
- Emerging Asia is responding to these pressures by adjusting policy frameworks.
 - China has taken steps to revise its energy targets in order to enhance the roles of gas, nuclear, and renewables while decreasing coal consumption. China is also pursuing clean coal technology (CCT) and efficiency measures to improve air quality, which has become a major concern.
 - In Southeast Asia, energy access remains a daunting challenge and gas imports are increasing. This trend has reinvigorated efforts in many countries, such as Indonesia, to phase out subsidies for oil and gas consumption, which are a heavy drain on government coffers and an obstacle to new efficiency measures. More broadly, many Southeast Asian countries have increased their focus on energy efficiency and regional energy and power market integration to manage rising import bills.
 - Environmental and “social license” concerns are playing an increasing role in energy sector development in Southeast Asia. Governments must find ways to effectively engage the public and address concerns in order to build the energy infrastructure necessary for economic growth.

KEY FINDINGS

- Due to the growing demand for clean energy and the political and practical challenges of expanding nuclear power plant facilities in the Republic of Korea, the Korean government is seeking to increase the role of liquefied natural gas (LNG) in the energy mix, although the demand for coal will also continue to grow.
- Diversification of suppliers and the energy mix is a central pillar of the energy security and economic strategies of many countries.
- Given Asia's rising energy demand and amid strained relations with the European Union, Russia aims to at least double its oil and gas flows to Asia over the next twenty years. The newly concluded Russia-China gas pipeline deals are a key element of this strategy and a boost to China's efforts to position itself as a future gas trading hub for Asia. The amount of Russian gas that will make its way to the Republic of Korea and Japan remains uncertain.
- Carbon pricing could help to create a more sustainable energy mix in the Asia-Pacific. However, carbon pricing policies must be used in accordance with efforts to increase efficiency and embrace energy options that lower greenhouse gas emissions.

Harnessing Technology to Improve Environmental Security

- Asia's ever-expanding prominence in global energy markets is a motivation for innovation. The region's scientific community has the potential to develop breakthrough technologies that could transform a nation's energy outlook.
- Meeting global climate targets in the coming years is unlikely without significant policy changes, as fossil fuels are projected to constitute 76% of the world energy mix by 2035, according to the International Energy Agency.
- There are currently no short- or medium-term alternatives that replace the prominence of coal in the energy outlook and economic development of the Asia-Pacific. Therefore, investment in carbon capture and storage (CCS) and clean coal technology (CCT) is needed to encourage commercial scale-up and drive down costs to the point where the use of this technology is economically viable.
- Renewable energy resources can gain prominence if costs fall and if technologies emerge that can increase storage capacity. To accelerate the use of renewable energy worldwide, governments and industry will need to work together to build financial and policy support that will enable renewable energy to play a larger role in the global energy mix.
- Energy efficiency technologies and energy conservation practices should be accorded top priority.
- Hydropower is an attractive alternative to fossil fuels because it provides base-load power to electricity operators and significant options for storage capacity. Hydro resources are being developed in the Asia-Pacific, and grid supply is being extended. In particular, the Association of Southeast Asian Nations (ASEAN) presents huge potential for regional cooperation on hydropower, which could offset future coal use if applied effectively.
- Although China's shale gas resource potential is significant, the costs of production and technology development, as well as infrastructure limitations, are obstacles that need to be overcome.

The Role of Nuclear Energy

- Prior to the Fukushima Daiichi nuclear disaster, nuclear power accounted for almost 30% of Japan's power sector. The subsequent suspension of nuclear power plants resulted in a significant spike in the need for imported fossil fuels, particularly LNG, and negatively affected Japan's economy, which ran its first deficit in over 30 years in 2011. Japan's 2014 energy plan aims to mitigate high import bills by restarting nuclear power plants,
- Globally the outlook for nuclear energy growth is robust, with 309 nuclear plants planned in the next 15 years. Nuclear generation is expected to grow more significantly in Asia than anywhere else in the world, with the majority of this growth coming from China and India. Northeast Asia already has the greatest density of nuclear plants in the world.
- It would be extremely difficult to reach climate change goals without nuclear energy playing a central role in meeting demand.
- Negative public opinion toward nuclear energy after the Fukushima disaster is one of the chief obstacles to nuclear energy growth. Key to overcoming the public's concerns is building trust in regulatory agencies and nuclear operators. Nations should adopt measures to restore public confidence while also taking the technical and regulatory steps to ensure nuclear safety and economic efficiency.
- For countries new to nuclear energy, acquiring knowledge from experienced countries is critical. Countries could cooperate on a regional level to establish a geological repository, which would be exceedingly beneficial to those that have less experience and capacity.



Kei Shimogori (Institute of Energy Economics, Japan) asks panelists about nuclear cooperation in the Asia-Pacific during the Summit session on “Scaling Up (and Down) on Nuclear Energy: Where Will We Land?”

Global Growth in Energy Consumption



Vice Minister Cho Tae-yul (Ministry of Foreign Affairs, Republic of Korea) provides keynote remarks at the opening of the Summit.

“None of us can tackle all these challenges alone. All the stakeholders, public and private sectors alike, should work together to ensure a secure and clean energy future in the region.”

— Cho Tae-yul, *Vice Minister of Foreign Affairs, Republic of Korea*

The dramatic economic growth of countries in the Asia-Pacific has made the region a driver of global energy consumption. The International Energy Association (IEA) predicts global energy demand will increase by one-third from 2010 to 2035. China and India combined are projected to account for 50% of this global growth. As Vice Minister Cho noted, the Asia-Pacific currently accounts for 40% of global energy demand, and its share is expected to increase continuously as a result of the region’s rapid economic growth. This rise in energy consumption accelerates the need to enhance energy strategies to meet demand while still addressing the threat of climate change.

Expansion of North American Energy Production

Amid this dramatic expansion in energy consumption in the Asia-Pacific, the United States and Canada have achieved impressive expansion of energy production, particularly in unconventional oil and gas. Mikkal Herberg, Research Director of

the Energy Security Program at NBR and Senior Lecturer in the Graduate School of International Relations and Pacific Studies at the University of California, San Diego, emphasized that “the U.S. unconventional oil and gas energy boom is truly on a scale that is hard to overstate,” with unconventional gas production rising twelvefold in the last five years. These new developments have created prospects for vast energy production in the region, causing many to agree with Mr. Herberg’s characterization of potential North American exports and Asia-Pacific energy demand as a “match made in heaven.”

Steve Lidisky, President of ExxonMobil LNG Market Development Inc., noted that due to the abundance, flexibility, and relatively low CO₂ emissions of natural gas, ExxonMobil forecasts “natural gas to be the world’s fastest growing energy source through 2040, with global demand rising by close to 65%,” and LNG will assume a growing share of the global gas trade. Mr. Lidisky argued that shale gas production development is becoming more economically sustainable due to innovations in the processes of

hydraulic fracturing and horizontal drilling, which have dramatically decreased development costs in the United States and Canada. U.S. government data from 2012 estimates that approximately 1,300 trillion cubic feet of technically recoverable unconventional resources exist in the United States and another 1,000 trillion cubic feet of conventional resources remain, leaving the potential for further development of these resources as technology improves.

In addition to natural gas production growth, **Ken Koyama**, Chief Economist and Managing Director at the Institute of Energy Economics, Japan, noted that the annual growth of U.S. oil production in 2013 reached 1.1 million barrels per day and is projected to

reach approximately 1 million barrels per day in 2014. Mr. Herberg observed that the United States has “added a new Kuwait to production over the last five years,” and the U.S. Department of Energy projects further increases in U.S. oil production in the next two years. Unexpected until the last decade, this strong contribution from the United States will lessen the supply crunch that could have occurred given production uncertainty in many oil-producing countries such as Nigeria, Libya, and Syria. The U.S. economy is steadily recovering from the global economic downturn, which benefits Asian countries that depend on the U.S. market for their exports. However, the recovery has also revived U.S. industry,



Oh Kang Hyun (Lee International IP & Law Group) comments on the prospects of energy trade between Asia and North America.



Ken Koyama (Institute of Energy Economics, Japan) speaks at the media roundtable on “North America’s Energy Revolutions and the Outlook for Gas Production in Asia.”

making it a strong competitor for Asian energy demand. U.S. geopolitical decisions about engagement with the Middle East and the Asia-Pacific will have an impact on wider energy markets for years to come.

There are a number of challenges that stand in the way of a simple match of Asian demand and North American supply. Significant questions remain for how substantial a role North America will play in Asia's energy markets, hinging on infrastructure development, environmental and social concerns about expanding energy exports, and the competitiveness of North America exports on a price basis. As Mr. Lidisky emphasized, technical expertise and long-term investment are needed to develop North American

resources, and “underpinning these long-term investment decisions is the need for a stable and predictable energy policy that embraces free-market and free-trade principles. This provides the confidence to the buyers, sellers, and their lenders to make these huge commitments.” In the United States, there is no overarching national energy policy for energy exports, and divisive politics across the country slows progress on these issues.

Additionally, **Jeff Brown**, President of FGE Group, observed that gas is cheap if the buyer is in the United States, but transportation increases costs, tempering the comparative advantage of lower U.S. gas prices. Some participants noted that even though agreements



“Underpinning the long-term investment decisions for natural gas resource development and for LNG exports is the need for a stable and predictable energy policy that embraces free-market and free-trade principles. This provides the confidence to the buyers, sellers, and their lenders to make these huge commitments.”

— **Steve Lidisky**, *President, ExxonMobil LNG Market Development Inc.*

are being signed, it can be difficult to sell gas in Asia due to high prices. However, an increased use of hybrid contracts, which enable buyers to assess risk and purchase both oil and gas, could be beneficial to the United States and Asia. Some participants observed that buyers are increasingly interested in liquefied petroleum gas (LPG), which could have an impact on Asian markets. Dr. Brown noted that the United States is predicted to export over 20 million tons of LPG in the next few years.

The situation in Canada also illustrates the challenges for developing infrastructure and

policies that would allow for increased energy exports to Asia. Canada's exports of thermal coal are very small, but 73% currently go to Asia, and the potential exists to expand these exports if significant investments in port capacity are made. The export of oil and oil products is similarly constrained by the obstacles of building expensive and often unpopular infrastructure such as oil pipelines or railways. Resistance from environmental groups to the Keystone XL Pipeline, which would bring Canadian oil to U.S. refineries, is one such example. **Eva Busza**, Vice-President of Knowledge



Eva Busza (Asia Pacific Foundation of Canada), addresses panelists in the Summit session on “Northeast Asia Energy Policy: New Strategies.”



Jeff Brown (FGE Group) at the Summit session on “North America Energy to Asia: Challenges and Opportunities.”

“The East Asia region has been growing dramatically and has become the energy-consuming center of the world. It is commonly anticipated that the region...will continue to play a key role in energy consumption in the coming years.”

— **Xu Qinhua**, *Director, Centre for International Energy and Environment Strategy Studies; Deputy Director, Institute of Russia, Eastern Europe and Central Asia, Renmin University*

and Research at the Asia Pacific Foundation of Canada, noted that Canadian oil exports to the United States are declining. The United States is the largest consumer of Canada’s oil exports, whereas less than 2% of these exports go to Asia. Dr. Busza emphasized that “while the federal and provincial governments are eager to promote the message that Canada is open for business, the Canadian public has reservations about energy trade with Asia,” particularly in reference to coal and oil. Many of these reservations are related to the environmental implications of extracting, transporting, and using coal and oil. As a result, securing public license is “the looming challenge” for Canada as its energy sector aims to ramp up exports to Asian markets. Despite concerns from citizens, however, there is much excitement surrounding LNG development, due to the geographic proximity of Canada’s west coast to Asia. Dr. Busza stated that potential LNG exports attract slightly less opposition from the Canadian public than the export of coal and oil.

Northeast Asian Importers

Northeast Asia is the economic center of gravity in the Asia-Pacific as well as a growing hub of energy demand. China, Japan, and the Republic of Korea each have distinct energy sectors with unique concerns, but all are highly dependent on energy imports. Compared with European countries, the energy importers of Northeast Asia have relatively independent energy and power markets. Some Summit participants suggested that these countries would benefit from more cooperation on energy issues due to shared challenges in their respective energy sectors. **Chen Weidong**, Chief Energy Researcher at the CNOOC Energy Economics Institute, argued that these major consumers should work to increase their interdependence and proposed that energy cooperation provides an opportunity for developing geopolitical relationships in the region. Increasing regional integration is a priority in the Korean government’s new energy master plan—as **Pak Yongduk**,

Managing Director of the International Energy Cooperation Group at KEEI, noted—which views greater energy and power sector cooperation as an important step toward the goal of building a more integrated region.

China

China is currently both the largest energy consumer in the world and the largest producer of greenhouse gas emissions. The majority of the country's energy production and consumption is made up by coal and oil, which has had a high impact on the country's environment. Mr. Chen noted that coal is much cheaper than gas in China, which exacerbates the prominence of coal in the

energy mix (coal made up 69% of China's energy mix in 2011). Record-breaking air pollution in many Chinese cities has led Beijing to work toward enhancing the roles of gas, nuclear energy, and renewables.

According to Mr. Chen, China has plentiful shale gas resources, but production is costly. China has committed to developing its nuclear energy production, and the country has strong potential in this sector. However, despite these potential sources of domestic energy, **Lin Chengge**, Senior Member of the Expert Committee of the State Nuclear Power Technology Corporation in China, described China's dependence on foreign energy supplies as high. He noted that with the country's projected growth in energy demand, imports will



Chen Weidong (CNOOC Energy Economics Institute) outlines the prospects for rethinking China's energy mix.



Seo Jong Tae (KEPCO E&C) gives his perspective on Korean nuclear industry and policy.

continue to grow steadily. Participants agreed that China, as the largest energy market in Asia, will play a key role in energy integration and infrastructure development as the region works toward more interdependent energy solutions.

Japan

Japan's energy sector was upended by the 2011 Fukushima Daiichi nuclear disaster, which resulted in the suspension of all nuclear power plants in the country. **Hironori Nakanishi**, Director-General for Energy and Technology Policy in the Agency for Natural Resources and Energy at Japan's Ministry of Economy, Trade and Industry, noted that, prior to Fukushima, nuclear power counted

for almost 30% of total electricity in Japan. The suspension of nuclear power production thus has had profound effects. This deficit has been addressed primarily through increasing LNG imports, and Japan's dependency on fossil fuels rose from roughly 60% in 2010 to almost 90% in 2012. The greater reliance on fossil fuels has resulted in a significant increase in the country's CO₂ emissions and has negatively affected the Japanese economy, causing the first trade deficit in over 30 years in 2011. For these reasons, Japan's 2014 Basic Energy Plan aims to restart the operation of nuclear power plants and expand the use of renewable energy technologies and allows for the development of higher-efficiency coal-fired power plants.



Panelists in the Summit session on “Northeast Asia Energy Policy: New Strategies” outline the varying experiences of China, Japan, Korea, and other countries in facing increasing energy import dependency.

The Republic of Korea

The Republic of Korea's energy policy has developed in recent years to better balance energy security, economic growth, and environmental impacts. As Mr. Pak outlined, since the 1990s, the focus of the Korean government's energy policy has been on securing stable energy supplies to support economic growth. During the 1990s, the

energy sector was dominated by public monopolies and prices were heavily and directly regulated by the government. In the early 2000s, this policy shifted, and the government began promoting competition in the energy industry. In 2008, the government's focus widened to promoting sustainable development.

Due to insufficient natural resources, the Republic of Korea depends on energy imports to



Yongduk Pak (Korea Energy Economics Institute) discusses the recent history of Korea's energy policies.



Ambassador Sung Kim (Embassy of the United States in the Republic of Korea) speaks on the importance of the U.S.-Korea relationship.

satisfy up to 96% of its demand, and like Japan it is adversely affected by high import prices. Additionally, the energy intensity of the Korean economy is relatively high compared with other developed economies. As a result of rising demand for cleaner energy sources, **Oh Kang Hyun**, Senior Advisor at Lee International IP & Law Group, noted that the Korean government has projected that LNG demand will continue to grow. Mr. Oh

emphasized that Korea will look to diversify its energy sources, and importing oil or gas products from the United States would help strengthen the country's energy security by diversifying its supply.



Anthony Jude (Asian Development Bank) addresses the panelists during the Summit session on “Southeast Asia—Shifting Strategies for Energy and Environmental Security.”



Satya Yudha (Commission VII, House of Representatives, Indonesia) gives an Indonesian take on how to optimize the Asia-Pacific energy mix.

Southeast Asia: Shifting Strategies for Energy and Environmental Security

Southeast Asia has emerged as a major center of energy demand. According to the IEA, 134 million people in ASEAN countries do not currently have access to electricity, and energy consumption is expected to grow by more than 80% by 2035. Given this rising demand, several Southeast Asian energy producers are shifting from being energy exporters to being importers, with important implications for economic sustainability, the environment, and overall patterns of regional energy trade.

Summit participants agreed that escalating dependence on energy imports will expose Southeast Asia to new geopolitical and economic vulnerabilities and greater cost pressures. This trend is creating more impetus for market-oriented policies, the promotion of energy efficiency, and a phasing out of costly subsidies. **Satya Yudha**, Deputy Chairman of Commission VII in the Indonesian House of Representatives, emphasized that energy subsidies are a common burden for a number of ASEAN governments. Using Indonesia as an example, he argued that there is a need for finding a balance between politics and leadership when discussing fuel subsidies that may discourage investment in clean energy. Mr. Yudha stated that it is necessary to scale back these subsidies, which



Secretary of State Ith Praing (Ministry of Mines and Energy, Cambodia) gives remarks on the energy security strategies in Cambodia during the session on “Regional Cooperation: Developing Healthy Energy Systems for Economic Development.”

can skew supply and demand in energy markets, and called for reallocating funding from product-based fuel subsidies to social welfare programs. Other participants, however, noted that government concerns about the affordability of energy can complicate the removal of energy subsidies.

Summit participants assessed the relationship between energy resources and sustainable economic growth when discussing Southeast Asia and its energy policy development. A country like Myanmar has substantial natural resources, including hydropower potential and large natural gas reserves. Yet it is in a state of flux amid ongoing political reforms and is carefully considering how to best harness these resources for economic

development. Myanmar is an extreme example of energy poverty, with an electrification rate of only 28%. However, **Thein Lwin**, Member of the Pyithu Hluttaw (Myanmar's Lower House of Parliament) and Secretary of the Natural Resources and Environmental Conservation Committee, noted that because of incomplete environmental and social impact assessments, coal-fired gas stations and hydropower projects are often denied permission. **Ith Praing**, Secretary of State for the Ministry of Mines and Energy in Cambodia, argued that it is possible to provide low-cost electricity to both industry and consumers while promoting clean energy use. Participants agreed that both goals should be more strongly reflected in policy choices.



Thein Lwin (Pyithu Hluttaw, Lower House of Parliament, Natural Resources and Environmental Conservation Committee, Myanmar) explains the challenges facing Naypyidaw in balancing economic reform, energy security, and environmental conservation.

RUSSIA LOOKS TO ASIAN ENERGY MARKETS

The Asian market features prominently in Russia's plans for energy trade expansion, as evidenced by Moscow's plans to at least double its oil and gas flows to Asia over the next twenty years. **Tatiana Mitrova**, Head of the Oil and Gas Department in the Energy Research Institute of the Russian Academy of Sciences, argued that these plans stem from Europe's slow recovery from the economic recession, as well as some European governments' decisions to diversify energy sources and thus limit the role of imports from Russia. Because oil and gas revenues constitute 50% of Russia's federal budget revenues, development of the gas industry to embrace the demand of Asian importers is a clear priority. In a step toward achieving this goal, Russia and China signed a major gas pipeline deal in May 2014, an agreement

that expands Russian energy exports to the East. Though some Summit participants argued that the Ukraine crisis served as a catalyst for the ultimate signing of this long-negotiated agreement, Dr. Mitrova noted that Russia's efforts to engage with Asia in the energy sector go back many years and were not driven purely by the events in Ukraine. She emphasized that there are several pipeline projects under development in Russia and that Russia will continue to engage with Asian markets seeking to diversify their energy sources.

The gas pipeline agreement between China and Russia has the potential to affect other East Asian energy markets, including those of Japan and Korea. **Kengo Asakura**, Chairman and Director of Teikoku International Corporation, noted that Russian energy will likely play a role in Japan's



Tatiana Mitrova (Energy Research Institute, Russian Academy of Sciences) outlines Russia's energy strategies with respect to Asian markets.

recovery from the Fukushima disaster, which increased the need for energy imports. Similarly, the Republic of Korea is interested in Russian energy to help diversify its energy sources, which would further bolster its energy security. **Ryu Ji-Chul**, Visiting Fellow at KEEI, noted that Russian natural gas is seen as a good alternative to reduce the role of nuclear energy in Korea's energy mix, particularly as Russia's share is currently small, making up only 3% of oil imports, 6% of natural gas imports, and 10% of coal imports. The interest from energy importers in Northeast Asia is evident, and Russia hopes to embrace this growing demand.

Due to the increased export potential of the United States and the evident goals of Russia to export its oil and gas to its neighbors in Asia,

Xu Qinhua, Director of the Centre for International Energy and Environment Strategy Studies and Deputy Director of the Institute of Russia, Eastern Europe and Central Asia Studies at Renmin University of China, predicted that competition between the United States and Russia in the Asia-Pacific energy sector would emerge in the future. Furthermore, Dr. Xu argued that the gas pipeline agreement is likely to have an impact on the pricing of gas in Northeast Asia, which would affect the level of U.S. energy exports to the Northeast Asian market. Because neither the United States nor Russia wants to miss the opportunities presented by rapidly growing Asia-Pacific countries, both will try to increase engagement with the region.

Keun-Wook Paik (Oxford Institute for Energy Studies; Chatham House) moderates the special briefing session on "Russia's Asia Bet: Will It Pay Off?"



The Potential for Regional Cooperation

The interdependency of energy must be embraced for wider benefit and mutual prosperity. Panelists pointed out that governments are increasingly talking about common energy challenges in existing institutions. There are important trans-boundary imperatives pushing countries in the Asia-Pacific to discuss these issues, but tangible action is still lacking.

Considering energy at a regional rather than national level increases the scope for improving efficiency, developing innovative technologies, and incorporating a wider variety of energy resources. But, as panelists noted, it can be difficult to

overcome traditional concerns between neighbors that often inhibit cooperation and foster distrust between them. **Taro Kono**, Member of the House of Representatives in Japan, suggested a “super Asian grid” to enable energy cooperation in Northeast Asia, which would create the possibility of connecting Japan to the Republic of Korea or to Russia through the northern islands. **Anthony Jude**, Chair of the Energy Committee and Senior Advisor and Practice Leader (Energy) in the Regional and Sustainable Development Department at the Asian Development Bank, suggested that the answer is an independent interlocutor like ADB. Such an intermediary could encourage countries to commit to cooperation, particularly if there is a clear economic benefit from key energy projects. Mr. Jude



Left to right: Xu Qinhua (Renmin University) and Ji-Chul Ryu (Korea Energy Economics Institute) discuss the recent Russia-China gas pipeline deal and its potential results.

“ASEAN has to be united in terms of energy security. It’s not only individual countries thinking of their own energy security; there has to be a broader energy security concept. If we have a strong leadership in ASEAN, then we can build that kind of a network.”

— Satya Yudha, *Deputy Chairman, Commission VII, House of Representatives, Indonesia*

cited the example of the large-scale electricity-trading network connecting West Kalimantan and Sarawak in Malaysia. He noted that the network saves Indonesia \$180 million per year in subsidies, although some Indonesian politicians dislike buying electricity from Malaysia. Instead of each country taking care of just its own individual needs, Mr. Jude argued that the ability an independent

actor to focus the discussion on broader, regional goals could have more success. Many Summit participants argued that the dialogue in the Asia-Pacific should now address mechanisms through which the independent plans of countries can become more interdependent to maximize the benefits and potential increased efficiencies.

Left to right: Melody Meyer (Chevron Asia Pacific Exploration and Production Company) and Taro Kono (House of Representatives, Japan) observe Summit sessions.



Energy Mix of the Future



Panelists take questions from participants in the session on “Finding the Best Mix: Policy, Markets, and Innovations to Secure, Cleaner Energy.”

“Every country needs and deserves reliable fuel and power to pursue its economic destiny and elevate the quality of life for all citizens. Growing all types of energy resources and delivering them reliably and affordably is a big challenge, but I believe we can do it together. Energy development partnerships of international oil companies, national oil companies, and governments are key to developing the Asia-Pacific’s energy future.”

— *Melody Meyer, President, Chevron Asia Pacific Exploration and Production Company*

An underlying principle of energy security is the diversity of supply. As Admiral Blair noted, this diversity keeps competition alive and thus reduces a country’s overall energy costs. Furthermore, if there is a supply interruption for a particular source, a balanced energy mix helps mitigate the impact of price hikes. **Melody Meyer**, President of Chevron Asia Pacific Exploration and Production Company, noted, “Every country needs and deserves reliable fuel and power to pursue its economic destiny and elevate the quality of life for all citizens. Growing all types of energy resources and delivering them reliably and affordably is a big challenge, but I believe we can do it together. Energy development partnerships of international oil companies (IOCs), national oil companies (NOCs), and governments are key to developing the Asia-Pacific’s energy future.” Energy demand is rising dramatically in the Asia-Pacific, and some analysts argue that committing to the entire spectrum of energy sources, with a particular focus on oil and gas, will be necessary to meet this growing demand in the years to come.

Mr. Koyama outlined energy security, environmental protection, economic efficiency, safety, energy competitiveness, and energy access as key regional and national objectives. He discussed the dominance of coal and oil in Asian energy consumption, as well as the potential of gas, renewables, and nuclear power. Mr. Koyama noted, however, that there is not currently a single, perfect energy solution to address all global energy challenges. Therefore, working together to find the optimal combination, while trying to limit or overcome the weaknesses of respective options, has the potential to provide the ultimate benefit.

Nuclear Power: Overcoming the Legacy of Fukushima

The 2011 Fukushima Daiichi nuclear disaster was potentially a global game changer for the future of nuclear energy use. Nearly four years later, however, the outlook for nuclear energy remains strong. There are currently 435 nuclear plants in operation globally, with 72 under construction and

“Many of the nuclear challenges we face are global, but the solutions are often regional, and regional coordination is very important.”

— **Robert Boudreau**, *Associate Deputy Assistant Secretary for International Nuclear Energy Policy and Cooperation, Office of Nuclear Energy, Department of Energy, United States*

309 planned in the next fifteen years. After Fukushima, the International Atomic Energy Agency revised its global growth projections, but 2013 projections indicate that nuclear energy use is still growing, even if at a lower rate than before Fukushima.

Nuclear-power generation in Asia is expected to grow more significantly than anywhere else in the world. China operates 22 nuclear reactors, Japan has 48, and the Republic of Korea has 23. In China,

nuclear power is driven by imminent energy needs and environmental concerns surrounding the impacts of fossil fuel consumption. There is substantial room for continued development in China’s nuclear energy production, however, as nuclear currently constitutes only 2% of China’s energy mix, with 28 reactors under construction. In the Republic of Korea, nuclear power generates 29% of the country’s electricity, with 5 more reactors under construction. Japan’s nuclear industry



Kim Hyo-Sun (Korea Gas Corporation) discusses Korea’s energy mix in the Summit session on “Finding the Best Mix: Policy, Markets, and Innovations to Secure, Cleaner Energy.”



Lin Chengge (State Nuclear Power Technology Corporation, People’s Republic of China) gives his take on China’s nuclear energy outlook.

previously supplied 30% of the country's electricity, which a nuclear restart is unlikely to replace anytime soon—only 2 reactors are currently under construction. In the United States, nuclear energy generated 19% of the country's electricity in 2013, and 5 additional reactors are under construction.

Nuclear energy has the potential to reduce carbon emissions and air pollution. Furthermore, the opportunity costs that come from the environmental effects of coal, oil, and natural gas could make nuclear power very competitive. Additionally, nuclear energy can contribute to meeting the demand of electricity in the developing world. **Robert Boudreau**, Associate Deputy Assistant Secretary for International Nuclear Energy Policy and Cooperation at the U.S. Department of Energy, emphasized that in order

to combat climate change, it is essential to make the nuclear future work.

According to **Tatsujiro Suzuki**, Vice Director and Professor at the Research Center for Nuclear Weapons Abolition at Nagasaki University, the most serious impact of the Fukushima disaster was the loss of public trust. Many Summit participants agreed, noting that the public perception is often that governments and utilities cannot be trusted to ensure safety. According to participants, this perspective has remained one of the biggest obstacles to the advancement of nuclear power. Polling conducted two years after Fukushima found that 85% of the Japanese public supported plans to phase out nuclear energy in Japan. Within that group, 30% favored the immediate shutdown of all nuclear power plants. **Park Younwon**, Professor in



Left to right: Tatsujiro Suzuki (Nagasaki University) engages with Kazuo Shimomura (Organisation for Economic Co-operation and Development Nuclear Energy Agency) and Robert Rosner (University of Chicago) during the roundtable discussion on “Enhancing Regional Cooperation on Nuclear Safety.”

the Nuclear and Quantum Engineering Department at the Korea Advanced Institute of Science and Technology, noted that expanded safety is necessary for the continuation utilization and scaling up of nuclear energy.

Some participants argued that a crucial reason for the lack of public trust globally surrounding nuclear energy is corruption. Mr. Kono noted that because nuclear energy involves large amounts of money, corruption is likely to be an ongoing problem. He further observed that the Japanese government only began taking steps to deregulate the power sector and increase transparency after the Fukushima disaster. Mr. Kono argued that the resulting market economy in the industry will reduce corruption, making prices more competitive

and allowing consumers to choose the source of their energy. In order to restore public trust, Professor Suzuki called for improved accountability in policy decisions, the disclosure of important information, and more public participation in policymaking.

Participants noted that the solutions to the challenges facing nuclear energy are regional, and they thus called for regional cooperation on nuclear safety, technology, and innovation. **Hahn Dohee**, Vice President for Advanced Nuclear Energy Systems at the Korea Atomic Energy Research Institute, observed that countries now entering the nuclear energy market can learn lessons through knowledge sharing with countries like China, Korea, and Japan. He also stressed the importance



Oh Sung Hwan (Ministry of Foreign Affairs, Republic of Korea) speaks about nuclear safety concerns in Northeast Asia.



Hahn Dohee (Korea Atomic Energy Research Institute) provides a Korean perspective on nuclear energy in the Summit session on “Scaling Up (and Down) on Nuclear Energy: Where Will We Land?”

Tadashi Maeda (Japan Bank for International Cooperation) discusses the significance of coal in many Asia-Pacific countries' energy mix in the session on "Southeast Asia—Shifting Strategies for Energy and Environmental Security."



of innovative technologies that improve inherent safety features in nuclear reactors and reduce capital costs. **Oh Sung Hwan**, Director of the International Energy Security Division at the Republic of Korea Ministry of Foreign Affairs, underscored the importance of regional cooperation to enhance nuclear safety in Northeast Asia, which has the greatest density of nuclear plants in the world.

At a regional level, countries could cooperate to establish a geological repository, which would be beneficial to countries that have less experience with nuclear energy development. **Robert Rosner**, Professor of Physics and Astrophysics at the University of Chicago, noted that for countries such as Vietnam it is disproportionately expensive to build storage capacity for their relatively small nuclear programs. There is no consensus, however, on the nature of such a repository; whether it is constructed to allow retrieval of material depends on the controversial topic of reprocessing of used nuclear fuel. Hence, Professor Rosner and other Summit participants suggested that it would be

beneficial for ASEAN to look at regionally consolidated interim storage facilities that would not require a decision on reprocessing in the immediate future.

Coal: Continued Prominence

Alongside the projected trends of dramatic energy growth in developing Asia, Summit discussions emphasized the importance of understanding the role of coal in the region's energy mix. **Tadashi Maeda**, Representative Director and Senior Managing Director at the Japan Bank for International Cooperation, noted that coal is an abundant and cheap energy source, making its continued prominence in the Asia-Pacific energy mix a near certainty. The IEA projects that the share of coal in electricity generation in Southeast Asia will increase from under one-third to almost one-half by 2035, nearly doubling the region's energy-related CO₂ emissions. **Mark Thurber**, Associate Director of the Program on Energy and Sustainable Development at Stanford University,

“Since coal is still considered a necessary power source for emerging countries, it is important to support the introduction of higher-efficiency coal power plants.”

— **Hironori Nakanishi**, *Director-General for Energy and Technology, Agency for Natural Resources and Energy, Ministry of Economy, Trade and Industry, Japan*

echoed this projection, stating that “embracing coal for Southeast Asia is embracing reality” and that there are no short- or medium-term alternatives that can replace the role of coal in the region’s economic development.

Participants who asserted that coal will remain prominent in the Asia-Pacific’s energy mix did not discount the environmental effects; rather, they called for a stronger commitment from governments

and industry to reducing the cost of technologies that can mitigate CO₂ emissions and air pollutants, including clean coal technology and carbon capture and storage. **Armond Cohen**, Executive Director of the Clean Air Task Force, called for the refinement and scaling up of existing technologies, including CCS, integrated gasification combined cycle power plants, underground coal gasification, and the separation of carbon in the production of ammonia.



Hironori Nakanishi (Ministry of Energy, Trade and Industry, Japan) describes Japan’s post-Fukushima energy policies.

Mr. Cohen noted that the cost differential between building a coal plant without CCS and building one with this technology is approximately 50%. In order to drive down costs, these technologies need to be scaled up more broadly in the region. Mr. Nakanishi made a similar argument, asserting that “since coal is still considered a necessary power source for emerging countries, it is important to support the introduction of higher-efficiency coal power plants in the future.”

For some Summit participants, China provides an example of both the environmentally detrimental effects of unregulated coal-fueled economic growth and the potential of CCS and CCT. Coal plays a large role in China’s energy mix, as it does in much of developing Asia, which has resulted in elevated carbon emissions and air pollution. In recent years,

Beijing has stepped up its efforts to mitigate record-shattering air pollution and other aspects of environmental degradation. However, **David Welch**, CIGI Chair of Global Security at the Balsillie School of International Affairs and Senior Fellow at the Centre for International Governance Innovation, noted that serious health problems have already resulted from extensive coal use in China. Furthermore, Mr. Cohen argued that China has so far been more committed to the development of nuclear energy than carbon capture and has not yet put CCS technology development at the forefront of its energy programs. Until new coal technologies are deployed widely, participants agreed that these new and developing technologies will not meet their full potential.



David Welch (Balsillie School of International Affairs; Center for International Governance Innovation) discusses public perceptions of nuclear energy.



David Tang (K&L Gates; Board of Directors, The National Bureau of Asian Research) speaks at the session on “Southeast Asia—Shifting Strategies for Energy and Environmental Security.”

THE GOLDEN AGE OF GAS?

Questions about the future role of gas in Asia have important implications for the region's environmental and energy security outlook. According to the U.S. Environmental Protection Agency, natural gas emits half as much CO₂ as coal overall. Asia, however, uses relatively less gas in the power sector than do other regions of the world. This can be attributed to a number of factors, including the high costs for building LNG infrastructure, a lack of viable pipeline options throughout much of Asia, and concerns that gas was a geopolitically vulnerable resource. Today, the shale revolution in North America and the growing availability of gas from major suppliers around the world, combined with heightened climate change concerns, have made gas a much

more attractive option for Asian consumers. Nevertheless, high LNG costs remain a central concern, and Summit participants discussed extensively the potential to move from long-term contracts for LNG linked to the price of oil, which are typical in Asia, to a more flexible and market-responsive formula.

Exports of U.S. LNG, with prices that are linked to flexible Henry Hub, are viewed by some regional experts as a way to open discussions with other suppliers on developing new pricing formulas. Many in the region have also called for Asia to establish its own gas trading hub, but questions persist about when the volumes of gas on the market and necessary infrastructure would be in place.



Peter Hughes (Peter Hughes Energy Advisory Limited) moderates the Summit session on “Finding the Best Mix: Policy, Markets, and Innovations to Secure, Cleaner Energy.”

The Geopolitics of Oil

Oil makes up a substantial portion of the worldwide energy mix, particularly due to its near monopoly in the transportation sector. As a result, steady oil production affects broader economic stability, in both developed and developing countries. Even though the production of oil in the United States has exceeded expectations in recent years, ongoing instability in many oil-producing countries in the Middle East and Africa, including Syria, Nigeria, and Libya, remains a significant concern.

Due to the continuing importance of Middle East oil in the Asia-Pacific, some Summit participants expressed concern about the prospects of the United States turning its foreign policy efforts away from the Middle East in its rebalance to Asia. However, Admiral Blair cited the continued importance of oil as a reason the United States will remain actively involved in the Middle East, even considering the Obama administration's rebalancing policy. He noted that "even if the United States is producing a huge percentage of its own oil, if there is an interruption anywhere in the world and the price goes up, the only countries that can increase their production, and bring the price back down to a reasonable level, are located in the Middle East." These issues of price stability can broadly affect the energy security of the region, and it is not in the interests of the United States or Asia-

Pacific powers to turn their backs on one of the main hubs of the world's oil production.

Realizing the Promise of Renewable Energy

One challenge the Summit aims to address is the balance nations must maintain between economic development and environmental concerns. Renewable energy—energy from a source that is not depleted when used—has long been heralded as a solution for this challenge. Summit participants discussed issues such as cost, public support, and investment and outlined the status of renewables today and the prospects for future development.

In 2013, renewable energy, including hydropower, accounted for nearly 24% of all electricity output in Southeast Asia, nearly twice the global average. Investment levels in renewables in Asia have been growing at approximately 20% per year for the past ten years, although they have been declining since their peak in 2011. ADB alone made \$2.3 billion in clean energy investments in 2013. Globally, solar photovoltaic (PV) capacity grew an average of 49% per year over the last ten years, and cumulative installed wind capacity has grown an average of 24% per year between 2000 and 2013. China is a leader in both solar and wind development, producing 65% of the world's solar panels and overtaking the United States in 2010 in

total installed wind technology, and has helped drive down costs.

Yet despite higher levels of investment, some Summit participants argued that global climate targets will not be met in the coming years. They observed that renewable energy sources are not currently being utilized at a rate that is having a significant impact on the world's biggest energy consumers and CO₂ producers. In Northeast Asia, for example, Japanese and Korean companies are very good at producing renewable technology, but they only have begun focusing on installing renewables domestically in the last few years. This highlights a major challenge for renewables: they require not just the development of advanced technology but also policy frameworks that support investment and implementation.

A few Summit participants pointed to the fact that renewables are currently seen as marginal and will only become more widespread as technologies

develop to lower costs and allow for increased scalability and storage capacity. Wind and solar energy, in particular, will also require significant technological developments in order to increase their reliability. Another challenge that one panelist highlighted is that renewables, like other energy resources, require technological developments in a variety of sectors in order to succeed.

According to Summit participants, renewables have a great deal of technological diversity, with both large- and small-scale projects popping up around the world. This diversity allows households, individuals, communities, and organizations to become both producers and consumers of their own energy. Participants argued that through this process consumers become stakeholders in addressing the shortcomings of renewable energy. However, without government support systems expanding rural access, building investment



Christopher M. Dent (University of Leeds) discusses the prospects of renewable technologies in the roundtable session on “Changing the Rules of the Game: Promoting Breakthrough Technologies.”

“In addition to utility-scale power plants, renewable energy technologies can rather uniquely operate at the household, community, and organizational level. This should over time facilitate the creation of a new clean energy society, where people and communities produce energy for their own consumption and are more directly engaged as stakeholders in energy security challenges.”

— Christopher M. Dent, *Professor, East Asia’s International Political Economy, University of Leeds*

frameworks, setting formal targets, and providing financial incentives for the development of new energy sources, it will be difficult for renewables to play a larger role in the global energy mix.

The Prospects for Hydropower Expansion

A few participants identified hydropower as one energy source that could play a larger role in Southeast Asia’s energy mix and offset coal development if used effectively, given the potential for regional cooperation through ASEAN. ADB has historically been a supporter of expanding hydropower use in Southeast Asia, and has a number of projects geared towards developing its use while ensuring global best practices for environmental, social, and indigenous safeguards.

According to some participants, the environmental sustainability of hydropower is a global issue, one that various governments, international organizations, and NGOs are working to address around the world. Proponents of hydropower as an energy resource argue that it presents significant

options for storage capacity and can provide base-load power to electricity operators. Because of these qualities, they see hydropower as a viable alternative to fossil fuels and a beneficial addition to any energy mix. A few Summit participants pointed out that China has developed numerous large hydropower projects. Globally, “micro-hydro” projects (installations that provide power to isolated homes or small communities) are becoming more common and providing new opportunities for communities.

In the case of Cambodia, according to Secretary Praing, the development of hydropower resources and the extension of the power grid will help reduce greenhouse gas emissions and increase the share of clean energy. Secretary Praing stated, “This will also result in providing lower-cost electricity to [Cambodia’s] industry and consumers, as well as opportunities for power trade and exchange with neighboring countries.” Local and international projects, along with developed international standards, have the potential to increase hydropower’s utilization worldwide, while addressing environmental and sustainability concerns.

“Developing countries, including Cambodia, need diverse, renewable energy products and services...as well as a focus on sustainable energy, energy efficiency, and conservation.”

— Ith Praing, *Secretary of State, Ministry of Mines and Energy, Cambodia*

Energy Conservation: An Essential Element of Energy Security

Encouraging the construction of more efficient buildings and infrastructure projects is an easy way to increase energy savings while achieving a broader, societal impact on energy consumption. Mobilizing investment in energy infrastructure will require better policy planning as governments work to

lower costs and find further savings. The IEA, for example, estimates that Southeast Asia will need \$1.7 trillion of energy infrastructure investment from 2013 to 2035. Institutions like the IEA place considerable importance on energy efficiency, which panelists agreed can be improved in every nation.

According to Mr. Koyama, energy conservation should be regarded as the “sixth energy source” and must be a key part of any country’s energy



Mikkal Herberg (The National Bureau of Asian Research; University of California, San Diego) asks a question during the Summit session on “Finding the Best Mix: Policy, Markets, and Innovations to Secure, Cleaner Energy.”

“Energy conservation should be regarded as the sixth energy source, as it is very important and has a number of advantages to addressing energy challenges.”

— Ken Koyama, *Chief Economist, Institute of Energy Economics, Japan*

policy. Secretary Praing noted that Cambodia is developing the National Energy Efficiency Policy, Strategy, and Action Plan, which identifies energy efficiency as the most cost-effective strategy for economic and social development. The IEA estimates that the adoption of efficiency measures in Southeast Asia could contribute to a 15% cut in energy demand by 2035.

Many participants pointed to efficiency as a low-hanging fruit that requires pairing with

technology development and cuts in CO₂ emissions in order to be most effective. **Christopher M. Dent**, Professor of East Asia’s International Political Economy at the University of Leeds, argued that efficiency measures should be more deeply embedded in societies. He emphasized that consumers must be incentivized to change, and electricity prices can be revised to reflect the importance of conservation and efficiency.



Summit participants continue discussions between sessions.

Moving Forward: The Urgency of Addressing Climate Change



Jostein Dahl Karlsen (International Energy Agency) discusses the process of breakthrough technology development in the roundtable session on “Changing the Rules of the Game: Promoting Breakthrough Technologies.”

“We are in a situation globally right now where we are on the brink of overshooting some important CO₂ targets, so what we do in the next three decades really matters.”

— Armond Cohen, *Executive Director, Clean Air Task Force*

An underlying theme in Summit discussions on finding the best energy mix was the growing need for governments and industry to work to address the global phenomenon of climate change. As countries in the Asia-Pacific have worked over the past few decades to promote greater prosperity among their populations, energy access and economic development have taken precedence over reducing emissions and protecting the environment. However, as can be seen from heightened air pollution, more frequent natural disasters, and spreading water scarcity, climate change is an increasingly serious problem. Mr. Maeda argued that the issue of compatibility between energy and environmental security and sustainable economic growth should be addressed in the G-20 Energy Sustainability Working Group, as well as in the Organisation of Economic Co-operation and Development (OECD). Mr. Cohen emphasized the time-sensitive nature of these problems, noting, “We are in a situation globally right now where we are on the brink of overshooting some important CO₂ targets.” He called for a stronger commitment

to developing the technologies that can help reduce CO₂ emissions across the world.

Opportunities for Innovation

Energy markets can be transformed by disruptive technologies, but investments in the energy sector are massive and long-term. **Jostein Dahl Karlsen**, Chair of the Working Party for Fossil Fuels and the Gas and Oil Technologies Implementing Agreement at the IEA, pointed out that there is an elevated degree of risk-averse behavior and conservatism in the energy industry. With regard to low-carbon technologies, he noted that only renewables are high on the agenda, while other technologies have not received adequate support.

Noriko Fujiwara, Associate Research Fellow and Head of Project Development at the Energy and Climate Change Unit of the Centre for European Policy Studies, noted that the Asian market—with a steadily growing population and GDP, greater urbanization, and increasing energy consumption—is a potential testing ground for

new technologies and innovation in the energy sector. She emphasized that successful innovation in Asia would send a strong message to the world, particularly middle-income countries.

Mr. Cohen noted that the region's growing energy development not only is a source of pollution but also could be a source of innovation. He stated that Asia provides a platform to utilize “work-through technologies,” technologies that have already been developed and could be made more efficient and affordable. He pointed to shale gas as an example of an incremental breakthrough, one that shows the power of step-by-step refinements.

The Potential of Carbon Pricing

Participants widely recognized the growing global problem of climate change, calling for the inclusion of environmental degradation in cost considerations. Many identified carbon pricing as a critical policy mechanism that must be more widely adopted. Carbon pricing, whereby a financial cost is associated with carbon pollution in an effort to curb CO₂ emissions, is both controversial and challenging to implement, but it is seen by many as a necessary step for creating the best energy mix



Mark Thurber (Stanford University) discusses the prospects for carbon pricing in the Asia-Pacific in the Summit session on “Southeast Asia—Shifting Strategies for Energy and Economic Security.”

in a given country and driving new efficiencies in consumption.

However, multiple panelists observed that at this point in time the Asia-Pacific appears very cautious about carbon pricing. China is a notable exception. The country has initiated a few pilot programs on carbon trading, and a national carbon-trading market is expected to be in place by 2016. Dr. Thurber posited that in order for carbon pricing to take hold in the developing world, countries such as the United States, the Republic of Korea, and Japan must lead the way by implementing carbon pricing in their own economies. Mr. Koyama

noted that carbon pricing will be an important challenge in the future and that climate policy should be consistent with overall energy policy, including the establishment of energy mix targets. Some participants argued that carbon pricing should not be implemented on its own but rather should be paired with efforts to improve efficiency and promote low-carbon energy options and alternative energy resources.



Meredith Miller (The National Bureau of Asian Research) speaks at the Summit.

Finding the Best Energy Mix



Left to right: Tatsuo Masuda (Nagoya University of Commerce and Business), Keun-Wook Paik (Oxford Institute for Energy Studies; Chatham House), and Onyeka Obasi (Hemisphere Frontiers Consultancy) meet between sessions at the Pacific Energy Summit.

“Today, energy security comprises of two equally important factors: sustainability of supply for the consuming countries as well as sustainability of demand for the producers.”

— Luvsanvandan Bold, *Minister of Foreign Affairs, Mongolia*

As the leader of world energy demand and production, the Asia-Pacific is uniquely positioned to contribute to finding a balance between environmental concerns and energy demands. The 2014 Pacific Energy Summit brought experts, industry representatives, and policymakers together to probe a variety of energy issues, including the relationship between energy consumption and economic development, the implications of global coal use, the challenges facing energy technology development, and the role that various countries in the Asia-Pacific can play in addressing global energy concerns. Overall, Summit participants agreed that although the best energy mix will vary from country to country, solutions to pressing energy issues require regional and global cooperation.

The diversification of a country's energy mix is vital not just for national energy and environmental security but for regional economic development and environmental sustainability. The role of emerging economies as hubs of energy demand has widespread economic and environmental

implications for the Asia-Pacific and will affect energy trade, economic sustainability, and regional emissions targets. Developed and developing economies are broadly in agreement that environmental concerns are reaching the prominence of energy security concerns, and efforts to find cooperative, fair solutions to climate challenges will benefit all parties in the region.

When considering the best energy mix, Summit discussions focused on the need to address climate and environmental concerns by optimizing energy consumption. All resource options pose cost issues, though the costs differ in nature. For example, although nuclear energy poses potential solutions for high-carbon resources, and coal has the potential to be a cleaner-burning resource with greater investment in new technology, public perception of both the potential harm of using nuclear energy and the environmental consequences of using coal tempers support for the development of both. Renewables will require significant financial investment and technology development, as well

“We can work across government, industry, and academic boundaries in creative ways, for it truly is in all of our interests that the Asia-Pacific region successfully maintains economic growth, meets its escalating energy needs, and curbs the rise in greenhouse gas emissions.”

— Admiral Dennis C. Blair, *Chairman, Sasakawa Peace Foundation USA; Member of the Board of Directors, The National Bureau of Asian Research*

as policy mechanisms that encourage increased use, in order to constitute a larger part of the world’s energy mix. Fossil fuels continue to have a firm hold in the global energy market, but their carbon footprint and resulting environmental impact limit the extent to which countries can rely on them going forward.

Global answers to energy concerns will not come easily. However, informing policymakers and leaders

of the issues at hand will enable governments to anticipate future energy challenges and respond to new ones. Over the last decade, trans-Pacific energy ties have strengthened, and the Pacific Energy Summit has facilitated the development of lasting relationships that center on finding solutions to common, global energy problems. ♦



Secretary of State Ith Praing (Ministry of Mines and Energy, Cambodia) and Thein Lwin (Pyithu Hluttaw, Lower House of Parliament, Resources and Environmental Conservation Committee, Myanmar) between sessions at the Pacific Energy Summit.

Agenda Overview

SESSION ONE

- Opening: SONN Yang-Hoon
Korea Energy Economics Institute
- Dennis C. BLAIR
*Sasakawa Peace Foundation USA;
Board of Directors,
The National Bureau of Asian Research*
- Keynote: Vice Minister CHO Tae-yul
Ministry of Foreign Affairs, Republic of Korea

Finding the Best Mix: Policy, Markets, and Innovations to Secure, Cleaner Energy

- Moderator: Peter HUGHES
Peter Hughes Energy Advisory Limited
- Panelists: Anthony JUDE
Asian Development Bank
- KIM Hyo-Sun
Korea Gas Corporation
- Ken KOYAMA
Institute of Energy Economics, Japan
- Satya YUDHA
*Commission VII, House of Representatives,
Indonesia*

SESSION TWO

Northeast Asia Energy Policy: New Strategies

- Moderator: Edward CHOW
Center for Strategic International Studies
- Panelists: CHEN Weidong
CNOOC Energy Economics Institute
- Steve LIDISKY
ExxonMobil LNG Market Development Inc.
- Hironori NAKANISHI
Ministry of Energy, Trade and Industry, Japan
- PAK Yongduk
Korea Energy Economics Institute
- SEO Jong Tae
KEPCO E&C

LUNCH

Featured Speakers: Melody MEYER
Chevron Asia Pacific Exploration and Production Company

Minister LUVSANVANDAN Bold
Ministry of Foreign Affairs and Trade, Mongolia

SESSION THREE

Scaling Up (and Down) on Nuclear Energy: Where Will We Land?

Moderator: Tatsuo MASUDA
Nagoya University of Commerce and Business

Panelists: HAHN Dohee
Korea Atomic Energy Research Institute

LIN Chengge
*State Nuclear Power Technology Corporation,
People's Republic of China*

PARK Jong Kyun
International Atomic Energy Agency

David WELCH
*Balsillie School of International Affairs,
University of Waterloo; Centre for International
Governance Innovation*



Left to right: Admiral Dennis C. Blair (Sasakawa Peace Foundation USA; Board of Directors, The National Bureau of Asian Research), Ambassador Sung Kim (Embassy of the United States in the Republic of Korea), and Richard Ellings (The National Bureau of Asian Research).

SESSION FOUR

Southeast Asia—Shifting Strategies for Energy and Environmental Security

Moderator	Jeffrey KUPFER <i>Asia Society</i>
Panelists:	Thein LWIN <i>Natural Resources and Environmental Conservation Committee, Pyithu Hluttaw (Lower House of Parliament), Myanmar</i>
	Tadashi MAEDA <i>Japan Bank for International Cooperation</i>
	David TANG <i>K&L Gates LLP</i>
	Mark THURBER <i>Stanford University</i>

RECEPTION

GALA DINNER

Evolving Energy Security Strategies in the Asia-Pacific

Welcome	Richard J. ELLINGS <i>The National Bureau of Asian Research</i>
Remarks	JANG Seok-Hyo <i>Korea Gas Corporation; Korea Gas Union</i>
Moderator	MOON Chungin <i>Yonsei University; Global Asia</i>
Panel:	Dennis C. BLAIR <i>Sasakawa Peace Foundation USA ; Board of Directors, The National Bureau of Asian Research</i>
	Taro KONO <i>House of Representatives, Japan</i>

BRIEFING SESSION

Russia's Asia Bet: Will It Pay Off?

Moderator PAIK Keun-Wook
Oxford Institute for Energy Studies; Chatham House

Panelists: Kengo ASAKURA
Teikoku International Corporation

Tatiana MITROVA
Energy Research Institute, Russian Academy of Sciences

RYU Ji-Chul
Korea Energy Economics Institute

XU Qinhua
Renmin University

SESSION FIVE

North America Energy to Asia: Challenges and Opportunities

Moderator Mikkal HERBERG
*The National Bureau of Asian Research;
University of California, San Diego*

Panelists: Jeff BROWN
FGE Group

Eva BUSZA
Asia Pacific Foundation of Canada

Colin MARSHALL
Cloud Peak Energy

OH Kang Hyun
Lee International IP & Law Group



Left to right: Meredith Miller (The National Bureau of Asian Research), Secretary of State Ith Praing (Ministry of Mines and Energy, Cambodia), Thein Lwin (Pyithu Hluttaw, Lower House of Parliament, Natural Resources and Environmental Conservation Committee, Myanmar), and Victorino S. Bala (ASEAN Council on Petroleum) at the 2014 Pacific Energy Summit.

ROUNDTABLES

*Roundtable One***Enhancing Regional Cooperation on Nuclear Safety**

Moderator PARK Youn Won
Korea Advanced Institute of Science and Technology

Panelists: Robert BOUDREAU
*Office of Nuclear Energy, Department of Energy,
United States*

OH Sung Hwan
Ministry of Foreign Affairs, Republic of Korea

Robert ROSNER
University of Chicago

Kazuo SHIMOMURA
*Organisation for Economic Co-operation and
Development, Nuclear Energy Agency*

Tatsujiro SUZUKI
Nagasaki University

*Roundtable Two***Changing the Rules of the Game: Promoting Breakthrough Technologies**

Moderator KIM Younkyoo
Hanyang University

Panelists: Armond COHEN
Clean Air Task Force

Jostein DAHL KARLSEN
International Energy Agency

Christopher M. DENT
University of Leeds

Noriko FUJIWARA
Centre for European Policy Studies

LUNCH

Introduction	Richard J. ELLINGS <i>The National Bureau of Asian Research</i>
Remarks:	Sung KIM <i>Embassy of the United States, Republic of Korea</i>

SESSION SIX

**Regional Cooperation:
Developing Healthy Energy Systems for Economic Developments**

Moderator	LEE Jae-Seung <i>Korea University</i>
Panelists:	Philip ANDREWS-SPEED <i>Energy Studies Institute, National University of Singapore</i>
	PARK Ki-Chang <i>Ministry of Foreign Affairs, Republic of Korea</i>
	Secretary of State ITH Praing <i>Ministry of Mines and Energy, Cambodia</i>
	Vice Minister Susilo SISWOUTOMO <i>Ministry of Energy and Mineral Resources, Indonesia</i>

CLOSING SESSION

Developing the Best Energy Mix for the Future

Wrap Up	Dennis C. BLAIR <i>Sasakawa Peace Foundation USA; Board of Directors, The National Bureau of Asian Research</i>
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Left to right: Lin Chengge (State Nuclear Power Technology Corporation, People's Republic of China) and Robert Rosner (University of Chicago) continue Summit discussions over lunch.

Working Papers and Interviews

To inform plenary sessions and promote thought-provoking discussion during and after the event, the organizers of the Pacific Energy Summit commissioned original research engaging top experts on energy and environment policy questions.

Working Papers

**Moving Toward Greater Collaboration:
Challenges and Tasks of Energy Cooperation in Northeast Asia**

Sungkyu Lee, *Korea Energy Economics Institute*

Ahhyun Park, *Korea Energy Economics Institute*

This working paper assesses the potential and prospects for strengthening regional energy cooperation in Northeast Asia and offers recommendations for moving forward.

Multilateral Cooperation in Asia's Nuclear Sector: Prospects for Growth and Safety

James E. Platte, *Pacific Forum, Center for Strategic and International Studies*

This working paper explores prospects for growth and multilateral cooperation in Asia's nuclear sector and argues the need for effective regulation and continued multilateral cooperation.

A Green Vision vs. a Brown Outlook? The Future of ASEAN's Energy Mix

Xunpeng Shi, *Energy Studies Institute, National University of Singapore*

This working paper assesses competing outlooks for ASEAN's energy mix and reviews regional energy security strategies using the SWOT analysis method to evaluate strengths, weaknesses, opportunities, and threats.

Interviews

Looking East Amid a Crisis to the West: Russia's Energy Export Strategies

Tatiana Mitrova, *Energy Research Institute, Russian Academy of Sciences*

The Outlook for a Chinese Pivot to Gas

Chen Weidong, *CNOOC Energy Economics Institute*

Access these papers, interviews, and additional material on Asia's energy and environmental challenges at www.nbr.org.

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Left to right: Ken Barron (The National Bureau of Asian Research) and Satya Yudha (Commission VII, House of Representatives, Indonesia) speak at the Summit gala dinner.

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Summit Leadership

The National Bureau of Asian Research (NBR) launched the Pacific Energy Summit in 2009 with the vision to find innovative solutions to energy and environmental challenges in the Asia-Pacific. NBR was fortunate to be joined this year by the Ministry of Foreign Affairs of the Republic of Korea (MOFA) and the Korea Energy Economics Institute (KEEI). MOFA, KEEI, and NBR were proud to bring the 2014 Summit to Seoul and would like to express our gratitude for the insights, contributions, and support of our core Summit leadership—our advisors, partner, lead sponsor, sponsors, and supporting organizations and collaborating institutions—as well as the Summit staff. We are also deeply appreciative of our moderators, panelists, and paper authors, who played an integral role in developing and strengthening this year’s program.

The Ministry of Foreign Affairs of the Republic of Korea establishes and carries out foreign policies, economic diplomacy, and economic cooperation; takes part in international economic communities; administers treaties and international agreements; protects and supports overseas Korean nationals; promotes cultural cooperation; and analyzes international affairs. MOFA has continuously introduced complementary measures for effective diplomacy such as readjustment of manpower and budget befitting the changes in the diplomatic environment and the pursuit of substantial diplomacy to maximize the national interest of the Republic of Korea in the midst of a highly competitive international environment.



The Korea Energy Economics Institute is a national research council of the Republic of Korea dedicated to conducting research in the field of energy and natural resources. KEEI aims to contribute to improve national energy security by collecting and analyzing information in the energy sector, examining current energy-related issues, and assisting the development of policies on energy and natural resources. In addition, KEEI actively conducts research on overseas energy issues by collaborating with the world’s leading research institutes and promotes research cooperation among the industry, government, and academia.



The National Bureau of Asian Research is a nonprofit, nonpartisan research institution dedicated to informing and strengthening policy in the Asia-Pacific. NBR conducts advanced independent research on strategic, political, economic, health, and energy issues affecting U.S. relations with Asia. Drawing upon an extensive network of the world’s leading specialists and leveraging the latest technology, NBR bridges the academic, business, and policy arenas. The institution disseminates its research through briefings, publications, conferences, congressional testimony, and email forums, and by collaborating with leading institutions worldwide.



Lead Sponsor

Chevron is one of the largest integrated energy companies in the world. Headquartered in San Ramon, California, and conducting business in more than 100 countries, the company is engaged in every aspect of the oil and natural gas industry, including exploration and production; refining, marketing and transportation; chemicals manufacturing and sales; geothermal and power generation.



Partner

Asian Development Bank (ADB) is an international development finance institution whose mission is to help its developing member countries reduce poverty and improve the quality of life of their people. Headquartered in Manila and established in 1966, ADB is owned and financed by its 67 members, of which 48 are from the region and 19 are from other parts of the globe. ADB's main partners are governments, the private sector, nongovernmental organizations, development agencies, community-based organizations, and foundations. Under Strategy 2020, a long-term strategic framework adopted in 2008, ADB will follow the complementary strategic agendas of inclusive, environmentally sustainable growth and regional integration. In pursuing its vision of an Asia and Pacific region free of poverty, ADB's main instruments comprise loans, technical assistance, grants, advice, and knowledge. Although most lending is in the public sector—and to governments—ADB also provides direct assistance to private enterprises of developing countries through equity investments, guarantees, and loans.



Gopalan Balachandran (Institute for Defense Studies and Analysis) raises his hand to ask a question in the session on “Scaling Up (and Down) on Nuclear Energy: Where Will We Land?”

Sponsoring Organizations

The Asan Institute for Policy Studies is an independent, non-partisan think tank with the mandate to undertake policy-relevant research to foster domestic, regional and international environments conducive to peace and stability on the Korean Peninsula, as well as Korean reunification.



ExxonMobil is the world's largest publicly traded international oil and gas company, providing energy that helps underpin growing economies and improve living standards around the world. ExxonMobil holds an industry-leading inventory of global oil and gas resources. The organization is the world's largest refiner and marketer of petroleum products, and its chemical company ranks among the world's largest. ExxonMobil is also a technology company, applying science and innovation to find better, safer and cleaner ways to deliver the energy the world needs. ExxonMobil is committed to being the world's premier petroleum and petrochemical company. To that end, ExxonMobil must continuously achieve superior financial and operating results while simultaneously adhering to high ethical standards.



Supporting Organization

Alliance for Northwest Jobs and Exports is a non-profit trade coalition created to support new export infrastructure projects in Oregon and Washington State. Founders include several of the railroad, coal and trade infrastructure companies proposing the projects that have come together in strong partnership with businesses, labor unions, civic groups, and others who understand the importance of trade to our region and the economic benefit these projects will bring. The Alliance works diligently with companies and communities to make these export projects a reality and attract needed new investment, jobs and tax revenue to the Pacific Northwest.



Collaborating Institutions

The Asia Pacific Foundation of Canada (APF Canada) has been a leader in research and analysis on Canada's relations with Asia since its foundation in 1984. Our mission is to develop ideas for action by business, governments and Canadians to help them seize the vast opportunities unfolding in Asia. We do this by offering clear, specific and actionable policy advice and leadership based on sound research and analysis. The Foundation's current thematic priorities include trade and investment, energy and the environment and international education. Engaged in research and convening, APF Canada has developed strong ties with policy-makers, business leaders, academics and opinion makers in Canada and throughout the Asia Pacific region.

Asia Pacific
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The Asia Society Policy Institute (ASPI) is the hub of a non-partisan, Asia-centric global network of experts who create solutions that advance the prosperity, security, and sustainability of Asia. ASPI provides a unique platform for policy development: one with a truly Asia-wide scope; participation from business and policy leaders on equal footing; and the application of Asia Society's world-leading convening and research capabilities. Our formula is suited to advancing international cooperation and effective policymaking during a century that many believe will belong to Asia.



Asia Society
Policy Institute

The Center for Energy Governance and Security (EGS) of Hanyang University conducts dynamic research on today's global energy issues while bringing together groups of energy experts from the United States and major countries in the Asia-Pacific (Korea, China, Japan, Singapore and Australia). Furthermore, building upon comprehensive network base from all three sectors (government, business and academia), global energy governance, energy security, and region-specific issues of significance to the Asia-Pacific region will be actively explored and discussed.



The Institute of East and West Studies (IEWS) at Yonsei University is a research center devoted to the advanced study of politics, economics, social science and cultural life—both domestic and foreign—as well as international affairs. Founded on March 23, 1972, as one of the major university research institutes, the purpose and scope of the IEWS continue to guide and define its mission in the twenty-first century. The main focus is to reinforce globalization of Yonsei education and enhance comprehensive research.



동서문제연구원
Institute of East and West Studies

The Korea Gas Union (KGU) seeks the development of the Korean gas industry, serving members throughout the country. KGU was founded in 1985, and now represents more than 70 local companies, organizations, and individuals in Korean gas industry. KGU members are comprised of state-run corporations, E&P companies, city gas companies, construction and engineering companies, marine and shipbuilding companies, research institutes, and associations.



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ABOUT THE SUMMIT



PACIFIC ENERGY SUMMIT

THE PACIFIC ENERGY SUMMIT is an annual, invitation-only meeting that convenes leaders from government, business, and research to explore innovative solutions to the dual challenges of rising energy demand and a changing climate. The urgency of meeting this energy demand to sustain the economic growth that has lifted millions out of poverty, while safeguarding the environment and climate, demands cooperation and collaboration across nations, sectors, and research areas.

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Bringing Depth to High-Level Discourse—The Pacific Energy Summit facilitates frank exchange of information and perspectives by bringing together leading policymakers, industry representatives and research specialists in a high-trust setting.

Focus on Market-Based Solutions—We are committed to practical and tenable approaches to energy and environmental challenges. The world needs realistic solutions based in an informed understanding of the economic and environmental needs of the region, and the Pacific Energy Summit strives to provide this essential foundation for a productive discussion.

Collaborative and Interactive Experience—We embrace the diverse expertise of all participants by encouraging dialogue before, during, and after the program itself. Participation is limited to ensure concrete discussions and a high-quality exchange of ideas and expertise.

NBR's Trade, Economic, and Energy Affairs Group

Fostering collaborative solutions to shared challenges in the Asia-Pacific

NBR's Trade, Economic, and Energy Affairs Group collaborates with a broad range of U.S. and Asian specialists from industry, research, and policy to conduct innovative research and convene high-level dialogues. Guided by an in-house research team and a select group of senior advisors, the group's research focuses on three broad areas: (1) energy security and policy, (2) energy and the environment, and (3) trade, investment, and economic engagement.

Highlighted initiatives include:

Pacific Energy Summit

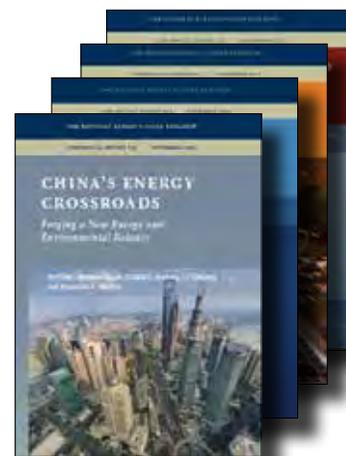
As economies in the Asia-Pacific region continue to grow at astonishing rates, the Pacific Energy Summit aims to foster economic and energy security in the Asia-Pacific by developing practical solutions to the dual challenges of rising energy demand and global climate change. The annual, invitation-only Summit convenes 200 global leaders to articulate practical and tenable policy solutions to energy and environmental challenges.



**PACIFIC
ENERGY SUMMIT**

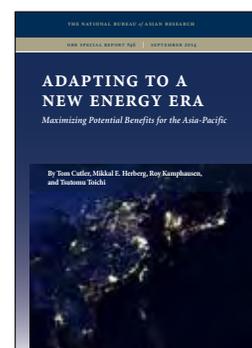
Energy Security Program

Dramatic developments are taking place in Asian energy markets, and these changes will affect the geopolitical situation in the Asia-Pacific region. Rising demand has led to increasing dependence on energy imports and a growing sense of energy insecurity among the major Asian powers. To address these issues, this initiative convenes senior policy and industry leaders and Asia energy specialists from across the region for high-level discussions on Asia's energy policies and their geopolitical implications. Experts share insights and recommendations through an invitation-only spring workshop; NBR's annual Energy Security Report, which compiles expert essays on each year's specific topic; and a public fall launch event.



Adapting to a New Energy Era

An unexpected boom in U.S. and Canadian production of shale gas and tight oil has accelerated an already steady decline in U.S. imports of Middle East oil and gas. At the same time, China, Japan, and the rest of Asia have emerged as major importers of oil and natural gas from the Persian Gulf. This initiative aims to provide in-depth and academically rigorous research into how the United States, Japan, and other countries can craft stronger diplomatic, strategic, and economic tools to support common energy security interests.

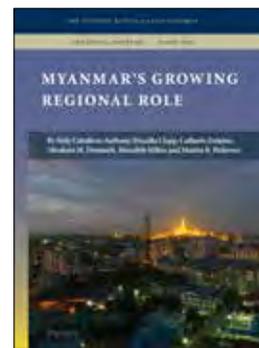


“NBR does a terrific job at getting great people, with great ideas, and making it into a process of dialogue and interaction that leads to recommendations that are very useful in the policymaking process.”

— Robert Hormats, *Former Under Secretary of State for Economic Growth, Energy, and the Environment, Department of State, United States*

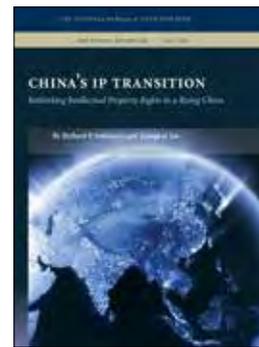
Myanmar’s Growing Regional Role

Myanmar’s recent domestic reforms and improved relations with the United States, European Union, Japan, and the Association of Southeast Asian Nations have opened the door for the country to be an important regional player. To better understand the challenges and opportunities presented by these shifting dynamics, this multi-year project brings together top experts from the United States, Myanmar, and the Asia-Pacific to deepen regional understanding. NBR’s Myanmar initiative seeks to develop a comprehensive framework for the future of the country’s engagement with partners in the region.



Innovation and IP Policy

Economies in the Asia-Pacific have shown unprecedented growth rates in recent years, and the United States aims to engage with the many burgeoning economies in the region. As India, China, and others work to further develop their economies, intellectual property and innovation policies have increasingly appeared in national and international discussions. To assess these key issues, NBR has developed projects looking at intellectual property protection and innovation policy development in the Asia-Pacific and how emerging players in the region continue to shape global discourse on the future of these policies.



Pacific Energy Forum

Broad and fundamental global energy shifts, along with rapidly evolving technologies and capabilities, suggest that Asia and North America need to fundamentally reconsider their current energy relationship. The Pacific Energy Forum gathers experts and leaders from Asia, the United States, and Canada to assess the key policy questions that will shape the future trans-Pacific energy relationship and enhance energy and environmental cooperation among key actors in the region.



For more info on these programs, please contact the Trade, Economic, and Energy Affairs group, at nbrpes@nbr.org.



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