

INNOVATIVE GENERATION

POWERING A PROSPEROUS ASIA

Welcome to the third annual Pacific Energy Summit, **“Innovative Generation: Powering a Prosperous Asia.”** We are honored once again to gather together an influential group of international leaders, representing diverse perspectives and expertise from across the stakeholder chain: industry, government, civil society, regulators, researchers, and international organizations. This is a pivotal moment for economic development in the Asia-Pacific region. After three decades of high economic performance and growing prosperity, concerns about energy security and the environment require the development of a coherent strategy to address these challenges while providing for Asia’s booming electricity needs.

Adequate electricity supplies are essential for every sector: from industry and transportation to agriculture and social services. Electricity is the foundation for economic development and improving living standards, yet it is also the source of 42% of global energy-related carbon emissions. We convene in Hanoi—a dynamic city at the epicenter of regional development and modernization—to exchange insights, ideas, and know-how. As we examine the key determinants of an effective and sustainable scale-up in Asia’s power-generation sector, we seek new ideas and initiatives to forge collaborations that will help us achieve a shared vision: energy security and economic growth for an environmentally secure Asia-Pacific region.

PACIFIC ENERGY SUMMIT

2012 · HANOI

THE SUMMIT VISION

THE VIEW FROM VIETNAM

In the Socialist Republic of Vietnam, market growth and social transformation is on the fast-track, and business forecasts have placed the country as a leader among the region's emerging economies. Vietnam has also aggressively addressed poverty, achieved consistently high levels of GDP growth, and set a competitive pace for economic expansion. The result is a tremendous increase in energy demand, and the government's ambitious plans to meet it are highly relevant to this year's Summit theme. As Vietnam's economy evolves rapidly, transitions to the competitive generation market (CGM), and grows at 7%–8% annually, the country is grappling with a 14%–15% annual increase in power demand. To meet this surge in power needs, Vietnam has taken strategic steps to restructure its power sector within a short time frame. The CGM strategy approved in 2006, which included a partial privatization scheme,

seeks to attract investors and foster the growth of and reliance on independent power producers (IPP), and led Vietnam to begin implementing a pilot competitive market in July 2011. To achieve a comprehensive power market restructuring program, Vietnam will need to make consistent and strategic decisions, especially as it seeks to implement effective and equitable pricing mechanisms that also support the ongoing expansion of the power-generation sector.

While scaling up power-generation capacity, Vietnam has also focused on developing greater domestic fuel sources and diversifying its energy mix to include gas-fired power plants, renewable energy, and nuclear power. High-level commitment to a forward-looking energy policy will be critical for Vietnam to maintain its breakout economic advances, which have put the nation on track to grow to 70% of the size of the United Kingdom's economy by 2050.

High-level commitment to a forward-looking energy policy will be critical for Vietnam to maintain its breakout economic advances, which have put the nation on track to grow to 70% of the size of the United Kingdom's economy by 2050.

FACING THE SURGE

Adequate Electricity Supplies for a New Era of Energy Demand

Adequate, reliable, and affordable electricity supplies are an economic imperative for Asia-Pacific countries to achieve their development goals. Since our last meeting in Jakarta in early 2011, we have witnessed a succession of momentous geopolitical events that have sparked tremendous uncertainty in the energy sector. The sociopolitical turbulence in the Middle East that launched the Arab Spring continues to add to regional instability, constrain the development of new oil supplies, and add to market volatility.

The tragic events of the Japan earthquake and tsunami in March 2011 have had a lasting impact on the global energy outlook. The subsequent public outcry over oversight and safety standards at the Fukushima Daiichi nuclear power plant reverberated around the world, reopening the debate on the safety of nuclear power. The crisis precipitated a decided retreat in Europe—namely in Germany, Italy, and Switzerland—from an energy source that is at the forefront of low-carbon development, while many countries in Asia are moving ahead with plans for nuclear power. Meanwhile, the “golden age of natural gas”—the principal theme of the 2011 Summit discussions—has begun in earnest, fueled by rapid expansion in unconventional gas sources, particularly in North America. Such developments could significantly increase Asia’s options for cleaner power generation.

As countries map the way forward, they must factor in a changing policy, investment, and socioeconomic landscape. The Kyoto Protocol is nearing expiration, and prospects for a unified global climate policy remain in flux. Australia, the world’s top exporter of coal, joined its South Pacific neighbor New Zealand in introducing a carbon tax, seen as the most comprehensive carbon price scheme outside Europe. The debt crisis in the United States and the ongoing confidence crisis

in the euro zone stand to create ongoing financial upheaval, with broad implications for foreign investment. Additionally, Iran’s threats to close access to the Strait of Hormuz, the passageway for approximately 35% of the world’s oil trade, have caused a spike in prices and may put global oil flows at risk. Meanwhile, the meteoric rise of Asia’s consumer class, bundled with a sharp increase in energy demand, particularly in China and India, continues unabated.

Individually and combined, these developments have impacted short- and medium-term energy trends. In late 2011, a report released by McKinsey Global Institute, a research arm of global management consulting firm McKinsey & Company, warned the world might be at risk of entering “a new era of high and volatile energy prices in the next two decades.” The report predicts that three billion people worldwide could join the middle class, up from 1.8 million currently, adding an even greater burden on current global energy demand. Currently, 700 million people in the Asia-Pacific region are still without access to electricity, a utility that is central to reducing poverty, furthering economic development, and improving the quality of life.

Coal, a historically cheap, readily available, abundant, and yet carbon-intensive fossil fuel, is the region’s most widely used energy source for power generation and threatens to undermine climate security, public health, and hard-won gains in economic development. China and India alone are expected to account for 80% of the increase in global coal consumption over the next 25 years, with 80% of that coal being used to generate electricity.

The McKinsey report largely echoed the warnings issued by the International Energy Agency (IEA) in November 2011 in the *World Energy Outlook*: should the world increasingly

At the core of these high-level Summit discussions are the twin challenges for the Asia-Pacific region: to ensure energy security to meet the brisk escalation of energy needs and further economic growth while mitigating the environmental impact of growing energy consumption.

rely on coal to meet growing energy demand, it is headed for a “dire future” where high energy prices drag on economic growth and global temperatures rise dangerously, unless significant innovations are made to lower the cost of clean energy and carbon-capture technology.

Energy experts note that coal is undergoing a transformation that brings advantages and disadvantages. New technologies to facilitate coal extraction, and thereby lower prices, are coming online in tandem with cleaner coal-burning technologies, which reduce environmental damage and carbon emissions yet push prices back up. The problem of fluctuating prices in the coal market is compounded by confusing pricing information and uncertainty surrounding other energy supply options.

It is in this context that policy challenges surrounding environmentally sustainable power generation and energy access are most salient. The task of promoting adequate, affordable, and reliable energy is burdened with lagging infrastructure development, very low domestic electricity prices that chronically discourage investment and stimulate demand, and the urgent need to reduce emissions and improve air quality.

A number of key questions, important in and of themselves but also interlinked, shape the discussion of how to effectively and efficiently power a prosperous and environmentally sound Asia:

Energy Supply and Demand Forecasts:

Considering the regional short-term and long-term forecasts for energy demand and for key fuels to generate electricity, from where will resources come and what actions can we take to ensure adequate supplies while minimizing the environmental impact?

Dynamic Pricing and Demand Response: How do we design domestic electricity markets to provide prices that support new investment, open the field to multiple players and real competition, support power trading and power exchange, and implement demand-management tools?

Expanding Access to Electricity: What are the cost-effective ways in which countries can extend electricity supplies to support economic development in rural areas? What are best practices for distributed generation and rural electrification programs, and how do we implement them?

Financing Infrastructure: How can countries create incentives and attract international investment in electricity and energy infrastructure to meet current and future power needs?

Innovative Technology: How can the region develop and rapidly deploy new and innovative technology that can provide additional electricity supplies, improve power generation and transmission efficiency, and reduce the environmental impact of Asia’s rising power consumption? What are the most effective policy tools to put them in place?

CALIBRATING MARKETS AND OPTIMIZING PRICE SIGNALS

Energy costs play a huge role in dictating fuel choices. Therefore flexible markets and prices have a central role to play in shaping and driving the outcomes we seek for energy security and sustainable growth and development. The balance of global economic power is shifting to the Asia-Pacific region, and energy markets are increasingly determined by emerging economies. The IEA estimates that over the next 25 years, 90% of the projected growth in global energy demand will come from non-OECD economies.

Though regional demographics are changing as Asia-Pacific countries become more prosperous, consumer behavior remains the same: sensitive to price signals. Strong frameworks for well-informed government policy, responsive market structures, and clear price signals are inextricably tied to an environmentally responsible scale-up in power generation. Australia's recent implementation of a carbon tax is an example of the growing trend toward implementing price signals to reflect the true cost of carbon. Yet ongoing uncertainty regarding carbon pricing and the lack of a uniform policy and implementation strategy will continue to place the energy sector in a state of flux.

Restructuring domestic markets is a long-term process requiring considerable investment and consistent high-level commitment. A substantive

discussion of market reform should reflect the real costs of fossil fuel subsidies, totaling more than \$409 billion per year worldwide, one-fifth of which is provided to producers. Energy analysts concur that subsidies lead to deep-rooted "pathologies" in domestic markets and are also difficult to remove once established. By sending the wrong price signals, subsidies encourage the very outcomes we are hoping to change: the wasteful consumption of fossil fuels and the power they generate. While it is important to keep electricity affordable, especially as countries try to reach development goals, policymakers must strike a reasonable balance. Moreover, perversely, 80% of the benefits of current subsidies go largely to medium- and high-income groups. According to the IEA, only 8% of subsidies benefit the bottom 20% income group. Energy experts posit that subsidies stifle innovation and are not financially sustainable for the long term, draining national coffers. According to the IEA, a complete phaseout of subsidies would result in a 5.8% reduction in primary energy demand on a global level by 2020 and a fall in energy-related CO₂ emissions of 6.9%. As regional economic engines shift into high gear, it brings an important question to the fore: can we continue to pay such a high price for cheap power?

The balance of global economic power is shifting to the Asia-Pacific region, and energy markets are increasingly determined by emerging economies. The IEA estimates that over the next 25 years, 90% of the projected growth in global energy demand will come from non-OECD economies.

THE BLUEPRINT FOR A LIGHTER FOOTPRINT

Investing in Innovation and Infrastructure?

Future economic projections for the Asia-Pacific suggest that the region is entering an era of great promise. Yet they are also tempered by a realistic assessment of where we stand today. Currently, there are 700 million people in the region without access to electricity, and development experts identify broad swaths of “energy-starved” areas that remain underdeveloped and extremely poor. How do we ensure that future regional energy supplies can support optimistic predictions for economic growth and development? If countries continue on the same energy path, some leaders ask, how will the region get to where it needs to be to meet its economic and environmental goals? The bridge to a prosperous, low-carbon, regional economy is forged through significant investment in innovation and infrastructure, and reinforced by a strong policy framework. According to the U.S. Energy Information Administration’s latest forecast, electricity demand in developing Asian countries will rise by 56% during 2015–25, and another 40% during 2025–35. During 2010–35, Japan’s Institute for Energy and Economics (IEEJ) forecasts that \$20 trillion will be needed to meet electricity demand growth worldwide, of which \$9 trillion alone will be needed in Asia. Due to

high start-up costs and the long-term planning required for energy infrastructure, decisions made in the next five years will affect the region and the world for decades to come.

If today’s energy choices will determine our future, what is the role of technology? Hydraulic fracturing has changed the game for unconventional gas. Where could carbon capture and storage (CCS), underground coal gasification, and advanced biofuel technologies take us? What might we gain from decentralized energy and small-scale electricity distribution? Who are the unexpected and unlikely players to engage and help us clear barriers?

Energy experts overwhelmingly agree: the Asia-Pacific stands to benefit enormously from early and targeted use of innovative tools and policies. However, these prospects can only be realized when buttressed by political will at the highest levels of government. Innovation, coupled with strong leadership ready to engage in meaningful regional collaboration, could be especially important for greater energy security in the Asia-Pacific.

The Asia-Pacific stands to benefit enormously from early and targeted use of innovative tools and policies. However, these prospects can only be realized when buttressed by political will at the highest levels of government.

FUEL FOR THOUGHT

Multiplying Cleaner Kilowatts across the Region

Policymakers, industry executives, and government leaders have the difficult task of charting a coherent strategy for long-term policy, market reform, and institutional and technological issues as well as short-term, operational, and crisis-management issues. What are the realistic and practical solutions within reach? How do we make sure we avoid chasing after “solutions” that will make our problems even worse?

The first step toward transforming the regional energy system requires a fresh look at the status quo. How can we effectively restructure traditional electricity market models to make way for more effective, efficient, and cleaner options? How do we identify optimal policies, specifically tailored for a diverse and complex region? The Summit is a forum for leaders hailing from all points within the energy sector. Building on robust plenary session discussions, the meeting also offers focused workshops led by experts in the field. These workshops invite participants to concentrate on and delve into specific challenges, enabling the depth of analysis needed for finding practical solutions. The Summit Secretariat also hopes these discussions develop into side meetings and will facilitate scheduling and reserve rooms for interested participants. Building on the meeting’s momentum, NBR will coordinate with PES sponsors to organize follow-up roundtables and peer discussions throughout the year in order to encourage informed debate and advance significant initiatives.

To prime the Summit discussions, The National Bureau of Asian Research has commissioned a series of background papers by leading international experts in the energy sector. Each paper is a topical and timely assessment of a related power-generation issue.

Policymakers have a wide array of fuel choices with varying price points, environmental impacts, and infrastructure requirements. They are also understandably wary of rising fuel prices and

SUMMIT PAPERS

Powering Asia’s Growth: Meeting Rising Electricity Needs

Mikkal E. Herberg (The National Bureau of Asian Research; University of California, San Diego)

Electricity at the Right Price

Donald Hertzmark (DMP Resources)

First Principles: Technology as an Enabler for Productive Power Markets

Peter Hughes (Ricardo Strategic Consulting)
Scott Hare (Ricardo Strategic Consulting)
Maite Pina (Renewable Energy International)

A Case Study on Power Sector Restructuring in Vietnam

Nguyen Anh Tuan (Institute of Energy, Vietnam)

Prospects for Nuclear Energy in Asia

Hooman Peimani (Energy Studies Institute)

Taking Renewable Energy to Scale in Asia

Letha Tawney (World Resources Institute)

Principles of Successful Expansion of Rural Electrification Programs

Daniel Waddle (NRECA International)

the risk of undermining social stability. Growing energy and resource nationalism and the ongoing political uncertainty worldwide contribute to market volatility and heighten the challenges we face today. Such concerns call for unprecedented cooperation and collaboration across nations, sectors, and areas of academic expertise. We welcome the insights and perspectives each Summit participant brings to the discussion as we work toward realizing a shared vision for an energy-secure, economically prosperous, and environmentally sound Asia.



PACIFIC ENERGY SUMMIT

Launched in 2009, NBR's annual **Pacific Energy Summit** is an invitation-only event that convenes high-level stakeholders to explore innovative solutions to the dual challenges of rising energy demand and climate change. By bridging the commercial, public, and nonprofit sectors, the Summit informs policy and inspires collaboration to help support sustainable economic development.

2012 To find sustainable solutions to Asia's rising electricity needs, NBR will hold the third annual Pacific Energy Summit in Hanoi, Vietnam, in March 2012. The 2012 Summit will focus on policy and market solutions for successfully meeting Asia's power generation needs and promoting environmental stewardship.

2011 The 2011 Pacific Energy Summit was held in Jakarta, Indonesia, on February 21–23, 2011, featuring the theme “Unlocking the Potential of Natural Gas in the Asia-Pacific.” The Summit explored the role of natural gas in addressing the challenges of energy security and climate change in the region.

2009 NBR's inaugural Pacific Energy Summit convened in Tokyo, Japan on November 3–5, 2009, with the theme “Energy Security and Economic Growth in the Asia-Pacific: Innovations, Markets, and Smart Policies for a Low-Carbon Future.”

Each Pacific Energy Summit Report and its associated background policy papers are available on our website, www.nbr.org. For more information, please contact nbrpes@nbr.org.