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International Energy Regulators Discuss Challenges and Solutions in Energy Policy: Report on the 2012 Asia Pacific Energy Regulatory Forum

On August 1 – 2, 2012, energy regulators from around the globe convened at FERC's headquarters in Washington, DC to share industry experiences and collaborate on policy strategies at the 2012 Asia Pacific Energy Regulatory ("APER") Forum.

The APER Forum was established in 2011 at the recommendation of the Asia-Pacific Partnership on Clean Development and Climate to facilitate an international exchange of information on regulatory policy and practice to promote the development of best practices in gas and electricity matters. Delegates from Australia, Canada, China, the Czech Republic, Ghana, India, New Zealand, Pakistan, Singapore, Thailand and the United States participated in the 2012 APER Forum, along with several other attendees nationally and internationally active in the industry. The focus of this Forum was on matters related to transitioning to a low-carbon economy, energy infrastructure and market regulation, and competition reform. FERC Commissioners Moeller and Norris and former FERC Chairman Kelliher delivered opening remarks, which were followed by formal presentations on national strategy, innovation and issues by delegates from Australia, China, Canada, India, New Zealand, Thailand and the United States. Following the formal presentations, panels convened to discuss the following topics: Carbon Trading and Policies for Low-Carbon Consumption, Smart Grid Technologies that Enhance Efficiency, Grid Reliability, Renewables in New Markets, Market Regulation, Oil and Gas Development and the Impact of Competition on Reliability of Supply. The panels were composed of both delegates and other relevant energy industry participants, and panelists led lively exchanges about their respective topics among the delegates and audience.

An underlying theme of the Forum was the examination of the various international approaches to the cost/benefit analysis involved in setting energy policy. Delegates provided descriptions of perceptions and priorities that impact the cost/benefit weighting of various issues and solutions. For example, a delegate from Australia noted that the rising cost of electricity is a huge national issue. Consequently, measures that might further contribute to those costs are weightier than they may be in other nations. A delegate from Singapore explained that a national policy decision was made to put all electric transmission and distribution lines, and all pipelines underground. The decision was based on a few factors, one of which was the important goal of enhancing the reliability of Singapore's energy infrastructure. The delegate admitted the measure required substantial initial investment, but now its energy system is essentially immune to certain reliability issues facing other nations, such as vegetation and weather-related outages and supply interruptions. On the other side of the scale, the introduction of intermittent resources

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could reduce the reliability of this system, which has played a role in a national hesitancy to promote the development of renewable resources in Singapore. Participants also shared their predictions of the impact various proposed policies and technologies will have on the cost/benefit scale in the future. As one example, the delegates were asked whether they foresee the possibility of their respective nations not using fossil fuels at all in the future. FERC Chairman Wellinghoff stated that if the United States obtains cheap storage technologies, he predicts it will be "game-over" for fossil fuels in the United States. A delegate from Canada generally agreed, but noted that Canada is not currently pursuing storage solutions because the cost is so high it outweighs assessed national benefits.

Below is a summary of additional highlights from the Forum, arranged by member nation. Copies of the presentations are available at the APER Forum website (http://www.ferc.gov/aper-forum/2012-agenda.asp), and a recorded webcast of the event may be found in FERC's webcast archives at www.FERC.gov.

Australia

Presenters on Australian issues included Brendan Morling, Head of the Energy Division of the Department of Resources, Energy and Tourism in Australia and Dr. Brian Spalding, Commissioner of the Australian Energy Market Commission ("AEMC").

As noted above, a major political issue in Australia is the increased cost of energy, which has resulted in higher costs of living. Mr. Morling reported that pervasive concerns about costs have significantly impacted energy policy. For example, Australia's historically cooperative energy regulatory regime is under scrutiny to assess whether a more cost-efficient system should be implemented. An analysis of the structure of the gas industry is also in progress to facilitate market transparency to ensure the high cost of gas is not exacerbated by the overwhelmingly private nature of gas contracts.

High electricity costs have also affected the development of renewable energy in Australia. Renewable energy research and development requires various incentives, some of which have met resistance because they are paid for by consumers who already feel their electricity costs are too high. The transmission and distribution networks would also require significant investments to integrate renewable resources, which the public is not apt to support. The high electricity prices are also believed to have contributed to the drop in energy demand. The drop in demand is, in turn, creating controversy over the national renewable energy target of 20 percent by 2020. Major industry players are arguing to amend this target because it would result in a decrease in already dipping profits.

Other issues Australia currently faces are challenges to the open-access transmission system and growing reliability concerns. Mr. Morling explained that there is no charge to use the transmission and distribution grid, which is nationally regulated. This open access is, however, entirely non-firm. There is an ongoing debate about whether there should be an option for some firm access in exchange for a fee. With respect to reliability issues, Australia has found that some of the new "green" technologies that have been deployed are not as robust as old systems and are more vulnerable to Australia's extreme weather conditions. To address this issue, regulators are conducting a review of technical standards for generation and transmission, reviewing distribution reliability standards, promoting the efficient use of small generators, and reviewing the framework for generation and transmission development. AEMC is also implementing various demand-side programs to enhance energy efficiency. One such project is called the "Power of Choice," which is a computer-based program that enables consumers to review their energy consumption and choose their electricity suppliers. The program is reported to be very popular among consumers, which may be due in part to high retail costs. One "lesson learned" from the implementation of demand-side measures is the importance of pre-planning cost allocation recovery mechanisms. Numerous residents complained that they were billed for their smart meter well before they actually received it, which did not help facilitate public acceptance of the program.

Canada

Presenters on Canadian issues included John Foran, Director of Natural Resources Canada; Michel Fernand Girard, Vice-President, Policy and Stakeholder Relations of the Standards Council of Canada; and Darren Finkbeiner, Manager, Market Development of the Ontario Independent Electricity System Operator ("IESO") of Canada.

In his presentation, Mr. Foran reported that Canada is heavily dependent on energy export activities, and the United States is its predominant customer. Because of this, one challenge that the Canadian energy industry faces is the implementation of policies in the United States that make domestic sources of energy cheaper than Canadian equivalents. A priority for Canada is market diversification to decrease dependence on US consumption and create more export opportunities. Canada is particularly focused on exporting to China. A related challenge is Canada's need for better infrastructure to tap unconventional fuel sources and to get resources to load or points of export. An estimated US$294 billion investment is needed in electricity infrastructure alone by 2030.

The public is very involved in energy issues in Canada, and the public demands that regulators explicitly address environmental and social welfare concerns in energy policies.

One such multifaceted policy is Canada's national target to reduce carbon emissions 17 percent from 2005 by 2020, which it intends to achieve through policies that emphasize energy efficiency, the integration of renewables, the development of clean coal and carbon capture and storage, the integration of bio-refinery concepts, the promotion of electric transportation systems and the responsible development of shale gas.

Mr. Finkbeiner provided a detailed overview of how the Ontario IESO plans to comply with ambitious provincial green legislation, including the mandate to eliminate coal-fired electricity generation by 2014. IESO's strategy to eliminate reliance on coal includes increased diversification in supply mix, including hydro, gas, wind and nuclear, in order to mitigate the limitations of each source. With respect to nuclear fuel, Mr. Finkbeiner announced that research and development are underway to enhance the flexibility of nuclear generation so that it can better accommodate variable resources. Significant emphasis is also being placed on developing better forecasting systems for variable resources, which may include a new five-minute dispatch schedule, and hammering out the details of the new provincial feed-in tariff ("FIT") program to interconnect small renewable generators. Mr. Finkbeiner reported that although 90 percent of the FIT capacity was already contracted for, provisions regarding curtailment compensation have yet to be resolved and have become a very political issue.

China

Presenters on Chinese issues included Dr. He Yang, Director of the Division of Generation Regulation, Department of Electric Power Market Regulation of the State Electricity Regulatory Commission of China ("SERCC") and Xie Kai, President of the New York Office of the State Grid Corporation of China ("SGCC").

Dr. Yang reported that the Chinese government is very interested in changing the generation structure in China, which is currently composed of 70 percent thermal energy. China has a Renewable Energy Policy that consists of legislation, formal plans, preferential tax policies and financial incentives. Under the current five-year energy plan, China aims to decrease CO2 emissions per GDP by 17 percent and increase the consumption of non-fossil fuel energy from 8.3 percent to 11.4 percent by 2015. The focus of the conversion is on the fast development of hydro, nuclear and wind power. The development of wind power has created certain challenges, however, because the large wind power bases are far from load centers, and the grid is not currently equipped to absorb all of the anticipated wind capacity. As a result, investment must be made in additional infrastructure and technology to mitigate line losses and address intermittency. Along with the shift to new fuel sources, the government has also required coal-fired units to install desulfurization equipment, and almost 90 percent had fulfilled the requirement by the end of 2011.

Mr. Kai provided a comprehensive overview of the SGCC's strategy for the development of a program it calls the "Strong & Smart Grid" program. The Strong & Smart Grid encompasses the generation, transmission, transformation, distribution, consumption and dispatching sectors, and consists of four goals: developing clean energy; ensuring power supply; helping to address global climate change; and realizing sustainable development. Mr. Kai reported on a substantial series of initiatives that are underway in China in furtherance of these goals. Several research and development facilities have been established, including the National Energy Solar Power Technology R&D Center, the Information Security Technology sub-center, the National Energy Large-Scale Wind Power Integration Technology R&D center, the energy Storage Technology sub-center, the Custom Power Technology sub-center, and Ultra-High Voltage (AC and DC) test centers. SGCC has also arranged 287 smart grid pilot projects, 238 of which were completed by the end of 2011. The pilot programs include the development of the world's largest 1000 kV transformer, which started operation on January 6, 2009; establishment of a National Wind and Solar Power Generation/ Energy Storage/Transmission Demonstration Project, which is currently in Phase 1 and consists of 100 MWs of wind power, 40 MWs of solar power, and 14 MWs of energy storage; establishment of 28 "smart" communities serving 251,000 residences; and the construction of 243 electric vehicle charging/ battery-swap stations. In sum, Mr. Kai reported remarkable success of the Strong & Smart Grid program to date. In response to a question regarding the cost-benefit analysis behind the use of power storage in China, Mr. Kai explained that several different types of storage mechanisms had been tested and acknowledged that storage is still very expensive. Mr. Kai indicated that the cost is justified as an investment in the future because China needs a solution for ensuring that its population will be able to use the electricity from its significant solar and wind resources.

India

Presenters from India were Dr. Pramod Deo, Chairperson of the Central Electricity Regulatory Commission of India ("CERC") and Konedana Rajeswara Rao of the Petroleum & Natural Gas Regulatory Board of India ("PNGRB").

Dr. Deo reported that India's regulatory system is decentralized, with separate regulators for different subject matters and separate regulators at the national and state levels. Until 2003, regulatory powers were historically with the government, but India passed an Electricity Act of 2003 that initiated the creation of a more independent regulatory regime. Dr. Deo sees the role of the regulator in India as broadly including the development of power markets, including the promotion of competition by encouraging private participation, facilitating the sustainable development of generation supply with tools

such as a preferential tariff to induce efficiency and the creation of a Renewable Energy Certificate market, and ensuring inclusive growth of the industry with a consumer focus through the administration and regulation of energy licenses.

A predominant issue in India is a shortage of domestic fuel sources and corresponding growing dependence on imported fuel. A critical issue for CERC is the timely development of coal blocks, which involves social and environmental issues including forestry clearance and land acquisition. Mr. Rao reported that per the Integrated Energy Policy in India, the demand for natural gas is expected to be about 600 MMSCMD by the year 2030, representing the highest growth rate of natural gas consumption in the world. The PNGRB has determined that the most desirable immediate solution to address natural gas supply concerns is to facilitate the development of LNG import terminals. Two LNG terminals are currently operational, two more are ready for commissioning, and many more are currently in the planning stages.

Other challenges and issues facing India are ensuring the financial health of national power distribution companies. India currently experiences a high level of transmission and distribution losses, which is due to thefts and billing and collection inefficiencies. Metering is often inefficient in India and a policy decision was made to move the agricultural sector and the low energy-use sector to separate feeders whereby these consumers obtain free power, but supply is controlled by the regulators and generally limited to a set number of hours per day. Consumers that do pay for electricity are charged low tariffs that, in many instances, cannot be revised. This is due in part to variations in political regimes among the states in India, some of which have policies that electricity must be provided by the government. Although not explicitly discussed by the delegation, in a recent report the former Power Minister in India, Sushil Kumar Shindesome, blamed the July blackout in India on the competing political and regulatory regimes, claiming that the states overloaded the power grid by taking more power than they were allocated.

New Zealand

The presenter for New Zealand was Carl Hansen, Chief Executive of the Electricity Authority of New Zealand. Mr. Hansen reported that the focus of regulation in New Zealand is on promoting competition and ensuring reliability. With respect to competition, the small population has meant that it is hard to get enough industry players to support a competitive market. Since 2004, there has been a big reduction in retailer concentration, as measured by the Herfindahl-Hirschman Index, but the speed of deconcentration has been decreasing. There are currently 18 retailers in New Zealand, and six of those are simply different brands. Moreover, the largest retailers are owned by the largest generators. The lack of competition has emerged as a significant public and political concern. To address the concern, New Zealand implemented a program called "What's My Number," which allows consumers to see how much they can save by switching to a cheaper retailer. Mr. Hansen reported that the program is much more popular than anticipated, but that he does not view the frequent switching of retailers as an indicator of competition.

With respect to reliability concerns, New Zealand is heavily dependent upon hydro generation, with hydro representing approximately 60 percent of the nation's fuel supply. The hydropower is generated from shallow lakes located on the South Island, and supply is contingent on regular rainfall in these locations. Mr. Hansen reported that there is only about 10 weeks of national energy supply in the lakes if hydro's share of the supply remained at 60 percent. Spot market prices consequently spike high during periods of low hydro inflows. Various mitigating programs have been put in place with some demonstrated success. One measure is the development of hedging options, and futures trading has grown rapidly as consumers seek to manage price volatility. New Zealand also developed public conservation campaigns that are implemented when there is a 10 percent risk of running out of hydro supply. When the public conservation campaigns are deployed, the retailers must compensate consumers at a rate that approximately equals 30 percent of the retailers' profits. Mr. Hansen believes this has played a significant role in prompting retailers to manage supply more efficiently.

Thailand

The presenter from Thailand was Dr. Pallapa Ruangrong, Commissioner of the Energy Regulatory Commission of Thailand ("ERC"). Dr. Ruangrong began her presentation by sharing a recent accomplishment of Thailand in the area of rural electrification and reported that today, 99 percent of the population has access to electricity. With increased access to energy, there has been a move toward greater regulation. Dr. Ruangrong reported that the current regulatory regime in Thailand is the product of relatively recent legislation, the Energy Industry Act of 2007, which established the ERC. The ERC has broad authority ranging from regulating the quality of service, safety and pricing of energy to ensuring consumer protection, expropriating property, and implementing disciplinary procedures and punishments. The ERC recently completed a major tariff review and adjustment. As a result of the review, the ERC developed a new three-part tariff structure for electricity. The tariff consists of a base tariff amount set at the equivalent of about 7.46 US cents/kWh, which is calculated to fund Thailand's power, transmission and distribution development plans. The base tariff is then adjusted by a 3.18 US cents/kWh Fuel Adjustment Charge, and a 7 percent VAT for a total tariff of approximately 11.39 US cents/kWh. The tariff does

not include variable service fees. The ERC plans to undertake tariff reviews biennially to ensure they reflect costs, provide an appropriate return on investment and ensure efficient operation.

Among the ERC's current priorities are the promotion of open access and the facilitation of competition and plans to implement third-party access to gas transportation and LNG terminals. The ERC is also in the planning stages of creating a regulatory framework that would support a smart grid and investigating the use of distributed generation and demand/response issues. Meanwhile, the Ministry of Energy in Thailand is also taking measures to promote renewable energy and is currently in the process of drafting a new national feed-in tariff.

The United States

Presenters on issues in the United States included FERC Chairman Jon Wellinghoff; FERC Commissioners Philip Moeller and Cheryl LaFleur; former FERC Chairman Joseph Kelliher; Dallas Burtraw, Senior Fellow and Darius Gaskins Chair at Resources for the Future; Philip Jones, Commissioner of the US Washington Utilities and Transportation Commission; Dr. David Wollman, Deputy Director of the Smart Grid and Cyber-Physical Systems Programs Office of the US National Institute of Standards and Technology; David Wright, Chairman of the South Carolina Public Service Commission and President of the US National Association of Regulatory Utility Commissioners; Michael McGehee, Director of the Division of Pipeline Certificates in FERC's Office of Energy Projects; and Andrew Ott, Senior Vice President for Markets, PJM Interconnection, LLC.

Commissioner Moeller provided an overview of the energy regulatory regime, including a discussion of federal and state jurisdiction, a description of the three electric system interconnections, and an explanation that energy policy in the US has multiple components including legislation, incentives, policies and a reliance on competition. The Commissioner noted that there are certain inefficiencies in this multifaceted regulatory system. As an example, the Commissioner explained that FERC's efforts to build-out the transmission grid are somewhat hampered because transmission siting is generally regulated at the local, not the federal, level. The Commissioner also advised that the system of three interconnections is "probably not the most efficient" way to regulate energy due to the variations among the markets, although the development of common market elements can help. Going forward, the Commissioner explained that FERC will likely place significant emphasis on enhancing market transparency, promoting demand response, and developing infrastructure and regulatory policies to manage natural gas resources.

Presenters reported that a major challenge the US currently faces is the aging energy infrastructure and the enormous need for capital investment. Mr. Wright predicted that the electric industry alone requires US$2 trillion in investments and emphasized that this figure only represents costs that are currently known. In a light moment, Commissioner Norris held up a copy of the August 2, 2012 *Washington Post* with the front-page headline "Decrepit US Power Grid Starts to Sputter" to illustrate the prevalence of the issue. The Commissioner noted, however, that in his opinion the article does not present a very fair characterization of the issue.

Commissioner LaFleur provided an overview of reliability regulation in the United States, which she said is one of her top priorities. The Commissioner explained that an underlying issue to reliability regulation is determining what level of reliability is adequate. Some of the current reliability threats in the United States include the aging and changing infrastructure, cyber security, and the low-frequency, but high-risk caused by geomagnetic disturbances that could have an international impact. A representative from the Thai delegation noted he was very interested in the relationship between FERC and NERC and asked the Commissioner to discuss what he gathered were tensions between the two agencies. The Commissioner explained that the tensions were likely due to the fact that the US Congress took a previously voluntary regulatory regime and made it a compulsory program, which led to tensions in the transition process. The Commissioner advised that the up-front sharing of priorities, involving early communication and priority setting, and clarity of regulator roles and reliability rules, is critical to developing reliability regulations.

Presenters also discussed measures implemented in the United States to facilitate the development of renewable energy. Commissioner Moeller cited to a Final Rule FERC issued in June designed to facilitate the integration of renewable resources to the transmission grid. The Commissioner noted that the Final Rule was not as robust as originally planned and predicted that FERC will have to revisit the Final Rule in the future, but that it reflected one important step. Chairman Wellinghoff discussed recent breakthroughs in solar technology, including new technology under development at MIT that would cut the cost of solar energy in half. The Chairman presented a price forecast estimating that solar energy, which currently costs around 14 – 23 cents/kWh, will drop to only 5 – 10 cents/kWh by 2021. The Chairman predicted that in two to three years, solar energy will be cost-effective for residential use and predicts that the United States will experience an explosion of distributed generation. This, in turn, is a factor in determining the level of investment that is appropriate in building out the transmission grid, further emphasizing the intricacies of policy planning for the dynamic energy industry.

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