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ELECTRIC TRANSMISSION INFRASTRUCTURE AND INVESTMENT NEEDS

HEARING

BEFORE THE

SUBCOMMITTEE ON WATER AND POWER

OF THE

COMMITTEE ON
ENERGY AND NATURAL RESOURCES
UNITED STATES SENATE

ONE HUNDRED SEVENTH CONGRESS

FIRST SESSION

TO RECEIVE TESTIMONY ON ELECTRIC TRANSMISSION INFRASTRUCTURE AND INVESTMENT NEEDS; POLICY AND TECHNOLOGY ISSUES

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ELECTRIC TRANSMISSION INFRASTRUCTURE AND INVESTMENT NEEDS

TUESDAY, AUGUST 7, 2001

U.S. SENATE,
SUBCOMMITTEE ON WATER AND POWER,
COMMITTEE ON ENERGY AND NATURAL RESOURCES,
Bismarck, ND.

The subcommittee met, pursuant to notice, at 10:08 a.m. in the Judicial Room, Best Western Doublewood Inn, 1400 East Interchange Avenue, Hon. Byron Dorgan presiding.

OPENING STATEMENT OF HON. BYRON L. DORGAN, U.S. SENATOR FROM NORTH DAKOTA

Senator DORGAN. The hearing will come to order. This is a hearing of the Subcommittee on Water and Power with the U.S. Senate Energy Committee.

My name is Byron Dorgan. I am chairman of the subcommittee and I am joined today by Leon Lowery, who is with the professional staff of the Senate Energy Committee. We are also going to be joined by my colleague, Congressman Pomeroy, who is in the State and in town today and I have invited him to join us and he'll be with us shortly.

I am joined by staff assistant Ladeene Freimuth, who works with me on energy issues, and I am pleased to have her here, as well.

Let me make a brief opening comment and then I would like to begin hearing some testimony.

The purpose of having a hearing on transmission issues, transmission infrastructure and investment needs today is because we are trying to write a new energy plan. Our chairman, Jeff Bingaman, had us working on one title, which was the research and development title, late last week. We completed that, but that is only the first title. When we come back in September, we will begin the efforts to complete writing an energy plan.

This is not an easy task. We did not understand it to be easy when we started, but from my perspective, I am interested nationally in a range of issues. I believe we must produce more. That means more oil, more natural gas and more coal. We must do it in a manner that is environmentally sensitive. And even as we produce more, we must conserve more. We must have more efficient appliances and efficient use of energy and we must have renewable energy and limitless energy sources, as well. And all of those areas are areas that we should pay attention to in an energy bill.

But especially in North Dakota we have a need to be concerned about the issue of transmission. Whether it is production of wind energy or the production of additional electric energy, it is not going to be of much value to the region or the country if we are not able to transmit that, and we don't have the transmission capability and infrastructure at present to substantially increase what this State and what our resources contribute to this country's energy needs.

Because of that, we want to make sure that we are doing on the transmission side the right things and trying to develop the right policies. And Senator Bingaman has agreed to host a series of hearings. I am going to be holding a hearing this morning, I will be holding a hearing in Seattle in a couple days, a hearing in New Mexico. We have a series of hearings that are being held, and the purpose is to gather information, gather thoughts and ideas.

And let me just finally say this. North Dakota has a great deal at stake on these issues. We produce oil, we produce coal, we have natural gas, we produce electric energy in substantial quantity, we have vast deposits of lignite, and so we have a lot at stake and we have a lot to contribute to this country in terms of energy supply and production. But the linchpin to making this available in most cases is transmission lines, especially with the opportunities to produce electric energy.

We have a representative of 3M today, and I am not about giving commercials for corporate enterprises except to say that there is a lot of really interesting, exciting work going on in new technology. In transmission and new technology this is a composite conductor that is produced by 3M. Other companies are engaged in interesting research. This is, I understand, three to four times more efficient than current transmission wires and we can run using new technology, new approaches, new devices, new wires across the same corridors and have substantial new opportunities to export electricity from our State.

I want to say one more time that when we contribute energy to a country that needs it, I want it all to be done in a manner that is very sensitive to our environment, with clean coal technology and the concern that all of us have about making certain there is significant and robust investment in that area. And Senator Bingaman especially, with me and others, believes very strongly in that. We can use our coal resources in a very thoughtful, environmentally safe way, and we intend to do that.

But I want to thank all of you for being here. We have eight witnesses. It is my hope that we can complete this in 2 hours.

And I indicated that, Congressman Pomeroy, before you came that I was happy to invite you to participate. You are not only in the State, but in town, the House is in recess, as well, and I thank you for being here. If you have a comment, I would be happy to hear from you.

[The prepared statement of Senator Dorgan follows:]

PREPARED STATEMENT OF HON. BYRON L. DORGAN, U.S. SENATOR FROM NORTH DAKOTA

Today, we will hear from our witnesses on policies and technologies to address transmission investment and infrastructure needs for North Dakota, the region, and the nation. I am pleased that we have as witnesses today representatives from the

FERC, the PMAs, IOUs, and rural electric cooperatives, and from the lignite and wind industries, as well as from 3M—the latter to represent some of the new, innovative transmission technologies that are being developed.

I would like to thank all of our witnesses for being here today, and especially thank those of you who have traveled long distances and adjusted your schedules to be here today. Your input will be invaluable to the energy debate, to me, and to the Committee's record, as we use this information to develop national energy policy legislation.

Transmission is one of the most critical aspects of the energy debate and the energy policy Congress will be developing in the coming weeks. We can have vast energy supply sources, as is the case in North Dakota with its coal and wind, among other traditional and renewable energy resources, but if we can't move and export those resources, then we won't be able to use the resources to power our homes, businesses, and more. North Dakota is referred to as "the Saudi Arabia of wind," because of its enormous potential for wind energy. And yet, we don't have a single turbine built yet, because we can't move the power that the wind would generate.

We are facing problems with transmission both here in North Dakota and nationwide in terms of capacity constraints, siting issues, reliability of the electricity system, to name a few. We need to figure out the most effective structures and policies to enhance the effectiveness of our system and facilitate transmission across state boundaries, regions, and the nation. We need to enhance transmission to rural as well as urban areas. I know our witnesses will shed light on many of these issues.

And it's not just about building more transmission lines, either. There's a lot we can do with our existing rights-of-way. New, advanced transmission technologies, such as composite conductor material, superconductor material, and other methods and devices can increase the efficiency of our transmission infrastructure.

3M, for example, whom we will hear from today has developed a composite conductor transmission line. This line replaces existing lines and does not require new towers or new rights-of-way. As a result, extensive environmental assessments and permit reviews are not required, which will significantly expedite the time in which we can expand our transmission capacity. The 230 kilovolt (kV) line is being tested in France. 3M is hoping to test 500 and 750 kV lines in the United States. The lines increase the efficiency over existing lines tremendously and our witness will elaborate upon this even more.

I have passed amendments at last week's Energy Committee markup and have inserted language in Senate appropriations bills to promote, develop, and test such innovative, new transmission technologies.

Though not the total solution, these technologies could go a long way toward helping solve some of the transmission capacity constraints we are facing.

I look forward to learning more from our witnesses about the combination of technologies and policies that Congress needs to examine to help solve the transmission problems we are facing.

Now, I would like to invite our first panel to testify.

STATEMENT OF HON. EARL POMEROY, U.S. REPRESENTATIVE FROM NORTH DAKOTA

Mr. POMEROY. Very briefly, Chairman Dorgan. Let me say how sweet it is to say Chairman Dorgan. I appreciate very much you using your subcommittee chairmanship of the Senate committee to advance a particular focus on the issue of transmission.

When you think about it in North Dakota, the striking similarities that exist between the transmission issues facing our ability to get more power produced in North Dakota to national markets to the railcar shortages we face every year in terms of getting the year's harvest out. We produce way more crop than we consume. We make a very significant contribution to our national food needs, in fact global food needs, but we have difficulty getting it to market.

We produce more power than we consume. Our potential to make a much greater contribution to the Nation's energy needs are profound, and yet getting our power to the markets is constrained

presently by a power grid that no one would maintain was constructive with an eye toward energy needs in the 21st century.

I believe transmission is absolutely a key to North Dakota lignite development, key to alternative and renewable fuels development ranging from in particular wind energy when you talk about North Dakota.

So as far as I am concerned, the House-passed energy bill last week did not devote sufficient discussion of the transmission issues in particular, and that is why your hearing is so particularly timely. I am very pleased your allowing me representing the House to participate. Thank you, Byron.

Senator DORGAN. Congressman Pomeroy, thank you. I might say just as an editorial comment, the House energy bill, as Congressman Pomeroy said, I think will be changed very substantially by the Senate. It has obviously some ingredients that will be common to both bills, but the Senate will take, in my judgment, a substantially different approach than the House did.

Mr. POMEROY. It needs work.

Senator DORGAN. Then that is what we are about.

Mr. POMEROY. Good.

Senator DORGAN. We are joined today by a representative of FERC, the Federal Energy Regulatory Commission.

And I should mention that this morning or yesterday, I guess, Chairman Curt Hébert of FERC announced his resignation effective at the end of the month, so FERC will be experiencing some changes.

William Longenecker, who is an energy industry analyst at FERC, is with us, and we have the administrator of Western Area Power Administration from Lakewood, Colorado, Mike Hacskaylo. We appreciate very much your being with us. We have asked witnesses to summarize their testimony and we will make their full testimony a part of the record. We have asked, if we could, for 5-minute statements so that there is room for questions.

Why don't we begin with Mr. Hacskaylo. Why don't you proceed.

STATEMENT OF MICHAEL S. HACSKAYLO, ADMINISTRATOR, WESTERN AREA POWER ADMINISTRATION, DEPARTMENT OF ENERGY

Mr. HACSKAYLO. Thank you, Mr. Chairman. Good morning. Good morning, Mr. Pomeroy. I appreciate your invitation to be here today to speak on behalf of the Western Area Power Administration.

Western is one of the four Federal power marketing administrations. We market and transmit 10,500 megawatts of Federal power, power produced at Federal powerplants, to nearly 650 wholesale customers spread across 15 Central and Western States.

For the purposes of this hearing, a significant point is that Western owns, operates and maintains almost 17,000 miles of high-voltage transmission system across the West. We are part of that backbone, that high-voltage backbone to move power between States, between markets. We have our employees based at 51 duty stations in 12 States, including here in Bismarck, North Dakota, with our North Dakota maintenance facility.

We operate four control areas and maintain about 1,600 load-serving interconnections with other utilities inside our control area boundaries. We schedule energy. That is, we move energy owned by one entity being sold to another entity with at least another hundred load-serving entities with which we do not have a direct interconnection.

Additionally, we make unused transmission capacity on our system available to any other buyer and seller, including power marketers and brokers, at a cost-reimbursable basis. As a matter of policy, Western offers transmission capacity on its system on a first-come, first-served basis under our open access tariff. This is in accordance with FERC Order 888 and 889.

For example, we are working with the Basin Electric Power Cooperative on interconnections in a variety of areas, including the Miles City DC tie. We are working with East River Electric Cooperative in South Dakota with their proposed T substation as they interconnect with our system in the Sioux Falls area. That is a new substation to deal with low growth in the area. We are also working with entities such as Basin on new transmission lines such as the Hettinger-to-Belfield line. Thank you, Mr. Chairman, for your efforts on that important project. That will help move power back and forth in this part of the country.

We also provide interconnections with merchant powerplants seeking transmission paths to move their power to load centers; for example, in California and in southern Arizona. We have underway eight interconnections with these merchant plants, and these are large plants, 500 megawatts to 700 megawatts, to move power into and through California.

Western Area Power Administration is responsive to the emerging generation market and we have seen strong demand on our available transmission capacity. We now have little capacity available to serve new generation or additional loads beyond these projects we are presently working on, so the system is becoming constrained.

In recent years transmission improvements, generation additions and maintenance and rehabilitation programs have often been deferred, I think this is a fair statement, across the industry. At the same time load growth, deregulation and restructuring, transmission open access, and merchant plant interconnections are placing unprecedented demands on the interconnected power grid.

Systemwide disturbances in the West in 1994 and 1996, energy shortages and price spikes in the Midwest last summer and the roller coaster ride that is going on in California have focused attention on the reliability of the nation's power grid and its ability to meet an ever-growing, instantaneous demand for high-quality, reliable electric service.

There are those that say that electricity is what powers the nation's economy, and they are right. And what the economy demands is this high-quality, reliable service, and that is where transmission comes into play.

Clearly, the system is much more integrated and being operated much more closer to the margin than in the past and its components are much more sensitive to disruptions. Minor outages that

would have been a local inconvenience a few years ago now have the potential to take down an entire regional system.

From the investment side, we work closely with the Congress through our budget process to obtain funds to upgrade our system as needed to improve reliability. We work closely with our customers as they advance funds to some of our activities. Merchant powerplants that interconnect with our system have to pay a freight, they pay their share of the costs to upgrade the system, and we are looking for more flexible ways with appropriate Congressional and customer oversight to use these funds to take care of emerging situations, rapid load growth and requests for quick interconnections.

We at Western look forward to continuing to work with the members of your committee as you seek ways to reinforce the infrastructure and investments in the nationwide power grid.

Thank you for the opportunity to testify.

[The prepared statement of Mr. Hacskaylo follows:]

PREPARED STATEMENT OF MICHAEL S. HACSKAYLO, ADMINISTRATOR, WESTERN AREA POWER ADMINISTRATION, DEPARTMENT OF ENERGY

Thank you, Mr. Chairman and members of the committee, for your invitation to speak with you today on behalf of Western Area Power Administration (Western).

I will focus my remarks on Western's improvements and investments in the transmission infrastructure of the high-voltage system we own and operate on behalf of the people of the United States. Western's concerns are to protect public safety around our facilities and to maintain the reliability of our high-voltage transmission system.

Western is one of the four Federal power marketing administrations. We market and transmit Federal power to nearly 650 wholesale customers spread across 15 Central and Western states. This power is generated at 55 hydro plants owned and operated by the U.S. Bureau of Reclamation, the U.S. Army Corps of Engineers and the International Boundary and Water Commission. To deliver this power to our customers—the cities and towns, public utility and irrigation districts, rural electric cooperatives, and Federal, state and tribal organizations we own and operate nearly 17,000 miles of high-voltage transmission lines, 256 electrical substations, 359 communication sites and a variety of other supporting facilities. Our employees are based at 51 duty stations in 12 states.

We deliver power to some of the most isolated communities in the nation. Our facilities are scattered across a 1.3 million-square-mile service territory traversing some of the most rugged terrain in the continental United States. Our transmission system is an integral part of the nation's high-voltage electrical grid in the West.

We operate four control areas and maintain about 1,600 load-serving interconnections with other utilities inside our control area boundaries. We schedule energy with another 100 load-serving entities with which we do not have direct interconnections. Additionally, we make unused transmission capacity on our system available to any other buyer and seller, including power marketers and brokers, on a cost-reimbursable basis.

Maintaining the reliability of our vast transmission system to serve customers around the clock is our most significant operational obligation. This requirement is buttressed by:

- our contracts with customers to deliver firm power,
- our commitments to the North American Electric Reliability Council and its member councils to reliably operate the transmission system, and
- our duty to safeguard this critical infrastructure.

Today, the Nation's transmission grid is interconnected, interstate and international. As Deputy Energy Secretary Francis Blake testified before this committee two weeks ago, assuring this integrated transmission system can reliably deliver bulk electricity is a core Federal issue.

The Administration's National Energy Policy noted that our energy infrastructure has failed to keep pace with the changing requirements in our energy system. Nationwide, since 1989, electricity sales have increased by 2.1 percent per year, yet transmission capacity has increased by only 0.8 percent per year. Some experts

across the electric industry sector agree that the bulk power transmission grid may need to be expanded to remove bottlenecks.

The National Energy Policy also directed the Secretary, by December 31, 2001, to examine the benefits of establishing a national grid, identify transmission bottlenecks and identify measures to remove those bottlenecks.

Recent load growth in the Western United States has greatly impacted transmission system reserve margins. The interconnected power grid is constrained by insufficient capacity where demand is greatest.

As a transmission system owner, Western must continue to take prudent steps to improve grid operations and ensure the safety and reliability of the Federal transmission system. We continue to cooperate with new merchant powerplants requesting interconnections to our transmission system.

As a matter of policy, Western offers transmission capacity on a first-come, first-served basis under our Open Access Tariff. This includes providing interconnections to merchant powerplants seeking transmission paths to move their power to load centers. Western is responsive to the emerging generation market, and we've seen strong demand on our available transmission capacity. We now have little capacity available to serve new generation or additional loads beyond the dozen projects now in planning or under construction across our service territory.

Before new generation is added, extensive studies are undertaken to evaluate its effects on the transmission grid. A number of technical, stop-gap measures address reliability in the short term. They do not, however, resolve the long-term reliability and operational security threats to the transmission system under the increasing stress and burden of many more bulk power transactions moving power long distances in response to market demands.

Western has played a key role in joint transmission planning and construction across the West. Western conducts its own studies and participates in studies conducted by entities including Western Systems Coordinating Council, Western Regional Transmission Association and Southwest Regional Transmission Association as well as local and statewide transmission planning groups.

Results of these studies have led us to develop a description of immediate and potential projects for grid enhancements to the Federal transmission system as permitted within the confines of Western's statutory authorizations and funding. A summary of these projects was provided to the Federal Energy Regulatory Commission earlier this year in response to the Commission's Order on Removing Obstacles to Increased Electric Generation and Natural Gas Supply in the Western United States (FERC Docket No. EL01-47-000). I am providing that summary for the Committee's use.*

At Western, our charter is different from investor- and consumer-owned utilities. They are required to invest in generation and transmission assets to meet load growth needs in their franchised service territories. Our transmission system was built to provide a way to deliver power from the Federal dams to the preference customers who have first call on this publicly generated power. Today, Western's high-voltage system provides a critical backbone of transmission grid in parts of the Western United States. This system includes nearly 9,000 miles of steel pole lines and 7,900 miles of wood-pole lines.

Wood-pole structures are expected to last an average of 40 years. Sixty-three percent, or 4,983 miles, of Western's wood-pole structures are more than 40 years old. Another 19 percent, or 1,482 miles, of wood-pole lines will reach the 40-year mark in this decade. Western has a long-term strategy for maintaining and extending the life of its aging infrastructure, particularly our wood-pole transmission lines.

Part of that strategy is an ongoing wood-pole replacement program to reinforce and replace individual poles. The other part is rebuilding entire line segments. This summer, we completed a rebuild of the Havre-Shelby line in northern Montana. This 115-kV transmission line was originally placed into service in 1951. Beginning in 1993, Western crews began the methodical task of replacing the rotted wooden poles on this 95-mile line, one by one, to extend the life of this vital line bringing electricity to small, isolated rural communities such as Chester, Rudyard and Kremlin. The project was scheduled to be completed in 2002, but the crews devised several innovations that sped up the work by a full year.

Last year, we began a similar life extension project in North Dakota on a 56-mile, 115-kV transmission line between Rugby and Neal Substation near Voltaire and Bergen. The line was originally placed into service in April 1952. We rebuilt the first 10-mile stretch last summer and expect to finish in 2005. Next year, we'll begin work on the 1949 vintage, 41-mile Williston-Watford City line and the 1951 vintage, 34-mile Watford City to Charlie Creek line.

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*The summary has been retained in subcommittee files.

We have also been able to stretch out our infrastructure replacement activities. The Havre-Shelby rebuild project was stretched out over nine years. It costs $7,000 in material and labor to replace one H-frame wood-pole structure. These costs include pro-rated shares for the heavy equipment and the often hidden costs of engineering design, work planning and acquiring the necessary materials. These costs also include the time and work needed to take down the old structures and comply with environmental requirements. The materials cost alone is about $3,500 for each structure.

When you multiply the costs across Western's entire system, the amount is quite substantial.

The equipment in our substations is also aging. Next year, we'll have 216 transformers and 183 circuit breakers that will have been in service for more than 40 years. Circuit breakers have an average service life of 30 to 35 years. The useful life of a transformer is 45 to 50 years. Like all responsible utilities, Western monitors its electrical equipment and attempts to obtain the greatest useful life from each component as a matter of sound fiscal policy and good business practice. Keeping each older piece of equipment in service must be weighed against any increased risk to reliability and liability.

Many of our partner utilities have minimized capital outlays in the past decade for transmission facilities in the face of uncertainty about who will pay for system additions and upgrades. As a result, transmission improvements, generation additions and maintenance and rehabilitation programs have often been deferred. At the same time, load growth, deregulation and restructuring, transmission open access and merchant plant interconnections are placing unprecedented demands on the interconnected power grid.

Systemwide disturbances in 1994 and 1996, energy shortages and price spikes in the Midwest last summer and the roller coaster ride that's going on in California have focused attention on the reliability of the nation's power grid and its ability to meet an ever growing instantaneous demand for high-quality, reliable electric service.

Clearly, the system is more integrated and being operated much closer to the margin than in the past, and its components are more sensitive to disruptions. Minor outages that would have been a local inconvenience a few years ago now have the potential to take down an entire regional system.

Western's construction, rehabilitation and maintenance programs have generally kept pace with system needs for repairs, replacements and upgrades. Interconnection projects with numerous proposed merchant plants have pulled resources away from work on our own system the past couple of years. This trend will continue in the near future. Given the time frames required to construct new or upgraded facilities, Western expects stresses on the existing transmission grid will increase before any relief is evident. The possibility of both planned disturbances (sometimes called rolling blackouts) and unplanned outages will remain high in the near future.

We at Western must maintain our excellent record of power system reliability. Today, as a WSCC member, we face sanctions and fines if a system disturbance is traced to poor maintenance practices or not replacing outdated equipment as required by reliability criteria. We expect the voluntary reliability systems that operate across the rest of the nation will soon be contractually or legislatively required as recommended in the National Energy Policy.

Compounding these funding pressures in the Upper Great Plains region is our requirement to meet network load requirements on the Integrated System that we jointly own and operate with Basin Electric Power Cooperative and Heartland Consumers Power District. Under a 1998 agreement, we and others transmit power across facilities owned by the three entities using a single transmission rate.

Requests to interconnect with this system are forcing us to replace aging system components that cannot continue to withstand the strains now being placed upon them much longer. Our Congressional mandate to sell power at the lowest possible cost consistent with sound business principles, along with extensive customer involvement in developing our power rates and our construction, rehabilitation and maintenance work plans serves to cap the amount of work we can accomplish each year. Regardless, the need to continue addressing our aging inventory of equipment is unavoidable.

We've been able to find creative ways to leverage our appropriated dollars with customer funding to meet our needs. Customer funding for these activities can offset our need for appropriated dollars. But their reluctance to provide more funding stems from their need to be competitive in the marketplace and the uncertainty over the future shape of the industry. Customers have no future guarantee they will receive the benefits of system improvements they finance today.

We at Western look forward to continuing to work with the members of this committee as you seek ways to reinforce the infrastructure and investments in the nationwide power grid.

Thank you for the opportunity to testify before you today.

Senator DORGAN. Mr. Hacskaylo, thank you very much for being here and we will ask some questions after we hear from Mr. William Longenecker from FERC. Thank you for joining us.

STATEMENT OF WILLIAM G. LONGENECKER, ENERGY INDUSTRY ANALYST, OFFICE OF MARKETS, TARIFFS & RATES, FEDERAL ENERGY REGULATORY COMMISSION

Mr. LONGENECKER. Thank you. Mr. Chairman, members of the subcommittee and Mr. Pomeroy.

Thank you for the opportunity to appear here today. I am pleased to offer testimony on current issues affecting the outlook of the Nation's electric transmission system. My testimony will focus on the development of regional transmission organizations—so-called RTOs—and how the Federal Energy Regulatory Commission can help on transmission infrastructure improvements and investments. The views expressed in this testimony are my own and they do not necessarily reflect those of the Commission or any one Commissioner.

FERC addressed the issue of access to the transmission lines of public utilities in Order No. 888, which was issued in 1996. Order No. 888 required all public utilities that own, control or operate facilities used for transmitting electric energy in interstate commerce to provide open access and nondiscriminatory transmission tariff service and to functionally unbundle wholesale power services.

Since Order No. 888 was issued, wholesale electricity markets have become much more regional than local, encompassing large multistate areas. For competition to flourish and bring benefits to wholesale, as well as retail customers, it is critical that there be adequate transmission to carry electricity from sellers to buyers.

The transmission grid is the essential superhighway for interstate electricity commerce, but it is becoming congested due to increased demands. Transmission constraints frequently prevent the use of lowest-cost generating facilities, and transmission expansion has not kept pace with changes in the electricity marketplace.

In Order No. 2000, issued in 1999, the Commission sought to address several transmission impediments to competition in wholesale electricity markets. There are continuing opportunities for discriminatory treatment in access to transmission. There are engineering and economic inefficiencies in the operation of the transmission system and in managing congestion. Transmission reliability problems have increased. Pancaked transmission rates, where a separate access charge is assessed every time the transaction contract path crosses the boundary of another transmission owner, restrict the size of regional power markets.

Finally, uncertainties associated with transmission planning and expansion processes has severely limited needed additions to the Nation's transmission system. We have found that these transmission problems could be best addressed if the interstate transmission grid were operated on a regional basis in a manner which is independent of entities that are buying or selling electricity.

Accordingly, Order No. 2000 required all public utility transmission owners and operators to submit filings related to the creation of regional transmission organizations. The Commission has strongly encouraged public power and cooperative entities which constitute such an important part of the Nation's electric system to participate fully in RTOs.

In addition, FERC has recognized that there must be adequate returns on transmission investments so as to encourage such investment. Order No. 2000 specifically indicated the Commission's receptiveness to innovative rate proposals that would reward those making new transmission.

The Commission has aggressively acted to review pending RTO applications and announce that it favors the development of one RTO for the Northeast, one for the Midwest, one for the Southeast and one for the West.

In conclusion, FERC is keenly aware of the importance to electricity markets of full and fair access to efficient and reliable transmission service. The Commission views the creation of RTOs as the single best approach to addressing, among other things, transmission congestion and facilitating expansion of the transmission grid.

I will be pleased to answer any questions you may have.

[The prepared statement of Mr. Longenecker follows:]

PREPARED STATEMENT OF WILLIAM G. LONGENECKER, ENERGY INDUSTRY ANALYST, OFFICE OF MARKETS, TARIFFS & RATES, FEDERAL ENERGY REGULATORY COMMISSION

I. OVERVIEW

Mr. Chairman and Members of the Subcommittee.

Thank you for the opportunity to appear here today. I am pleased to offer testimony on current issues affecting the outlook for the Nation's electric transmission system. In particular, my testimony will focus on the development of regional transmission organizations (RTOs) and how the Federal Energy Regulatory Commission (FERC or the Commission) can help on infrastructure improvements and investments. The views expressed in this testimony are my own, and do not necessarily reflect those of the Commission or any one Commissioner.

A competitive market is the best way to protect the public interest and ensure that consumers' needs are met over the long run at reasonable prices. For competition to flourish and bring benefits to wholesale as well as retail customers, it is critical that there be adequate transmission to carry electricity from sellers to buyers. It is also critical that transmission services be provided on the interstate grid on a fair and non-discriminatory basis.

The transmission grid is the essential superhighway for interstate electricity commerce, but it is becoming congested due to increased demands. The use of the interstate transmission grid has grown dramatically, but transmission expansion has not kept pace with these changes in the interstate electricity marketplace. Also, wholesale electricity markets have become much more regional than local, encompassing large multi-state areas. Thus, the existing grid is being pushed to its operational limits, and transmission constraints frequently prevent the use of lowest cost generating facilities. The institutional structures used in the past for planning and expanding the grid are not currently meeting our needs.

For a number of years, the Commission has recognized the importance of an efficient transmission grid, and has exercised its authority to make the transmission system operate efficiently.

II. ORDER NO. 888

The Commission addressed the issue of access to the transmission lines of public utilities in its Order No. 888, which was issued in 1996. There, we found that unduly discriminatory and anti-competitive practices existed in the electric industry, and that transmission-owning utilities had discriminated against others seeking transmission access. Accordingly, Order No. 888 required all public utilities that

own, control or operate facilities used for transmitting electric energy in interstate commerce to provide open access non-discriminatory transmission tariff service and to functionally unbundle wholesale power services from transmission services.

III. ORDER NO. 2000

In Order No. 2000, issued in 1999, the Commission sought to address several remaining transmission impediments to competition in wholesale electricity markets. These impediments were identified as continuing opportunities for discriminatory treatment in access to transmission lines, and engineering and economic inefficiencies in the planning and operation of the transmission system. We identified the following specific problem areas that Order No. 2000 is intended to address: the reliability of the nation's bulk power system is being stressed in ways that were not experienced before; it is increasingly difficult to accurately compute the available transmission capacity on transmission facilities; existing transmission congestion management systems do not optimize regional congestion relief and are cumbersome, inefficient and disruptive to bulk power markets; the uncertainty associated with transmission planning and expansion have resulted in a noticeable decline in planned transmission investments; and pancaked transmission rates (where a separate access charge is assessed every time the transaction contract path crosses the boundary of another transmission owner) restrict the size of regional power markets. Order No. 2000 also recognizes that wholesale trading patterns have become increasingly regional and multi-state in character.

Many of these transmission problems, we found, could best be addressed if the interstate transmission grid were operated on a regional basis, in a manner which is independent of entities that are buying or selling electricity. Utility-by-utility management of the interstate transmission grid is inadequate to support the efficient and reliable operation of the bulk power market. Accordingly, Order No. 2000 requires all public utility transmission owners and operators to submit filings related to the creation of regional transmission organizations (RTOs). RTOs are institutions that will own and/or operate the transmission grid on a regional basis and that will not participate in the power sales business, i.e., they must be independent of power market participants.

Order No. 2000 requires that RTOs address essential transmission functions on a regional basis. These functions include operation of the grid, maintenance of reliability, congestion management, planning and expansion, calculation of transmission capacity, parallel path flow management, and tariff administration. Although not all transmission owners are public utilities subject to the Commission's general Federal Power Act jurisdiction, the goal of Order No. 2000 is for all transmission-owning entities, including non-public utility entities (e.g., municipal and electric power cooperative utilities) to place their transmission facilities under the control of independent RTOs.

Accordingly, in the future, the Commission will look to RTOs not only to ensure non-discriminatory access over the interstate grid, but also to manage congestion over existing regional transmission constraints and take the lead in regional transmission planning and expansion to remove or mitigate constraints over the long-term. RTOs must have the authority to ensure the short-term reliability of the regional grid and must be responsible for planning, and for directing or arranging, necessary transmission expansions and upgrades that will enable it to provide efficient and reliable transmission service. We expect that the RTOs will have a process for determining the most cost-effective transmission upgrades, and that this process would take into consideration any technological advances in the transmission of energy that may be available.

IV. COMMISSION EFFORTS TO ESTABLISH RTOS EXPEDITIOUSLY

Recognizing the critical importance of transmission issues, FERC established an aggressive timetable in Order No. 2000 for RTO implementation, and we have been acting expeditiously in response to the RTO filings. Since the beginning of 2001, the FERC has issued over 20 orders on RTO filings. The Commission has also recently ordered mediation in an effort to create one large RTO for the Northeast U.S. and another for the Southeast U.S. Creation of effective RTOs has been and continues to be one of the top priorities of the Commission.

V. OTHER COMMISSION ACTIONS

In addition to efforts to get RTOs established, we have recognized that there must be adequate returns on transmission investments so as to encourage such investment by the private sector. Order No. 2000 specifically recognizes the importance of transmission pricing reform, and indicates the Commission's receptiveness to in-

novative rate proposals that would reward those making new transmission investments.

FERC also believes that so-called "merchant" transmission projects sponsored by entities other than traditional utilities can play a role in expanding competitive generation alternatives for customers, and it has taken initial action on two merchant high voltage direct current transmission line projects: the Neptune Regional Transmission System, LLC project consisting of several thousand miles of undersea cable which will connect capacity rich regions in Maine, New Brunswick and Nova Scotia with capacity constrained markets in Boston, New York City, Long Island and Connecticut; and the TransEnergie U.S. Ltd. 26-mile undersea cable project from Connecticut to Long Island, New York.

In evaluating these proposals, the Commission has established criteria to use to determine whether merchant transmission line projects should qualify for negotiated or bid transmission rates: the merchant project should assume full market risk; the merchant project should create tradable transmission rights; the merchant project should not preclude access to essential facilities by competitors; the merchant project should be subject to market monitoring for market power abuse; the physical energy flows on the merchant project should be coordinated with, and subject to, reliability requirements of the relevant RTO; and the merchant project should not impair pre-existing property rights to use the transmission grids or interconnected RTOs or utilities.

Another related area where we have acted to increase efficiencies involves interconnection of generating facilities with the transmission system. In recent orders the Commission has stated its intent to evaluate in the near future the importance of standardizing interconnection policies and procedures. FERC has already taken some steps in this direction by encouraging utilities to file their interconnection rules. Standardizing interconnection rules and procedures may help minimize cost and barriers to entry for new generation.

VI. LIMITATIONS ON THE COMMISSION'S ABILITY TO RESOLVE TRANSMISSION ISSUES

FERC is statutorily unable to directly and completely address all transmission problems. A significant portion of the nation's transmission grid is owned and operated by utilities not subject to FERC's open access requirements. For example, the Commission has limited authority with respect to transmission facilities owned by the Federal government, state and municipal governments, and rural electric cooperatives or within the Electric Reliability Council of Texas (ERCOT). Public power entities control about 30% of the nation's electricity transmission grid. We have encouraged public power and cooperative entities, which constitute such an important part of the Nation's electric system, to participate fully in RTOs. In Order No. 2000, the Commission stated that a properly formed RTO should include all transmission owners in a region, including municipals, cooperatives, Federal power marketing agencies, Tennessee Valley Authority and other state and local entities. Certain tax laws impede public power and cooperatively-owned utilities from fully participating in the development of RTOs. One such example is the Internal Revenue Code's restrictions that may prevent transfer of operational control of existing transmission facilities financed by tax-exempt bonds to a for-profit transmission company.

FERC also has no authority over transmission siting decisions. Even though public utilities must offer to expand transmission facilities to fulfill a transmission service request, the utilities first must obtain siting permission from relevant state and local authorities.

VII. CHANGES THAT HAVE BEEN PROPOSED TO IMPROVE TRANSMISSION EFFICIENCY

Although the Commission itself has not taken a position on what action Congress should take with respect to transmission issues, and I a staff member do not here make any such recommendations, I note that a number of measures have been proposed to improve the operation of the Nation's transmission system. Among these are:

- proposals to extend the Commission's open access regulatory authority to all transmission facilities, including those owned by municipalities, rural cooperatives, the Tennessee Valley Authority, and Federal power marketing administrations;
- proposals for the Commission to have transmission siting authority for transmission facilities as a backstop in limited circumstances;
- proposals providing for enforcement of transmission reliability rules by a self-regulatory organization subject to the Federal oversight; and
- proposals for legislation to eliminate tax code and other restrictions that impede public power entities from fully participating in RTOs.

VIII. CONCLUSION

Full and fair access to efficient and reliable transmission service is vitally important to competitive electricity markets. The Commission has been diligent in exercising its authority to promote competitive markets. Currently, in our view, the creation of RTOs is the best approach to addressing a wide range of transmission problems, including transmission congestion and expansion of the transmission grid, among other things. RTO implementation is one of the Commission's top priorities.

Senator DORGAN. Mr. Longenecker, thank you very much. Let me ask a series of questions and then call on my colleague, Congressman Pomeroy.

First of all, with respect to WAPA, my understanding is that the capacity doesn't exist at this point for us to move much additional electric energy from North Dakota. I think you indicated that in your testimony.

Mr. HACSKAYLO. Yes, sir. That is correct.

Senator DORGAN. Can you give me your perspective of why we have not seen investment and why we have not seen substantial improvement in the capability in the transmission system, and not just in North Dakota, but nationally? If you look at the miles of transmission capability available, it really has not changed much over the last couple of decades. Why is that the case?

Mr. HACSKAYLO. I think the most significant reason is that the rules of how the electric utility industry operates are changing. They are in a state of flux. It used to be in the days of regulated monopolies, regulated utilities, that utilities could make an investment in transmission and the State commissions or FERC would guarantee the return on investment so there is some certainty on the fact that the investment would in effect pay off.

Now in these days of deregulation, in these days of companies merging, in these days of merchant plants coming into the system, that certainty is gone. And where investors are looking for a relatively quick return on the investment, we are not finding that in transmission. I think transmission has to be viewed more as a long-term, steady investment, with steady returns. So I think the rules are changing. That is the main reason.

Senator DORGAN. Under a mechanism in which you had regulatory authorities providing returns that were sufficient to justify the investment and the investor would know those returns would be available, we had a buildout and we had certain redundancy and we had guarantees of service at a certain price. When we go to the marketplace and the marketplace decides on the incentives for the buildout to exist, would we have at the conclusion of that a redundancy in the system that will give the consumers the same protection of continued service that exists under the regulated system?

Mr. HACSKAYLO. The economic theory underlying that premise says yes. The facts may be very different. The facts may be very different because redundancy by nature implies overcapacity, capacity that might not always be used, and yet it still has to be paid for.

Senator DORGAN. And the marketplace would not view that overcapacity with great sympathy, would it?

Mr. HACSKAYLO. It is hard to say. Certainly in California, given the transmission problems there, I think we are beginning to see some recognition that there does need to be redundancy in the sys-

tem, additional capacity to deal with reliability issues. But it is a hard-fought issue and the costs are tremendous in California of not having the reliability, not having the extra capacity there to deal with system emergencies.

Senator DORGAN. But I am just asking, is not the extra capacity almost antithetical to the market system?

Mr. HACSKAYLO. It is hard to make the two fit together.

Senator DORGAN. Maybe impossible?

Mr. HACSKAYLO. I do not know. I do not know. Again, I think the industry is still in a state of flux. The rules keep changing. Directions are still different. So I think the jury is still out on whether all of this is going to work.

Senator DORGAN. Let me ask you your view of technology. I talked about composite conductor technology this morning. How do you view technology as being able to address some of these transmission issues, especially in our region, especially in North Dakota? Are you high on technology producing substantial progress here, or do you think we are going to have to make progress the old-fashioned way, put more lines and more towers and worry less about increased technology?

Mr. HACSKAYLO. The new technology has very much a role to play in the industry, and certainly within Western's system. We have already made use of AC to DC to AC converter stations in Miles City and in Sidney and Nebraska. We've made use of flexible thyristor series compensation devices at various substations that we have in the West. The technology helps reduce losses on the system. It helps improve efficiencies on the system. So there is definitely a role for cost-effective technology to take its place as we rebuild transmission lines, as we upgrade our system.

Senator DORGAN. Mr. Longenecker, FERC is going through some rather interesting times. Would you agree with that?

Mr. LONGENECKER. Yes, sir.

Senator DORGAN. Especially given what is going on in California and, of course, it has been the subject of great controversy and its actions or lack of actions have the subject of great controversy in Washington, D.C., recently.

You describe in your testimony pretty much what we hear from most members of FERC, and that is that as our country has changed, the mechanism by which we develop and transmit electrical energy has to change, as well. Most of our structure was built for an intrastate-regulated system, and now we are trying to create a circumstance where we have effectively a transmission highway to be able to move energy back and forth across the entire country through RTOs. It is an entirely different approach, is it not?

Mr. LONGENECKER. Yes, it is.

Senator DORGAN. And can you tell me, how does FERC see our movement to the RTOs and the upgrade of the capability and the capacity? How do you see that happening? Can you describe the Federal involvement, State involvement, how that relates to the competitive market system? We are not only changing from a regulated environment to an unregulated environment in some cases. We are also changing from an intrastate to essentially a regional and national system. Tell me FERC's impression of different levels of government's responsibility here.

Mr. LONGENECKER. Well, I think we see RTOs as taking the lead in assessing transmission needs within a region that are necessary to meet the evolving electricity market needs such as generation services. We see the RTO working with the States to decide how to best meet those transmission needs with the technology that might be the most economical solution to fixing appropriate in constrained areas, for example, and whether or not transmission is the answer. It may be that a generating station would be the better solution. We also see RTOs taking the lead in terms of seeking siting approvals, and so forth, for whatever projects that the RTO through a collaborative process, has decided best fit the needs at a particular time in a particular power market.

Senator DORGAN. Congressman Pomeroy.

Mr. POMEROY. Thank you both for very interesting testimony.

Mr. Hacskaylo, did you in indicating the projects WAPA was participating in reflect that basically WAPA transmission facilities are being used to carry privately generated power?

Mr. HACSKAYLO. Yes, sir.

Mr. POMEROY. How long has that been going on?

Mr. HACSKAYLO. It has been going on for as long as there has been a Western Area Power Administration. What we do is use our transmission system to move power from generation to load to our preference customers, and then with the additional capacity in the system we make that available to others to gain revenue to help repay the cost of the Federal investment.

Mr. POMEROY. The whole Power Administration concept is the Federal Government builds facilities and recoups costs from power generated over a period of time?

Mr. HACSKAYLO. Yes, sir. That is correct.

Mr. POMEROY. It also addresses neatly some of the investment issues you speak to?

Mr. HACSKAYLO. I think so.

Mr. POMEROY. Might that be a model then for Congress to look at as we would further invest Federal dollars in expanding carrying capacity on existing WAPA lines or other Power Administration facilities that could then be cost out over time carrying the power generated by others?

Mr. HACSKAYLO. That certainly is one option to be considered, yes, sir.

Mr. POMEROY. Mr. Longenecker, how long have these RTOs been an essential part of load management coordination?

Mr. LONGENECKER. Well, the RTOs are in the process of forming, and in many parts of the country RTOs are an extension of the existing independent system operator that has already been in place for a number of years as a consequence of our Order No. 888 having been issued. In fact, many of the ISOs in the Northeast have proposed to transform themselves into an RTO.

Mr. POMEROY. You have two sentences in your statement—excuse me for interrupting—that get to the point you were making, I think.

On page 3 of your testimony you state, "existing transmission congestion management systems do not optimize regional congestion relief and are cumbersome, inefficient and disruptive to bulk power markets; the uncertainty associated with transmission plan-

ning and expansion have resulted in a noticeable decline in planned transmission investments."

So we have a bad system, it is not working very well, we have got very little investment in terms of building a new and better system and the hope is RTOs. Now, what leaves me a little anxious about that is RTOs are quite new. I am concerned about whether they have within the RTO the governing capacity to really make it work to optimal efficiency, and, secondly, whether because they are inherently regional, as their very name implies, whether these regionals can hook up in a clear national system, and FERC is obviously betting the ranch on these RTOs at the present time. Would you please tell me just briefly how this is going to work?

Mr. LONGENECKER. Well, we first determined in Order 2000 that utility-by-utility management of each transmission grid does not work.

Mr. POMEROY. Right.

Mr. LONGENECKER. We have had some ISOs—independent system operators—formed in various parts of the country, but even those, though they are larger and are serving subregions of electricity markets, they are not serving the entire marketplace, the electricity marketplace that has developed, for example, in the Northeast, and so we have a replication of the problem we had with individual utilities managing small transmission grids. We have a little bit bigger organizations, ISOs, managing bigger transmission grids, but it is not——

Mr. POMEROY. It is not the entire coordination?

Mr. LONGENECKER. It is not the full coordination. They have differing approaches to congestion management in these subregions. They have not agreed on how to deal with a single market transaction that might cross their seams, the borders of the individual independent system operators.

Mr. POMEROY. My question is, will RTOs need to assume——

Mr. LONGENECKER. We are looking for RTOs to be large enough to deal with the evolving electricity marketplace, the wholesale markets that are growing because of the interest in nontraditional utilities becoming involved with the selling of power.

Mr. POMEROY. And will FERC then provide the national overlay coordinating the RTOs?

Mr. LONGENECKER. Well, under Order 2000 we require the RTOs to work with their neighbors to facilitate trade and work on common business practices, and so forth.

Mr. POMEROY. I am not convinced the good neighbor policy is enough to get an optimal national framework for building the next century's energy grid, but it remains to be seen. We look forward to continued dialogue with you on that.

Thank you, Mr. Chairman.

Senator DORGAN. Mr. Hacskaylo, you made a comment about, in some cases, minor problems could shut down a regional system at the present time because of a lack of transmission capacity. Can you expand on that?

Mr. HACSKAYLO. A good example is what is called the path 15 bottleneck in central California. Due to system constraints as far away as Idaho, and, remember, we are dealing with an interconnected transmission system here, interstate. As a result of some

system conditions in Idaho, for example, the flow of power from northern California to southern California can drop from approximately 3,500 megawatts down to 900 megawatts at certain times of the year. That can cause rolling blackouts. It did so in northern California. It can cause system disturbances in severe cases such as we saw in 1996 coming out of the Northwest. A relatively small problem can cause the entire Western interconnected system to break up for a short period of time before the system operator can restore it. So that is what all the utilities focus on, is the reliability of the interconnected system, as well as their own systems, to prevent that from happening. Where we see problems like this based on studies, we try to work together to solve them, to get the transmission upgrades in place to relieve congestion.

Senator DORGAN. Mr. Longenecker, tell me what FERC's position is on some sort of mandatory FERC jurisdiction over the RTOs. What kind of jurisdiction?

Mr. LONGENECKER. RTOs would be public utilities, and, hence, they would be subject to our jurisdiction. I am not sure if your question is going to public participation in RTOs. We certainly are encouraging public power bodies and cooperative systems to become full participants in the RTOs.

Senator DORGAN. The reason I ask the question is, as you know, in the development of the RTOs, the creation of the RTOs, there is a healthy discussion going on about pricing plans and the mechanisms by which you price transmission and we have the license plate versus the postage stamp proposals, and the distinction between the two can have a profound impact on certain regions of the country. And I assume that under some circumstances if the pricing scheme is a scheme that is not satisfactory, you will have difficulty bringing some into the RTO organizations. Do you agree with that?

Mr. LONGENECKER. I think FERC is very keenly interested in encouraging participation by all transmission owners, and an important factor that we realize in that regard is that each participant feel that it is being fully compensated for its contribution to a larger RTO effort. What has happened is that many of the RTOs that have developed so far, they are proposing the zonal rate approach as a transition mechanism to bring some certainty to each of the participants that they are going to be recovering their contribution to the system, the larger system.

Senator DORGAN. What is the progress of the development of RTOs at this point?

Mr. LONGENECKER. The Commission has actually issued about 20 or so orders since this past January in regard to various RTO proposals. The RTO West effort is very much active in trying to form something larger than the Pacific Northwest area where it started. It is working towards the formation of a larger westwide RTO. The Northeast ISOs—independent system operators—are in the process of a mediation conference right now ordered by our Commission to look into the possibility of forming a larger RTO for the Northeast. The same thing is happening in the Southeast. And very recently the Midwestern independent system operator and the Alliance RTO reached a settlement to form a super region which would basically run, I think, from the Dakotas all the way to Virginia, a super re-

gion where there would be no pancaked rate in place. It would be a systemwide rate to facilitate trade over a large region of the country from middle America to Virginia.

Senator DORGAN. Mr. Hacskaylo, WAPA, of course, is a very important element of our energy picture here in North Dakota and our region. I was reading in some testimony that we essentially do not have additional capacity at this point to unlock opportunities for additional production of electric energy and transmission of that energy from North Dakota. Is that the case? Do you agree with that?

Mr. HACSKAYLO. It is accurate. The system here is constrained, yes, sir.

Senator DORGAN. And the solution to that, of course, is to find ways either through technology or through new transmission lines and the development of those lines connecting into RTOs and being able to be part of a regional and national grid, that allows us to access a whole series of new energy sources and new energy production in North Dakota. Do you agree with that?

Mr. HACSKAYLO. Yes, sir.

Senator DORGAN. And in order to do that, there are some significant controversies on building transmission corridors. I mean, that is not without some controversy. There is some controversies dealing with the RTO issues. I mentioned a couple. We will have some testimony about them in a while from others about pricing. There are some people who think that, as you indicate in your testimony, this is all "theory," putting together a system in which the market sends signals to replace a system that has largely been a regulated system that has tried to have over the years some redundant supply. I got when you testified some skepticism, maybe I read that wrong, but give me your assessment. Is this going to fit? Are we moving in the right direction? Are there points that we have to be very concerned about as we try to put this together in a new energy policy, and, if so, what are they?

Mr. HACSKAYLO. I think we are moving in the right direction. As I indicated, we do have an industry that is in flux, the rules keep changing. We have new direction from FERC and from others on ways to go. But I think that a judicious blend of the market dictating here is a good place to put generation, whatever type, wind power, coal, whatever, because it can be sold to this load center, we, the developers, whoever they might be, can make money on it, and we need this transmission and here is how we work the transmission. This can work, but it is going to take time. It is not going to happen overnight.

Senator DORGAN. Let me raise one additional point finally, and that is, notwithstanding transmission or just transmission issues, some of us would observe that in a State like North Dakota where we have been blessed with relatively low-cost power for a long period of time and have been well satisfied with that, that there are others in the country that want access to that power, and if they achieve that access, our power will be replaced by higher-cost power. So what we are talking about being able to transmit our energy, if you have a so-called truly competitive system, those who have been pushing most for restructuring, which are the largest manufacturing companies in the country, the automobile industry

and others, would like to access cheaper power, where is that going to come from and how is it going to be replaced? Some would say more production, for example.

But, you know, I must say that I worry a bit about restructuring and its ultimate goal of making power available to be moved at a moment's notice and leaving a State like North Dakota, which is a very heavy user of power and has a significant need for the low-cost power that it has enjoyed for a long while. We don't want to be in a situation where North Dakota is left with a circumstance where that power is replaced by higher-cost power simply because we have a national system.

Congressman Pomeroy, do you have other questions?

Mr. POMEROY. We did not build the interstate highway system based on the reaction of local investing interest. It is a national system to serve national transportation needs. I really agree when it comes to transmission, it is the critical backbone for the Nation's energy delivery system, it needs to be national, it needs to be coordinated, it needs to be fair to remotely populated areas that produce the power, as well as serve to maximum advantage the urban areas.

That is why, Mr. Chairman, I think this panel has been an excellent panel, has shown that I am not sure, left to its own devices, we are at all on the road we need to be on to get this transmission system into shape for the 21st century. Thank you.

Senator DORGAN. Mr. Hacskaylo and Mr. Longenecker, thank you very much for being with us today, and we will make your entire statement a part of the record.

Mr. LONGENECKER. Thank you, sir.

Senator DORGAN. I would like next to call on Ted Humann, senior vice president of transmission of Basin Electric Power; Dave Sparby with Xcel Energy; and Elizabeth Moler, senior vice president, government affairs, Exelon Corporation.

While they are coming up, let me ask that we make a part of the record by consent testimony submitted by Otter Tail Power.

[The information referred to follows:]

OTTER TAIL POWER COMPANY,
August 7, 2001.

Hon. BYRON DORGAN,
220 E. Rosser Ave., Room 312, Bismarck, ND.

DEAR SEN. DORGAN: It's my understand you are convening a panel in Bismarck today for the purpose of discussing "Issues associated with Transmission Expansion" in North Dakota.

As you may be aware, Otter Tail Power Company has served electric customers in North Dakota for some ninety years now, and in this continuing capacity, I believe we have a significant stake in discussions related to transmission expansion. Our company currently operates some 2,700 miles of transmission lines in North Dakota, and we serve power to 249 North Dakota communities with these lines. It's my belief that these facts should have earned us a seat at the table for today's discussions.

It may have been your impression that our views are represented by the North Dakota Lignite Energy Council on this issue. While we are members in good standing of the LEC, it should be noted that areas of common interest and purpose are generally limited to the extraction and sale of lignite coal in North Dakota. The electric transmission business, on the other hand, represents a very distinct dimension of the utility business. Issues relating to regional transmission are more appro-

priately handled through MAPP and, in the future, will be handled through the MISO.

Very Sincerely,

JOHN MACFARLANE,
Chairman & Chief Executive Officer.

STATEMENT OF OTTER TAIL POWER COMPANY

INTRODUCTION

Otter Tail Power Company would like to thank Senator Dorgan for the opportunity to provide testimony today on the topic of "Issues associated with Transmission Expansion." This topic is very timely and Otter Tail Power Company looks forward to assisting in developing policy on this issue in the future. Our comments will focus on what Otter Tail Power Company believes are the primary issues related to electric transmission in our region, together with what we believe are some potential solutions to challenges faced by the transmission grid.

BACKGROUND

Otter Tail Power Company is an investor-owned utility based in Fergus Falls, Minnesota, serving approximately 135,000 customers in North Dakota, Minnesota and South Dakota. Otter Tail Power own 5,300 miles of transmission lines in those three states, of which approximately 2,700 miles are located in North Dakota. In North Dakota, we serve power to 249 communities; only three of these communities have populations over 3,000. In 1999, Otter Tail Power's residential electric rates were 24% less than the national average cost for electricity.

CHALLENGES FACING THE TRANSMISSION SYSTEM

Since the passage of the 1992 Energy Policy Act, the electric utility industry has been in a constant state of transition. Twenty-five states have disaggregated the electric generation business from the electric delivery business, leaving a confusing hodge-podge of deregulation experiments. Changes in the electric transmission business, on the other hand, have been driven from the federal level by the FERC. But while central coordination of change in the transmission sector has created at least some degree of uniformity across the country, many issues are still unresolved and an environment of uncertainty has resulted. This uncertainty has further slowed the development and expansion of the transmission system, exacerbating a trend that dates back to the late 1970's. A recent study indicates that transmission investment throughout the United States has been declining for the last twenty years and, in 1999, was roughly half of what it was in 1979. Like most other areas of the country, North Dakota, South Dakota and Minnesota are living today on yesterday's invested transmission capital.

Running parallel to this transmission deficit trend is an ever growing electric demand on the transmission system. By order of the FERC, wholesale power transactions are now an efficient means of bringing buyers and sellers together in the wholesale market. But these transactions are causing the regional grid to be used in ways that neither its designers nor the regulators intended or envisioned. In addition to serving as a local conduit to carry electricity from power plants to customers, the grid is now being relied on to do much more, including:

- Act as regional highways linking generators in one state to customers in another;
- Maintain reliability of an entire interconnected system;
- Provide flexibility over a wide range of generation, transmission and load conditions;
- Facilitate an ever increasing number of economic exchanges among market participants who are moving electricity over ever increasing distances.

In summary, the regional transmission grid is being stretched to its limits. These limitations have resulted in limits to the expansion of the generation system. This is a particular problem for North Dakota, where we have abundant supplies of coal and almost unlimited potential for wind generation.

In addition to preventing generation expansion, transmission "gridlock" holds the potential for serious reliability problems in our future. We are at a critical juncture where transmission expansion must occur. Significant transmission reliability problems were identified in eastern North Dakota last winter, e.g. and these were only resolved through the cooperative efforts of GRE, Minnkota Power, Xcel Energy, MDU, Manitoba Hydro and Otter Tail Power Company. Repeated circumstances of this nature are not a desirable approach to dealing with transmission challenges in

the future, however. North Dakota already has nearly twice as much generation as we require for our own use, and we need to pay attention to our export channels if we want to remain a significant seller of electricity—much less a bigger player in new markets. Increasing our market share of power sales in other states requires a remedy for the problem of inadequate transmission capacity. We need the help of the Congress and we need the help of the FERC in this regard.

To better understand the barriers to transmission expansion, one must first understand the regional nature of the transmission system. Transmission systems and electrons do not recognize state boundaries. Rather, they are governed by the laws of physics. This is why it's a challenge to explain to citizens and politicians alike that a transmission line in one state can have a significant impact on customers in another state, and that thinking in terms of state boundaries is counter-productive.

The regional nature of the transmission system has increased the difficulty of doing multi-state transmission expansions. While some states like North Dakota have very workable siting laws, other states' laws are more stringent and, in some cases, impossible. For a project that crosses state boundaries, one state may take a year to approve the project, while the other state may take seven years; or, the other state may choose to ignore the project altogether. This state-by-state approach makes it difficult, if not impossible, for utility companies to make necessary additions to the transmission system.

A final barrier to transmission system expansions is the uncertainty that results from disparate methods of transmission pricing. In many cases, it is unclear who is going to pay for transmission system expansion costs. Because of this uncertainty, it is difficult for companies to commit to large capital investments. A common methodology needs to be established for "who is going to pay the freight".

To all of the challenges above, add the potential for negative publicity that new electric transmission projects generally receive, and it's not difficult to understand why utility companies choose to exhaust all other options before going through the hassles of trying to get a new transmission project approved and constructed.

SOLUTIONS TO THE CHALLENGES

The top priority for developing solutions to the challenges cited above is for the Congress to give the FERC authority to mandate participation in Regional Transmission Organizations (RTO's). This will facilitate the resolution of most of the other transmission issues, including the development of regional tariffs that provide greater certainty with respect to transmission pricing and cost recovery. At present, participation in RTO's by transmission owners is voluntary. Mandatory, common membership in RTO's will provide the best vehicle for development of common rules and transmission tariffs among owners of transmission facilities.

Regional transmission tariffs are very important for North Dakota, as well as they are for all of the transmission-owning utilities serving North Dakota. Certain methods of tariff pricing could result in significant cost shifts from urban areas to rural areas and this would be detrimental to our rural economy. Owners of both urban and rural transmission systems will do their best to protect their interests, but in the end, all transmission system stakeholders need to be willing to come to the table and compromise to establish tariffs that benefit everyone. In return, both regulators and the public must be willing to accept compromises that may result in increased costs in the short run, but hold the promise of improved reliability and cost savings in the long run. Again, the best vehicle for accomplishing all of the above is the Regional Transmission Organizations that are being formed with the FERC's encouragement today.

A final mandate for Congress: Give FERC the authority to establish "need" for interstate transmission system additions. States should retain the right to determine appropriate routes for new transmission lines, accounting for environmental concerns, etc. But the "need" for new transmission lines should not be considered on a state-by-state basis. Rather, it should be planned on a regional basis by the RTO's, with an eye toward achieving the greatest common good.

THE PRIVATE SECTOR SEEKS AN EQUAL OPPORTUNITY TO EXPAND

Otter Tail Power Company is very interested in being a part of North Dakota's transmission future. In fact, we are currently a partner in a transmission project with Xcel Energy and Manitoba Hydro that involves the construction of 160 miles of 230 kilovolt transmission line from Central North Dakota to central Manitoba. This is the largest transmission expansion in North Dakota since the mid-1980's. Together with our partners and the North Dakota Public Service Commission, we

have demonstrated what it takes to move a transmission project forward successfully.

For any transmission project proposed by the RTO, all transmission providers should have the opportunity to bid on ownership and construction of that project. Entities that can construct, own and maintain the new transmission line most efficiently while still meeting recognized standards of performance, should be awarded the right to do so. Competition of this sort among transmission providers would be healthy for consumers, and it would be beneficial for all of North Dakota.

Otter Tail Power Company would like to thank Senator Dorgan and his staff for the opportunity to present this testimony. We look forward to working with the Senator as we build our energy future together.

LOREN LAUGTUG,
Director, Legislative and Regulatory Affairs.

TIM ROGELSTAD,
Manager, Transmission Planning.

Senator DORGAN. Thank you for being with us. Why don't we begin with Elizabeth Moler. Elizabeth, thank you very much for being here.

STATEMENT OF ELIZABETH A. MOLER, SENIOR VICE PRESIDENT FOR GOVERNMENT AFFAIRS AND POLICY, EXELON CORPORATION

Ms. MOLER. Thank you very much, Mr. Chairman and Congressman Pomeroy. I appreciate the invitation to join you in Bismarck today. I have not been in Bismarck in a long time. I was overdue.

My name is Elizabeth Moler. My friends call me Betsy. I am the senior vice president for government affairs and policy of Exelon Corporation. Exelon Corporation is headquartered in Chicago, Illinois. Through our subsidiaries ComEd and PECO Energy we serve over five million customers principally in Chicago and Philadelphia areas, so we have generator installations in over 20 States.

Prior to joining Exelon, I served as the Deputy Secretary of the U.S. Department of Energy and as a member and the Chair of the Federal Energy Regulatory Commission from 1988 to 1997. Before that I served as senior counsel to this committee.

Your letter of invitation asked me to focus today on transmission issues. I am pleased to do so.

Our transmission capacity, as the previous witnesses and as you, Mr. Chairman, have observed, has not expanded to keep pace with demand. The current situation is comparable to a country road carrying the traffic on an interstate highway. The transmission system is facing significant increases in congestion. Between 1999 and 2000, in one year, transmission congestion grew by more than 200 percent. And in the first quarter of this year transmission congestion was already three times the level experienced during the same period in 2000. The constraints that you see depicted on these maps, Mr. Chairman, are replicated many times all over the country.

Annual investment in transmission is simply not enough to ensure that we have a reliable grid, and we will not make the needed investment through private enterprise or through government companies unless Congress modernizes the regulatory regime governing our transmission grid.

My testimony today provides a policy prescription to cure the problems in our Nation's transmission infrastructure. I should add that most of these issues, Mr. Chairman, and the solutions are addressed in Chairman Bingaman's July 20 White Paper. We endorse his proposal wholeheartedly with only two minor tweaks.

Can you imagine what it would be like to have different rules apply to individual cars using the same interstate highway? Chaos would reign. But that is the circumstance today along our interstate transmission grid. No wonder it does not work very well. In order to have the transmission grid function more efficiently, we simply must have all traffic subject to the same rules of the road.

As Mr. Longenecker testified, the current rules of the road were written in Order No. 888 issued in 1996 while I was Chair of the Federal Energy Regulatory Commission. It directed all utilities subject to FERC's jurisdiction, an important caveat, to provide other users with access to transmission facilities.

Order 888, however, applies directly only to those who are subject to the FERC's jurisdiction under the Federal Power Act. Thus, the open access regime looks like a piece of Swiss cheese. The holes in the cheese are those transmission facilities that are not subject to the Federal jurisdiction. They include high-voltage lines owned by cooperative utilities, publicly owned utilities, and federally owned utilities for a total of 27 percent of our Nation's transmission lines. In certain parts of the country, like the West, there are really more holes than there are cheese.

In order for the transmission system to work more efficiently, all transmission-owning entities should be subject to the Federal Energy Regulatory Commission's jurisdiction.

An equally confused regime applies when determining which regulatory authority has jurisdiction over a particular transmission line. The same set of high-voltage transmission lines is used to serve both wholesale and retail customers. Yet, in some circumstances the State regulatory authorities have jurisdiction over those live wires. In other circumstances the local co-op has jurisdiction over those wires, or the local municipal utility has jurisdiction over those wires. In still others FERC has jurisdiction.

The who is in charge here question is not one that is easily answered. We have a crazy-quilt system of regulation over the Nation's transmission grid. It is subject to discrimination and abuse. Congress clearly has the authority, and I would assert the duty, to establish one traffic cop for these highways.

The only practical solution that I know of given the use of the transmission line is to put all transmission under FERC's jurisdiction, whether the wires are used for wholesale transactions, whether they are used to serve bundled or unbundled retail load, and whether they are owned by municipal utilities or a cooperative.

With respect to transmission siting, Exelon supports granting FERC a backstop role to site new transmission lines when States are unwilling or unable to act on new transmission line applications. Such an approach would give States the first opportunity to act on transmission siting applications.

It made sense in 1935 when the Federal Power Act was enacted to leave transmission siting with the States since transmission lines were generally local in nature. Now, however, our trans-

mission system is being asked to move large amounts of electricity across long distances and across State lines.

The problems are not theoretical. They are real. AEP, for example, in Ohio has been trying to site a facility across Virginia for 10 years. They got the permit from the Virginia commission last month. However, they still do not have their permits from the Federal agencies. They are now talking to the Forest Service. Regulators in Idaho have been reluctant to build new capacity to serve California. Regulators in Connecticut recently refused to site a line across Connecticut because, heaven forbid, it helped serve people in New York. The problems are real.

FERC-mandated regional transmission organizations are being established across the country. These RTOs will have responsibility to plan how the transmission grid should be upgraded and where new lines are necessary. If State regulatory authorities are unwilling or unable, and under some States' statutes they are unable, to take into account the benefit in another State, Federal regulators should examine the need for the facilities and issue the required permits.

There has been a lot of loose rhetoric about the fact that this would mean FERC would have authority to take private property. That simply is not true. Eminent domain authority would rest with the holder of the certificate. If necessary, they could go to court to exercise the eminent domain authority. This model exists for natural gas pipelines today. It works. It should be applied to the electric transmission grid.

Let me now turn to Federal tax issues. We also believe that the Internal Revenue Code should be amended to allow the tax-free restructuring of transmission ownership and to allow municipal and cooperative utilities to participate in competitive wholesale and retail markets without imperiling their existing tax and financial status.

FERC Order 2000 issued last year has already been mentioned. It requires utilities to form regional transmission organizations.

I am in charge of Exelon's RTO formation efforts for both ComEd and PECO. RTOs will be these large-scale organizations. However, being in an RTO means that we will have to give up control over transmission lines to this independent third party who is going to be charged with running the RTO. Once that happens, the transmission lines will no longer have any strategic value to us as a company. We would sell our transmission system. ComEd, for example, is on record as saying we would be willing to sell our transmission system to the RTO, thus, furthering FERC's pro competition policies, if it did not mean we would have to pay a tremendous tax bill upon the sale of that transmission asset.

Exelon endorses legislation that would enable a utility to sell its transmission assets to the RTO, or to an independent transmission company under the purview of an RTO, without having to pay taxes on the gain realized by the asset transfer. We would, however, of course, be willing to reinvest the gain in infrastructure to serve our customers within a specified period of time.

If this legislation were enacted, it would encourage utilities to transfer the ownership of their transmission systems to RTOs. The RTOs, in turn, would be able to obtain the critical mass of assets

under their ownership that would enable them to operate more efficiently, and this further would encourage the RTOs, the new owners, to invest in transmission infrastructure.

When Congress restructured the telecommunications industry, it provided a similar mechanism for telecommunications asset divestitures. It should do so again in this instance.

I would note that the transmission tax provisions were included in H.R. 4 passed by the House of Representatives last week, and I would further note that this was not one of the controversial areas of the bill.

Let me talk now about innovative pricing for transmission assets.

Current returns on transmission are simply too low to attract the huge amounts of capital necessary to fund investments in transmission expansion. A comprehensive national policy should include direction to FERC to provide innovative transmission rates for transmission owners, not just to owners who have made the transmission improvements and not just to RTO operators, which is the current FERC policy today.

There are two additional statutes on the books, the Public Utility Holding Company Act and the Public Utility Regulatory Policies Act, which have outlived their usefulness and are a barrier to competition.

Last, but by no means least, Congress should give FERC specific statutory authority over the reliability of the interstate transmission grid. The organization now charged with the responsibility for reliability issues, the North American Electric Reliability Council, does not have the necessary tools to do its job. In particular, it needs significantly enhanced authority to make its rules mandatory for all segments of the industry.

Mr. Chairman and Congressman Pomeroy, I have given you a rather comprehensive listing of the transmission issues that need to be addressed by the Congress. Given the absolutely vital importance that transmission plays in our Nation's economy, you should be commended for focusing on this vitally important subject. It is certainly an arcane area, but it is vitally important.

I have spent the last decade of my professional life focused on transmission issues, strange but true. The needs of the Nation's electricity superhighway cannot be ignored. Transmission should not be allowed to become the weakest link in our industry because we cannot tell it good-bye.

I would be pleased to answer any questions you may have. Thank you.

[The prepared statement of Ms. Moler Follows:]

PREPARED STATEMENT OF ELIZABETH A. MOLER, SENIOR VICE PRESIDENT FOR GOVERNMENT AFFAIRS AND POLICY, EXELON CORPORATION

Mr. Chairman and Members of the Subcommittee:

I appreciate the invitation to join you in Bismarck today to testify before the Subcommittee on Water and Power. My name is Elizabeth A. (Betsy) Moler. I am the Senior Vice President for Government Affairs and Policy of Exelon Corporation. Exelon, formed last year by the merger of Unicom Corporation and PECO Energy, is headquartered in Chicago, Illinois. We serve over five million customers principally in Illinois and Pennsylvania, which have both restructured their electricity markets. Prior to joining Exelon, I served as the Deputy Secretary of the United States Department of Energy (from 1997-98), and as a Member and the Chair of

the Federal Energy Regulatory Commission (from 1988-1997). Before that I served as Senior Counsel to your Committee.

Your letter of invitation requested me to focus my testimony today on the electric transmission infrastructure and investment needs, and to address transmission policy and technology issues. Before I turn to the transmission policy issues, I want to comment briefly on the overall policy context facing our industry.

The electricity industry is in the middle of a sometimes painful transition from an industry composed of highly regulated integrated utilities with monopoly service territories and cost-based pricing, to an industry with competitive power generation markets, market-based pricing and a wide diversity of market participants. New institutions are emerging, such as regional transmission organizations. It remains our firm belief that market-oriented restructuring of the electric industry remains the best opportunity we have to provide consumer benefits and to develop reliable new sources of supply. We must work together to make competitive markets work.

Let me turn now to the transmission policy issues.

IMPORTANCE OF TRANSMISSION INFRASTRUCTURE; NEED FOR NEW INVESTMENT

Our transmission capacity has not expanded to keep pace with demand. The current situation is comparable to a country road trying to carry the traffic of an interstate highway. All segments of the electricity industry are imposing tremendous demands on the transmission system to carry more and more transactions across even greater distances. As a result, the transmission system is facing significant increases in congestion. Between 1999 and 2000, transmission congestion grew by more than 200 percent. In the first quarter of 2001, transmission congestion was already three times the level experienced during the same period in 2000.

Annual investment in transmission has been declining by almost $120 million a year for the past 25 years. Transmission investment in 1999 was less than half of what it had been 20 years earlier. Maintaining transmission adequacy at current levels would require about $56 billion in investment during the present decade. The Electric Power Research Institute ("EPRI") estimates it will cost up to $30 billion to bring the western regional transmission system back to a stable condition and $1 billion to $3 billion a year after that to maintain this condition in the face of continued growth.

How do we ensure sufficient transmission capacity to help assure the success of competitive electricity markets? We believe the following proposals should be included in a comprehensive national energy policy. I should add that most of these issues—and solutions—are addressed in Chairman Bingaman's July 24th Electricity White Paper. We endorse his proposal wholeheartedly with only minor tweaks.

PROPOSED POLICY PRESCRIPTION

FERC: A Single Traffic Cop

Can you imagine what it would be like to have different rules apply to individual cars using the same interstate highway? Chaos would reign. That's the circumstance today along our interstate transmission grid; no wonder it doesn't work very well. In order to have the transmission grid function more efficiently, we simply must have all traffic subject to the same rules of the road.

In 1992, Congress passed the Energy Policy Act (EPAct). One of its most significant provisions is a requirement that, upon request, utilities must transmit or "wheel" wholesale power generated by others. If a utility fails to wheel when requested to do so on mutually satisfactory terms, the requesting party can petition the FERC for an order requiring the wheeling.

In 1996, when I was the Chair of the FERC, the Commission determined there was the opportunity for discriminatory behavior and anti-competitive abuse in wholesale electric markets. We issued a landmark decision, known as Order No. 888. It directed all utilities under FERC's authority to provide other users with access to transmission facilities on the same terms and conditions that they themselves have. The purpose was to promote wholesale competition by providing ways for competitive generators to move their power to wholesale customers through open, non-discriminatory transmission services.

Order No. 888, however, only applies directly to those utilities that are subject to FERC's jurisdiction under the Federal Power Act. Thus, the open access regime looks like a piece of Swiss cheese. The holes in the cheese are those transmission facilities in the United States that are not subject to FERC jurisdiction. They include high voltage transmission lines owned by cooperative utilities (6%); publicly owned utilities (8%); and federally owned utilities (13%), for a total of 27% of our Nation's transmission lines. In certain parts of the country, like the West, there are more holes than cheese.

In order for the transmission system to work more efficiently, all transmission-owning entities should be subject to FERC jurisdiction.

Who's in Charge Here?

A similarly confused regime applies when determining which regulatory authority has jurisdiction over the transmission line. The same set of high voltage transmission wires is used to serve both wholesale and retail customers. Yet, in some circumstances the state regulatory authorities have jurisdiction over those wires; in other circumstances the local cooperative or the local municipal utility has jurisdiction over those wires; in still others the FERC has jurisdiction.

This confusing circumstance is due to FERC's determination in Order No. 888 that it has jurisdiction over transmission used for wholesale transactions, as well as the transmission component of so-called "unbundled" retail sales (where the electricity and transmission services are sold separately). Order No. 888 determined that state authorities have jurisdiction over the transmission component of so-called "bundled" retail sales (where the electricity and transmission services are sold as a package). Since that decision was made in 1996, approximately half of the states have restructured their electricity markets. In states that have "unbundled" their retail sales and have adopted customer choice, FERC has jurisdiction. In states that still have "bundled" retail sales (that is, where customers do not have the ability to choose their electricity supplied), state authorities have jurisdiction over the transmission wires that serve retail load, while FERC has jurisdiction over wires for wholesale transactions.

That jurisdictional call was reviewed, and upheld, by the United States Court of Appeals for the District of Columbia Circuit. Indeed, the DC Circuit determined that FERC has jurisdiction over all transmission, but that it properly exercised its discretion to regulate only certain transactions when it issued Order No. 888. The DC Circuit's decision is now under review by the Supreme Court of the United States.

While I supported FERC's decision at the time that Order No. 888 was issued, the jurisdictional call is proving not to be practical in today's world. We have a crazy-quilt system of regulation over our Nation's transmission grid. It is subject to discrimination and abuse. The Supreme Court should not make the policy call on who has jurisdiction and under what circumstances. Congress clearly has the authority—and I would say the duty—to clarify this ambiguity. The only practical solution is to put all transmission under FERC's jurisdiction, whether the wires are used for wholesale sales, or whether they are used to serve bundled or unbundled retail load.

Transmission Siting Authority

Exelon supports granting FERC a backstop role to help site new transmission lines when states are unable or unwilling to act on new transmission line applications. Such an approach would give states the first opportunity to act on transmission siting applications.

It made sense in 1935 when the Federal Power Act was adopted to leave transmission siting authority with the states, since transmission lines were generally local in nature. Now, however, our transmission system is being asked to move large amounts of energy across long distances and across state lines. In some instances state authorities are being asked to consider siting transmission lines whose primary beneficiaries are electricity customers in other states. Many state siting agencies do not have authority to consider the beneficial effects of siting a new transmission line if those benefits accrue to citizens in another state. Under these circumstances, it is becoming increasingly difficult to obtain the necessary siting permits from affected states, which may receive few direct benefits and thus have little incentive to approve construction. As I will discuss later in my testimony, FERC-mandated Regional Transmission Organizations (RTOs) are being established across the country. These RTOs will have the responsibility to plan how the transmission grid should be upgraded and where new lines are necessary. If state regulatory authorities are unwilling to site the lines identified by RTOs, federal regulators should examine the need for the facilities and issue required permits.

Under several proposals pending before the Congress, FERC would be given the authority to issue a certificate of public convenience and necessity for a transmission line if state authorities do not act in a timely fashion. There has been a lot of loose rhetoric that this would mean FERC would have authority to "take" private property. That simply is not true. Eminent domain authority would rest with the holder of the certificate. If necessary, they could go to court to exercise that authority. Electric utilities that are issued such certificates by the states also may exercise the power of eminent domain if they are unable to acquire the rights-of-way through other means.

Federal Tax Issues

We also believe that the Internal Revenue Code should be amended to allow the tax-free structuring of transmission ownership and to allow municipal and cooperative utilities to participate in competitive wholesale and retail markets, without imperiling their existing tax and financial status.

By way of background, the Federal Energy Regulatory Commission ("FERC") issued Order No. 2000 last year. The order requires utilities to form what are known as "regional transmission organizations" or RTOs. RTOs will be large-scale regional organizations that will manage the flow of electricity over our Nation's transmission lines. Our Nation's utilities are in the process of forming RTOs. FERC has mandated that they begin operation no later than December 15, 2001. These new organizations will enable utilities to pool their transmission assets. An independent entity that is not associated with the utilities will be charged with operating the transmission lines in a manner that will make the transmission grid operate much more efficiently. A well-functioning transmission grid will spur investment.

Certainly everyone is aware of the tremendous problems with electricity supplies and prices that have plagued California and the Western part of our country in the past year. Prices have skyrocketed; there have been shortages of electricity, which have resulted in rolling brownouts and even blackouts from time to time. The Chairman of the FERC, the Honorable Curtis Hébert, testified recently that if there had been an RTO serving the Western region that the electricity crisis in the West would not have been nearly as severe.

Secretary of Energy Spencer Abraham recently issued a request for private investors to upgrade the transmission grid in California. The transmission resources in the State are simply not adequate to meet the State's needs. The Department of Energy is now evaluating private investors' plans to upgrade the California grid along a critical North-South part of the grid known as Path 15. The shortcomings of Path 15 have been known for years and years, yet neither the Federal government (through the Western Area Power Administration) nor the private utilities have made the infrastructure upgrades that are necessary.

Unless we do something to encourage additional investments in our transmission infrastructure the California experience could be repeated time and time again. Properly structured, properly designed RTOs will meet that need.

President Bush and Vice President Cheney's National Energy Policy Development Group Report, released on May 17, calls for the development of a National Transmission Grid. While the specific details of the Administration's proposal are still being written, the Administration strongly supports further investment in our transmission infrastructure and the FERC's Order No. 2000 initiative.

We believe that the best model for organizing RTOs is to establish a for-profit transmission company known as a transco. A transco will have a business orientation. It will have an economic incentive to maximize throughput, make appropriate cost-effective transmission upgrades, and do a good job of managing congestion on the grid. Transcos should eventually own transmission system assets. In order to encourage utilities to sell their transmission systems to the transco, Congress should make changes in our tax laws.

Under current law, if a utility divests its transmission system to one of these RTOs, it would suffer a tremendous tax burden. Exelon endorses legislation that would enable a utility to sell its transmission assets to the RTO, or to an independent transmission company under the purview of an RTO, without having to pay taxes on the gain realized by the asset transfer. In order to benefit from the provision, the utility must reinvest the proceeds in qualified utility property. This will encourage utilities to transfer their transmission systems to the RTOs. The RTOs in turn will be able to obtain the critical mass of assets under their ownership that will enable them to operate more efficiently and will encourage investment in additional infrastructure.

In addition, municipal owners of transmission argue they cannot join RTOs because tax code provisions preclude the "private use" of tax-exempt financed utility property. These provisions should be modified to allow municipal transmission assets to be placed into an RTO without violating "private use" rules.

When Congress restructured the telecommunications industry, it provided a similar mechanism for telecommunications asset divestitures. It should do so again in this instance.

I would note that the tax provisions have very broad support within the utility industry. An unusual coalition of investor owned utilities, and small and large municipally owned utilities—groups that are frequently at odds with one another—developed the tax relief proposal I just described. The essential elements of the proposal were included in H.R. 4, the energy bill passed last week by the U.S. House of Representatives. Unlike many of the provisions in that bill, these provisions had

broad bipartisan support. Chairman Bingaman's July 24, 2001, White Paper on Electricity Legislation, highlighted the issue as follows:

> "Certain provisions of the tax code (that) create a disincentive for participants in the market to engage in certain of the structural changes that are necessary. These provisions should be repealed. The tax code should be amended to allow utilities to spin transmission assets off into separate corporations and to remove tax restrictions on participation by public power utilities and cooperative utilities. While such provisions are not jurisdictional to this Committee, they represent an essential component of a functional electricity policy and should be pursued through the committees of jurisdiction."

The Bingaman proposal should be modified to provide relief if assets are sold rather than spun off. Sen. Murkowski has included all of the elements of the agreement reached last year between the investor owned utilities (through the Edison Electric Institute, or EEI), and the municipal utilities (through the American Public Power Association, or APPA, and the Large Public Power Council, or LPPC) in his proposed legislation, S. 389.

Innovative Pricing

Current returns on transmission are too low to attract the huge amounts of capital needed to fund investments in transmission expansion. A comprehensive national energy policy should include direction to FERC to utilize innovative transmission pricing incentives, including rates of return more appropriate with the higher levels of investor risk in a restructured electricity industry. These incentives must be available to all transmission owners; not just to owners who have made transmission improvements and not just to RTO operators—which is the current FERC policy.

PUHCA and PURPA

The Public Utility Holding Company Act of 1935 (PUHCA) has outlined its usefulness and is a barrier to competition. It was enacted during the Great Depression with a goal of simplifying the existing utility company structures and to protect investors and consumers from multi-state utilities that had adopted abusive structures and practices. PUHCA now applies to fewer than 20 out of the Nation's more than 200 electric and natural gas utilities. It limits their geographic scope and product diversification, and imposes burdensome filing requirements. It severely limits the ability of those who are subject to it—including Exelon—to compete in today's fast evolving energy marketplace.

PUHCA is also a barrier to RTO formation, because it effectively limits those who can invest in RTOs. PUHCA is such a burden that none of the major investment banking firms, and none of the major engineering firms (to name just a couple of categories that would logically be interested in investing in RTOs) is willing to invest in RTOs. The Securities and Exchange Commission (SEC) has called for its repeal, believing that they have more than adequate authority to protect investors from abuse under other securities laws. State regulators also support its repeal, provided that FERC is given adequate authority to compel utilities to produce records necessary for their regulatory purposes and to guard against captive customers being forced to subsidize non-utility business ventures. Both provisions are included in legislation pending in the Senate. It is long past time to repeal this outmoded statute.

Another statute that has outlived its usefulness is the Public Utility Regulatory Polices Act of 1978 (PURPA). It was enacted to help alleviate the oil and natural gas shortages of the late 1970s and to encourage the development of electricity generation by non-traditional players and to encourage construction of generators fueled by alternative energy resources. Certain provisions in PURPA now stand in the way of more competitive and efficient wholesale power markets particularly the provisions that require utilities to purchase generation from so-called "qualified facilities" or QFs. Those provisions have become both antiquated and burdensome in light of the later enactment of EPAct. PURPA should be repealed prospectively. However, existing contracts should be honored.

Reliability Organization

Last, but by no means least, Congress should give FERC specific statutory authority over the reliability of the interstate transmission grid. The organization now charged with the responsibility for reliability issues, the North American Electric Reliability Council (NERC), does not have the tools necessary to do its job. In particular, it needs significantly enhanced authority to make its rules mandatory for all segments of the industry. As NERC testified recently before the full Energy and

Natural Resources Committee, it is seeing increasing violations of its reliability rules. A voluntary reliability regime lacks the enforcement authority needed in a competitive electricity market. A comprehensive national energy policy should include provisions to establish a self-regulating reliability organization, with FERC oversight, to develop and enforce reliability rules and standards that are binding on all market participants. This Committee approved and the Senate passed a similar bill last year.

Conclusion

Mr. Chairman, I have given you a comprehensive listing of the transmission issues that need to be addressed by the Congress. Given the absolutely vital importance that transmission plays in our Nation's economy you should be commended for focusing on this vitally important—but admittedly arcane—subject area. I have spent the last decade of my life focused in large part on transmission issues. The needs of the Nation's electricity superhighway cannot be ignored. Transmission should not be allowed to become "The Weakest Link" in our industry because we cannot simply tell it "Goodbye". Action is needed to ensure our country has affordable and reliable electricity for years to come. Congress has been debating electricity issues for six years. In the meantime, our Nation's electricity infrastructure has not kept pace with the growing demands of our new economy. California's woes have clearly sounded an alarm bell that must be heeded by the Congress. The time to act is now.

I would be pleased to answer any questions the Committee may have.

Senator DORGAN. Ms. Moler, thank you very much.

Next, we will hear from Mr. Ted Humann representing Basin Electric Power Cooperative.

STATEMENT OF TED HUMANN, SENIOR VICE PRESIDENT FOR TRANSMISSION, BASIN ELECTRIC POWER COOPERATIVE, BISMARCK, ND

Mr. HUMANN. Thank you, Senator. My name is Ted Humann. I am the senior vice president for transmission at Basin Electric Power Cooperative in Bismarck, North Dakota. Basin Electric delivers approximately 1,700 megawatts of primarily coal-based generation to its 121 member cooperatives located in North and South Dakota, Montana, Wyoming, Nebraska, Iowa, Minnesota, Colorado and New Mexico.

I will focus my comments today on two issues relating to the high-voltage transmission system in this region, the movement towards regional transmission organizations and the transmission constraints in North Dakota.

Basin Electric owns and operates high-voltage transmission facilities on both the eastern and western transmission grids. For our discussion here today, I will limit my comments to the Basin Electric facilities on the eastern grid, but the issues are similar on the west.

Basin Electric owns approximately 1,300 miles of high-voltage transmission facilities on the eastern grid that are interconnected with the high-voltage facilities of the Western Area Power Administration and Heartland Consumers Power District and operate as a single system known as the integrated system. This integrated system consists of approximately 9,000 miles of high-voltage transmission facilities located in six States. In response to the reciprocity requirements of Order 888 of the Federal Energy Regulatory Commission, the non-jurisdictional owners of the integrated system developed and operate the system under an open access tariff. Basin Electric's facilities on the west grid also operate under an open access tariff.

Basin Electric and the other owners of the integrated system have been following the development of the regional transmission organizations and are continuing to negotiate with existing regional transmission organizations or groups that hope to develop an active regional transmission organization. Talks have been held with the Midwest independent system operator, Crescent Moon, Desert Star, Southwest Power Pool and others, in an effort to determine if the integrated system should be a party to a regional transmission organization.

The primary reason why Basin Electric and the other independent system operator owners have not elected to join a regional transmission organization is the way they are proposing to price transmission service using "license plate" pricing. In general, license plate pricing is where each transmission owner recovers the cost of owning and operating its transmission system from the customers whose loads are located within the area serviced by that system, known as a zone. Customers with loads in one zone and generation in another zone obtain transmission service in the other zones for free. They bear none of the costs of the transmission facilities in the other zones, even though they may be principal beneficiaries of those transmission facilities.

The Midwest independent system operator is a good example. In the Midwest independent system operator, the existing load control area becomes a geographical rate zone and a customer located in a rate zone pays the tariff only in that zone. With only that payment, the utility can receive power from anywhere within the Midwest independent system operator region for no additional charge.

This methodology is similar to purchasing a license plate for your car. If you purchase a license plate for your car in North Dakota, you can drive your car anywhere for no additional charge. This pricing does not work because, unlike highways, there is no cost assessed to build the electric transmission system. The gasoline tax pays for the interstate highway system.

If the integrated system were to join the Midwest independent system operator, there would be an increase of approximately $40 million in the cost of transmission service to the customers in the integrated system zone because of license plate pricing. This occurs because more than one-third of the integrated system is located in other rate zones. The current integrated system rate is approximately four mills per kilowatt-hour. If the integrated system is located in the Midwest independent system operator, the transmission costs for users of the integrated system would almost double. A typical integrated system residential consumer could see an increase of more than $100 per year in his bill.

Basin Electric believes that postage stamp pricing is the only fair and equitable method for pricing transmission service in a world of regional transmission organizations. Under this method there is a single rate paid for the use of the transmission system for the entire regional transmission organization region. This would require the sharing of transmission costs equally among all customers located in the regional transmission organization and would encourage construction of improvements to the transmission system for the benefit of all consumers. Postage stamp pricing eliminates the

inequities that license plate pricing brings to rural areas and creates a level playing field among market participants.

In recent weeks several FERC commissioners have noted the superior benefits of postage stamp pricing and the fallacy of using license plate pricing to avoid cost shifts.

Basin Electric supports the development of regional transmission organizations and would even support a congressional grant of mandatory FERC jurisdiction over regional transmission organizations, if that grant of jurisdiction included the following:

Number one, regional transmission organizations must utilize postage stamp pricing;

Small systems that are operating primarily distribution facilities should not be required to include their facilities in the regional transmission organization;

There should be no mandatory rate unbundling requirement;

Any legislation should not materially alter the existing roles of the rural utilities service or the Federal power marketing agencies;

Existing contracts should be grandfathered;

And, also, standard depreciation and typical rates of return should be used for all new facilities constructed instead of incentive rates.

As you mentioned earlier, Senator, there are transmission constraints in North Dakota in our inability to move additional generation out of the State. We feel before any significant amount of new generation can be built in North Dakota, be it fossil fuel, wind or other alternative forms of energy, significant additions to the transmission system will have to be constructed.

It is my view that these transmission facilities will not be constructed under license plate pricing because it truly allows some parties to use portions of the transmission system and not pay for the privilege.

The thought I would like to leave with you is that postage stamp pricing will foster the development of an interstate transmission grid similar to the interstate highway system. This interstate grid will allow for the future development of this region's abundant coal and wind energy resources and will provide the needed infrastructure to support the National Energy Policy.

Because of time constraints, I must conclude my remarks. I appreciate the opportunity to speak to you and look forward to answering any questions that you may have. Thank you.

Senator DORGAN. Mr. Humann, thank you very much.

Next we will hear from Dave Sparby.

STATEMENT OF DAVID SPARBY, VICE PRESIDENT FOR GOVERNMENT AND REGULATORY AFFAIRS, XCEL ENERGY, INC.

Mr. SPARBY. Thank you, Mr. Chairman and Representative Pomeroy. I am Dave Sparby from Xcel Energy. Excel serves several communities in North Dakota together with 11 other States in the Midwest, and we move power and energy between these communities with about 16,000 miles of transmission line.

My message today allows me to join this choir saying that we need more transmission infrastructure, but maybe because I am the guy that goes out to get all the regulatory permits and government approvals, my voice is perhaps a little louder and a little

shriller than maybe others. And that is because those of us who have done that appreciate the very long lead times necessary for transmission improvements under today's regulatory framework.

I know when I am asked what is that transmission system going to look like 4 or 5 years out, I can respond, take a look out your window, because large interstate transmission line additions typically require at least that much time to get permitted, to get designed, and to get built under today's regulatory framework.

Now, this system and these improvements are going from being needed more urgently to being an absolute necessity in a short period of time. In the Midcontinent Area Power Pool, we see more requests for transmission being denied every single month than we have seen for the previous months. We are seeing line-loading relief being called on a national basis more and more frequently. We have seen the amount of investment in transmission on a normalized peak-load basis declining for more than two decades. None of this makes sense when you consider that transmission is about 6 percent of the average consumer's bill, and generation is about 60 percent.

Very small changes in the amount of transmission investment can create huge savings for consumers, our local economies and the environment when looking at the value of their total investment.

Now, the regulatory and legislative policies that we want to change will result in attracting more investment to the transmission business and providing some needed structural changes to help resolve many of these new issues the industry is facing.

In the very briefest of words, we need some additional incentives, and we need those incentives designed to promote the upgrade and expansion of our current network. Traditional cost-based, average rate-based kind of regulation provides no incentives to expand and improve that system.

And, Mr. Chairman, I think your concerns with respect to issues like research and development are right on. As we move to a desegregated industry, who is going to do that, what the level of that is going to be and how it is going to get done I think is a very significant public policy issue.

We are one of the few industries, notwithstanding the work of 3M and others, that still use basically 1930's level of technology in an age of microchips. We need to move past that.

Part of our program would be to direct the Federal Regulatory Commission, who has already undertaken some work with incentive regulation, but to continue their efforts to consider innovative noncost-based forms of regulation to expand this transmission network and to get the needed improvements operational.

Now, with respect to a comment that Mr. Pomeroy made, I agree with the comment that RTOs perhaps standing alone may be worth thinking about whether or not they are going to meet all the challenges necessary to get power transmission network into place.

We at Xcel have advocated the use of independent transmission companies in conjunction with RTOs to help get that transmission built. ITCs are companies that we propose would earn returns on getting that transmission constructed and getting those megawatts of power moved. The ITC can work within an RTO and also be subject to incentive regulation to make sure that issues like quality of

service and the location and geography of service get properly addressed.

We think for-profit transmission companies, together with innovative regulation, offer a great alternative that we should proceed along to help ensure transmission gets constructed.

Other fixes, I think Ms. Moler addressed completely, PUHCA, some tax changes, expediting and reforming the siting process. These changes are changes we need to make today to ensure that the transmission network that carries our energy five years from now is in place.

Thank you very much.

[The prepared statement of Mr. Sparby follows:]

PREPARED STATEMENT OF DAVID SPARBY, VICE PRESIDENT FOR GOVERNMENT AND REGULATORY AFFAIRS, XCEL ENERGY, INC.

Chairman Dorgan and members of the subcommittee:

Thank you for the opportunity to come to Bismarck and testify.

I am David Sparby, Vice President for Government and Regulatory Affairs of Xcel Energy Inc. Xcel Energy was created as the result of a merger between Minneapolis-based Northern States Power (NSP) and Denver-based New Century Energies (NCE). The merger of those two companies was completed on August 17 of last year, only 17 months after it was announced. Xcel Energy serves more than 3 million electricity and 1.5 million natural gas customers in 12 states, and 2 million electricity customers internationally. Xcel has $1.5 billion of existing transmission assets and over 16,000 miles of transmission lines.

INTRODUCTION

Electricity powers the U.S. economy and continues to provide the means to improve the quality of life in our homes. Constantly evolving electrically-powered technologies have made us more productive at work. The expectation that electricity will be there when we need it is fundamental to the American way of life in the 21st century. Adequate supply of highly reliable and reasonably priced power is and will continue to be of the highest national priority.

Over the past decade, the electricity supply industry has undergone a profound change that—in many ways—mirrors the changes in our economy. Consumers today demand more electricity and expect lower prices. At the same time, the digital workplace requires greater reliability of the electricity supply than was needed in the past.

In response, the electricity supply industry has embarked on a quest for greater efficiency and reliability in the generation, transmission and distribution of electric energy.

While most power is still generated and delivered today by vertically integrated companies, the electricity supply industry is evolving into separate generation, transmission and distribution businesses. Independent generators selling to the burgeoning wholesale market today build most new generating facilities, while many traditional utilities, often directed by state legislation or regulation, now concentrate on individual elements of the electricity business.

The wholesale electricity market, which once handled few transactions, now handles hundreds daily. The geographic size of these markets is also increasing rapidly, holding out the promise of greater competition and lower prices for consumers. The transmission grid was designed by integrated utilities to serve their retail customers. While transmission was interconnected to support reliability and some economic diversity, it was never intended to support the level of inter-company trading that is currently occurring. In addition, the siting of new transmission is an extremely cumbersome and difficult process due to the concerns of local communities. As a result, the transmission system is being stretched to the limit and concerns about the reliability of the system are increasing.

There is an urgent need to improve our electric infrastructure—the fundamental bedrock of reliability and an economic and efficient wholesale energy market. The federal government can help by establishing a clearer statutory framework for the electric industry of the future. This framework should:

- Allowing for and supporting the creation of for-profit independent transmission companies that are price regulated by the FERC;

- Encouraging non-jurisdictional utilities to join RTO's and ITC's by providing appropriate incentives (We are trying to get publics and co-ops into TRANSLink through the carrot rather the stick approach);
- Provide incentives for increased investment in and improved operation of transmission facilities;
- Provide innovative, non-cost-based forms of transmission rate regulation to promote smarter management of the existing grid to reduce congestion and increase reliability;
- Remove federal barriers that block a more efficient system; and
- Establish an enforceable reliability code of conduct.

While the Federal Energy Regulatory Commission (FERC) can address a number of these issues, there is much that only the Congress can do. Congress should:

Support ITC's

Late last year, FERC took another large step in ensuring workable competitive markets by issuing its Order 2000, which called upon jurisdictional utilities to voluntarily form Regional Transmission Organizations (RTOs). As the name suggests, RTOs will ensure that the transmission grid is operated on a regional basis to support efficient wholesale markets. Establishing RTOs would:

- Reduce opportunities for market abuse by separating control of transmission systems from transmission owners;
- Reduce the charging of multiple transmission rates for use of transmission within the RTO; and
- Eventually level rates within the operating region.

FERC Order 2000 also envisions the creation of for-profit Independent Transmission Companies or ITC's. As their name implies, ITC's are companies whose sole purpose is the provision of transmission service to the wholesale markets. ITC's are designed to work within the regional transmission organizations and promote the efficient operation and extension of the transmission system to support the growing need for new investment, particularly investment that is necessary to transfer large amounts of energy from one region to another, and thereby promote greater efficiency and use of generation and transmission resources.

The biggest gap in FERC's RTO authority remains its inability to impose the same requirements on federal electric utilities, municipal utilities and electric cooperatives. These utilities operate important transmission facilities that are integral to RTOs throughout the nation. FERC has invited these entities to participate in mediation talks. However, because FERC lacks jurisdiction over these entities' transmission systems, it cannot put the same pressure on them to join RTOs that it has clearly demonstrated it intends to put on shareholder-owned utilities. Support of ITC's that include these non-jurisdictional companies is an efficient mechanism for FERC to include these companies in regional organizations.

Remove Disincentives From the Tax Code

Ultimately, RTOs will succeed only if all transmission owners in a region join. In some areas of the country, such as the Pacific Northwest, the participation of all publicly-owned transmission entities will be needed to form an effective RTO. Municipal owners of transmission argue they cannot join RTOs because tax code provisions preclude the "private use" of tax-exempt financed utility property. These provisions should be modified to allow municipal transmission assets to be placed into an RTO without violating "private use" rules.

For-profit transmission companies covering large regional areas are ideal candidates for RTO membership. Unfortunately, it is difficult, complex and expensive for utilities to spin-off or sell their transmission assets without incurring large tax liabilities. This discourages formation of transmission companies and slows needed realignment of the utility industry. The tax code should be modified to allow deferred recognition of any gain resulting from these types of reorganizations.

H.R. 4, passed by the House last week, includes necessary changes to municipal utilities' "private use" restrictions and the deferred gains recognition required by IOUs.

Upgrade and Provide Necessary Incentives to Expand the Transmission System

Generation is of little use if the power that is generated cannot be moved to where it is needed, and when it is needed, instantaneously. "Busy" signals are not acceptable in our business. Our increasingly interconnected and overloaded transmission system is what makes the entire electric system work (or not).

All segments of the electricity industry are imposing tremendous demands on the transmission system to carry more and more transactions across greater distances. As a result, the transmission system is facing significant increases in congestion.

On an interstate highway system overloaded with traffic, gridlock often results. On a transmission system with congestion, transactions are curtailed to ensure that the system does not become overloaded, limiting delivery of low-cost power and potentially resulting in a loss of reliability.

Annual investment in transmission has been declining by almost $120 million a year for the past 25 years. Transmission investment in 1999 was less than half of what it had been 20 years earlier. Maintaining transmission adequacy at current levels would require about $56 billion in investment during the present decade. The Electric Power Research Institute estimates it will cost up to $30 billion to bring the western regional transmission system back to a stable condition and $1 billion to $3 billion a year after that to maintain this condition in the face of continued growth.

Without change, the prospects for future investment in transmission are not much more promising. According to the North American Electric Reliability Council (NERC), only 8,445 miles of transmission facility additions are planned throughout North America over the next 10 years.[1] This represents just a 4.2 percent increase in total installed circuit miles, at a time when the EIA projects that electricity demand will grow by 1.8 percent per year.

NERC has reported that:

- Unless proper incentives can be developed to encourage investment in new transmission facilities and siting problems can be resolved, few new transmission facilities and reinforcements will be constructed. The lack of necessary additional transmission facilities and reinforcements will require that either new technologies be developed to alleviate transmission congestion or that generating facilities be located and dispatched in a manner to minimize the use of constrained transmission corridors.[2]
- Without adequate transmission capacity to meet growing demand, reliability will be compromised, prices will increase, overall system efficiency will decline and the benefits of wholesale generation competition will not be realized.

Government policies that have failed to recognize the key role of our transmission system are partly to blame for the declining investment in transmission. As the Department of Energy's Power Outage Study Team noted, "In many cases, state and federal regulatory policies are not providing adequate incentives for utilities to maintain and upgrade facilities to provide an acceptable level of reliability."[3]

FERC should be directed to provide incentive returns for investments that expand our transmission capacity.

Provide Innovative, Non-Cost-Based Rate Regulation to Enhance Transmission Efficiency and Reliability

While progress toward deregulating generation markets continues, transmission is, and will likely remain, a regulated business. Traditionally, transmission owners have been allowed to recover their prudently incurred costs, based on depreciation over many decades, plus earn a return on their investment. No consideration was given to the critical value of adequate transmission to the reliable, competitive operation of electricity markets.

As a result, this cost-based form of regulation does not provide the incentives needed to build and operate an efficient, reliable transmission system. Nor does it encourage adoption of newer technology that may hold great promise for increasing system efficiency and reliability. FERC should be directed to implement innovative, non-cost-based forms of regulation to reward investments and operations that enhance reliability and greater system efficiency.

Without adequate transmission capacity to meet growing demand, reliability will be compromised, prices will increase, overall system efficiency will decline and the benefits of wholesale generation competition will not be realized. A regulatory regime that fosters an economic climate to encourage investment in transmission is necessary. It is time for innovative, non-cost-based forms of regulation to reward transmission investments and operations that enhance reliability and greater system efficiency.

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[1] North American Electric Reliability Council, Reliability Assessment 2000-2009, The Reliability of Bulk Electric Systems in North America, at 31 (October, 2000).

[2] Id. at 5.

[3] Department of Energy, Power Outage Study Team Interim Report at S-2 (January 2000).

Bipartisan provisions designed to adequately incent new investment in transmission was included in last year's House-produced electricity bill. The same provisions were introduced as stand-alone legislation on August 3 by Reps. Sawyer and Burr (H.R. 2814). It is our understanding that a bipartisan group of members from the full Senate Energy Committee is preparing to introduce similar legislation immediately following the August break. We urge the Subcommittee's careful consideration of this bill.

Repeal the Public Utility Holding Company Act of 1935

The Public Utility Holding Company Act of 1935 ("PUHCA"), was enacted during the Great Depression with two primary objectives: the integration and simplification of complex natural gas and electric utility holding company systems which then dominated the utility industry and protection of investors and consumers through effective regulation of multi-state utilities operating through subsidiaries.

PUHCA long ago achieved its first objective of restructuring the electric and natural gas industries. And consumer protection is now the purview of other regulatory authorities, which didn't exist 65 years ago.

PUHCA met its first objective by dismantling and simplifying the organizational structure of the more than 200 complex electric and gas utility holding company systems in existence in the mid 1930s. These geographically scattered and diverse businesses were limited to the operation of a single integrated utility system, plus such other businesses as were closely related to an integrated utility system. By the early 1950s, according to the Securities and Exchange Commission ("SEC"), the agency responsible for administering PUHCA, the reorganization of the electric and gas utility industries was complete.[4]

The second objective of PUHCA—to protect investors and consumers—was met by authorizing the SEC to regulate certain holding companies that remained the owner of utility subsidiaries in more than one state. This regulation requires advance SEC approval for many business and financial transactions, including the issuance of debt or equity, acquiring utility or non-utility assets and entering into service arrangements with affiliated companies.

Even the SEC has recommended PUHCA's repeal because it is no longer needed and is largely duplicative of other investor and consumer protection authority administered by the SEC and the states. As an SEC report has noted, "[a]cting under authority in the Securities Act of 1933 and the Securities Exchange Act of 1934, the SEC has, over the past six decades, created a comprehensive system of investor protection that obviates the need for many of the specialized provisions of the Holding Company Act."[5]

Not only has PUHCA outlived its usefulness, but it also is a barrier to competition. It requires fewer than 20 out of the nation's more than 200 electric and natural gas utilities to register and be subject to pervasive SEC regulation. By significantly limiting geographic and product diversification, and imposing numerous burdensome filing requirements, PUHCA severely limits the ability of companies to invest in transmission or other projects not immediately within their traditional franchise areas.

North Dakota Considerations

For many of the reasons stated above, transmission in the general geographic region around North Dakota has never been sufficiently upgraded to address limitations imposed by large generation additions in the 1970s in the coal fields of the state.

The state currently suffers from a severe lack of export capacity. The technical list is long: stability-based limits due to short circuits in the coal fields; blocks on the state's two DC lines, thermal limits on lines out of the coal fields and short circuits in the Twin Cities.

Because of its rich resource base and lack of problems with environmental compliance, it is Xcel's view that rural regions like North Dakota are likely to host a large percentage of the many new base-load generation facilities that will be needed in the nation over the next 20 years. Some of these plans are already on the drawing board.

We note again, however, that much of this generation will only be possible if incentives are put in place to ensure that associated transmission projects make financial sense.

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[4] See "The Regulation of Public-Utility Holding Companies," a report of the Division of Investment Management, Securities and Exchange Commission, Executive Summary at viii (June 1995).

[5] Id. at x.

Following is a description of proposed transmission projects to increase the ND export level:

- Harvey-Glenboro 230 kv project. Xcel has planned this project to meet contractual obligations to ensure our ability to transfer 500 mw northward. In conjunction, our company is also considering an additional 200 mw southward capability in conjunction.
- WAPA/Basin increase ND export 100 mw. WAPA has recently identified an overbooking of its ND export allocation. The agency has identified some equipment additions that will be necessary to relieve stability issues but has yet to address thermal concerns in western Minnesota.
- North Dakota Lignite Council. Last fall, the Lignite Council (of which Xcel is a member) performed a study to determine what would be required to deliver another 500 and 1000 mw of generation from the Coal Fields to the Twin Cities. The plan recommended upgrade of the existing Antelope Valley-Huron Line to 500 kv. The plan also calls for addition of a 500 kv line from Huron to Sioux Falls and a 345 or 500 kv line from Sioux Falls to Lakefield Junction. The plan, while comprehensive, still needs to address Xcel-planned wind generation additions.
- Red River Valley Load serving. Last year the destruction of the McHenry-Ramsey 345 kv line revealed a major winter peak load serving risk in North Dakota. A study is underway looking at adding major transmission to the valley. This includes options of a coal fields line, back feed line from Bemidji or another line from Manitoba. Any of these could impact ND export levels.

There are also on the drawing board a number of new proposed generation projects that will require new transmission investment:

- GRE has announced plans for a 500 MW coal field generation unit;
- MDU has teamed with Westmoreland Coal to propose a separate 50O MW unit;
- WAPA is considering two sites to add 300 MW of wind generation. The North Dakota site would be near Jamestown and the South Dakota site near Ft. Thompson. Both sites would require a 345 kv line across the state to Granite Falls, MN and an additional 345 kv line from there to the Twin Cities;
- OTP is proposing a 500 MW merchant plant that would require additional transmission to the Twin Cities.

While Xcel supports all of these efforts, each raises concerns. In general, any increase in ND export will result in the need to increase transmission capacity through western Minnesota. With limited routes, conflicts are already apparent in the plans described above. One big conflict is with Xcel Energy's own wind outlet expansion plans. A single 345 kv line likely is not sufficient to deal with all the plans.

To repeat once again, our ability to address these concerns within our business plans depends on reforming current policies to ensure that additions to our transmission network provide returns commensurate with those available through other investments.

Mr. Chairman, there are three issues unrelated to investment that Congress must also address in order to ensure the development of wholesale markets, transmission efficiency and reliability. These are:

Provide a Federal Role in Sighting of Transmission Facilities

The transmission planning, siting and approval process is often contentious, time-consuming, and fragmented. It is also still largely based around the outmoded idea that transmission facilities serve only small regional or local markets. Transmission approvals can be difficult to obtain in a jurisdiction which does not see a direct benefit for its citizens, even though the region as a whole may benefit.

With today's interconnected transmission grid, congestion in one area can have an impact across state boundaries. This illustrates the urgent need for some level of federal involvement in the transmission sighting process.

To begin, Congress should pass legislation that rewards the establishment of planning mechanisms. Such legislation would allow an RTO, a member of an RTO, including an ITC or any other applicant whose application is consistent with a planning process approved by an RTO (or comparable approved regional planning process) to submit a transmission expansion planning process for the construction and expansion of facilities to the FERC for review and approval.

Plans should then be submitted to affected states for review and approval, much as happens under current state regulation. If, however, states are unable or unwilling to approve projects that would affect the efficient function of wide-scale wholesale markets, then an RTO or other applicant should be allowed to request a certificate of public convenience and necessity.

If a transmission expansion plan has been approved through a FERC-approved transmission planning process—and a certificate of convenience and necessity has been granted for the facilities by the FERC after notice and the opportunity for comment—a right of eminent domain would become available to the holder of the certificate. The certificate holder should be entitled to exercise this right if unable to acquire the necessary land by contract, or if unable to agree with the property owner on the amount of compensation for the required rights-of-way.

Require Federal Lands Agencies to Expedite Review of Applications for Transmission Facilities That Would Cross Federal Lands

Transmission facilities are difficult to site for reasons such as landowner opposition and the requirement to obtain approvals from dozens of different jurisdictions. Federal land management agency approvals, required when proposed facilities cross federal lands, are often the most time-consuming and difficult approvals to obtain. The federal government should not stand in the way of needed new transmission. Federal land management agencies must do a better job of streamlining and coordinating review of proposed transmission projects. Congressional codification of this directive would help expedite review of such projects.

Adopt an Enforceable Reliability Code of Conduct for the Bulk Power System

The system of voluntary reliability self-regulation by the electricity industry, which has worked well in the past, is not adequate to meet the growing demands on the bulk power system. With the advent of increased wholesale and retail competition, hundreds of new companies are today involved in the generation and sale of electricity. The existing industry reliability system, dependent upon the voluntary cooperation of incumbent electric utilities and institutions, simply was not designed to address this new marketplace.

An enforceable reliability code of conduct adopted by an industry self-regulatory organization with oversight by the FERC, extending to all market participants and all owners of transmission, should replace the existing voluntary system designed for a different era. The means to achieve this objective is federal legislation. Reliability legislation alone, however, will not solve the reliability problem. Reliability legislation can only help fairly allocate shortages of electricity or transmission capacity. To help ensure reliability, Congress must also deal with the federal barriers and disincentives that plague the electric industry.

CONCLUSION

Federal and state policies must encourage, not discourage, the building of new transmission facilities needed to meet the power demands of a growing economy. The federal government must help ensure that the wholesale markets work more efficiently and reliably and that its policies do not stand in the way of greater efficiency. The adoption of legislation based on the recommendations outlined above will help accomplish these objectives.

Action is needed now to ensure our country has affordable and reliable electricity for years to come. Xcel looks forward to working with this subcommittee to achieve these objectives.

Senator DORGAN. Mr. Sparby, thank you very much.

Your last point is certainly an appropriate point about siting and having the plans in place and the ability to go ahead and build the additional capacity we need. But all of you have talked some about pricing, which I think is a key to this issue. The decision about what additional capacity we need and how you price the utilization of that capacity is central, it seems to me, to what we try to do here in energy policy, and I would like to ask some questions about that. I will start with you, Mr. Sparby.

You indicated that the cost-based, rate-based approach to pricing really provides no incentives. On the other hand, the whole description of using a market-based would suggest the market would provide incentives from the market, itself, and yet you say using a market-based approach you need financial incentives. Why do you need incentives if you use a market-based approach for the build-out of a system? Would the market not send a signal that you need

additional capacity and thereby from the market provide the incentives?

Mr. SPARBY. Well, I think certainly if you were to apply market-based incentives to transmission additions, yes, in part with some other improvements, that does send a much better signal to investors. However, we are going to need that market-based incentive together with some reforms in siting and some of the other reduction of barriers in the Tax Code, as well as the repeal of PUHCA, to also get that investment on the ground.

Senator DORGAN. I don't think I was very clear in my question. A market-based incentive, if the market describes this additional capacity as necessary, the market will design its own incentive, and, yet, I think you are talking about rates that say, let us use a market system, but provide incentives on top of it for the build-out. Why would the market, if the market is a good allocator of goods and services, not assess its own incentives?

Mr. SPARBY. Well, because the marketplace cannot do that, Mr. Chairman. Government defines every single aspect and facet of this marketplace that we operate in. It decides where we can spend our capital. It decides how we can raise it, decides what we can charge for its cost, and it is going to review our investment for its prudence and its impact on regulators.

In the electric industry government shapes our market, and what our advice is about is working with government to reshape that market to address the lack of capital that has been coming into it because we have not seen investors willing to bring the type of capital to meet the growing demands of customers.

Senator DORGAN. Mr. Humann, your assessment of that, market-based or cost-based?

Mr. HUMANN. I guess I don't agree that we need incentive rates to build transmission lines because the pricing is wrong. Under license plate pricing, you run the risk of building a transmission facility and then someone else using it or upgrading it for their benefit and then you not getting paid for that transmission investment because someone else is using it.

Under the postage stamp pricing methodology all consumers would be paying for that transmission investment; therefore, you are guaranteed a payment of that investment. And, therefore, the RTO could decide which transmission facilities are required and go out to the lowest bidder to build those facilities, and because you are guaranteed payment for those facilities, you do not need incentive rates.

Senator DORGAN. Mr. Humann, I understand from your testimony that you are in the process of talking to entities about an RTO, but the pricing practices are very important to making a judgment about whether you join an RTO and under what conditions. What happens if you are not able to resolve that?

Mr. HUMANN. Well, because of the cost shift, we will try to stay out of an RTO as long as possible because of the cost shift and we will just continue to operate our grid in the manner that we have today. We still make the sales across our grid, but we certainly are not going to join a transmission grid where we have a possible increase to our customers of $40 million a year in transmission costs because of license plate pricing.

Senator DORGAN. Ms. Moler, what is wrong with that thinking? Anything?

Ms. MOLER. I understand that Mr. Humann is looking out for his customers, but as long as that situation persists, you will not get the transmission upgrades. It is one of the holes I described in the Swiss cheese. There are lots of utilities across the country that are not participating in this regime, and you have huge increases in congestion across the country. You are not getting the infrastructure investment, and it is just not working very well. And until you get everybody singing off the same page, the situation is going to continue to worsen rather than get better.

Senator DORGAN. Let me just ask, is it not the case that you could have buildout with a cost-based system if the cost base provided the reimbursement that was sufficient to accommodate the buildout?

Ms. MOLER. There are ways that you could design the rates. I mean, regulators do rate design. I used to be a regulator. I did rate design with the help of a very able staff. There are ways that you can design rates to enable the recovery of costs. There are also ways that you can design rates to have proper incentives for constructing new transmission. Right now the situation we face is, we expect to have roughly $400 million worth of upgrades needed on the ComEd system, for example, there is lots going on, and no ability to recover. We have frozen rates. We have the rate design that Mr. Humann described in the Alliance RTO. And we do not have any ability because of our current rate design to recover those costs. That is why the situation has to change.

Senator DORGAN. What percent of the delivered cost of electricity to a customer is transmission of that electricity, roughly?

Ms. MOLER. The national figures are roughly 5 to 10 percent, but they vary from system to system.

Senator DORGAN. And if I might ask all three of you, as we construct the Senate energy bill, give me again—I think, Ms. Moler, you outlined the several steps concisely in your testimony, but give me again exactly the steps you believe we ought to take at the Federal level, in Federal law dealing with the transmission issue, capacity and reliability.

Ms. MOLER. I would put Mr. Humann's system and my system under the same regulatory regime so that we get a much better coordinated regime. I would provide innovative incentive pricing. There are ways that you can do it. You can give special rates, for example, for transmission upgrades. They do not necessarily have to go for the basic infrastructure that is there today. You can do it for capacity expansion. I would encourage utilities to sell their transmission assets to these transcos, the for-profit companies that will specialize in transmission. I would do it by changing of the tax code. And I would have the same traffic cop on the beat for all of us. It really will not work to have individual State regulatory commissions doing this when you have the interstate highway grid.

Senator DORGAN. Mr. Humann.

Mr. HUMANN. I guess Basin Electric would agree to come under FERC regulation. As I have indicated in my testimony, one of the requirements would be that we have a postage stamp rate where all consumers are on a level playing field. That is why RUS was

organized in the first place in 1935, because all of the customers were not on the same playing field. And we need to put the transmission grid and all of our customers on the same playing field, and we can only do that through the postage stamp rate where everybody is charged the same price. And in that type of pricing I believe we will get the interstate transmission system built that is required.

I compare that to the telephone system. Can you imagine if we would have deregulated the telephone system and tried to give incentive rates to AT&T whereby as long as you paid for your local telephone service, anybody from the country could call you for nothing? That is basically how we are trying to design the transmission grid, and that is not going to work under license plate pricing.

Senator DORGAN. Mr. Sparby.

Mr. SPARBY. Thank you, Mr. Chairman. First of all, we need to take a whole new look at how we make rates to encourage investment in the transmission network and use innovative ratemaking not only for that purpose, but to address the R&D questions and some other emerging issues for our industry. We also need to encourage some innovative organizational structures like independent transmission companies that can work with RTOs to make sure that transmission gets built five years down the road and we don't have a worse problem tomorrow than we have today.

We agree that nondiscriminatory open access needs to be extended, but with Basin a good customer and supplier of ours, we would like to see incentives to encourage cooperatives and other public entities to come into this type of regulatory framework as opposed to mandates.

We argue for expediting and reforming the siting process, reducing some of the barriers moving into this market. For many companies that includes items like the repeal of PUHCA and also addressing some reliability issues that I think the Congress really needs to take a look at absolutely as soon as possible. That is our list. Thank you.

Senator DORGAN. Congressman Pomeroy.

Mr. POMEROY. Mr. Chairman, this is a fascinating panel, deeply experienced with differing perspectives, and of one accord regarding the existing system, it makes no sense, it is going to get worse before it gets better unless we turn things around dramatically. Betsy's comments about how the thing doesn't have an overall coherency, Mr. Humann's comments about how it is not economically rationalized, and Mr. Sparby's comments about the dysfunctional regulatory overlay discouraging new investment all create a compelling picture that it requires fairly dramatic intervention.

I used to be the insurance commissioner, and watching the interplay between regulation and marketplace, not just in North Dakota, but across 50 States, has left me with a keen appreciation of the public protection regulatory responsibility not getting in the way of market forces.

On the other hand, I think we can see a much greater appreciation of markets today for the value investment that utilities represent even in a very extensively regulated environment. Even return over long term looks pretty good today as opposed to the go-go, hot NASDAQ market of a couple years ago even. So when we

are looking at the long-term investment, providing the long-term return out of a nation's transmission grid, clearly a significant regulatory role is going to be part of the picture, but doing so in a way that does not forestall entrepreneurial activity in getting new plant built is the trick of it.

What do you think, Mr. Sparby, about this "postage stamp" versus "license plate" rates? It seems to me any system that gives for free a passage over part of the line is inherently illogical, irrational in terms of trying to capture costs in the most realistic way under marketplace dynamics.

Mr. SPARBY. It is an issue that has been vigorously debated within the industry because our systems look so very different. Some are so very small and compact with very minimal amounts of transmission, and others, like Mr. Humann's, and to some extent ours, are just so geographically dispersed and investments are difficult to replace.

As an industry, I think we come up with a lot of solutions that include grandfathering and revenue sharing and a lot of other tools. And there is no, I think, just answer that addresses everybody's needs in any particular time. What we need to do is we need to come together to get that issue addressed, to get it addressed in the short term because the impacts from whether or not you have a postage stamp rate or some other kind of rate are so small compared with the generation costs and the costs to our communities and cost to the public of not coming together to having regional solutions, that there is a long ways we can go to getting those issues addressed to get to the result we need to.

Mr. POMEROY. Betsy, given your present private experience and considerable public sector participation on this whole issue, do you think there is in place yet a model that we ought to be moving toward that puts an adequate national regulatory framework in place on the transmission question?

Ms. MOLER. Not yet. No, sir.

Mr. POMEROY. How do we develop one?

Ms. MOLER. I have tried in my prepared statement to give some of the essential elements of it.

Mr. POMEROY. It is one of the more substantive 15-page testimonies I have seen. I mean, that is condensed in very good testimony.

Ms. MOLER. Thank you. That makes the ruined weekend worth it.

[Laughter.]

Ms. MOLER. There is a lot that needs to be done, and Congress has been debating these issues for 6 years and has not come to grips with them. There are differences among the players. But we have really got to stop having these endless debates and move forward. Everybody has agreed on certain essential elements of a legislative package. We are fighting over the last 5 or 10 percent and letting the perfect be the enemy of the good, and it really is time to do something. And I am very hopeful, because I am by nature an optimist, that Congress will come to grips with this. The California crisis could have been either just, oh, my goodness, it is too hard or it could be a call to action, and I am hoping it will be the latter.

Mr. POMEROY. You can run, but you cannot hide. I mean, California compels us to move forward no matter how intractable these problems.

Mr. Humann, just a quick question. Would Basin view favorably an additional Federal law upgrading the WAPA carrying system so it might offer more access to additional power you could generate?

Mr. HUMANN. I guess we could not support that because it depends upon who has to pay for that upgrade. Again, there are license plate pricing issues.

Mr. POMEROY. On initial Federal investment, carrying costs recouped over time.

Mr. HUMANN. Recouped by the customers? Right now it would be the IS customers, and that is what concerns me. If it is recouped by the IS customers, then our customers bear the brunt of the cost to somebody else's benefit.

Mr. POMEROY. I understand. We have got to get the rate base fixed.

Thank you, Mr. Chairman.

Senator DORGAN. Let me just mention the California experience. Ms. Moler, you have been previously a chairman of FERC and you know I have been a rather aggressive critic of FERC, suggesting that they have done their best imitation of a potted plant for a couple of years in California. And I worry very much. I know they have taken some action more lately. But I worry very much that the California experience sends some signals to us that are not very good signals. And I think it is a call to action, but I think it also ought to be a call to all of us to be cautious about this notion that the marketplace, quote/unquote, by itself will resolve all of these issues, because the marketplace has some wonderful and some grotesque signals it sends from time to time.

I have mentioned at the Energy Committee that Judge Judy, this cranky little judge on television, makes $7.4 million a year in income and the Chief Justice of the Supreme Court is paid $180,000, and so much for the market. Or a shortstop for the Texas Rangers is paid $252 million. Again, so much for the marketplace and its excesses. I am a big fan of the marketplace. I think it is a wonderful allocator of goods and services, but not perfect and it needs referees. And so we have FERC.

We need especially in the area of energy to be careful. The ultimate concern of all of us is to have a consumer that has affordable energy when they need that energy.

And so this is very good testimony. Let me say that Congressman Pomeroy is correct, I think all three of you presented some interesting testimony for us to consider as we put together the additional pieces of the energy bill in September.

I have a couple of additional questions I would like to submit to you perhaps and ask you to send responses to us for the record. And we thank you very much for being here.

Next, we will hear from Tracy Anderson, program manager at 3M Electrical Products Division; Clifford Porter, Lignite Energy Council in Bismarck, North Dakota; and James Caldwell, policy director of American Wind Energy Association. If you would come forward, please, I would appreciate it.

Why don't we begin with Mr. Anderson. Mr. Anderson, you are representing 3M Company and, I believe, are here to talk about the new technology issues in transmission. Thank you very much for being here.

STATEMENT OF TRACY ANDERSON, PROGRAM MANAGER, 3M ELECTRICAL PRODUCTS DIVISION, ST. PAUL, MN

Mr. ANDERSON. Good morning, Mr. Chairman, Representative Pomeroy and Mr. Lowery.

I would like to thank you again for this opportunity to appear before you today to talk about this composite conductor technology.

In all of the debate surrounding energy one of the forgotten elements is the cable, itself, and, more specifically, what materials the cables are produced from.

The composite conductors that are in development by 3M are made with a new material, not steel like exists in our aluminum conductor steel reinforcement conductors that are installed in about 90 percent of the U.S. network. The composite conductors are reinforced with a high-strength ceramic fiber. This is a technology built on 3M's leadership in oxide fibers. Each composite wire within the conductor in fact contains about 25,000 of these high-strength ceramic fibers. The fibers are fully embedded in high-purity aluminum to provide some conductivity.

The material has been developed specifically for this application, meaning that it is resistant to UV exposure over its lifetime. There are no galvanic material science issues between the fibers in the aluminum. And the fact that we have high-purity aluminum inside embedded fibers essentially gives us some conductivity developed into the steel used today.

The conductor has been designed with the application of ampacity increases in mind, where the idea is essentially take down the existing conductors and install one of these composite conductors to get more power through the existing corridor, and in doing that because of the improved performance of the materials, it is possible to get substantial increases in the amount of power while still respecting the clearance requirements and not increasing the mechanical or structural loads in the towers.

We have done initial design studies in partnership with leading utilities throughout the United States, and sponsored by the Department of Energy, to take a look at what the potential would be for this technology, and we have well-documented ampacity gains—that is the term that is used to measure the current—of up to 300 percent with a doubling very typical over the conventional conductor technology. In all cases the studies assume that towers were not modified or reinforced. So it is a very quick solution that has a lot of other side benefits.

Most importantly, detailed economic analyses were also carried out as part of these studies in the composite conductor. It was shown they could offer substantial cost savings at the system level, even though it might cost more on a per-unit length basis than the conventional conductors.

Key attributes of this new composite wire that has been developed by 3M is a very high-strength weight ratio, essentially is on a per-unit weight basis about ten times the strength of aluminum

and three times the strength of steel. That is one very important property.

The second is the fact that at high temperature, it does not expand very much, and that is a very important property for materials because an overhead conductor that expands by about 1 foot in its length actually sags about 10 feet more by the time you actually measure that, so you want materials that are very stable in respect to thermal expansion. Then there is a range of other properties that make it very good for this sort of application.

We have been working on this topic for some time and we are at a pivotal point right now where the conductor has been tested by a European utility. It is actually a lower-temperature version of what would be required for the U.S. network. And we have test data on a small-diameter version of this conductor and there has been a whole range of properties, such as sag tension, strength, stiffness, and so forth, that utilities need to have confidence in this conductor that has been tested, and the results have been very promising and matched what you would predict from the constitutive properties.

We are at a point right now where we need to have field trials installed to get that confidence on the part of the utilities, in addition to having available some of the larger-diameter versions of the conductor, and we also need a version that operates at high temperature. DOE funding and technical support, in our opinion, is needed to strengthen this technology, the development and the implementation through selected field trials. These are needed to improve and assess the economic and technical benefits of this new conductor technology and to demonstrate the benefits to the U.S. utility industry.

The participation and expertise of the Department of Energy's National Laboratories are also important to the acceleration of this technology. Their expertise in selecting utilities for field testing, as well as designing the instrumentation and monitoring and documenting the performance of the conductor is central to the rapid deployment of this revolutionary product.

They also play an important role in assessing the national impact of such technology. And a couple of the labs have groundbreaking technology that could really help out here.

In closing, I would like to thank you for the opportunity and I will look forward to answering your questions.

[The prepared statement of Mr. Anderson follows:]

PREPARED STATEMENT OF TRACY ANDERSON, PROGRAM MANAGER, 3M ELECTRICAL PRODUCTS DIVISION, ST. PAUL, MN

Good Morning, Mr. Chairman. Thank you for the opportunity to appear before you today to talk about 3M's Composite Conductor Program.

As you may know, 3M is a diversified manufacturing company with sales of just over $16 billion dollars. The company has more than 40 product divisions and is organized into six market centers: Industrial Transportation, Graphics and Safety, Health Care, Consumer and Office, Electro and Communications and Specialty Materials. As a result, the broad range of products we manufacture defy efforts to categorize us. From delivering power or communications to your home; transporting you safely in your automobile to manage your busy schedules with the ubiquitous Post-it Notes, it is sufficient to say we impact your lives daily.

Generally we can be thought of as a materials company; we are good at focusing our various technological strengths into new materials and the products that flow from them. The lifeblood of 3M is this flow of new products. To sustain the flow of

critical technologies on which new products are based requires substantial annual investment in research and development. In 2000, 3M invested just over $1 billion to this end.

A NEW CONDUCTOR

The Composite Conductors are reinforced with high strength ceramic fibers; a technology built by 3M leadership in oxide fibers. Each composite wire in the core of the cable contains thousands of ultra-high strength, micrometer sized fibers. The fibers are fully embedded within aluminum metal. The 3M composite is resistant to UV exposure over its lifetime and there is no galvanic corrosion between the fibers and aluminum in high humidity and wet environments. The pure aluminum matrix enables a high conductivity in comparison with the steel cable or ACSR in use today.

The Conductor has been designed to substantially increase ampacity for the reconducting of existing overhead transmission lines. Initial design studies done in partnership with leading utilities, and sponsored by DOE, have demonstrated potential ampacity increases of up to 300% over existing commercial conductor technology. In all cases, the studies assumed that the towers were not modified or reinforced. Most importantly, detailed economic analysis indicated that the composite conductors could offer substantial cost savings at the system level by increasing the capacity of existing transmission corridors.

The key attributes of 3M conductor are: high strength (10 times that of aluminum) light weight (1/3 the weight of steel, low electrical resistance (1/4 that of steel) Low thermal expansion (1/4 of aluminum), retain properties up to 300 degrees Celsius, low creep (less than steel), good fatigue resistance, high stiffness and it is sensitive to the environment.

CONDUCTOR QUALIFIED BY EUROPEAN UTILITY

3M development has reached a pivotal point where composite conductor have been made and tested by a leading European utility for use on the 69-230 kV network with maximum operating temperature of 150 degrees Celsius. Critical properties such as sag-tension data, strength, stiffness, thermal expansion, resistance, creep have been validated for this class of composite conductors, i.e., and (26/7) ROUND 1350 AL-composite conductors.

NEED FOR FIELD TRIALS

DOE funding and technical support is needed to strengthen the technology development and implementation through selected field trials. These are needed to prove and assess the economic/technical benefits of the new conductor technology and to demonstrate the benefits to the utility industry.

The participation and expertise of DOE's National Laboratories are important to accelerate this program. Their expertise for selecting the utilities and sites for field testing, as well as designing the instrumentation and monitoring and documenting the performance of the composite conductor is central to the rapid evaluation and deployment of this revolutionary product. They also plan an important role in assessing the national impact of this new conductor on the nation as a whole. A couple of the labs have groundbreaking technology in the wireless instrumentation field that is needed to monitor and assess the performance of the overhead conductor and determine such parameters as sag. The lab would also support the standardization of this new class of conductor and work on identifying potential regulatory and implementation barriers.

In closing, Mr. Chairman I thank for the opportunity to present to you today, I'll be happy to answer any questions.

Senator DORGAN. Mr. Anderson, thank you. We will include your complete testimony in the record. And thank you.

And we ask you again to summarize in 5 minutes. Mr. Caldwell, we will include your statement in the record in its entirety, and we appreciate your being here on behalf of wind energy.

STATEMENT OF JAMES H. CALDWELL JR., POLICY DIRECTOR, AMERICAN WIND ENERGY ASSOCIATION

Mr. CALDWELL. Mr. Chairman, Representative Pomeroy, Leon. How about them Cubbies?

At this late hour in this hearing, I would like to take a little bit of a risk and talk about a subject that we have not broached first and then, secondly, to take a little bit different view of the planning and regional transmission organization discussion that has been going forward.

And the first subject I would like to talk about is the current grid scheduling and settlement protocols and the terms of wholesale trade and what that is doing to the grid.

Virtually 100 percent of the transactions taking place today in wholesale transactions are confined to commodity strips and firm blocks of power that are being traded between and among the 150 control area operators in this country. And that is fine as far as it goes. And it is being done because it is easy. It is easy to trade those. It is relatively easy to schedule them. It is easy to settle them. It is easy to worry about credit terms.

But the problem is that all of the rules and the protocols that are being put forward are essentially making it impossible to do anything else but trade those. And that for those resources that are not firm, that are not commodity strips and are not firm blocks of power, that are so-called non-firm resources, is today virtually impossible to settle a transaction for physical delivery across control areas. And this means that something upwards of 30 to 40 percent of the available resources and the cost-effective resources on our system are essentially excluded from wholesale trade today.

Wind happens to be one of those. And that is far and away the largest reason why we are having trouble commercializing wind energy today.

The problem is that these rules have been written, again, so that only firm blocks of power can be traded. And as I say, if it was just wind, that would be one thing, and maybe we could deal with that in some form. But it is not.

As a matter of fact, I can make a case for saying that this was the triggering event for the California debacle. That in November 1999 the California ISO instituted a whole series of tariff changes which put severe imbalance penalties on people who deviated from their schedules. And what the result was was that people who had been trading power amongst themselves somewhat flexibly and settling their schedules flexibly after the fact, all of a sudden had to make sure that each one of those schedules was firm. And what that did is it drained two to three thousand megawatts of reserves out of the California system to support each individual schedule as opposed to supporting the system as a whole. So that in April 2000 the WSCC put out a report which said that reserves in the West would be adequate for the summer of 2000, tight but adequate.

On May 23, right as this report hit the press, then we had the triggering event that then ended up in the debacle that happened from there. You can go back and you can look at the some 20,000 megawatts of transactions through the California system and you can detail out how 2,000 megawatts of reserves were drained from the system simply to support the imbalance penalty provisions that

were installed in November 1999. That is just an illustration of how some of these terms in wholesale trade and some of these rules and protocols can really affect a system. And wind in that environment simply gets killed. Wind simply cannot operate under those conditions.

Now, what should we do about that? We have language in the Bingaman bill as it exists today, and we can work to see if we can firm that language up in any way. And what it would do is three things.

Let us say that none of these things that I am talking about are inconsistent with either economic theory or current FERC policy. Current FERC policy and economic theory says that we ought to be able to do these non-firm transactions, and certainly Order 2000 by the FERC does contemplate these kinds of transactions, in effect does mandate that one of the functions of an RTO is to ensure that these type of transactions can take place.

So the first thing we have to do is we have to facilitate the full, complete and rapid implementation of Order 2000 in its functions, not so much in its form that we have been talking about today, but the functions of those RTOs. And we need to encourage the formulation of Order 2002, which will be the inevitable fix or the inevitable follow-on to the Order 2000. This is work in progress, and we started with Order 888, Order 2000 built on that, and we will have to build again.

The second thing that we need to do is we need to have an affirmative duty of the FERC to see that the rules, procedures and protocols of RTOs and indeed each control area operator pending the formation of RTOs allow and encourage non-firm, intermittent, as-available transactions.

And the third thing we need to do is we need to provide for exemptions from these kind of rigid scheduling protocols and imbalance penalties pending the institution of the above.

Now, as to the planning and the RTO function, let me take a little different view, and let me illustrate by looking at that chart there and say that if we take the green region and we drop off, I believe that is Saskatchewan and Manitoba up there, and we look at the green that is in the United States there, just for wind alone we have in that region somewhere around 200 to 300 thousand megawatts of cost-effective resource, that with all due respect to my running partner here, Mr. Porter, that we would be perfectly willing to go toe-to-toe with him on bus-bar energy cost with lignite with this wind resource if we could develop it at that scale.

And part of the problem that we have in terms of this planning process and in terms of RTOs is that, first of all, today we have no planning process. None. And we will not have if we do it this way and if we do what the rest of the panel has said for at least 5 years. It is going to take us 2 years to form these RTOs, and at least the first 2 years of the operation of these RTOs they are going to be so consumed with the day-to-day operations and with getting the people in place, with getting their rules down. You know, what happened in Texas last week, the day they opened their market, and the prices went to a thousand dollars and say, gee, we had a little software glitch, we had these flux. And we all know what it takes to get these kinds of systems, these kinds of institutions,

these kinds of people in place, and it is going to be 5 years before they can ever turn their view to the long term, before they can ever get their head out of all these little transactions and all their computer problems, get their head out from under the desk and look up and say, what should we do in terms of energy policy? And so we will not have a planning process if we depend upon just RTOs.

And I contrast the operation here and say in Texas, now in Texas, we do not have FERC jurisdiction, but what we do have—and let's go back to this green here for a second. In Texas, very similar type of thing. West Texas has about 40,000 megawatts of cost-effective wind resource. Unfortunately, all of the load or most of the load is in east Texas. And so that there is no transmission effectively between west Texas and east Texas.

So what has Texas done? The first thing it did is, this year it decided to install a thousand megawatts of wind in west Texas, essentially mining all of the available transmission capacity from west to east. And before that is even installed, it has already got all but one of the major permits for a substantial upgrade that will allow another thousand megawatts to come on line in about 18 months.

And 2 weeks ago I attended a meeting in Austin that included representatives from 3M, included representatives from the Texas PUC, from transmission owners, from virtually all of the stakeholders where we were discussing the technical alternatives for transporting 40,000 megawatts—not 300 or 3,000, but 40,000 megawatts out of west Texas.

Last Friday there was a follow-on meeting, including members of the legislature, including people from the Governor's office, talking about this same issue, how do we get 40,000 megawatts from west Texas to wherever it needs to go?

I think the difference that we are talking about between Texas and what we are talking about RTOs is that in Texas the transmission system, URCOT, is politically anchored. It is politically anchored to the Texas legislature. And that is one of the benefits of not having FERC jurisdiction, if you will, that there is one political master, and that political master made some decisions and they said that we will develop this resource in west Texas, and as a result then the technicians set about taking care of it.

And it is the political anchoring of these RTOs that has been missing from the discussions so far. I despair of having a Midwest ISO that goes all the way from Oklahoma up through this region over into Virginia having any kind of political anchoring. And I don't think it is going to happen at the congressional level. It is certainly not going to happen at the national level.

If it is not going to happen at the national level and is not going to happen at the State level, where is it going to be? And I think we need to consider these RTOs as being political bodies or at least having some political legitimacy to their outcome and to their formation and to their operation. And unless we make those considerations we are never going to get there from here. Thank you.

[The prepared statement of Mr. Caldwell follows:]

PREPARED STATEMENT OF JAMES H. CALDWELL JR., POLICY DIRECTOR, AMERICAN WIND ENERGY ASSOCIATION

My name is James H. Caldwell Jr. I am Policy Director for the American Wind Energy Association (AWEA). AWEA is proud to represent an industry poised to make significant contributions to the nation's energy supply and to rural economic development. AWEA is pleased to be in Bismarck—a place that represents a major portion of the wind industry's future—to speak on the timely subject of electric transmission infrastructure and investment needs.

Before discussing the wind industry's views on electric transmission policy, a few words about the wind resource potential and economics are in order. Table 1 below lists electric generation capacity from wind divided geographically in the same way as the nation's electric transmission grid.

Table 1.—ELECTRICITY GENERATION FROM WIND

(Nameplate Capacity, MW)

Region	On-line	In-development	Economic potential	
			@$2 natural gas	@$4 natural gas
West	1,800	3,000	35,000	200,000
Midwest	610	700	1,000	350,000
East	35	225	500	7,000
Texas	200	900	1,000	40,000
South	2	20	100	600
Total	2,615	4,800	38,000	600,000

In this table, "in development" is defined as identified projects with identified sites, owners, and customers who have agreed on price, timing, and quantity. Because the physical construction of a wind project is so quick, this broader definition is a truer measure of wind projects that will be on-line soon rather than the conventional designation of "under construction." "Economic potential" is defined as the amount of wind capacity available at today's technology and today's costs that would yield equal or lower bus-bar energy costs than a new natural gas fired plant at the stated gas price given reasonable environmental and land use constraints on wind development.

The fact that almost twice the existing wind capacity is currently under development makes wind the fastest growing electric generating source in the country. Indeed, more wind capacity is under construction in the United States than new coal and nuclear combined. In a growing number of regions in the U.S., wind is the most popular fuel diversity hedge against rising natural gas prices. The economic potential columns in Table 1 should be read like conventional oil, gas, and coal proven and probable reserve statistics. The basic data underlying the numbers is several years old and the DOE will issue an update later this year. Like oil and gas reserves, the numbers tend to grow as development occurs. The recent rapid development of the wind resource in West Texas has caused more "potential reserves" to be "found" and the new DOE update will show approximately double the economic wind resource in Texas as that in Table 1.

What these data show is that there is enough wind resource available at today's technology and expected fossil fuel prices in the Upper Colorado and Missouri river basins plus West Texas to satisfy all the nation's electricity demands. Indeed it is realistic to expect that with appropriate public policies, about 20% of the nation's electricity could eventually be generated by the wind. Wind could be making a significant contribution to the nation's energy supply within a decade. Furthermore, this policy would be in the country's economic self-interest even before environmental and economic development considerations. The vast majority of the commercially significant wind resource is on land now used for ranching and dry land farming, and harvesting of the wind "crop" does not interfere with these traditional uses. Royalties to the landowner for leasing space to wind turbines generally return many times the annual income of the agricultural crop that is displaced. Harvesting the wind for electricity uses a renewable domestic resource and creates no emissions of either carbon dioxide or criteria air pollutants. Thus, a multi-billion dollar per year rural economic development program, a "no regrets" global warming policy, and a significant acid rain/regional haze mitigation measure come along naturally as added benefits to the development of wind based solely on bus bar energy prices.

Clearly, sound energy policy should include measures to ensure wind's rightful place in the suite of electricity supply options.

In order to fulfill this promise, the wind industry must attract significant capital, and no public policy is more important to this capital formation than electric transmission policy. As folks around here know all too well, only a few hardy people live where the wind blows hard enough and long enough to be commercially significant. Unless the wind to electricity "crop" can be efficiently brought to distant markets, capital will not be attracted to the industry, and the economic, rural development, and environmental promise of wind energy will not be realized.

Transmission related issues for wind fall into two general categories: grid operation rules that promise fair treatment for "intermittent" and "as-available" resources like wind; and robust, proactive grid expansion planning that anticipates long term needs for transportation services. Wind is an "intermittent" resource, meaning that it only produces energy when the wind blows, and its output is "as-available" meaning that, even with accurate forecasting, the exact timing of its energy output cannot be precisely predicted. These characteristics are not desirable, but they are not fatal and are shared by many other potentially cost effective resources. Indeed, they are shared by electricity demand itself and are routinely handled in that context without complaint or cost by grid operators worldwide.

Grid operation rules that accommodate intermittent resources like wind include the following technical features:

- Network transmission access fees paid by load.
- Flexible near real time scheduling.
- Penalty free imbalance settlements in a liquid spot market.
- Long term non-firm transmission rights at volumetric pricing.
- No pancaking of transmission access fees.
- Robust secondary markets in transmission rights.

These features are required for efficient transport of wind energy from its rural sources to urban load centers over the transmission grid. It is important to point out that these same features are required by many of the newer non-traditional resources such as as-available cogeneration, distributed generation, run-of-the-river hydroelectric, demand response bidding, etc. In the near future, as much as 30% of the cost effective resources on the grid will require these or similar features. If these features are not offered by transmission owners and grid operators, essential reserves will be drained from the system and cost effective resources will be ignored. The inevitable result will be higher electricity prices and reduced reliability.

To explain what each of these technical features means and why they are important for efficient grid operation requires fairly detailed technical knowledge of commodity market operations in general and electric grid operations in particular. AWEA here simply points out that all of the above are consistent with theoretical economic efficiency, all comport with current Federal Energy Regulatory Commission (FERC) policy, and none are available at most locations in today's wholesale electricity markets. Instead, what wind sees in today's market are the following:

- Rigid scheduling protocols with strong deviation penalties.
- Imbalance settlements in dysfunctional "markets" or punitive non-cost based penalties.
- Market balkanization with significant "trade barriers" between adjacent utility "control areas."
- FERC Order 888 pro-forma tariffs that presume perfect dispatchability.
- Inflexible requirements for a "balanced schedule."
- A persistent and uneconomic bias toward "commodity strips" and "firm" unit sales.
- No short term transmission rights. No flexibility for partial resale of long term rights.
- No politically legitimate regional planning process.

The existing transmission grid was designed and built for traditional large central station power plants that can precisely predict, and in many cases precisely control, their output. However, these large power plants are also subject to occasional "forced outages" or "trips" where the electric output suddenly goes to zero and grid reliability would be compromised if these "contingencies" were not anticipated and planned for. The considerable costs of planning for these contingencies is not charged to the individual generating unit but is shared by all users of the grid. Rules and protocols like the above list that do not affect dispatchable resources but that are convenient for risk-averse grid operators grew up as a means of simplifying the difficult job of balancing supply and demand in real time. Wind and many other non-traditional resources are not nearly as likely to suffer sudden, complete loss of

output as, for example, nuclear plants, but cannot precisely predict or control their output in real time. Yet the current grid operating protocols do not value wind's resilience but unfairly punish its variability.

In 1996, when the FERC was writing the initial set of rules governing wholesale competition in Order 888, it put forth a pro-forma tariff designed on a natural gas model and meant to serve as a least common denominator for grid operator behavior. Quite naturally, it presumed traditional resources and simply ignored the commercial needs of newer non-traditional resources. Transmission owners and grid operators took this tariff not as a floor but a ceiling that defined minimum acceptable behavior towards competitors and transmission owners did not take one step beyond the bounds of that tariff no matter how cost effective. The FERC quickly realized this limitation of Order 888 and, in late 1999, issued a sequel called Order 2000. Order 2000 carries an explicit requirement that "Regional Transmission Organizations" or RTOs (the FERC preferred form of transmission provider) offer or facilitate the offer by third parties of competitive services much like the above list of wind's needs. Unfortunately, FERC authority to require RTOs or their functional equivalent only extends to less than two thirds of the grid. What has been even more problematic is a "passive-aggressive" attitude by the FERC it has been aggressive about asserting jurisdiction over the wholesale grid, but passive about regulating grid operators or requiring compliance with its policies once it obtained jurisdiction.

As a result, of all the areas of significant commercial wind potential, only Texas has a set of operating protocols conducive to the use of the grid by intermittent or as-available resources like wind. Somewhat ironically, the East Coast "Independent System Operators" with only scattered wind resource potential have nevertheless spent considerable time and effort designing rules that can accommodate intermittent resources.

Congress is currently debating major changes to national energy policy including clarifying and redefining the role of the FERC in regulating wholesale commerce in electricity. This legislation should include provisions that:

- Ensure complete, rapid implementation of the principles and commercial functions of RTOs as enumerated in FERC Order 2000.
- Define an affirmative duty of the FERC to ensure that transmission providers design operating rules and protocols conducive to fair, economic participation in wholesale markets by intermittent and as-available resources like wind.
- Provide for exemptions from restrictive policies like imbalance penalties for intermittent resources pending maturation of markets and development of institutions capable of efficiently dealing with these non-traditional resources.

Consistent, fair grid operating rules are essential to allow wind to reach its full economic potential. So too are robust, pro-active grid expansion policies. One of the principal advantages of wind is that it can be developed quickly in small increments thereby reducing risks of over-investment in generating capacity or responding quickly to unexpected shortages. This attribute is extremely valuable as the emerging wholesale market rewards investment flexibility and short lead times. Many unanticipated surprises can occur in the almost ten years it would take to plan, design, and build a new nuclear plant. Once it begins operation, a nuclear plant's energy arrives in one large lump that must be swallowed whole by the market. Wind does not have these problems. Unfortunately, transmission expansion shares the undesirable characteristics of long lead time and "lumpy" investment.

While the gross quantity of investment in transmission is small in relation to investment in generation, it is essential to have adequate transmission capacity in place before the new generation can operate. This requires planning and at least some investment in advance of the need for new generation. These requirements are particularly acute for wind resources which are generally developed quickly, are remote from load centers, and must be located in specific windy locations.

Here again, Texas serves as a model for transmission planning processes favorable to the development of wind resources. The nearly 1,000 MW of new Texas wind development this year essentially "mined" all the available West to East transmission capacity in Texas, but even before most of this new capacity is in operation, planning has begun in earnest for the transmission expansion necessary to serve the next large increment of wind capacity. Furthermore, mechanisms are in place in Texas that allow for the "lumpiness" of these investments to be financed by all users of the grid for eventual repayment by user fees over time.

Texas has the distinct advantage of only one regulatory body with political oversight only at the state level. Texas intentionally avoided electrical connections with the rest of the country to avoid interstate commerce and attendant Federal jurisdiction. Texas is large enough both geographically and in electricity demand that the economic consequences of this decision are minimized. Moreover, it is politically and

culturally compact enough that policy decisions and regulatory philosophy can consistently and quickly be converted into detailed tariffs, rules, and protocols. The advantages of this political structure are maximized in times like these where shifting technology and shifting ideas about market structure are much more difficult to implement when regulatory jurisdiction and political oversight of the monopoly transmission system is divided between Federal and state governments and political consensus is difficult to reach among diverse interests.

It is for this reason that the FERC has promoted "RTOs" or regional transmission bodies as the appropriate scale for transmission planning that neither strictly respects state boundaries nor conveniently fits with a "one-size-fits-all" federal model. Unfortunately, these new regional organizations will take years to put in place, and then more years to achieve political legitimacy. Experience to date graphically illustrates the fact that the early years of these organizations will be consumed by problems of day-to-day operations for reliability and development of short-term market structures necessary to efficiently handle existing resources. If wind's economic potential is to be realized in a timely way, some jump-start to the long-term planning process will be necessary.

Fortunately, of the major wind resource areas, one, Texas, already has that jump start and the others, the Upper Colorado and Missouri basins, have an appropriate regionally based organization with the charter and expertise to conduct at least the preliminary planning—the Western Area Power Administration. Congress should require WAPA to conduct a long range planning exercise on technical options for bringing the vast wind resource potential in the Upper Great Plains to the urban load centers in both the Midwest and the West. This should be an open process which includes both resource rich but rural and resource poor but populous states, environmental interests, existing WAPA customers, Native American tribes, and other stakeholders in the region. The engineers can build whatever is politically desirable and economically attractive The difficulty is in defining the terms of reference for these concepts. As stated earlier "economically attractive" must include environmental and rural economic development considerations in order to be politically desirable.

In summary, AWEA believes that wind resources can only reach their true economic and environmental potential if Congress takes this unique opportunity to formulate constructive electric transmission infrastructure policies that accommodate a maturing wind industry, and serve the nation's electricity consumers, rural landowners looking for economic development, and environmental interests in a win/win proposition.

Together with policies such as the production tax credit extension to stimulate early capital formation, effective transmission planning and grid operating polices will ensure timely development of the indigenous, environmentally sustainable, and cost effective energy resource that is blowing in the wind. Thank you for this opportunity to express our views.

Senator DORGAN. Mr. Caldwell, thank you very much.

Mr. Porter representing the Lignite Council. Thank you.

STATEMENT OF CLIFFORD PORTER, DIRECTOR, LIGNITE RESEARCH, DEVELOPMENT AND MARKETING PROGRAM, LIGNITE ENERGY COUNCIL, BISMARCK, ND

Mr. PORTER. Thank you, Senator Dorgan, Representative Pomeroy, Mr. Lowery.

First, I am Clifford Porter. I am director of the Lignite Research, Development and Marketing Program and also director of research and development for the Lignite Energy Council.

I am here today as a designee for John Dwyer, who could not attend the meeting. He is off on military duty. He does want me to assure the committee that he feels that transmission is very important to the State of North Dakota and certainly to the lignite energy in North Dakota.

The State of North Dakota through the Industrial Commission and the Lignite Energy Council have formed a partnership, and the design of that partnership is to revitalize the lignite industry. The program that we have right now is called Lignite Vision 21. It has

a vision to construct one or more 500-megawatt base-load lignite-fired powerplant in North Dakota.

A 500-megawatt lignite-fired powerplant means an increased production of 3 million tons of lignite annually, $140 million of total business volume for the State, and $6 million in State tax revenue on an annual basis. Also, a 500-megawatt powerplant in mind would create 1,300 new jobs for North Dakota.

The Lignite Vision 21 project is a significant economic development opportunity for the State of North Dakota. The Industrial Commission has provided over a million dollars for feasibility studies to support this activity. The feasibility studies have identified transmission issues, as well as potential routes for additional electrical output from North Dakota and has the estimated cost for seven specific sites within North Dakota.

A potential electrical transmission system option may exist from North Dakota with upgrades from a site near Beulah, North Dakota, down through Huron and Sioux Falls, South Dakota, and then on to Lakefield Junction in Minnesota.

Electrical export from North Dakota is currently limited by our existing transmission system. Interested parties must work together to resolve these existing limits on export. Resolution of these transmission challenges requires congressional, Federal agencies, State and government agencies and industry working together.

In addition to our over $1 million in feasibility studies, the State of North Dakota and the Industrial Commission have committed to provide $20 million to date or $10 million to each of two projects, Great River Energy and Montana-Dakota Utilities/Westmoreland joint development. Great River Energy and Montana-Dakota Utilities/Westmoreland have initiated studies that could lead to construction of a new base-load lignite-fired powerplant.

The Lignite Energy Council members have developed the following set of guiding principles to resolve transmission issues, and these are given in more detail to the testimony that I have provided beforehand.

But in summary, recognize that transmission business is a regulated monopoly and that transmission owners must recover their cost.

Encourage construction of new interstate transmission facilities and build a national grid system under FERC jurisdiction.

Support the NERC and North American Energy Reliability Organization and their corresponding regional electric liability organizations, their standards and enforcement.

Establish a regional transportation organization.

Expands research and development for transmission, including options such as superconductivity.

In consultation with appropriate State and Federal agencies, develop legislation to provide Federal siting authority for rights-of-way for electrical transmission lines similar to the authority already existing for natural gas pipelines.

Support the $200,000 WAPA appropriation for studies and encourage WAPA to join the regional transportation organization.

Ensure that financial incentives exist to build new transmission capability under FERC jurisdiction and assure that IOUs and G&Ts are handled equitably.

Increase electrical export through expanding existing transmission system is a key element if the State is to acquire the economic development and jobs. Also, transmission is a key element if the surrounding region is to have access to additional low-cost base-load reliable electricity.

Again, I thank you for the opportunity to present these comments and, again, I express my regrets for Mr. Dwyer that he is not able to attend.

Thank you, Senator.

[The prepared statement of Mr. Porter follows:]

PREPARED STATEMENT OF CLIFFORD PORTER, DIRECTOR, LIGNITE RESEARCH, DEVELOPMENT AND MARKETING PROGRAM, LIGNITE ENERGY COUNCIL, BISMARCK, ND

The Lignite Energy Council is a regional association whose primary interest is the development of lignite coal as an energy source. The membership of the association includes (1) the major producers of lignite coal in North Dakota and Montana, (2) all investor-owned utilities and rural electric cooperatives headquartered in North Dakota and Minnesota who have interests in plants that generate electricity from lignite, and (3) over 200 contractors and suppliers who provide goods and services to the lignite industry.

The Lignite Energy Council is pleased to provide testimony to the Subcommittee on Water and Power regarding the electric transmission infrastructure and investment needs in North Dakota (ND).

Mr. John Dwyer, President of the Lignite Energy Council, is on a military assignment and regrets that he is not able to be here to provide this testimony. However, he wants the Subcommittee to know that he feels strongly about the need to expand the transmission network in ND.

The State of North Dakota and the Lignite Energy Council have formed a government/industry partnership to promote the use of North Dakota lignite and to enhance economic development. In the summer of 1999, the North Dakota Industrial Commission (Industrial Commission), whose current members are Governor John Hoeven, Attorney General Wayne Stenehjem and Commissioner of Agriculture Roger Johnson, and the Lignite Energy Council initiated a partnership between the state and industry designed to revitalize the North Dakota lignite industry. This initiative is called the Lignite Vision 21 Project (LV21P). The LV21P project manager is Mr. Tony Rude, who is the former Chief Executive Officer (CEO) of United Power Association and co-CEO of Great River Energy.

The vision of the LV 21 initiative is to construct one or more state-of-the-art lignite-fired base-load generating stations located in ND that utilize cost-effective generation technologies, the latest environmental technologies and the highest efficiency to meet the reliable low-cost electricity demands in our region.

For North Dakota, a 500 MW plant means 3 million more tons of coal mined annually, 1,300 additional permanent jobs, $140 million more annual business volume and $6 million more tax revenue annually. Besides meeting our region's energy needs, the Lignite Vision 21 Project will provide much needed economic development for the citizens of ND. The state of North Dakota through the Industrial Commission has provided significant support to promote the project. The Industrial Commission has provided over $1 million for feasibility studies to address environmental, generation, and transmission issues. Additionally, the Industrial Commission has provided up to $10 million in matching grants for detailed feasibility and permitting assistance for each project. To date, the Industrial Commission has approved funding for two potential projects—Great River Energy for a site to be selected and Montana-Dakota Utilities Company, who is involved in a joint development with Westmoreland Coal Company for a site at Gascoyne, ND.

Black and Veatch, who conducted the generation study, believes the construction and operation of the plant is feasible and the project can be competitive in the marketplace. ABB Power analyzed existing electrical transmission system, identified system upgrades and recommended options to increase electrical export from North Dakota. As a part of their study, ABB recommended a proposed option for an existing transmission route that would increase the electrical export capability out of North Dakota to 2450 MW. This option included a system upgrade to the Antelope Valley to Huron line to permit 500kv operation and extending the line to Sioux Falls, South Dakota, and constructing a 345kv line to Lakefield Junction in Minnesota.

The Industrial Commission and industry have provided $300,000 in additional funding for subsequent transmission studies evaluating the potential and estimated costs for additional electrical export from seven sites in North Dakota. ABB estimated the cost for upgrading the system from Antelope Valley to Lakefield Junction at $130,000,000 to $160,000,000. Site-specific cost for each of the seven locations was estimated at an additional $2,000,000 to $50,000,000.

Additional studies have been proposed to evaluate options for eliminating restraints to the present electrical transmission system and for providing alternatives to further increase electrical export capability from North Dakota.

The LV21P studies have identified major challenges that need to be solved and have identified how these challenges can be solved by the interested parties working together, including Congress and federal agencies, state government and agencies and industry.

In that regard, the Lignite Energy Council and its members have developed the following guiding principles to resolve transmission issues concerning our state. They are as follows:

1. Recognize that the transmission business is a regulated monopoly and as such transmission owners need to have assurance from the Federal Energy Regulatory Commission (FERC) that they can recover their cost.
2. Encourage construction of new interstate transmission facilities to build a national grid system under FERC jurisdiction.
3. Support the National Electric Reliability Council (NERC)—North American Electric Reliability Organization (NAERO) proposed national electric reliability organizations and regional organizations and standards with authority to set and enforce reliability standards subject to FERC oversight.
4. Establish a regional transmission organization (RTO).
5. Direct the Secretary of Energy to expend research and development on transmission superconductivity and other means to increase transmission capacity.
6. Direct the Secretary of Energy, in consultation with the appropriate federal agencies and state and local governments officials, to develop legislation to provide federal siting authority and to grant authority to obtain rights-of-way for electricity transmission lines. Similar authority already exists for natural gas pipelines in recognition of their role in interstate commerce.
7. Support the $200,000 federal appropriation for the Western Area Power Administration (WAPA) enhancement studies and provide the authority and encourage WAPA to join a RTO. In conducting transmission studies, WAPA must be sensitive to their limited resources and their primary mission to ensure that the reliability of the WAPA system is maintained.
8. Ensure the financial incentives to build transmission benefit both utilities subject to FERC jurisdiction as well as those that are not subject to FERC jurisdiction. Investor owned utilities (IOUs) and generation and transmission cooperatives (G&Ts) have different regulatory, financial and corporate structures. These organizations must be handled equitably.

The Lignite Energy Council appreciates the opportunity to provide testimony to the Subcommittee on Water and Power regarding improvement to the transmission network in North Dakota and the surrounding region. Without these transmission improvements, the LV21P power plant will not be constructed, North Dakota will lose out on all the jobs and economic development, and the surrounding region will not have access to the additional low-cost base-load reliable electricity.

Senator DORGAN. Mr. Porter, thank you very much.

I would ask, Mr. Anderson, you have field-tested your 230-kV line in Europe, I understand. Have you field-tested your line anywhere in the United States, especially the larger capacity lines?

Mr. ANDERSON. No, we have not. We have actually installed one span in Europe and also one span in the United States that has operated under current, but we have not installed a multi-span installation as part of our field tests.

Senator DORGAN. Do you have plans to do that?

Mr. ANDERSON. We would like to do that, yes.

Senator DORGAN. Mr. Porter, tell me what your impression is of the TAG project, the Transmission America Grid project. Have you been involved in that and, if so, what is your position on it?

Mr. PORTER. Certainly, Senator. I don't know if it is appropriate to say we have been involved with it. We certainly have been fol-

lowing it. I think the concept of looking at a national grid, however that is developed, is something that we think is very important and key to the export of power from North Dakota. Whether that is the base-load reliable lignite-fired power or whether that is the wind energy, I think those both have the same requirements.

Senator DORGAN. You talked about one or more powerplants when you talked about Vision 21. We have talked a great deal about clean coal technology in conjunction with Vision 21. Can you tell me, provided we have the transmission capability, what your expectation might be with respect to the production of lignite in the future for this State?

Mr. PORTER. I think it is very encouraging to look at these two Lignite Vision 21 projects that are currently moving forward, and they are evaluating advanced technologies, including integrated gasification combined cycle. There are also some recent new developments in Europe looking at super critical boilers that look at efficiencies in the neighborhood of 42 percent. So I think there are some exciting options for us out there in terms of new production from the lignite fields in North Dakota.

Again, I just reiterate that getting power out of North Dakota is key. Certainly we are an energy-rich State and we can produce a great deal more energy than we can consume inside. I am also encouraged to see that although we have two proposals on the table, we have other people that are talking and we anticipate that we will be looking at other options as we go down the road.

Senator DORGAN. Mr. Caldwell, as you discussed your testimony this morning with us, it occurred to me that much of what you are talking about could be accomplished by an aggressive FERC. Is that the case, and, if so, what remains and must be done legislatively, in your opinion?

Mr. CALDWELL. Well, first of all, I think an aggressive FERC is probably an oxymoron. You know, in terms of the criticism of the FERC, my criticism of the FERC in the recent past has been that it is passive-aggressive, that it is very aggressive about asserting its jurisdiction and very passive once it gets it.

I think that is, first of all, genetic. It is the way it has been for 70 years. It has been in a position of appellate review. It has been a fairly sleepy place for a lot of years. And to think that all of a sudden that organization can be the traffic cop on the beat when I do not think it even knows how to carry a gun, I do not think it has a permit currently to carry a gun, and I do not think it has ever been trained in how to carry a gun, and I do not see it being the cop on the beat and I do not see it being the proactive regulatory commission.

Part of the reason is because it is not anchored politically. It is sitting off all by itself up there at 888 First Street. It is very close to the Capitol. But I recall, my wife was working for the EPA about 3 years ago when Order 888 came out, and the EPA had some issues with Order 888, and so Mary Nichols, the assistant administrator for air and radiation, went to then Vice President Gore to talk about these issues that the EPA had with the FERC, and Vice President Gore said, Who are those guys? Who are they? And my wife's boss said, Well, you appointed them. He said, Well, why? What do they do? And that it is just simply not politically an-

chored. And if we expect this organization to be aggressive, if we expect it to take all these things to talk about this vision, and with all due respect, I would say the vision of one or two powerplants is not a vision, it is small steps by tiny feet. Now, it may lead to large things down the road, but we need to have the vision. That vision must come from the political entities, not from the regulatory people.

Senator DORGAN. I got the feeling it was therapeutic for you to be able to answer that question.

[Laughter.]

Senator DORGAN. I almost felt I should take a microphone to Betsy Moler because she was probably gritting her teeth through some of that.

Congressman Pomeroy.

Mr. POMEROY. Mr. Chairman, must be the clear air out here, the hearings outside the Beltway, at least as evidenced by this one this morning, are a heck of a lot more interesting than the ones you will find in any Senate or House office building in a given day. My commendation to all participants. This morning's hearing has been a particularly good one. We like straight talk out here, Mr. Caldwell, and, by God, you brought it.Who imposed that reserving change or the certainty change that you referenced having an impact on power available out in California?

Mr. CALDWELL. It was one of those things that had good intentions. I mean, it was intended to correct a problem that existed in California, and it was referred to as the under-scheduling problem. And that problem came about because, again, the only way that people could actually physically transact for effect in the spot market was to deliberately unbalance their schedules and, therefore, put them in the spot market, and that was beginning to create reliability problems. In order to solve that perceived problem, the ISO instituted things to make people follow their schedules, and it had the unintended consequence, as I say, of draining reserves.

I think that is the kind of thing that you are going to see from these RTOs, is they struggle to come up with the rules and the protocols to govern this thing. It is not easy to figure out how to do all of these things and how to do all these transactions, and especially if you start off from the proposition that I am independent and I am outside the market, that I am Zeus, I am not Olympus, who is going to watch all these people down in the Plains and let them duke it out in the marketplace, and I am up here just to ensure to keep the lights on. And that is a very, very difficult job. And it is going to take a long time before we ever get that right, and it is going to be a continuing problem. And this is just an example of the kind of thing.

So, again, I think the problem with these organizations is more of governance and how they change and how they can adapt, that we set them up and we say, okay, we are going to design the perfect system, we are going to design the perfect market, and it never works, there is always a problem.

And if there is a little problem, the one thing that markets are good at doing is they are good at driving that little itty-bitty wedge and driving it wide open. And that is what people are going to do. They are going to see a slight advantage and they are going to

drive it open. These organizations are going to have to be able to adapt, they are going to have to be able to evolve, and the predators are going to have to—right now only the predators can evolve, and the prey cannot, and we tie people's hands.

We say we cannot change the rules. If we go to the FERC, it is 18 months before we can get a tariff change. It is $400,000 and a year before we can ever get an adjudication of a complaint. We can't operate that way with that speed, that clock. And I think that was what the problem was in California, and we are going to face that as we try to get our act together in this new market rules.

Mr. POMEROY. Mr. Chairman, I know you want to adjourn the hearing at noon. We are at the appointed hour, so I will hold additional questions other than just to commend Mr. Anderson and Mr. Porter for excellent testimony. There is a couple things I would like to pursue with you as we break up here.

Senator DORGAN. Let me again thank all of those who have come today. I think that these issues are very important. We are going through a period of rather profound change in an area that is critically important to our citizens.

We need to make sure that all of these issues work for both the producers of energy and consumers of energy, and I think the California experience, in which I think the market was essentially broken and the system that was being put together was fundamentally unworkable as it was constructed, ought to lead all of us to be cautious about this.

It is one thing to not have the capacity on a telephone system. In that case, as they say, you get a busy signal, you cannot get through. If you have a lack of capacity on an electric energy system or a power grid of some type, the problem is a blackout. I mean, that is a whole different situation.

So I think especially those of us in our region of the country have a healthy conservatism and caution about these issues as we move forward. We are trying to do new things in new ways, and in some ways it makes us very vulnerable. So we need to have thoughtful analysis of where we are heading and what the consequences might be, and that is the purpose of holding hearings.

I appreciate very much the testimony that has been submitted. We will keep the record open for 2 weeks and we would accept testimony from others who wish on behalf of themselves or their organization to submit additional testimony for this hearing record.

As I indicated, in September we will reconvene, myself, Senator Bingaman and others on the Senate Energy Committee, and we will continue trying to write the energy bill. We finished the research and development title and we will move to other titles. And transmission is a very, very important component of the construction of an energy policy so that we have one that works for this country. We appreciate all of your being here and your patience and your testimony, and this hearing is now adjourned.

[Whereupon, at 12:04 p.m., the hearing was adjourned.]

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