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Introduction

Thank you for inviting me to this important conference to discuss energy policy questions with my colleagues from Asia and the Pacific. The United States borders both the Atlantic and Pacific Oceans, and our country looks both East and West. We are facing many of the same challenges, and I look forward to learning how these challenges are being met in other countries.

I appreciate the opportunity to review the state of competitive U.S. electricity and natural gas markets, and discuss current U.S. competition policy.

Nature of U.S. Electricity and Natural Gas Markets

Before I turn to competition policy, I should begin with a brief review of the nature of the U.S. wholesale power and gas markets.

Electricity

Electricity markets in the United States are not national in nature, but regional. Depending on how you define them, the U.S. has 8 to 10 different regional power markets. Since the U.S. is fully interconnected with Canada and part of Mexico, some of these regional markets are also international.

The United States is the largest electricity generator in the world, generating 4 billion kilowatt-hours or 24 percent of the world's power. The U.S. has significant diversity in fuel sources used for electricity generation, relying on coal, natural gas, nuclear, hydropower, and other renewable energy sources (Figure 1).

The primary fuel for U.S. electricity generation is coal, which accounts for 49

percent of total U.S. generation. While coal's share of U.S. electricity generation has fallen in recent years, coal remains the dominant primary fuel for U.S. electricity generation. This position could be challenged, however.

One of the striking aspects of the U.S. electricity market compared to other countries is the disaggregation of generation ownership. In many countries, generation ownership is concentrated in a small number of companies. By contrast, the United States has hundreds of power generators. The largest U.S. generator controls less than four percent of total generation, and the top 20 generation owners in the U.S. combined control only 45 percent of total generation (Figure 2).

The disaggregation of generation ownership is a strength for the United States, since it means as a general matter generation market power in the U.S. is more diffused than in other countries. That increases the prospect of success of competitive power markets in the United States.

Wholesale power markets in the United States are also hybrid in nature. Structurally, some of our regional power markets are organized markets, with centralized wholesale power markets operated by regional transmission organizations or independent system operators. Competition in other regional markets is governed by bilateral transactions, without a central auction.

All of our regional power markets are competitive, but the nature of the competitive market varies from region to region. The Federal Energy Regulatory Commission (FERC) does not favor any particular market design, and FERC does not seek to impose a preferred structure on the various regional markets. We believe both the organized wholesale markets and the bilateral wholesale markets can be workably competitive.

U.S. power markets are hybrid in another sense. The United States has different classes of competitors in the generation sector. The principal competitors are independent power producers, vertically integrated utilities, and utility affiliates or affiliated power producers. Over the past 25 years, independent power producers have been responsible for the bulk of generation additions in the United States. During the last major generation build in the United States from 1996 to 2004, when we added 242 gigawatts in generating capacity, independent power producers accounted for nearly three-quarters of U.S. generation additions.

That balance has shifted somewhat more recently, with utilities accounting for a larger share of generation additions. It is not clear at this time whether that shift is fleeting or more longstanding.

This type of hybrid competition is certainly not unique to the United States or to

the power sector. It is analogous in some respects to competition in the airline industry, where government-owned airlines compete with private airlines.

The United States has the most extensive power grid in the world, encompassing about 200,000 miles or 320,000 kilometers of high voltage transmission lines (Figure 3). However, the U.S. does not have a national power grid, but a series of regional power grids. At the same time, the U.S. transmission grid is fully interconnected with Canada and parts of Mexico. For that reason, some power grids are both regional and international.

One of the striking aspects of the U.S. electricity market is the disaggregation of transmission ownership (Figure 4). While many countries might have a handful of transmission owners, the U.S. has over 500. The disaggregation of transmission ownership poses difficulties with respect to transmission operation, planning, cost allocation, and investment.

There are also significant differences among the classes of U.S. transmission owners. Roughly two-thirds of the grid is owned by for-profit vertically integrated utilities. The rest is divided among federal utilities such as the Bonneville Power Administration and Tennessee Valley Authority, and hundreds of state and local governmental utilities such as the New York Power Authority, rural electric cooperatives, and for-profit transmission companies or transcos.

Natural Gas

The United States is relatively self sufficient in natural gas, compared to other countries (Figure 5). Currently domestic production accounts for 84 percent of demand. In recent years, we made up our shortfall in domestic production with Canadian imports.

Natural gas markets in the United States are undergoing fundamental change. However, I would submit there no longer is a “U.S. gas market.” Our natural gas market is North American, not national, and has been ever since the U.S. was no longer self sufficient in natural gas supply and relied on Canadian imports to make up the shortfall in domestic production.

However, Canadian gas imports are no longer sufficient to make up the shortfall in domestic gas production (Figure 6). As a result, the U.S. is increasingly relying on liquefied natural gas (LNG) to meet domestic demand. LNG currently is the fastest growing source of U.S. natural gas supply, and is projected to account for 17 percent of U.S. demand by 2025.

Our natural gas market is changing, and is becoming more international. It is no longer North American, no longer neatly bounded by the Atlantic and Pacific Oceans.

The United States is part of the Atlantic basin LNG market, and is poised to enter the Pacific basin market. This will have significant changes on North American gas markets, some of which can be anticipated, others of which will only be appreciated over time.

While we often consider energy markets as distinct, one development in U.S. energy markets is the increased integration of the power and natural gas markets. Natural gas is frequently the marginal fuel for power in regional power markets, so the power and gas markets increasingly influence each other.

Competition Policy in the United States

At the beginning of my remarks, I took care to say I would discuss the state of “competitive” power and gas markets rather than “deregulated” markets. Notwithstanding perceptions to the contrary, deregulation is not and has never been U.S. national policy with respect to power and gas markets. The term “deregulation” suggests an absence of regulation. However, the U.S. power and gas markets have never been unregulated, and the U.S. has never relied solely on competition to assure just and reasonable rates.

U.S. national policy with respect to electricity and natural gas markets is more accurately characterized as promoting competition rather than deregulation. Competition is U.S. national policy in both electricity and natural gas markets, reaffirmed by the Energy Policy Act of 2005, which represents the third major law in the past 25 years to establish competition as policy in wholesale power markets. A series of laws enacted over the same period established competition as national policy in wholesale natural gas markets.

In the wake of the California and Western power crisis of 2000-2001, there was a debate in the United States about whether competition was the correct policy. With enactment of the Energy Policy Act of 2005 that debate is over, competition is national policy in both power and natural gas markets, and will remain national policy. The U.S. will not retreat from competition policy.

The role of FERC is to successfully implement competition policy, to use the expanded regulatory tools Congress gave us to make wholesale power and gas markets work better.

I recognize that competition is U.S. national policy, but also believe as a personal matter it is the correct policy. Competition, when combined with effective regulation, can deliver the greatest benefits to the public and the Nation. I believe competition policy in the U.S. has been a success, although there have been failures. My job is to reinforce and perpetuate the successes of competition policy.

However, competition policy does not seek to displace regulation altogether. The United States relies on both competition and regulation to assure just and reasonable wholesale power and natural gas prices. We seek to develop the best possible mixture between competition and regulation.

I find it unremarkable that U.S. electricity and natural gas markets are governed by both competition and regulation. All competitive markets in the United States are governed by some kind of regulation or market rules, whether they be rules established by a regulatory body such as FERC or antitrust laws enforced by antitrust agencies. The notion that a competitive market must be free from all regulation and free from all market rules is simply false.

There can be tension in the marriage between competition and regulation. However, there is little doubt that competition contributes to improved performance of public utilities. For that reason, competition should be permitted where feasible. At the same time, unregulated competition is infeasible, provided that an industry is properly treated as a public utility in the first place.

The development of competition policy in the U.S. has taken place over the past 25 years. During that period, the U.S. has enacted a series of federal laws and FERC has issued a series of policy directives to promote competition in both wholesale power and gas markets. Development has been incremental in nature, moving steadily in a coherent policy direction of promoting competition and necessary regulatory reform.

The nature of regulation has changed, of course, to reflect structural changes in both markets. Competition policy has been characterized by regulatory reform, by significant changes in the nature of our regulatory scheme, not by deregulation.

The reality is that competition policy is not an event. It is a long process that requires strong and sustained political commitment, and continuous reform. The U.S. has been pursuing competition policy for 25 years, and the process is not yet complete. I would go further and argue that the process will probably never be complete. Discussions of the “transition” to competitive markets imply there is some kind of perfect end state, and that once that end state is realized all reform can cease.

I believe that notion is also false. The reality is that electricity and natural gas markets are highly dynamic, that changes will continue to occur in these industries, and those structural changes in turn will spur regulatory reforms. If at some point in the United States we were to achieve the perfect mixture between reliance on competition and regulation in power and natural gas markets, some structural change in those markets will force us to once more adjust the mixture.

The series of laws that established competition as national policy in power and

natural gas markets also have granted FERC new regulatory powers. As the U.S. has promoted competition, the role of FERC in power and natural gas markets has changed significantly. Frankly, I would not say that role is smaller than it was 25 years ago. But the role is clearly different.

The principal mission of FERC in its regulation of wholesale electricity and natural gas markets over the past 70 years has been to guard the consumer from exploitation by noncompetitive power and gas companies. The way we discharge that role has changed dramatically over time. In the 1930s, we guarded the consumer by setting rates for individual companies to prevent monopoly rents. Rate regulation can effectively regulate profit levels. But traditional rate regulation tends to create substantial excess capacity, whose costs were recovered in rates. It also provided no incentive to lower cost, no incentive to improve efficiency, no incentive to reduce environmental impact, and no incentive to deploy new technologies. Competition policy was intended to remedy these failures of traditional rate regulation.

It is admittedly difficult to prove the success of competition policy. One could compare the elements of competitive power and natural gas markets to the elements of perfect competition as outlined in a textbook. Under perfect competition, markets could be characterized by ease of entry, market access, robust infrastructure, access to network facilities, contract certainty, market transparency, price elasticity, good market rules, and absence of market manipulation and market power exercise.

However, I am not sure perfect competition exists outside a textbook. The realistic goal should perhaps be workable competition rather than perfect competition. By that standard, we have workable competition in both U.S. wholesale power and natural gas markets. There has been significant new entry into both power and natural gas markets and barriers to entry are relatively low. There is good market access, with some room for improvement in power markets. There is a robust power and natural gas infrastructure, albeit one with significant investment needs. Open access to network facilities such as the bulk power system and natural gas pipeline system has been established, and we have recently adopted landmark rules to provide more perfect access to the bulk power system. FERC respects contract certainty. There is good transparency in both markets, and we have proposed reforms to provide greater transparency in natural gas markets. We continue to make progress on good market rules. We have established new rules to prevent market manipulation and accumulation of market power, and are exercising new authority to police market manipulation. Perhaps the greatest need for improvement is in demand response, in order to improve price elasticity.

U.S. Electricity and Gas Infrastructure Development

Energy infrastructure is the ability to produce energy and deliver it to where it is needed. A robust energy infrastructure can provide reliability of supply and support

competitive markets. A weak infrastructure can result in higher prices, greater price volatility, lower supply reliability, and less effective competition. A strong energy infrastructure is a necessary foundation for competitive markets.

Electricity

Generation

The United States is poised for another major build of new generation. Electricity demand in the U.S. continues to rise as our economy grows. There are a range of projections, but according to some estimates the U.S. may have to add 230 gigawatts to its generating capacity over the next 15 years.

The question is not whether the U.S. needs another major build of new generation, but what type of generation will be added, which class or classes of generators will account for the generation additions, and what actions are available to regulators to encourage the development of adequate electricity supply.

As we confront the need for another major build of new generation in the United States, we must ask what policy considerations will govern. There are at least three different policy paths we could pursue: security or fuel diversity, sustainability, or competition. Which path we go down may dictate to a large extent what kind of generation is built and which class of competitor will account for the bulk of U.S. generation additions.

Under the security path, the United States would seek greater fuel diversity, and seek to minimize our reliance on natural gas generation. We would build more coal generation than under a status quo scenario, as well as more nuclear and renewable energy generation. Under a sustainability scenario, we would maximize our use of renewable energy, and seek to avoid coal generation additions, at least until carbon capture and sequestration technology is available. A sustainability scenario would also likely involve a large nuclear energy expansion to succeed.

I do not mean to suggest that these are three entirely separate paths, and that we must choose to go down one or the other. But there is clear tension among these policy paths. For example, the future role of coal generation is completely different in a security scenario compared to a sustainability scenario. For that reason, it is probably correct to say that currently there is major regulatory risk associated with coal generation additions in the United States.

There is substantial interest in clean energy development in the United States. “Clean energy” can be defined in different manners. Perhaps the most common way is to equate it with renewable energy, including hydropower, wind, solar, geothermal,

biomass, wood, and waste products. Defined in this way, clean currently accounts for about 9.5 percent of U.S. electricity supply.

Clean energy may account for a larger share of U.S. electricity generation in the future. Currently, 29 states have renewable portfolio standards or goals providing that state regulated utilities increase purchases of electricity generated from renewable energy. At the federal level, there is discussion about whether to adopt a federal renewable portfolio standard.

One of the rationales for small scale clean energy development was that it was a distributed resource, and could obviate the need for transmission investments. That may well be true for small scale projects. However, large scale clean energy development will likely entail significant transmission investments beyond a status quo policy baseline. In short, considering two generation build cases, a status quo policy scenario and a clean energy scenario, it is likely that the necessary transmission investments in the clean energy scenario will be greater than under the status quo.

For example, the United States has significant potential for large scale wind generation development. However, much of this potential for large scale development is in locations that are now remote from the bulk power system. It will require substantial transmission investment to achieve this potential.

The federal government has recognized that the cost of interconnecting remote wind and other intermittent generation facilities to the grid can prove an insuperable barrier to continued clean energy development. To that end, FERC approved an order earlier this year to change cost allocation of large scale wind and other intermittent generation facilities in California under certain conditions, rolling in more of these costs. This order can provide a basis for taking similar action in other regions of the country.

A key factor in clean energy expansion is research and development. To the extent research and development reduces the costs of clean energy and improves performance and forecasting, clean energy will play an even larger role.

At present, it is not clear which policy choices will govern the new build of generation additions in the United States. Until there is more clarity, the United States will probably build less generation that would be optimal, and probably rely more heavily on natural gas generation additions.

Another variable is energy efficiency and demand response. Improved energy efficiency can lower overall electricity demand, offsetting the need for new baseload generation. Effective demand response can reduce peak demand, obviating the need for new peaking units. Ineffective demand response results in higher peak prices and greater price volatility.

The United States recognizes the need to improve energy efficiency and demand response. Part of the challenge in the United States is our federalist regulatory structure. In the United States, retail sales are the province of state regulators, and wholesale sales are the province of FERC or federal regulators. Yet energy efficiency and demand response result from the individual and collective decisions of retail consumers. Success in achieving improved energy efficiency and demand response will require collaboration among federal and state regulators. We recognize that need, and federal and state regulators have established a collaborative process designed to make improvements.

Transmission

While the U.S. transmission system is extensive, it has suffered from inadequate investment levels for many years. The last sustained period of adequate investment in the U.S. power grid took place in the 1970s. We are taking steps to reverse that trend.

Over the past two years, FERC has approved rules governing transmission incentives to increase grid investment and granted incentives in a series of orders. Those rules are having an effect. Grid investment in the United States is on the rise, and is moving in the right direction (Figure 7). Yet we have not yet erased the effects of the sustained period of underinvestment that began in the 1970s.

Transmission investment in the United States has not yet achieved the level necessary to assure reliability and support competitive markets. Contrast current levels of transmission investment in the United States and the United Kingdom (UK). Last year, grid investment in the UK outpaced investment in the U.S. Yet, the U.S. transmission system is more than ten times the size of the UK power grid. Grid investment trends in the United States are moving in the right direction, but are not yet at the right levels.

There is still significant congestion in the U.S. interstate power grid. That congestion has the effect of an import quota, reducing supply and raising prices inside the congested area. Concern about congestion led Congress to enact the transmission siting provisions in the Energy Policy Act of 2005. These provisions would grant the national government some ability to site transmission facilities.

Up to this point, siting of transmission facilities was the exclusive preserve of state governments. Before the Energy Policy Act of 2005, transmission siting in the U.S. reflected an unspoken assumption that the bulk power system was local in nature. That is no longer the nature of the grid. The new federal transmission siting role reflects a recognition that the power grid is regional in nature.

We also have acted to strengthen transmission planning. While the U.S.

transmission system operates as 8 or 10 large regional machines, there are over 500 owners of these machines. Historically, grid planning was conducted by the individual transmission owners for the benefit of their individual systems, not on a regional basis. It is important that transmission planning reflect the regional nature of grid operation. For that reason, FERC issued new rules earlier this year requiring jurisdictional utilities to conduct regional transmission planning.

In the wake of the August 2003 Northeast blackout, we have also taken steps to assure reliability of the bulk power system. Previously, the United States relied on voluntary compliance with unenforceable reliability standards to assure reliability. No more. Over the past year, FERC has approved mandatory reliability standards and established a new regulatory regime to enforce those standards. The summer of 2007 is the first summer where reliability of the bulk power system is governed by mandatory standards.

Natural Gas

Supply

Perhaps the greatest success of U.S. competition policy with respect to energy markets can be seen in domestic natural gas production. The U.S. once maintained price controls on natural gas. Those price controls resulted in a steady decline in U.S. natural gas production. This decline was not caused by declining reserves but by regulatory policy. In the late 1970s, the U.S. changed course on policy, decontrolling natural gas prices. Domestic production recovered in response to this regulatory policy change. This experience is a reminder that poor regulatory policy can retard development of essential energy supplies.

The United States currently impairs domestic gas production levels through restrictions of development of promising reserves offshore and in other areas, although the effect of these restrictions is much less than price controls of the past.

The U.S. expects to roughly maintain current levels of domestic natural gas production. Improved technology makes it easier to locate and produce natural gas. However, Canadian imports are expected to decline, both as a percentage of U.S. supply and in absolute numbers. Increasingly, the U.S. will turn to LNG to meet domestic natural gas demand.

Currently, LNG is the fastest growing source of U.S. natural gas supply. If development of LNG imports projects slows, that will serve to reduce U.S. natural gas supply and result in higher prices.

Pipelines

The United States has the most expansive natural gas pipeline network in the world, encompassing 300,000 miles or 480,000 kilometers (Figure 8). As is the case with our power grid, our gas pipeline network is fully interconnected with Canada and part of Mexico, so again this energy infrastructure is North American and not national in scope.

The U.S. has had great success in strengthening our pipeline network. Over the past seven years, FERC has approved over 10,000 miles in pipeline expansions. This was only possible due to sound regulatory policies that encourage investment, as well as the high level of administrative efficiency FERC has displayed in reviewing pipeline expansion proposals.

Regulatory certainty is an important element in attracting private sector investment into energy infrastructure. Investors must see that decisions by regulators are based on the law and the facts. It is important that there be some level of predictability and constancy in regulatory decisions. FERC pipeline regulation is characterized by a high level of regulatory certainty.

Our administrative efficiency in this area has allowed the U.S. to maintain strong levels of domestic natural gas production. As promising gas reserves are developed, FERC has been able to increase pipeline takeaway capacity in a timely manner. That allows continued development of new gas reserves.

Conclusion

In conclusion, the United States remains committed to competition policy in wholesale power and gas markets. Competition policy was developed in response to the shortcomings of traditional rate regulation. In promoting competition, the United States has not abandoned regulation altogether, but instead engaged in a series of major regulatory reforms. In my view, reliance on a mixture of competition and regulation can deliver the greatest benefits to the public and the Nation. Competition policy has been a success, but it requires constant attention of regulators to find the best possible mixture between competition and regulation.