

**PACIFIC ENERGY**  
**FORUM**

**New Frontiers in  
Trans-Pacific Energy Trade**

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Front cover photos (left to right): Congressman Rick Larsen (U.S. House of Representatives, Washington, 2nd District), Anthony Jude (Asian Development Bank), Congresswoman Cathy McMorris Rodgers (U.S. House of Representatives, Washington, 5th District), Hironori Nakanishi (Ministry of Economy, Trade and Industry, Japan), and Congressman Norm Dicks (The National Bureau of Asian Research; Van Ness Feldman LLP)

Back cover photos (left to right): Minister Cal Dallas (Government of Alberta, Canada), Edith St-Hilaire (Consulate General of Canada in Seattle), Tadashi Maeda (Japan Bank for International Cooperation), Phyllis Yoshida (Department of Energy, United States), and Stephen P. Groff (Asian Development Bank)

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# New Frontiers in Trans-Pacific Energy Trade



**Senator Slade Gorton** (Slade Gorton International Policy Center; The National Bureau of Asian Research) moderates a question-and-answer session with **Minister Chulsu Kim** (Lee International IP and Law Group).

“In bringing together this diverse group in Seattle, the Pacific Energy Forum offers a rare opportunity to introduce fresh voices into the conversation, voices from all over the Pacific. Some of these voices have not always been fully considered in local discussions of Asia’s energy demand and regional energy trade, yet they are an essential dimension to the conversation.”

— **Senator Slade Gorton**, *Counselor, The National Bureau of Asian Research; Slade Gorton International Policy Center*

The Asia-Pacific is the most economically dynamic region in the world and sits at the forefront of global efforts to effectively meet growing energy needs and combat climate change. At the same time that Asian demand is rising, the commercial viability of new supplies and the relative abundance of North American energy resources, including shale gas, tight oil, and coal, have opened the door to increasing trans-Pacific energy trade. This shift in supply and demand calls not only for policy adjustments but also for the creation of more integrated and competitive energy markets. Asia’s trajectory toward increasing energy import dependence will bring discussions of energy trade, energy security, and environmental conservation to the forefront of national and international debates in the Asia-Pacific for years to come.

On April 23–24, 2014, the Pacific Energy Forum gathered leading experts from Asia, Canada, and the United States in Seattle, Washington, to assess the key policy questions that North America and Asia face in shaping the future trans-Pacific energy relationship.

This event brought Asian views into the ongoing discussion in Canada and the United States on increasing energy exports. The Pacific Energy Forum was co-hosted by The National Bureau of Asian Research (NBR) and the Slade Gorton International Policy Center, in collaboration with the Asia Pacific Foundation of Canada. Participants included members of the U.S. Congress, senior government officials, and industry representatives, as well as top researchers and academics from North America and Asia. Key questions considered at the Forum included:

- What are the prospects for increasing trans-Pacific energy trade?
- How can we ensure healthy energy markets for sustained economic growth?
- How should we approach challenging issues such as social license and environmental considerations in developing the infrastructure for energy trade?
- How can we best deploy technology to optimize coal consumption?

## KEY FINDINGS

### Growth in Asian Energy Demand and the Importance of Healthy Global Markets

- The Asia-Pacific is the engine of the global economy and the fastest-growing region in the world, with developing Asia experiencing 6% growth in 2013 according to the Asian Development Bank (ADB). Asian countries are also among the United States' and Canada's fastest-growing markets. Asia's growth, driven largely by the region's expanding middle class, provides North America with market opportunities through heightened demand for energy resources.
- By 2035, most Asian countries will produce less than half the energy they need, and many will produce only a tiny fraction, according to ADB. Asia is thus heavily dependent on global markets to ensure the reliable energy supplies necessary to sustain continued economic growth and eradicate poverty.
- Import-dependent Asian countries are working to diversify their energy mix to insulate their economies from potential price fluctuations and market volatility by employing all available fuel sources, including coal, gas, nuclear, and renewable energy resources.
- Both Asian and North American economies and companies would benefit from continuing to promote an open trading system for energy. Regional and trans-Pacific trade and market integration are keys to increasing flexible, efficient, and resilient energy markets.
- Rising energy consumption has serious implications for the environment. Meeting climate change goals and safeguarding the environment necessitate the adoption of energy-efficient technologies and the more widespread use of clean coal technology (CCT).
- Global demand for coal has almost doubled since 1980, driven by increased consumption in Asia, where demand is up over 400% from 1980 to 2010.
- Coal will play a central role in Asia's energy mix for the foreseeable future. In Asia, coal is the cheapest fuel source, easy to transport, and available from multiple suppliers.



**Tadashi Maeda** (Japan Bank for International Cooperation) shares his views on North America's increasing energy exports to Asia during the session on "Abundance and Demand: Shifting Dynamics in Trans-Pacific Energy Markets."

## Increasing North American Energy Production

- North America's shale gas revolution has led to a decrease in coal consumption in the United States due to low gas prices. As a result, U.S. coal producers are looking for new markets.
- The United States has the largest supply of coal reserves in the world and is the second-largest producer of coal globally. Growing demand in Asia makes the region a desirable destination, and many Asian buyers, such as Japan and South Korea, are increasingly looking for alternative coal suppliers.
- In the case of Canada, Asia accounts for over 70% of total coal exports.
- Asian countries are eager to import more liquefied natural gas (LNG) from the continental United States in the hopes of capitalizing on currently low prices, which have led to significant differentials between U.S., European, and Asian markets. Canadian gas is also an attractive option for Asian importers looking for a possible alternative to oil-linked pricing for LNG contracts.
- Transportation constraints will be a key factor in determining how much energy is exported from North America to Asia. New infrastructure for LNG and coal exports in North America will require significant financial capital, regulatory certainty, and local community support. Asian countries can continue to invest in export infrastructure in North America as a way to stimulate projects and benefit from the value chain of energy.

“Washington State is truly well positioned to take a leadership role in the development of the U.S.-Asia energy relationship. Over the last fifteen years, Washington State's trade with Asian countries has grown significantly, and these relationships with Asian trading partners continue to flourish.”

— **Congresswoman Cathy McMorris Rodgers,**  
*U.S. House of Representatives,  
Washington, 5th District*



## KEY FINDINGS

### The Promise of Technology

- Global climate goals will not be met without a commitment to use technology that addresses carbon dioxide (CO<sub>2</sub>) emissions from coal and air pollutants and that improves the efficiency of coal-fired plants.
- Strong differences exist between experts on the question of prioritizing CCT or carbon capture and storage (CCS) development. For many Asian countries, air-quality concerns take precedence over concerns about climate change. Additionally, CCS technology remains expensive.
- Asia and North America should collaborate and commit to supporting the development of technologies that mitigate the environmental impact of coal use through public policies, political support, and funding and investment from private and public sources. As global leaders and the world's largest energy consumers, the United States and China could play a central role in ensuring that coal is used responsibly, particularly in developing countries, where it is often the first step toward electrification.

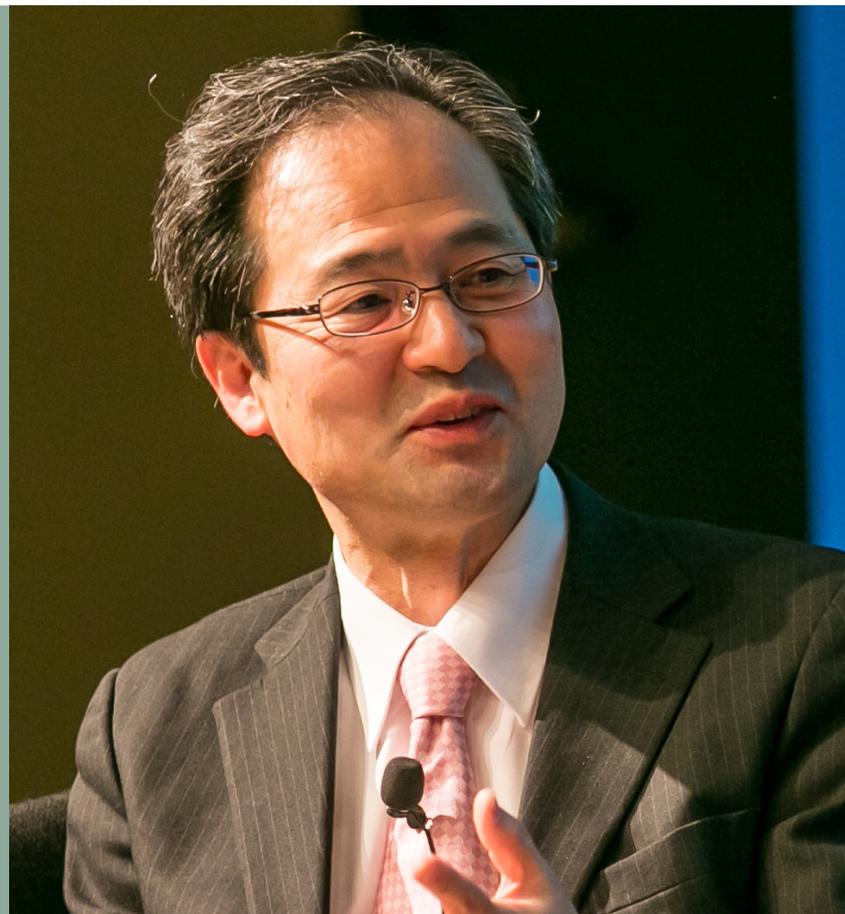


**Han Phoumin** (Economic Research Institute for ASEAN and East Asia) discusses the importance of developing technology to reduce carbon emissions in the Forum session on “Fueling Sustained Growth: Strengthening Energy Markets for Economic Development.”

## Environmental Impact Assessments and Social License

- Potential energy export projects are in some cases facing a new requirement to evaluate the impact on global greenhouse gas emissions (GHG), in addition to conducting local impact studies. Such evaluations need to take into account a complex array of factors, including differences in the elasticity of demand across markets, disparities in fuel quality, and varying levels of clean coal and energy efficiency technologies.
- Complex evaluation processes can significantly increase project costs by extending the time horizons for proposed projects and could prove an obstacle to completion and limit the benefits of trade.
- Acquiring social license—that is, approval from local communities and other stakeholders—is increasingly important for energy export projects around the world. Local opposition is a potential barrier to project completion and subsequent utilization.
- Governments could provide forums for stakeholders to help shape government responses to a wide range of environmental concerns. This could shift the burden of discussions about environmental degradation from individual projects to broader policy questions.

**Hironori Nakanishi** (Ministry of Economy, Trade and Industry, Japan) shares his views on energy policies for optimizing coal consumption during the session on “Pairing Technology with Policy to Optimize Coal Consumption.”



# Abundance and Demand: Tectonic Shifts in Global Energy Flows



Left to right: **Andy Roberts** (Wood Mackenzie) and **Mikkal Herberg** (NBR; University of California, San Diego) participate in the Forum session on “Abundance and Demand: Shifting Dynamics in Trans-Pacific Energy Markets.”

“At projected growth rates of 6.0% to 6.5%, developing Asia will remain the fastest-growing region in the world and the largest contributor to global growth.”

— **Stephen P. Groff**, *Vice President for East Asia, Southeast Asia, and the Pacific, Asian Development Bank*

Global energy trade patterns are dramatically changing due to increased global oil and gas production, driven in large part by North America's shale gas revolution and rising demand in developing Asia and post-Fukushima Japan. Natural gas from shale production in the United States has increased twelve-fold in seven years. Oil production in the United States has also grown dramatically, with an incremental increase in U.S. daily oil production from 2008 to 2013 equivalent to the total daily oil production in Iraq in 2010. These new supplies have the potential to meet a ready market in Asia. Asia has driven recent world economic growth and made some of the most significant economic advances in history, lifting millions out of poverty over the past three decades. However, 1.3 billion people globally remain without access to electricity, according to the International Energy Agency. High growth requires energy resources that Asia increasingly imports from other countries.

Yet at the same time that Asian consumers are seeking out new supply options, they are also searching for innovative solutions to reduce the environmental impact of greater energy consumption. Addressing this dual challenge was an underlying theme in each panel discussion at the Pacific Energy Forum. Participants also widely agreed that healthy energy markets are vital to economic growth and efficiency. For Asia's import-dependent countries, they are critical. An ADB assessment found that by 2035 most Asian countries will produce less than half the energy they need, and many will produce only a tiny fraction. Asia is thus heavily dependent on global markets to ensure the reliable energy supplies necessary to sustain continued economic growth and eradicate poverty. North America's newfound energy abundance has opened the door for increasing energy exports to Asia, as coal supplies have been freed up by the greater use of gas in the U.S. power sector.

## *Asia's Economic Forecast: Key Trends and Policy Considerations*

Safeguarding economic progress in Asia is at the center of regional concerns about energy security and growing import dependence. To provide a foundation for Forum discussions focusing on high economic growth in the region and the resulting increase in energy demand, ADB gave a special presentation on “Asia’s Economic Forecast: Key Trends and Policy Considerations.” This session featured discussion of ADB’s annual Asian Development Outlook (ADO), highlighting the bank’s economic forecast and analysis of macroeconomic issues in developing Asia.

**Stephen P. Groff**, Vice President for East Asia, Southeast Asia, and the Pacific at ADB, noted that the ADO forecasts steady growth in Asia in the coming years. At projected growth rates of

6.0%–6.5%, developing Asia will remain the fastest-growing region in the world and the largest contributor to global growth. Mr. Groff qualified these projections, however, by indicating that the pace of growth differs across subregions and countries. Whereas increased or steady growth is projected in India and much of Southeast Asia, moderated growth is expected in China as the country continues to shift toward a more balanced growth model. The ADO forecasts growth rates of 7.5% in 2014 and 7.4% in 2015 for China, down from 7.7% in 2013. Mr. Groff reiterated, however, that China’s growth continues to be robust and that this forecast need not warrant a concerned response from Chinese authorities.



“[The region] is on track to meet the 2010 APEC goal of a decrease in energy intensity of 45% by 2035.”

— **Phyllis Yoshida**, *Deputy Assistant Secretary for Asia, Europe, and the Americas, Office of Policy and International Affairs, Department of Energy, United States*

The GDP growth occurring across Asia will continue to drive world energy consumption. **Congressman Rick Larsen**, U.S. Representative from Washington's 2nd district, emphasized in his opening remarks that "the demand for energy in Asia is going to continue to grow...and how efficiently they use that energy is going to be very important." **Phyllis Yoshida**, Deputy Assistant Secretary for Asia, Europe, and the Americas at the U.S. Department of Energy, enumerated Asia's role in the increase of global energy demand, noting that 60% of the rise in demand from 2010 to 2040 will come from developing Asia. As a result, Asia's share in worldwide energy-related CO<sub>2</sub> emissions is expected to grow dramatically. According to ADO forecasts, Asia was responsible for 37% of CO<sub>2</sub> emissions in 2010, and this share is projected to increase to 47% by 2035.

On the other hand, energy intensity is decreasing in Asia. Dr. Yoshida indicated that the region is

"on track to meet the 2010 APEC goal of a decrease in energy intensity of 45% by 2035," but she emphasized that much work remains to be done to promote energy efficiency further. A key issue in the discussion of reducing energy intensity is the role of different types of energy in the energy mix. Dr. Yoshida projected that renewable and nuclear energy will account for 20% of the world energy mix by 2040, meaning 80% will still be made up of various types of fossil fuels.

Dr. Yoshida provided several global policy prescriptions for addressing energy concerns, including promoting continued reductions in energy intensity, encouraging international cooperation, building better investment conditions for unconventional fuel sources, supporting renewable and nuclear energy development, and seeking greater diversity of energy supplies.

"The demand for energy in Asia is going to continue to grow...and how efficiently they use that energy is going to be very important."

— **Congressman Rick Larsen**,  
U.S. House of Representatives,  
Washington, 2nd District



## *A Changing Role for North America*

**Richard W. Westerdale II**, Director of the Policy Analysis and Public Diplomacy Office in the U.S. Department of State Bureau of Energy Resources, made the important point that “energy sits at the nexus of national security, economic development, and environmental responsibility. It is important for us to recognize and realize that is

true for all nations. It is also why energy can be a tremendous source of cooperation or a source of conflict.” This is in part the reason that the U.S. government will continue to be involved in global energy supply and work to address energy problems in the Asia-Pacific. Canada also looks to play a similar role. **Edith St-Hilaire**, Acting Consul General for the Consulate General of Canada in Seattle, noted Canada’s abundance of natural gas and the country’s potential to become a major



**Edith St-Hilaire** (Consulate General of Canada in Seattle) delivers opening remarks in the session on “Evaluating the Environmental Implications of Trans-Pacific Energy Trade.”



**Richard W. Westerdale II** (Department of State, United States) discusses the roles of strengthening energy and environmental security in trans-Pacific energy markets in the session on “Abundance and Demand: Shifting Dynamics in Trans-Pacific Energy Markets.”

global supplier of LNG. She further stated that “Asia is an obvious market” for Canada due to the geographic proximity of British Columbia to Asia.

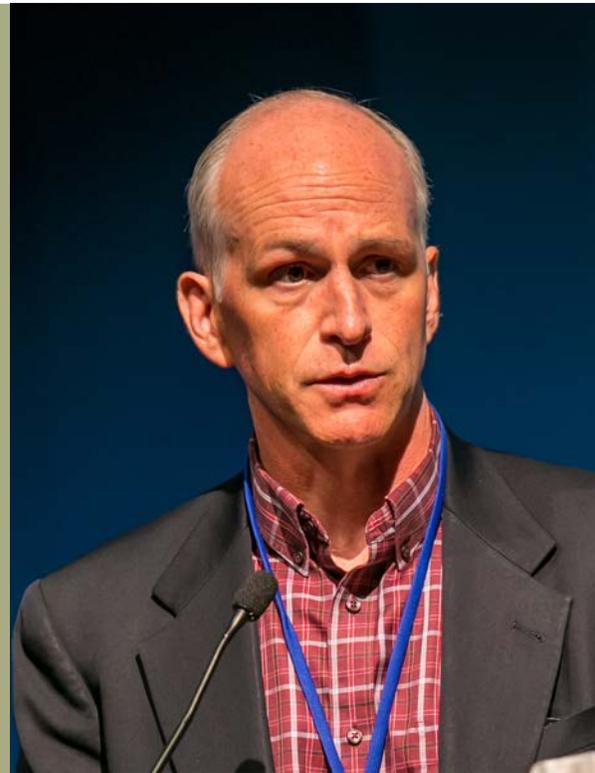
**Congresswoman Cathy McMorris Rodgers**, U.S. Representative from Washington’s 5th district, also emphasized that the energy revolution—including North American shale—has been a game changer, “positioning America to lead the world in energy production by 2015.” U.S. leaders, companies, and citizens have a vested interest in how emerging

economies meet their energy demand because there are direct consequences for the United States.

**Congressman Adam Smith**, U.S. Representative from Washington’s 9th district, noted that massive growth in Asia is a positive development, creating markets that are important for U.S. companies. Since energy security is tied to economic growth, the United States has a stake in Asia successfully working through its energy conundrum.



**Yuen Pau Woo** (Asia Pacific Foundation of Canada) discusses policy options for reducing Asian carbon emissions in the session on “Evaluating the Environmental Implications of Trans-Pacific Energy Trade.”



**Congressman Adam Smith** (House of Representatives, Washington, 9th District) delivers his opening remarks for the session on “Fueling Sustained Growth: Strengthening Energy Markets for Economic Development.”

# Strengthening Energy Markets for Economic Development



**Anthony Jude** (Asian Development Bank) and **Joseph Kalt** (Harvard University) explore the roles of trans-Pacific energy and environmental ties in strengthening Asia's economic outlook during the Forum session on "Fueling Sustained Growth: Strengthening Energy Markets for Economic Development."

“Diversification of Japan’s gas import portfolio to include North American supply is a key priority [for Japan].”

— *Tadashi Maeda, Representative Director and Senior Managing Director, Japan Bank for International Cooperation*

## *Enhancing Trans-Pacific Energy Trade*

While the market dynamics of North American supply and Asian demand would seem to ensure extensive trade, the current monetary value of trans-Pacific energy trade is surprisingly low. **Minister Chulsu Kim**, Senior Advisor at Lee International IP and Law Group and former Minister of Trade, Industry and Energy for the Republic of Korea, pointed out that the energy-trade relationship is not meeting this potential. In terms of total energy trade, according to Minister Kim, North America exported only \$11.2 billion to China, Japan, Taiwan, and Korea in 2013. Minister Kim stated that trade in the reverse direction was even lower, reaching only \$5.7 billion. Industry leaders and policymakers are working to address shifting demand, but trade has not yet caught up with these changes. Minister Kim’s point was well received by Forum participants, who generally agreed that North America and much of Northeast Asia have similarly aligned energy interests, particularly with respect to shale gas.

Partly because of the alignment of interests and needs in North America and Asia, it is expected that trans-Pacific energy trade and multilateral technological partnerships will deepen. **Tadashi Maeda**, Representative Director and Senior Managing Director of the Japan Bank for International Cooperation, spoke about the need for Japan to expand its energy sources. He stated that the “diversification of Japan’s gas import portfolio to include North American supply is a key priority” for Japan, whose economy has suffered on account of the post-Fukushima spike in natural gas imports and relatively high prices for LNG imports. Asian countries are interested in increasing the number of source countries for gas, particularly by importing shale gas from North America, in the hopes that this will drive Asian LNG prices down. Other motivations for diversifying suppliers include the desire to limit overreliance on any one energy resource in order to avoid price shocks or supply disruptions.

Forum participants agreed that the prospect of cheaper prices for LNG imports from the continental

United States is a key driver of Asian interest in expanding trans-Pacific gas trade. According to FACTS Global Energy, in 2012 imported gas in Japan cost roughly \$18 per million British thermal unit (mmBtu), whereas wholesale prices were \$9 per mmBtu in the United Kingdom, under \$2 per mmBtu in the United States, and \$0.75 per mmBtu in Saudi Arabia. The integration of gas into the power sector has been historically limited in developing Asia, where it was regarded as a premium fuel source.

For countries seeking to diversify their energy supply, such as Japan, Korea, and members of the Association of Southeast Asian Nations (ASEAN), governments have an opportunity to play a role in financing export and transportation infrastructure in their respective countries that will help ease the process of diversification and market integration. Some Forum participants argued that North American governments should work to streamline the process for approving energy export projects, such as terminals and pipelines, in an effort to facilitate the economic opportunities of new trans-Pacific investment and trade.

Minister Kim identified four specific suggestions for promoting an open trading system through government and industry strategies:

1. North America should ease its ban on oil exports by liberalizing the export of oil-related products like condensate.
2. The United States should allow for early approval and final investment decisions for pending gas export projects and should shorten public interest evaluations for non-free trade agreement partners.
3. Financial and tax incentives should be given to facilitate industry-to-industry cooperation in shale gas terminals and pipelines.
4. An intergovernmental meeting at the ministerial level should be conducted for trans-Pacific energy trade, along with an accompanying private-level body.

Given that there is no perfect solution to addressing global energy concerns, Congressman Smith observed that an “all of the above strategy” that balances economic needs and global environmental responsibility is needed. This strategy would necessitate substantial investment from the United States in cleaner-burning alternative sources of fuel. However, Forum participants affirmed that Asia also needs healthy capital markets to foster growth and to attract capital, which could yield more efficient energy use through improved transportation networks and use of environmentally friendly technologies.

## *Trade and Market Integration: Tools to Increase Asian Energy Security*

Cross-border investment and inter-regional trade with Asia and within North America will play a significant role in increasing energy security in Asia. Trade among neighbors and regional partners is one such way to address energy security concerns by improving efficiency and supply options. **Anthony Jude**, Chair of the Energy Committee and Senior Advisor and Practice Leader (Energy) in the Regional and Sustainable Development Department at ADB, noted that improving energy technology is a good opportunity for investment and cooperation across borders. Creating cooperation and integration in regional energy trade, however, requires common

standards and codes for infrastructure, along with patience and a willingness to overcome political challenges in order to develop new inter-regional trade relationships.

**Han Phoumin**, Energy Economist at the Economic Research Institute for ASEAN and East Asia, stated that ASEAN needs to develop a common commitment to using the best technology to reduce emissions while at the same time bringing attention to the need for global support to help developing countries pursue cleaner technologies. One way to forge such a commitment would be through the establishment of a common regional electricity market. To achieve this goal, Mr. Phoumin cited the need for a strong and integrated grid system with a harmonization of procedures, both of which require political cooperation and economic support.



Participants listen to the panel discussion on “Pairing Technology with Policy to Optimize Coal Consumption” at the Pacific Energy Forum.

On the North American side of the discussion, **Joseph Kalt**, Ford Foundation Professor (Emeritus) of International Political Economy at Harvard University's John F. Kennedy School of Government, argued that U.S. prospects for increasing exports of oil, coal, and natural gas are low for two reasons. First, there is no waning of the desire to keep energy prices low, which limits the commitment to export energy among policymakers. Second, as concerns over the environmental implications of the export of LNG and coal increase, the force of local politics impedes some activities that would otherwise be to the national benefit. Dr. Kalt also stressed that “solving the problems of global climate change will

take global cooperation that simply is not evident in the will of the system.” The United States, Dr. Kalt said, should engage in the export of energy resources to Asia as a means to promote economic development and raise the global standard of living. This approach will in the long run develop the capabilities needed to adapt to global warming through greater economic prosperity.

### *Energy as a Tool for Economic Development*

North American leaders, companies, and citizens have a vested interest in how emerging economies meet their energy demand because of the



**Minister Cal Dallas** (Government of Alberta, Canada) discusses the importance of gaining social license for North American energy infrastructure projects.



**Stephen P. Groff** (Asian Development Bank) outlines the prospects of economic growth in the Asia-Pacific in the ADB special presentation on “Asia’s Economic Forecast: Key Trends and Policy Considerations.”

interconnected nature of the global economy and environment. Environmental degradation in one country can affect others. Many panelists pointed to the example of Chinese coal use as a global concern that influences the quality of the environment in the entire Asia-Pacific. Additionally, the nature of global markets today is such that economic success or failure in one region has the potential to affect another region economically. The link between economics and energy can transform regional issues into international concerns, as increased economic growth requires greater access to electricity and the construction of infrastructure to sustain growth.

**Jeffrey Kupfer**, Bernard Schwartz Fellow at the Asia Society, believes global markets are important for sustaining economic growth in Asia and pulling people out of poverty. He noted that as worldwide demand shifts, the close interdependence among all countries, especially suppliers and consumers, is clear. Efficient energy use in one country is good for everyone. Thus, the relationships between developed and developing economies would improve if the focus of cooperation were shifted from one-sided demands to common collaboration and exchange.

One natural area for cooperation is investment in new technology and infrastructure. Many Forum participants suggested that North America and Asia should collaborate to further develop and deploy clean coal technology in order to enhance energy efficiency and improve air quality. Multiple Forum participants stressed that many developing



**Dan Kirschner** (Northwest Gas Association) participates in Forum discussions.

economies do not possess the high-tech skills or financing needed to acquire new technologies, so international cooperation is an important part of increasing sustainable, efficient energy use in these countries. Energy technology is often expensive, and most countries have prioritized raising the common standard of living over protecting the environment and achieving global climate change goals. Therefore, continued improvement of capital markets within countries is important to facilitate economic development, which can lead to more ambitious energy efficiency goals as basic economic and energy access needs are met.

## Coal: Continued Role and Paths Forward



Left to right: **Hironori Nakanishi** (Ministry of Economy, Trade and Industry, Japan), **Armond Cohen** (Clean Air Task Force), and **Shoichi Itoh** (Institute of Energy Economics, Japan) discuss the urgency of transforming coal into a cleaner and more efficient fuel in Asia in the Forum session on “Pairing Technology with Policy to Optimize Coal Consumption.”

“Asian economies are going to, out of necessity, remain coal-based. . . . If we triple the generation from natural gas, quadruple the generation from renewables, and quintuple the generation from nuclear power, you still need to approximately double the generation from coal in China just to meet the economic targets.”

— **Andy Roberts**, *Principal Analyst, Wood Mackenzie*

## *Pairing Policy and Technology to Optimize Coal Consumption*

Asia is the world’s largest coal market, and coal is expected to play a fundamental role in the region’s energy mix for decades to come due to a lack of domestic alternatives and the limited projected expansion of nuclear and renewable energy. **Nate Aden**, a PhD candidate at the University of California, Berkeley, stressed that coal provides both costs and benefits that warrant debate. On the one hand, 60% of the rise in carbon emissions since 2000 has been from the increased use of coal. On the other hand, coal is energy-rich and easily transportable, and it continues to be an important resource for economic development. Therefore, the clean coal research agenda should not be neglected.

CCT was a popular topic among Forum participants. It refers to a group of technologies that reduce coal’s environmental effects and limit the emission of harmful gases, such as sulfur dioxide and nitrogen oxide. According to U.S.

government data, 90% fewer pollutants are emitted from coal power plants built in the United States today than from those built in the 1970s. Additionally, emissions generated from coal-powered electricity in the United States have decreased by 40% since the 1970s. Carbon-capture-and-storage technologies refer to the process by which CO<sub>2</sub> emissions from an industrial facility are trapped and stored underground in geological formations. CCS can capture roughly 90% of CO<sub>2</sub> emissions, though there are challenges surrounding the storage of extracted carbon. CCS is just one example of the varieties of CCT that provide larger options for global coal consumption; however, this technology is expensive and has not yet been brought to large-scale markets.

Mr. Aden believes that international programs for efficiency improvements and CCS development are essential for reducing the environmental impacts of continued coal use. As the role of coal shifts in global energy systems, private-public cooperation can reduce societal costs by accelerating efficiency

“In 2013, \$254 billion was spent globally on wind and solar, but the corresponding number for carbon capture was less than \$2 billion. Wind and solar are providing less than 3% of global power supply, and CCS is relevant to the other 80% to 85%, so we’ve got a mismatch.”

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

improvements and development of emissions-mitigation technologies.

Many Forum participants argued that, given the central role that coal plays in the global economy, particularly in developing Asian countries, it is essential for stakeholders to come together and invest more in reducing the environmental externalities of coal consumption. **Armond Cohen**, Executive Director of the Clean Air Task Force, noted that in 2013 “\$254 billion was spent on wind and solar, but the corresponding number for carbon capture was less than \$2 billion.” As wind and solar provide less than 3% of the global power supply and CCS is relevant to the remaining 80%–85% of the power generated from fossil fuels, Mr. Cohen noted a decided “mismatch” in investment. In addition to increased investment in clean sources of energy, countries could also benefit from pursuing energy efficiency in order to glean more output from less energy.

According to another Forum expert, many Asian countries are learning from previous environmental mistakes involving unregulated coal use and are

using technology to mitigate coal’s environmental impact. Mr. Jude highlighted the broader success of developing CCS technology in Asia, with projects now being developed by ADB in Shanghai, Beijing, and Indonesia. According to Mr. Jude, unlike some of its neighbors, China has deployed high-standard technology for new coal plants and is currently developing CCS technology domestically.

**Ben Yamagata**, Executive Director of the Coal Utilization Research Council and Partner at Van Ness Feldman LLP, observed, “I don’t think we can meet global climate goals without a commitment to technology that addresses CO<sub>2</sub> emissions from coal.” Many participants noted, however, that new technologies take a while to be realized, as upfront costs are quite high. According to **Hironori Nakanishi**, Director-General for Energy and Technology Policy in the Agency for Natural Resources and Energy of Japan’s Ministry of Economy, Trade and Industry, the investment and time needed for CCS remain a significant challenge. Public funding for CCT is important, Mr. Nakanishi said, but it requires support from policymakers and local communities.

International collaboration on coal could also be helpful, and technology transfer is a good example of how to foster collaboration.

Forum participants agreed that Asia, North America, and the rest of the world could benefit from the development of technologies that mitigate the environmental impacts of coal use. Public policies, political support, funding, and investment would all play an important role in supporting these technological advances. ADB estimates that coal will account for approximately 83% of electricity production in the Asia-Pacific by 2035, leading many experts to conclude that transforming coal into a cleaner, more efficient fuel is increasingly urgent.

**Colin Marshall**, President and CEO of Cloud Peak Energy, also focused on the importance of developing practical ways to approach the role of coal in the energy mix. He called for a separation of the political and emotional arguments surrounding coal from the reality of its necessary role in powering

future global growth. **Shoichi Itoh**, Manager and Senior Analyst at the Institute of Energy Economics, Japan, echoed this view, stating that because coal is cheaper than oil and gas, more dispersed geographically, and more available and accessible, it will continue to play a large role in the energy mix. However, Mr. Itoh also emphasized the importance of reducing environmental burdens associated with coal use, either by funding, developing, and implementing new technologies or by replacing older coal-fired power plants with new, more efficient ones.

The geopolitical implications of not enhancing coal use, Mr. Itoh asserted, are dramatic: energy security uncertainties that are a result of geopolitical conflicts over oil and gas could become exaggerated if Japan, China, the United States, and other large coal consumers do not focus on improving the utilization of this abundant resource. Regional and global conflicts as a result of energy insecurity are not uncommon. If the United States and Asian



Left to right: **Shoichi Itoh** (Institute of Energy Economics, Japan) and **Ben Yamagata** (Coal Utilization Research Council; Van Ness Feldman LLP) participate in the Forum session on “Pairing Technology with Policy to Optimize Coal Consumption.”

countries were to take the lead in developing promising technologies such as CCT and CCS, technological development could become a means of maintaining peaceful international relations and, similar to diversification, reducing risks of uncertainty in international markets.

Forum participants pointed to the numerous advantages of using coal as a reason for working to stem CO<sub>2</sub> emissions instead of rejecting coal outright. North American coal production, use, and exports are currently being challenged by stringent environmental guidelines. As Mr. Yamagata noted, “Our challenge is to be patient. To provide the time, financial support, and the public policy support needed to develop these technologies. American ingenuity and know-how have done this before; we can do it again.”

Experts question whether environmental concerns can be addressed without developing and implementing technologies that reduce CO<sub>2</sub> emissions. For that reason, many Forum participants argued for the development and widespread use of CCS technology, as well as for the depoliticization of the global discussion of coal. International programs for CCS development could be valuable in preventing the negative environmental impacts of increased coal use and help create public and political support for clean technology developments across the energy sector.

## *China: Managing Coal Consumption*

As many panelists noted, the bulk of the energy available to North America and Asia comes from fossil fuels, which typically have more repercussions for the environment than other forms of energy. In China, managing coal consumption has come to the forefront of policy aims due to poor air quality resulting from previously weak environmental standards. As **Mikkal Herberg**, Research Director of NBR’s Energy Security Program and Senior Lecturer at the University of California, San Diego, noted, “there are four top issues in Asian energy. These are (1) China Coal, (2) China Coal, (3) China Coal, and (4) India Coal.” He then asked, “How do we get from where we are today to where we want to be? The amount of energy required for economic development globally is not environmentally sustainable, so what do we do?”

**Andy Roberts**, Principal Analyst at Wood Mackenzie, stressed that in the face of such questions, and despite investment and environmental challenges, it must be recognized that coal will not be going away anytime soon. Global coal production is expected to reach 13 billion tons per annum in the next twenty years, with today’s total thermal coal production required to meet demand solely for future electricity production. Mr. Roberts stated that even as developed economies move away from coal,

“Asian economies are going to, out of necessity, remain coal-based.... If we triple the generation from natural gas, quadruple the generation from renewables, and quintuple the generation from nuclear power, you still need to approximately double the generation from coal in China just to meet the economic targets.” However, the shift of coal demand to Asia cannot be met solely by domestic production, resulting in large imports and increased seaborne trade. Whether a country will import coal depends on the type of coal needed and whether it can reach the destination at a reasonable price. Coals are ranked based on carbon content; the higher the rank of coal, the higher the carbon content. Coals with lower carbon content are growing in popularity, and these are produced predominantly in Indonesia and the western United States.

**Ayaka Jones**, Senior Analyst at the U.S. Energy Information Administration (EIA), indicated that while the EIA estimates that in developing Asia coal will grow the slowest of all energy sources between 2010 and 2040, it will still account for 46% of the energy supply by 2040. China consumed about 3.8 billion metric tons of coal in 2012, more than four times what the United States consumed. The export market potential created by this huge energy demand from China, as well as from other Asian countries, was a significant underlying theme in Forum discussions, shaping questions about the size of the future market for U.S. coal producers and how to balance economic and environmental considerations. Balancing environmental concerns with potential economic success is a major conundrum, and China is on the front lines of this challenge.

**Ayaka Jones** (Energy Information Administration, United States) shares her thoughts on energy and environmental projections for the Asia-Pacific region during the session on “Abundance and Demand: Shifting Dynamics in Trans-Pacific Energy Markets.”



# Evaluating the Environmental Implications of Trans-Pacific Energy Trade



Left to right: **Mark Thurber** (Stanford University) and **Nate Aden** (University of California, Berkeley) explore key factors for evaluating environmental implications of trans-Pacific energy trade.

“How do we get from where we are today to where we want to be? The amount of energy required for economic development globally is not environmentally sustainable, so what do we do?”

— **Mikkal Herberg**, *Research Director, Energy Security Program, The National Bureau of Asian Research; Senior Lecturer, University of California, San Diego*

Participants reiterated throughout the Forum that large investments in infrastructure are necessary to further trans-Pacific trade. Conversely, in many locations in North America the public is increasingly concerned with the potential consequences of energy infrastructure development, such as the construction of ports and pipelines, for GHG emissions and the environment. As a result, acquiring social license is central to energy export projects because local opposition can be a barrier to their completion.

The Pacific Northwest has emerged as a focal point for the debate over the potential global environmental impacts of North American energy exports. Because the Pacific Energy Forum was convened in Seattle, Washington, these issues were at the forefront of many of the Forum discussions. In both the United States and Canada, there have been calls to consider the GHG emissions produced from initial extraction through to end-use of energy projects. Evaluation is a challenge, however, as one must account for a complex array of factors, such as differences in the elasticity of demand across

markets, disparities in fuel quality, and varying usage of clean coal and energy efficiency technologies. These evaluations could also have serious implications for the global trading system if they become widespread, even more so if the scope were to be expanded to include other consumer goods and commodities outside of the energy sector.

**Cal Dallas**, Minister of International and Intergovernmental Relations in the Government of Alberta, Canada, highlighted the difficulty that Canadian projects have faced in obtaining social license. Minister Dallas stated, “The engagement and the respectful involvement of aboriginal communities and aboriginal governments along the proposed routes of these projects is one of the challenges that we have before us.” He emphasized the importance of being mindful of environmental considerations as well as of economic and social impacts associated with key projects. One way in which social license can be achieved in local communities in both the United States and Canada is through environmental impact assessments,

“The engagement and the respectful involvement of aboriginal communities and aboriginal governments along the proposed routes of these [Canadian] projects is one of the challenges that we have before us.”

— **Cal Dallas**, *Minister of International and Intergovernmental Relations, Government of Alberta, Canada*

whereby an evaluation process is used to predict, identify, and evaluate the environmental effects of proposed projects in a particular region or area. Such assessments can recommend either the prevention or completion of projects, depending on the results.

Panelists suggested a variety of ways to make energy systems more sustainable and deepen trans-Pacific trade while considering the environmental and economic effects of energy use.

These include fostering economic and research partnerships to address universal energy issues, promoting regional gas hubs, and encouraging new technology development. Additionally, promoting CCT usage in emerging economies is seen as having great potential for ensuring the continued spread of clean, alternative energy sources and improved environmental outcomes.



**Congressman Norm Dicks** (Van Ness Feldman LLP; The National Bureau of Asian Research) introduces the session on “Fueling Sustained Growth: Strengthening Energy Markets for Economic Development.”

## Community Engagement and Environmental Solutions

Opponents of exporting fossil fuels from North America are increasingly focused on global, lifecycle emissions associated with the trade of fossil fuels rather than just on the local environmental impacts. In some cases this has led to an expanded mandate for environmental impact assessments to take into account both the site-specific and broader effects associated with a given project. **Brian Yates**, Vice President of Impact Assessment and Community Engagement at SNC-Lavalin, believes this is partially due to the rise of social media. In addition, environmental assessments are an accessible way for the public to debate and see action on broader environmental issues.

Panelists discussed ways that governments could provide a forum for people to contribute on larger environmental issues such as climate change. Governments, many panelists believed, should follow up on public recommendations with robust policies, transferring the burden of these discussions from individual projects to the wider industry and society. A few panelists argued that building in the externalities of fossil fuel use through carbon pricing or taxation, which places a cost on emitting CO<sub>2</sub>, is the best method for reducing emissions. Others disagreed with this approach, which they believe would have a negative impact on the economy.

**Brian Yates** (SNC-Lavalin) shares key insights in the session on “Evaluating the Environmental Implications of Trans-Pacific Energy Trade.”



# Looking Ahead



**Don Collins** (Western Research Institute) asks a question during the Pacific Energy Forum.

“The world has changed. The picture where OPEC countries produced and OECD countries consumed has been completely shattered.”

— **Richard W. Westerdale II**, *Director of the Policy Analysis and Public Diplomacy Office, U.S. Department of State Bureau of Energy Resources*

Many Forum participants maintained that providing the amount of energy the world requires with fossil fuels is not environmentally sustainable and argued that a global answer is necessary. Many participants believed this point to be particularly evident given the likelihood of coal’s continued prominence in the energy mix of large-scale consumers in Asia in the immediate future. The United States and Canada have the ability to play a significant role in finding and facilitating solutions to environmental challenges, but success will require cooperation among many countries.

Economic development in emerging Asia requires access to energy resources as well as a focus on sustainability in order to protect the environment. Investment and inter-regional cooperation, along with political will, are necessary to develop these resources and support the deployment of technologies such as CCT and CCS. These technologies are essential as Asia-Pacific countries struggle to meet growing energy demand while supporting environmental conservation.

The United States and Canada have the chance to supply much-needed energy to countries in the Asia-Pacific, but local and regulatory barriers to North American development of domestic energy projects have widespread implications for the rest of the world. This detracts from both countries’ historical leadership of free, open, and transparent global energy markets, undermining long-standing efforts to build a diversified, integrated, and efficient market that maximizes prosperity.

While participants at the Pacific Energy Forum did not agree on all issues, there was consensus on the need for closer collaboration between industries, local and national policymakers, and foreign governments. By working together, these stakeholders can better address the challenge of effectively meeting energy demand to sustain economic growth while safeguarding the environment. As Dr. Yoshida noted, “One of the fundamental truths is that the world is interconnected in energy. Our energy security depends on that of our neighbors and our partners.” ♦

# Agenda Overview

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## OPENING

### **Asia Economic Forecast: Key Trends and Policy Considerations**

- Welcome: Richard J. ELLINGS  
*The National Bureau of Asian Research*
- Opening Remarks: Congressman Rick LARSEN  
*House of Representatives, United States*
- Moderator: Meredith MILLER  
*The National Bureau of Asian Research*
- Panelists: Stephen P. GROFF  
*Asian Development Bank*
- Phyllis YOSHIDA  
*Department of Energy, United States*

## SESSION ONE

- Welcome: Senator Slade GORTON  
*Slade Gorton International Policy Center;  
The National Bureau of Asian Research*
- Remarks: Minister Chulsu KIM  
*Lee International IP & Law Group*

### **Abundance and Demand: Shifting Dynamics in Trans-Pacific Energy Markets**

- Moderator: Mikkal HERBERG  
*The National Bureau of Asian Research;  
University of California, San Diego*
- Panelists: Ayaka JONES  
*Energy Information Administration, United States*
- Tadashi MAEDA  
*Japan Bank for International Cooperation*
- Andy ROBERTS  
*Wood Mackenzie*
- Richard W. WESTERDALE II  
*Department of State, United States*

## SESSION TWO

**Evaluating the Environmental Implications of Trans-Pacific Energy Trade**

- Opening Remarks: Edith ST-HILAIRE  
*Consulate General of Canada in Seattle*
- Moderator: Yuen Pau WOO  
*Asia Pacific Foundation of Canada*
- Panelists: Nate ADEN  
*University of California, Berkeley*
- Mark THURBER  
*Stanford University*
- Brian YATES  
*SNC-Lavalin*

## LUNCH

- Introduction: Meredith MILLER  
*The National Bureau of Asian Research*
- Opening Remarks: Patrick HO  
*China Energy Fund Committee*
- Moderator: Richard J. ELLINGS  
*The National Bureau of Asian Research*
- Remarks: Minister Cal DALLAS  
*Government of Alberta, Canada*



Left to right: **Richard W. Westerdale II** (Department of State, United States), **Meredith Miller** (The National Bureau of Asian Research), **Anthony Jude** (Asian Development Bank), and **Stephen P. Groff** (Asian Development Bank) at the Welcome Reception.

SESSION THREE

**Fueling Sustained Growth: Strengthening Energy Markets for Economic Development**

- Introducer: Congressman Norm DICKS  
*Van Ness Feldman LLP;*  
*The National Bureau of Asian Research*
- Remarks: Congressman Adam SMITH  
*House of Representatives, United States*
- Moderator: Jeffrey KUPFER  
*Asia Society*
- Panelists: Anthony JUDE  
*Asian Development Bank*
- Joseph KALT  
*Harvard University*
- Han PHOUMIN  
*Economic Research Institute for ASEAN and East Asia*



**Jeffrey Kupfer** (Asia Society) and **Han Phoumin** (Economic Research Institute for ASEAN and East Asia) share ideas during a break between sessions.

## SESSION FOUR

**Pairing Technology with Policy to Optimize Coal Consumption**

Remarks: Congresswoman Cathy MCMORRIS RODGERS  
*House of Representatives, United States*

Moderator: Armond COHEN  
*Clean Air Task Force*

Panelists: Shoichi ITOH  
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Van Ness Feldman LLP*

## CONCLUSION

**The Path Ahead**

Remarks: Senator Slade GORTON  
*Slade Gorton International Policy Center;  
The National Bureau of Asian Research*



Forum participants take advantage of breaks between sessions to meet other participants and continue Forum discussions.

## Working Papers and Interviews

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

### Working Papers

#### **A New Era of Coal: The “Black Diamond” Revisited**

Shoichi Itoh, Senior Analyst, *Institute of Energy Economics, Japan*

This working paper explores the rising importance of coal for satisfying surging global energy demand, considers the geopolitical implications of the effective use of coal, and highlights the potential role of the U.S. as a major coal supplier.

#### **Fueling Sustained Growth: Strengthening Energy Markets for Economic Development**

Han Phoumin, Energy Economist, *Economic Research Institute for ASEAN and East Asia*

This working paper examines the importance of energy market integration for capturing the advantages of energy cooperation between Asia and North America.

#### **Extracting Coal from the U.S. Pacific Northwest: Potential Impacts of Removing an Energy Transportation Constraint**

Mark Thurber, Associate Director, Program on Energy and Sustainable Development, *Stanford University*

This working paper provides a general review of how transportation constraints affect energy markets and offers a framework for thinking more specifically about the greenhouse gas implications of building new coal ports in the U.S. Pacific Northwest.

### Interviews

#### **Learning from China: A Blueprint for the Future of Coal in Asia?**

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

#### **Social License to Operate: How to Get It, and How to Keep It**

Brian Yates, Vice President of Impact Assessment and Community Engagement, *SNC-Lavalin*

Access these papers, interviews, and additional material on Asia’s energy and environmental challenges at [www.nbr.org](http://www.nbr.org).

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## Forum Leadership

The Pacific Energy Forum gathers high-level representatives of policy, industry, and research from across the Asia-Pacific in order to facilitate interactive, frank discussion on pressing energy and environmental issues. As Forum organizers, The National Bureau of Asian Research (NBR) and the Slade Gorton International Policy Center would like to express their gratitude for the insights and contributions of our core Forum leadership, staff, and partners. We are also deeply appreciative of our moderators, panelists, and paper authors, who have played an integral role in developing and strengthening the content of the program.

### Organizers

The National Bureau of Asian Research (NBR) 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.



The Slade Gorton International Policy Center honors the living legacy of Senator Gorton's values and significant contributions to Washington State and the nation by sponsoring world-class policy research and inspiring the next generation of leaders. The Center works to promote Senator Gorton's values of principled leadership, rigorous analysis, intellectual pursuit, integrity, inspiration, effectiveness, bipartisanship, and public service. The Center is a core, permanent program of NBR with three focus areas: policy research, fellowship and internship programs, and the Gorton History Program.



## Collaborating Institution

Since its foundation in 1984, the Asia Pacific Foundation of Canada (APF Canada) has been a leader in research and analysis on Canada's relations with Asia. 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  
Foundation  
of Canada

Fondation  
Asie Pacifique  
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## Supporter

The Government of Canada.



Participants listen to the panel discussion on “Abundance and Demand: Shifting Dynamics in Trans-Pacific Energy Markets.”

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## 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

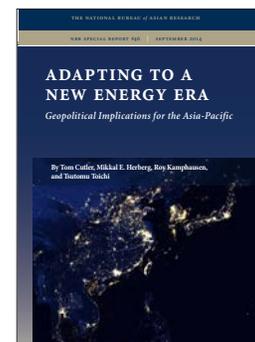
### Energy Security Program

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.

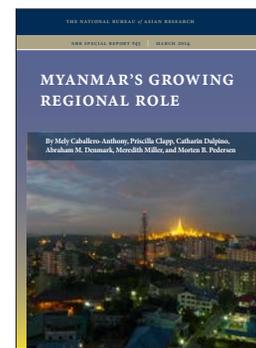


“NBR does a terrific job at getting great people, with great ideas, and making it into a process of dialogue and interaction that leads to recommendations that are very useful in the policymaking process.”

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

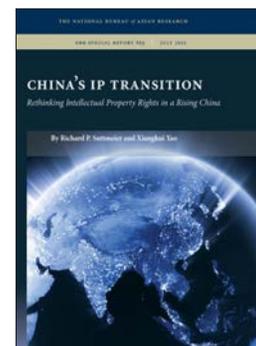
## Myanmar's Growing Regional Role

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 Clare Richardson-Barlow, Assistant Director, Trade, Economic, and Energy Affairs, at [nbrpes@nbr.org](mailto:nbrpes@nbr.org).





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