MICROFILM DIVIDER

OMB/RECORDS MANAGEMENT DIVISION
SFN 2053 (2/85) 5M

ROLL NUMBER

DESCRIPTION

1222

2001 HOUSE FINANCE AND TAXATION

HB 1222

2001 HOUSE STANDING COMMITTEE MINUTES

BILL/RESOLUTION NO. HB 1222

House Finance and Taxation Committee

☐ Conference Committee

Hearing Date January 24, 2001

Tape Number	Side A	Side B	Meter #
1	X		112
Committee Clerk Signature	Janice Stein		

Minutes:

REP. AL CARLSON, CHAIRMAN Opened the hearing and read the fiscal note to the bill.

REP. MIKE BRANDENBURG, DIST. 26, Introduced the bill. Stating this bill brings a positive note to the state. This bill does not have a fiscal note. The power that is generated is paid back to the land owner who has a wind turbine. He submitted a handout which showed wind tower projections. See attached copy.

REP. CARLSON Asked Rep. Brandenburg to explain the overstruck language in the bill.

REP. BRANDENBURG Stated that Jay Haley would speak to that.

REP. CARLSON It appears to have some effect on centrally assessed prope[illegible]

REP. S. KELSH, DIST. 11, SOUTH CENTRAL FARGO Testified in support of the bill. Generation from wind energy is the fastest growing form of electrical generation in the world. We have the greatest wind resource of any place in the nation. Many areas of the country are experiencing electricity shortages and within a few years, areas of the upper midwest, will

experiencing the same types of shortages. The Lignite Council's Vision 21 Project will provide a firm resource for this, and the wind energy sector will be working in conjunction with, and in cooperation with, our existing generation industry. I expect the electricity generation industry will soon be acting as one industry, sharing infrastructure, pooling resources to expand and enhance the infrastructure, and marketing this. North Dakota needs economic development, and we need venture capital. He stated he supported all three bills, HB 1221, 1222, & 1223.

REP. HERBEL How does the three percent compare with the states around us.

REP. KELSH Stated there would be other people that would be able to answer that with more clarity. Right now, if we compare ourselves to Minnesota, North Dakota property taxes would be two and a half times what they are in Minnesota on wind generated facilities.

REP. BILL DEVLIN, DIST. 23, Testified in support of the bill. He testified in support of all three wind generation bills, HB 1221, 1222, and 1223. He stated his district has been devastated by the out migration of population over the last twenty years. Wind energy may very well, provide the opportunity to reverse that trend. He stated, he looks at wind energy, much like other people, years ago, looked at the coal industry. We have a marvelous opportunity with this legislation. We need to harvest our assets, the wind sweeping across the prairies, and turn it into energy as well as dollars for the people or our state. In this process, we can create unlimited opportunities for the people of North Dakota. I think we have a once in a lifetime opportunity to make this happen. The time is now. We can work hand in hand with the coal industry.

SEN. ROBERT ERBELE, DIST. 28. Testified in support of the bills #1221, 1222, & 1223.

He stated he viewed this as a strong opportunity for our state. Don't have to worry about reclamation. This is an opportunity to stabilize our population. We all campaigned on economic development and talked about increasing our tax base, this can do that quite well.

SEN. KEN KROEPLIN, DIST. 23. Testified in support of the bills. This is true economic development which will create new wealth. It doesn't come along all that often.

JAY HALEY, EAPC ARCHITECTS ENGINEERS, GRAND FORKS, ND. Testified in support of HB 1221, 1222 and 1223. See attached written testimony

REP. CARLSON Referred back to Rep. Herbel's question, What are the surrounding states doing, what are they centrally assessing, and how does our three percent compare to the surrounding states.

JAY HALEY The tax in Minnesota is almost all centrally assessed. The comparison that we have done, suggests that the same wind farm in North Dakota, would be taxed at a rate two and a half times higher than that same wind farm in Minnesota. This tax bill addresses that and puts it on an equal playing field with Minnesota, so that the tax should be comparable from state to state.

REP. DROVDAL Wind energy isn't a new concept, it has been around for quite a few years, What has changed in the last ten years to make it attractive to put up wind plants in North Dakota now?

JAY HALEY I have been involved with this business almost twenty years now, over that twenty years, if I heard it once, I heard it a thousand times, is wind energy doesn't make sense, it is not reliable, etc. Maybe the last fifteen years that has been true, but what happened since 1985, they have been making incremental design improvements and technology, today you have some

of the finest, most reliable electrical generating technology that exists. Today, these wind turbines are routinely showing an availability of ninety nine plus percent. They are rarely down for unscheduled reasons. The cost of wind generation has come down. The wind generation is the least form of new generation. There is an opportunity before us today, that probably didn't exist five years ago.

REP. BRANDENBURG Asked Mr. Haley to explain the size of the turbines.

JAY HALEY We are not talking about the old wind chargers of yesterday, that some of you are familiar with. These are large utility scale wind turbines. The generation capacity of these machines is going to range from 750 kilowatts up to 1.5 megawatts. In terms of size, these machines are about 260 feet tall. The blades are each, in the neighborhood of 200 feet long. At the tip of its arc, the blade will be approaching 400 feet in the air. Each of those blades weigh about 9,000 pounds. This is not your grandfather's windcharger.

REP. HERBEL Like all of the other entities that are interested in developing energy, have you checked on the transmission of the energy.

JAY HALEY There has been quite a bit of work done on transmission issues. There have been, to my knowledge, five studies that have been completed or underway to identify the limitations and the existing capacity that is available on the grid. In the short term, wind development in North Dakota, I see a short term and a long term. In the short term, there are pockets of transmission capacity available. They exist in pockets of twenty megawatts here, one hundred megawatts over here, the largest pocket is probably one hundred fifty megawatts or less. In the short term, maybe the next three to five years, I expect to see those pockets to be developed by other projects, and that will help to get this industry going. There is a lot of work being done in

the long term, where we will go to a large scale and transmit that directly to one of the largest centers. When you do that, what you have effectively done, is taking a load to Chicago and stuck it right in the middle of North Dakota.

REP. DROVDAL We in North Dakota, have an economic development council who works very hard in bringing in new businesses, this appears like a new type business that would come in here, in the case of the EDC, they can provide a local tax exemption for these same property taxes this bill is debating, do wind energy turbine companies qualify for these EDC exemptions in property tax?

JAY HALEY I asked that question and the answer was that probably yes, but you need to apply.

REP. CARLSON Asked what the capability was for each of these towers, how many megawatts of power do they produce?

JAY HALEY One megawatt machine would provide enough power on an annual basis to power approximately three hundred homes.

REP. CARLSON Is that the size you are talking about, the one megawatt tower?

JAY HALEY It is ranging from seven hundred fifty kilowatts up to two megawatts. The machines which are in production today are about 1.3 to 1.5 megawatts.

REP. CARLSON Asked how they determined what the landowner receives?

JAY HALEY It is based on an industry average, it is about two percent of the gross revenue of the project. In terms of how many kilowatt hours the turbines produce on a wind farm, take two percent of that, you get a range of somewhere in the neighborhood of two thousand dollars per year. The larger 1.5 megawatt machines will probably generate something in the neighborhood of thirty five hundred to four thousand dollars per year.

REP. CARLSON At what wind level will your turbines function?

JAY HALEY These machines will start up at approximately ten miles per hour. When you are standing on the ground and think it is a calm day, more than likely, there is a ten mile per hour wind two hundred and fifty feet up. They don't produce a lot of power in a ten mile per hour wind, but as the wind increases, the power outflow increases, at thirty five miles per hour, these machines will be putting out their full rate capacity. At about sixty miles per hour, the machine will shut itself off, to reduce the wear and tear of the machine. The machines are designed for a wind rating of one hundred forty miles per hour.

REP. LLOYD How much land is consumed by wind turbines, and how do we transmit it?

JAY HALEY The maximum backup density of a wind farm in North Dakota, is about ten to twelve megawatts per section of land. If you pack them to close, they interfere with each other, then they rob energy from each other. You will have two to five or seven turbines in a cluster. Those turbines will then be cabled underground to a transformer, which would be located centrally with that cluster. From that collection transformer, it would more than likely be cabled underground to a substation. Once you get to the substation, you can go overhead with wires and transmit the power out of the area.

REP. LLOYD How much tillable acres would still have to farm?

JAY HALEY If you put the maximum packed density, ten to twelve megawatts on a section of land, you could still use ninety eight percent of that land.

REP. LLOYD What if I am disking my field, and my disk hits that turbine, what happens? Or my tractor runs into it.

JAY HALEY You will probably have to repair your tractor. It is routine to see a crop go right up to the foundation of the tower. It is also routine to see cows grazing right up to the tower. They fit in very well with an agricultural picture.

REP. CARLSON Another question that comes to mind, is the environmental issue, and the wildlife issue, I would wager, someone will think you will kill a bird.

JAY HALEY The wind industry, many years ago, had an incident in California, where inadvertently on one of the wind farms, placed in the middle of a city of prairie dogs. The significance of that is that, prairie dogs along with hawks and eagles, thought these were nice perching posts, there were a lot of birds killed and that caused alarm amongst the Audobon Society and the wildlife folks and the wind industry. The result of that is that every wind farm has gone in with the U.S. Fish & Wildlife, and Ducks Unlimited, it has been very carefully monitored, and what they learned is, that California is a unique and isolated case. The U.S. Fish & Wildlife folks have put together a document which, if approved, will allow wind development on grassland easements on a case by case basis.

REP. CARLSON You were saying that the top of the blade is four hundred some feet, in a lot of places in North Dakota, that would be the highest thing around.

JAY HALEY The U.S. Fish & Wildlife has told us, that the impact is not what the concern is, these machines turn very slowly, the collisions really are not a concern for them. The concern they have is, putting these turbines in the grassland areas, which may disturb their nesting sites.

REP. SCHMIDT Have you got any data regarding the cost of maintenance for one of these chargers?

JAY HALEY The wind industry keeps extensive data on maintenance. Typically, what they do is, they have a scheduled maintenance routine twice a year they go through a maintenance procedure, which may take two people about a half a day to complete. The machines are available to operate ninety nine percent of the time. The scheduled down time on these machines is very minimal.

REP. CARLSON How do you envision the wind industry's cost of transmission, getting your power to a main transmission line, or in the building of a transmission line?

JAY HALEY It would be the same as any other utility. We make a request to transmit power on a particular line. Studies are done whether or not there is capacity on that line to fulfill your request. They also look at whether there are any system upgrades which are necessary to fulfill that request. If there is enough capacity and there are some upgrades that are required, the wind developer will pay for those upgrades, just like any other utility would.

REP. CARLSON What if it is thirty miles to the main transmission line you want to get to, who is going to pay for the line to get it there?

JAY HALEY The developer of the wind field.

DENNIS ANDERSON, EDGELEY, CHAIRMAN OF WIND DEVELOPMENT GROUP, Testified in support of the bill. They are currently working on a twenty megawatt project, but are approved for a one hundred megawatt project. Are currently working with people in Kulm and Ellendale areas, two counties and three school districts. We will be working on a thousand megawatt project in the hill area from Highway 46 to the South Dakota line. We want to see one thousand towers put in there. One megawatt tower is one million dollars. You take one thousand towers times one million dollars, that is a billion dollar project. We understand that it

may take five to seven years to do the big projects, because of conservation issues, but those will be overcome. He introduced a farmer from Edgeley who is currently receiving money for a tower already from a developer. Landowners are lining up, they want to put these on their land. We have the developers and the investors who want to come and spend the money. They want to invest and are not asking for any handouts. Now we need the favorable legislation.

If you put one thousand towers in, you are looking at two hundred jobs. These will be high paid technological jobs. These two hundred workers will probably have an eight million dollar payroll. If you tax this legislation, at somewhere around five thousand dollars per tower, that is five million dollars for taxes per year.

REP. LLOYD I got the impression from what you said, you would bring people in, how would this help our young people who have been training in technology, how will this tie in with wind energy development?

DENNIS ANDERSON I would think there will be a lot of people in the local area that will apply for these jobs. These will be a thirty to forty thousand per year job. I know people will come from around the state. When you put up a project like this, people will come from around the state.

REP. LLOYD My point was, North Dakota, in the last session, worked on developing high technology training throughout the state, the universities have a dedicated program for providing unique employment training, I think that is an important part of the whole program.

DENNIS ANDERSON I agree, I believe in Grand Forks, there is an energy research council, and I heard them talking about wind training.

REP. WINRICH Pursued what Rep. Lloyd talked about. I think what we really need for sustained growth in this state, is a whole spectrum of jobs. We, in fact, need some low level, entry level kind of jobs, etc., but there has to be opportunity for people to work up into really good jobs, if they are going to stay here and not move away. Do these projects provide that kind of spectrum?

DENNIS ANDERSON Yes, there are hi tech jobs, computer jobs, and probably someone will have to paint that tower that Rep. Lloyd is going to drive his tractor into.

REP. HERBEL I can't imagine a project of this magnitude, that there wasn't some opposition, have you run into any of that?

DENNIS ANDERSON To my knowledge, I don't know, I feel like the people who came here in a covered wagon, we are making decisions as we go along, we are learning on the run. I have had phone call after phone call, and they say what can we do to get the towers on our land. This is the local support I am talking about.

REP. HERBEL Some of the money has already been advanced to some farmers to get this project going, by the looks of what they are paying per tower, where can I sign up?

DENNIS ANDERSON You asked a question earlier, what happens if the wind doesn't blow - Through the month of November, they took an average of the wind, it was twenty two miles per hour on the top and ten miles per hour below. Essentially, that turbine would have been going all of the month of November.

REP. RENNER Is there a noise factor?

DENNIS ANDERSON Stated one of the developers was in Germany last summer, and drove his car right up to a wind turbine, and he could still hearing the radio playing in the car. He

related to one of the questions, what do you do when the wind doesn't blow - you can move ten percent up and down, without affecting the grid. When the wind backs off, if you are somewhere in that ten or fifteen percent area, it doesn't affect the grid.

REP. CARLSON Stated there is a supply and demand thing there, and also a reliability factor, which has been a concern in the wind energy. You have addressed those very well.

SEN. TERRY WANZEK, DIST. 29, Testified in support of the bill. He stated he wanted to speak from the perspective of economic development. We have to be open minded, maybe we can be noted as a quality energy supplier. This is a tremendous opportunity to try to make ourselves competitive with the other states. We have nothing to lose with this bill.

BOB MARKEE, ENERGY UNLIMITED, Testified in support of this bill plus HB 1221 and HB 1223. Energy Unlimited is one of the pioneer wind developers in this country. We were incorporated in 1980 and we are still here. We have worked with the Griggs-Steele people and the Edgeley people, and look forward to working with others. We think this will create a marvelous economic climate in this state.

REP. HERBEL Asked when these turbines quit, how do you store the energy?

REP. CARLSON Answered, there is no storage, the grid picks up the difference.

BOB MARKEE Stated they do use battery storage in the smaller units.

REP. CARLSON You are familiar with some other states, are they giving tax incentives similar to what we are using here?

BOB MARKEE Stated he is from Pennsylvania, there is no state funding available there. On the other hand, there has been a merger with a utilities and a Chicago company, as part of the

negotiations of that merger, there were some settlements which came about that provided some funds to wind developers and solar developers in the state.

REP. CARLSON There are no tax breaks on the assessments for the real estate taxes or whatever?

BOB MARKEE No.

REP. CARLSON I am trying to get a feel for what other states are doing, we were told we would be two and a half times higher than the state of Minnesota.

BOB MARKEE The stimulation of this industry, back in the 1980's came about with tax breaks in California. But it all went away in 1985.

REP. CARLSON We hear the terminology of "green power" in some states, where a customer can check on his bill and is willing to pay more on his utility bill, to use renewable energy such as "wind".

BOB MARKEE The Public Service Commission wanted to market on a green pricing program, we put in the first five megawatts, and they were charging a premium two and one half cents per kilowatt hour to those that wanted to participate in that program. Those five megawatts sold quick. They added another twenty megawatts also at a two and one half cent premium, that oversold, now they are in the process of doing another twenty megawatts, they are bidding on the streets for it, and they are going to charge three and a half cents for it.

REP. CARLSON My thought was that in North Dakota, it probably wouldn't be the hottest item going

DAVID LINDLEY, RENEWABLE ENERGY SYSTEMS, LONDON, ENGLAND,

Testified in support of the bill. He stated they also had an office in Austin, Texas. He commutes

between London and Texas. They have approximately sixteen to seventeen professional people and approximately one hundred twenty other people other people employed. They have investment costs of about two hundred million dollars. They are about to announce another investment of approximately three hundred million dollars. That is a total of about five hundred million dollars in projects in Texas. Wind power happens very quickly. They operate in Borneo, France, United Kingdom, Spain, Switzerland, Jamaica, and China. He stated they are now developing the largest resource in the United States. Wind energy is a serious business. Everywhere in Europe there is wind energy being used. Denmark employs more people in this business than it does in fishing. Germany has spent five hundred billion dollars in wind energy, and there is no wind near that of North Dakota. He stated you can choose who you want to buy power from in Europe. He stated wind power developers are major employers. This bill is North Dakota's competitive advantage.

REP. LLOYD Asked what effect acid rain would have on these projects?

DAVID LINDLEY It has no effect on us, we use CO2 emissions. Wind energy is complimentary to anything you farm.

REP. LLOYD Has there been any wind farms abandoned?

DAVID LINDLEY In the early days in California there were some, they were the worst wind farms built in the 1980's. They were built very rapidly by entrepreneurs, used technology which was poorly developed.

BRAD STEVENS, UND ENERGY & ENVIRONMENTAL RESEARCH CENTER,

Testified in support of the bill. He wanted everyone to be aware of the efforts which are going on to support the wind energy.

KEN JUNKERT ON BEHALF OF ROGER JOHNSON, STATE AG COMMISSIONER. Testified in support of the bill. See attached written testimony.

KIM CHRISTIANSON, ENERGY PROGRAM MANAGER, NORTH DAKOTA DIV. OF COMMUNITY SERVICES. Testified in support of the bill. See attached written testimony. He also presented a map showing the areas of wind energy development. There are five large scale turbines in North Dakota.

KEITH MONSON, CHAIRMAN OF THE GRIGGS/STEELE WIND POWER GROUP. Submitted written testimony, see attached copy.

MIKE HOHL, PRESIDENT OF DMI. Submitted written testimony in support of the bills, HB 1221, 1222, 1223, see attached written copy.

MARCY DICKERSON, STATE TAX DEPARTMENT, Appeared before the committee to respond to some of the questions. In regard to the overstruck language on page 1, all that does is get rid of language which has been obsolete since 1985. Addressed Rep. Drovdal's question about new business exemptions for the wind properties. There is an Attorney General's opinion 86-21, which says that centrally assessed property is not eligible for an exemption. The local government people do not have the authority to grant a new business property tax exemption to centrally assessed property. Under existing law, there is no provision for the Board of Equalization to grant property tax exemptions.

MARK JOHNSON, NORTH DAKOTA ASSOCIATION OF COUNTIES, Testified in support of all three bills., HB 1221, 1222, 1223. He urged the committee members to look at HB 1222 to look at the property tax exemption which reduces from ten percent down to three

percent, and makes it perpetual. Suggested a ten year or fifteen year limit. He submitted the amendments to the committee members.

JEROME HURDLE, CHAIRMAN OF WIND POWER DAKOTA. Testified in support of the bill. He stated they formed a committee since October, 2000. He stated the response has been overwhelming. Skyrocketing utility costs are putting too much of a hardship on the people. ProGold is shut down because of the high utility costs. He felt we wouldn't need OPEC if we developed our wind energy.

With no further testimony, the hearing was closed.

COMMITTEE ACTION 1-31-01, Tape #3, Side A, Meter #233

REP. BRANDENBERG Presented an amendment to the committee #10297.0101, which would address contracts for the wind towers. He also presented the same amendment which was added to HB 1221 regarding the end date.

REP. DROVDAL Second the motion. **MOTION CARRIED BY VOICE VOTE.**

REP. SCHMIDT Made a motion for a **DO PASS AS AMENDED.**

REP. CLARK Second the motion. **MORTION CARRIED**

15 yes 0 no 0 absent

REP. SCHMIDT Was given the floor assignment.

FISCAL NOTE

Requested by Legislative Council
01/16/2001

Bill/Resolution No.: HB 1222

Amendment to:

1A. **State fiscal effect:** *Identify the state fiscal effect and the fiscal effect on agency appropriations compared to funding levels and appropriations anticipated under current law.*

	1999-2001 Biennium		2001-2003 Biennium		2003-2005 Biennium	
	General Fund	Other Funds	General Fund	Other Funds	General Fund	Other Funds
Revenues						
Expenditures						
Appropriations						

1B. **County, city, and school district fiscal effect:** *Identify the fiscal effect on the appropriate political subdivision.*

1999-2001 Biennium			2001-2003 Biennium			2003-2005 Biennium		
Counties	Cities	School Districts	Counties	Cities	School Districts	Counties	Cities	School Districts

2. **Narrative:** *Identify the aspects of the measure which cause fiscal impact and include any comments relevant to your analysis.*

HB 1222 sets the taxable value of a centrally assessed large-scale wind turbine electric generation unit at 3% of assessed value. Other centrally assessed property has a taxable value of 10% of assessed value. For example, a $1 million tower would have a taxable value of $15,000, while other centrally assessed property with a true and full value of $1 million would have a taxable value of $50,000. Assuming a tax rate of 300.00 mills, the wind tower would pay $4500 in annual property taxes; other centrally assessed property of the same value would pay $15,000 in annual property taxes. Construction of a large-scale wind generation facility is not assumed in the baseline forecast for the next biennium. If HB 1222 is enacted, and if a wind turbine is constructed during 2001, the first assessment date would be January 1, 2002, and the taxes would be payable in January, 2003.

3. **State fiscal effect detail:** *For information shown under state fiscal effect in 1A, please:*
   A. **Revenues:** *Explain the revenue amounts. Provide detail, when appropriate, for each revenue type and fund affected and any amounts included in the executive budget.*

   B. **Expenditures:** *Explain the expenditure amounts. Provide detail, when appropriate, for each agency, line item, and fund affected and the number of FTE positions affected.*

   C. **Appropriations:** *Explain the appropriation amounts. Provide detail, when appropriate, of the effect on the biennial appropriation for each agency and fund affected and any amounts included in the*

executive budget. Indicate the relationship between the amounts shown for expenditures and appropriations.

Name:	Kathryn L. Strombeck	**Agency:**	Tax Department
Phone Number:	328-3402	**Date Prepared:**	01/23/2001

Date: 1-31-01
Roll Call Vote #: 1

2001 HOUSE STANDING COMMITTEE ROLL CALL VOTES
BILL/RESOLUTION NO. HB 1333

House FINANCE & TAXATION Committee

☐ Subcommittee on _____

or

☐ Conference Committee

Legislative Council Amendment Number _____

Action Taken Do Pass as amended

Motion Made By Rep. Schmidt Seconded By Rep. Clark

Representatives	Yes	No	Representatives	Yes	No
CARLSON, AL, CHAIRMAN	✓		NICHOLAS, EUGENE	✓	
DROVDAL, DAVID, V-CHAIR	✓		RENNER, DENNIS	✓	
BRANDENBURG, MICHAEL	✓		RENNERFELDT, EARL	✓	
CLARK, BYRON	✓		SCHMIDT, ARLO	✓	
GROSZ, MICHAEL	✓		WIKENHEISER, RAY	✓	
HERBEL, GIL	✓		WINRICH, LONNY	✓	
KELSH, SCOT	✓				
KROEBER, JOE	✓				
LLOYD, EDWARD	✓				

Total (Yes) 15 No 0

Absent 0

Floor Assignment Rep. Schmidt

If the vote is on an amendment, briefly indicate intent:

REPORT OF STANDING COMMITTEE

HB 1222: Finance and Taxation Committee (Rep. Carlson, Chairman) recommends **AMENDMENTS AS FOLLOWS** and when so amended, recommends **DO PASS** (15 YEAS, 0 NAYS, 0 ABSENT AND NOT VOTING). HB 1222 was placed on the Sixth order on the calendar.

Page 2, line 26, after "more" insert ", on which construction is completed before January 1, 2011,"

Renumber accordingly

2001 SENATE FINANCE AND TAXATION

HB 1222

2001 SENATE STANDING COMMITTEE MINUTES

BILL/RESOLUTION NO. 1222

Senate Finance and Taxation Committee

☐ Conference Committee

Hearing Date 3/19/01

Tape Number	Side A	Side B	Meter #
1	x		52-end
		x	0-47.2
2	x		26.5-27.7
Committee Clerk Signature			

Minutes:

Senator Urlacher: Opened the hearing on HB 1222, relating to reduction in taxable valuation of wind turbine electric generators that are centrally assessed property.

Senator Stenehjem absent from the hearing.

Representative Mike Brandenburg: Co-sponsored the bill, testified in support. Provides flowchart. We need to provide some incentives to people to come to ND and develop this resource. Explains chart. With wind energy, we can be proactive and develop bills that allow development that comes into the state to want to work together with coal, wind, and hydro all together. We have all of those, transmission is the key to all development. This could benefit our state with a lot of economic development.

Senator Christmann: The Heskett Plant over in Mandan is centrally assessed, are they paying the 3% or are they at the 10%?

Representative Mike Brandenburg: The Heskett Plant was a good example to use in comparison to a 100 MW farm.

Senator Urlacher: Is the $2,000 average income for farmers per turbine correct?

Representative Mike Brandenburg: I believe so. That depends on the turbine.

Representative Scot Kelsch: Testified in support of all three bills-1221, 1222, and 1223. As one looks at the energy needs of our country, it's become clear that we need to take action for these growing needs. In ND, we've been blessed with many natural resources, coal, oil, and wind. We stand poised to meet those growing electricity needs. ND also needs venture capital, wind developers are very interested in our state, and they present a real opportunity to provide infusion of inter capital in our state. I support the development of the Division 21 Project, a new coal plant. Together we can do much to meet those growing electricity needs by sharing resources, to overcome marketing efforts, and solve infrastructure problems. This development would be good for both rural and urban areas. This simply levels the playing field with our surrounding states and makes ND a little more competitive.

Senator Christmann: I am going to ask you a philosophical question. I represent a coal producing area. We are looking at an ever moving target based on demand and transmission lines of how much power ND can use and export, but there's always some maximum amount. On a calm day, the coal producing plants needs to have enough capacity to meet that maximum load, but during the rest of the year when the wind is blowing, they're supposed to have their capacity not fully utilized. Isn't this kind of unfair to the coal industry to ask them to always be built up and have the capacity to produce whatever the amount on whatever the day the wind producers are unable to?

Representative Scot Kelsch: A lot of what you are questioning needs to be addressed and agreed between the firm power source and the wind industry. I think there is room for both. Wind developers have been in meetings with the lignite industry. I think agreements can be reached within the industries themselves.

Senator Wardner: Some parts of the country are demanding green energy, whether we have fixed power or not, they still want some green energy and the fact that we have to supply some of it. What percentage of energy that we're starting to look at is green?

Representative Scot Kelsch: I don't have a figure as far as the percentage.

Senator Wardner: Do you think they'll leave us alone as far as externalities if we're providing some green energy? They could shut us out because we don't have any green energy.

Representative Scot Kelsch: We could be.

Senator Christmann: On 1221, is there a necessity for it to be implemented for 10 years, or would it be a problem if we looked at 4 years or something and see how it's going or do you needs that consistency for a decade?

Representative Scot Kelsch: The original bill did not have any sunset on it. In the House we amended it to the 10 years. I think it may take some time for this industry to start building projects and 10 years is a fair amount of time.

Senator Nichols: It seems the transmission lines are very critical for the success of this industry. Do you think the bottlenecks in going west could be overcome? That we could start moving some of this power to the west?

Representative Scot Kelsch: Our greatest opportunities do lie in the east. I do hope someday that we'll be able to transfer power.

Robert Markee: Director of Marketing for Energy Unlimited, Inc., testified in support of all three bills. We are one of the first wind developers in the country. We are in a number of states including ND. In ND we are partnered with Renewable Energy Systems. Our two companies have thus far invested well into 6 figures of money for the Griggs-Steele project and Edgeley project and we are going to keep doing that even though we haven't received any revenues yet. We think the marketplace is right.

Scott Piscitello: Renewable Energy Resources, testified in support of all three bills. Our headquarters is in the UK, our US headquarters is in Austin, TX. We've been involved in the development and construction of wind farms for 10 years. About 9 months ago, we began looking outside of TX for opportunities within the US, we quickly became very interested in ND. Part of that interest came from the great wind resource that ND has, we were also encouraged by the reasonable proximity to the large load centers in Minneapolis and Chicago. As a result of that, we formed a partnership with Energy Unlimited. We began working with the Griggs-Steele community and the Edgeley community. We've prepared a proposal to Northern States Power-Excel Energy in response to their solicitation. From our perspective, the business in this part of the country is very competitive with surrounding states. As Keith Monson mentioned, electricity crises to the wind farms are in the $.03-$.04 kilowatt hour range. That's what we need over 20-25 years to make this project work. In competitive situations, projects are really won and lost on the basis of tenths of a percent. The three bill which you are considering, we estimate they'll reduce the price of electricity ¼ of a cent. From a developer's prospective, these bills are attractive. These bills will give wind power development a boost.

Senator Christmann: Do you own your transition lines in TX?

Scott Piscitello: No.

Senator Christmann: Do you know how much the owners pay in taxes on the lines?

Scott Piscitello: No I don't.

Senator Christmann: I'm wondering how our transition line taxes compare to the other states.

Scott Piscitello: What I am familiar with is transition tariffs. From our perspective, if we need to get the tower from our wind farms to a point of delivery, we as the developer encourage transmission tariffs. Explains.

Senator Wardner: When it comes to putting your electrons on the transmission line, isn't it that postage stamp rate?

Scott Piscitello: You're right, there is a postage rate. The postage rate is assessed on a dollar per kilowatt confirmed capacity.

Senator Wardner: In reference to Senator Christmann's question, if these lines go over different states, each state's going to have different property tax policies. When you send electricity on a transmission line, it's the same rate.

Scott Piscitello: That's correct as long as you're on the same transmission system.

Anonymous citizen testified in support of all three bills. He stated that he has invested money in MN wind energy because there is not an opportunity to invest in ND.

Dennis Anderson: Edgeley Development Corp. & Chairman of wind committee, testified in support of all three bills. Representative Brandenburg and I have been accused of being dreamers, but feel the projects can bring revenue to the state. Explained the history of development in Edgeley. These bills would be the first step in making wind energy happen.

Jay Haley: EAPC Arch. Engineers in Grand Forks, previously testified in support of all the bills. Explained the tax on the Heskett Plant in Mandan, the fairness between all the industries, and the transmission line taxes.

Senator Urlacher: Closed the hearing. Action delayed.

Others signed the roster in support.

Discussion held later. Meter number 26.5-27.7, Tape 2, Side A.

COMMITTEE ACTION:

Motion made by Senator Nichols for a DO PASS, Seconded by Senator Wardner. Vote was 5 yeas, 0 nays, 1 absent and not voting. Bill carrier was Senator Kroeplin.

Date: 3/14/01
Roll Call Vote #: 1

2001 SENATE STANDING COMMITTEE ROLL CALL VOTES
BILL/RESOLUTION NO. 1222

Senate Finance and Taxation Committee

☐ Subcommittee on _____
or
☐ Conference Committee

Legislative Council Amendment Number _____

Action Taken DO PASS

Motion Made By Nichols Seconded By Wardner

Senators	Yes	No	Senators	Yes	No
Senator Urlacher-Chairman	✓				
Senator Wardner-Vice Chairman	✓				
Senator Christmann	✓				
Senator Stenehjem					
Senator Kroeplin	✓				
Senator Nichols	✓				

Total (Yes) 5 No 0

Absent 1

Floor Assignment Kroeplin

If the vote is on an amendment, briefly indicate intent:

REPORT OF STANDING COMMITTEE

HB 1222, as engrossed: Finance and Taxation Committee (Sen. Urlacher, Chairman) recommends **DO PASS** (5 YEAS, 0 NAYS, 1 ABSENT AND NOT VOTING). Engrossed HB 1222 was placed on the Fourteenth order on the calendar.

2001 TESTIMONY

HB 1222

SEE TESTIMONY ON HB 1221

HB 1222- 1221- 1223

Chairman Carlson and Members of the House Finance and Tax Committee.

For the record, I am Representative Bill Devlin, District 23 from Finley. District 23 is a rural district that includes all of Steele, Griggs and Nelson Counties along with parts of Ramsey and Walsh counties.

I am here to give testimony in support of House Bills 1222, 1221 and 1223. As you are well aware, these bills all deal with wind energy issues.

My district has been devastated by the out-migration of population over the last twenty years. Steele and Griggs counties have lost between 25 and 30 percent of their populations during that time period. Other rural counties have seen similar decreases in population.

Wind energy may very well provide the opportunity to reverse that trend and bring economic development opportunities to our farms, our towns and our people.

I look at wind energy in it's infancy much like others, generations ago, looked at the coal industry. We have a marvelous opportunity in this legislative session to start harvesting another of our assets, the wind that sweeps across our prairie, and turn it into energy, as well as dollars for our people and our state.

Though this process we can create unlimited opportunities for our people.

I think we have a once in a lifetime opportunity to make this happen. The time is now, and we are the legislature that can make it happen.

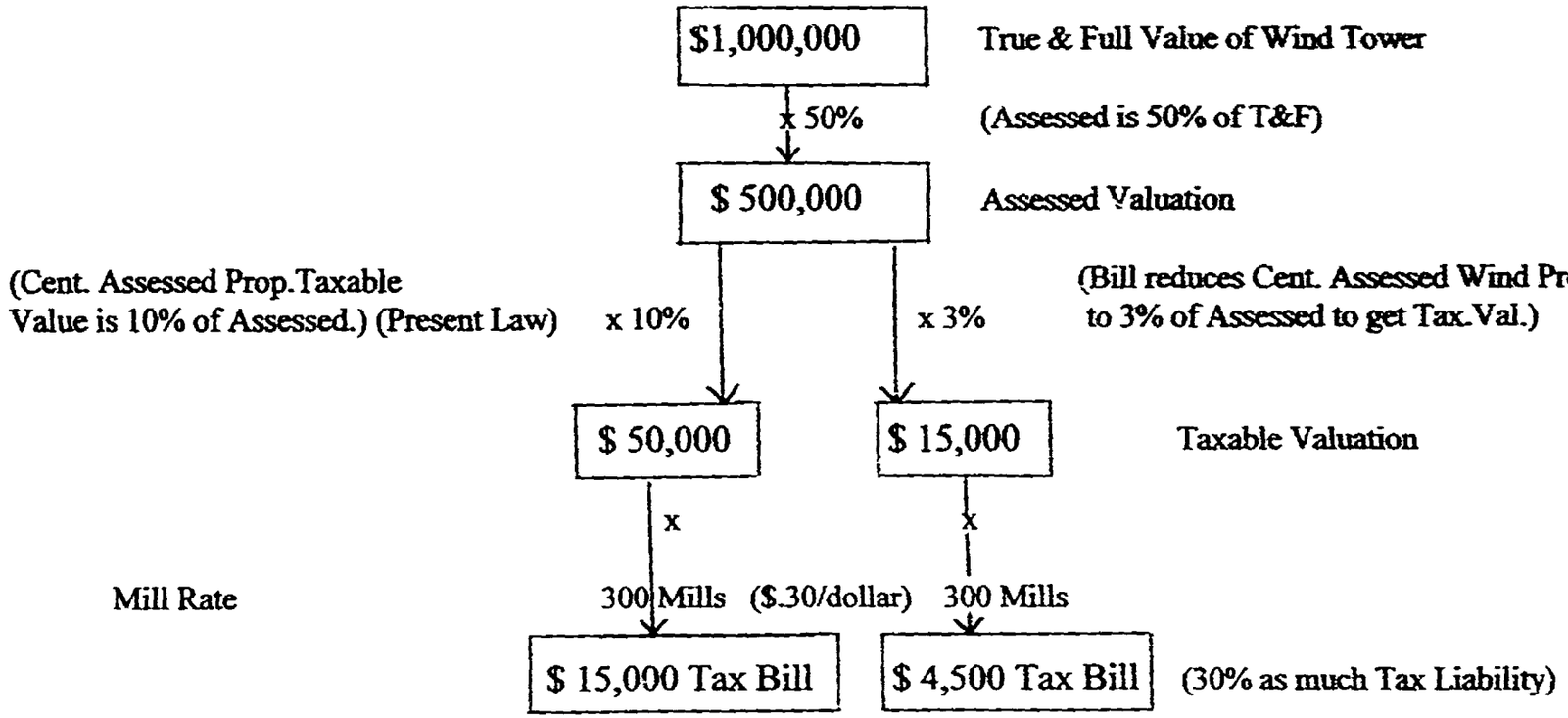
We can work hand-in-hand with the coal industry, to meet joint needs for transmission lines that will export the power created by both industries throughout the nation. We don't need to see competition between the industries in North Dakota, but instead we look for collaboration between everyone.

Mr. Chairman, there are people here who will answer every technical question that this committee will have through the hearing process. Because of the number of issues we have before the House Human Services Committee this morning, I respectively ask the committee to wait for the people that will follow my testimony to get all your questions answered. I urge this committee to give the a Do Pass recommendation to all three bills. Thank you for the opportunity to testify in support of House Bills 1222, 1221 and 1223.

Rep Brandenburg

HB 1222

WIND TOWER PROJECTIONS



300 mills was used because it's a round number and close to 1999 statewide average consolidated mill rate of 285.00. "Consolidated" means a combination of county, school, township, park, etc. Levies that apply to property.

Possibilities of Wind Towers

0 Wind Towers x 15,000 = 0

10 Wind Towers x 4500 = 45,000
100 Wind Towers x 4500 = 450,000
1,000 Wind Towers x 4500 = 4,500,000

Wind Energy Development
Is Good for North Dakota

By Jay Haley
EAPC Architects Engineers
Grand Forks, ND
1-11-01

Wind Energy is a Powerful Resource for Rural Economic Development.

- Wind farms offer a new cash crop for farmers and ranchers.
- A landowner receives $2,000 to $4,000 per year for each wind turbine depending on its size and production.
- A fully developed section of land can support 10 to 12 megawatts of wind generation.
- A fully developed section of land would generate more than $30,000 per year in land-lease payments to the landowner.
- Land that is fully developed with wind turbines is still more than 95% available for its original agricultural use.
- Wind development creates 15 to 19 jobs per 100 megawatts of installed capacity.
- Two North Dakota companies are engaged in the manufacture of wind turbine components (towers and blades).

North Dakota has the Greatest Wind Resource in the Nation

- North Dakota's wind potential is over 138,400 MW, which could supply about 1/3 of the nations' annual power requirements.
- There are few poor wind sites in North Dakota. Some sites are just better than others.
- North Dakota ranks at the bottom of states that are utilizing their wind resource.
- North Dakota needs more transmission capacity.
- The transmission grid in the upper Midwest is in need of substantial upgrades and new transmission in order to increase the export capacity of North Dakota.
- WAPA studies indicate there is sufficient transmission capacity available throughout North Dakota in smaller parcels of 50 to 150 MW each.
- Both the coal industry and the wind industry need new transmission capacity in order to expand their industries.
- The coal and wind industries would benefit by working together on solving the transmission issues.

Wind Energy is the Fastest Growing Energy Technology in the World

- Wind energy has had the highest growth rate for over ten years. The annual growth rate last year was more than 40%.
- There are more than 35,000 wind turbines installed worldwide with a capacity of more than 12,000 MW.

Benefits of Wind Development In North Dakota

By Jay Haley
EAPC Architects Engineers
Grand Forks, ND
1-11-01

Introduction

The wind industry has been looking closely at North Dakota for years. The reason is simple; North Dakota has the greatest wind potential in the United States. Until now, there's been no utility-scale wind development with the exception of a few single-turbine installations scattered around the state. Things are about to change. Over the last year, every major wind developer in the world has visited North Dakota in preparation for expansion into the Midwest.

The cost of wind energy has dropped dramatically in the last ten years to the point where wind power is competitive with any form of new generation. The demand for clean renewable energy is growing at an ever-increasing rate. Today, wind is the fastest growing energy technology in the world.

What Does Wind Development Mean for North Dakota?

Rural Economic Development

First and foremost, wind energy means rural economic development. Wind development has the ability to revitalize rural communities. For example, the Griggs-Steele Wind Development Group is planning the development of a 130 MW wind farm to be located in Griggs and Steele counties in North Dakota. The project will consist of 85 to 175 wind turbines with a capital cost of approximately $130 million dollars. It will create around 200 construction-related jobs, and once complete will create 15 to 20 full-time jobs. Local landowners will receive land-lease payments ranging from $2,000 to $3,500 per year for each wind turbine placed on their land. This is a new cash crop for the farmer. Land-lease payments to local landowners will total more than $500,000 annually. All this at no cost to the landowner. In addition, the annual property tax revenue will be approximately $750,000. This scenario can be repeated all over the state.

Wind development also results in increased tourism. People will travel a long way to see a wind farm. Communities in southern Minnesota and northern Iowa have experienced a distinct increase in business volume for hotels, motels, restaurants, gas stations, convenience stores, hardware stores, lumber yards, and cement plants.

Manufacturing

A number of local businesses already benefit from wind development. Tubular towers are being manufactured by Dakota Machine in West Fargo, and LM Glasfiber in Grand Forks manufactures turbine blades. Additional wind development in the Midwest will increase business volume for these industries as well as create opportunities to add turbine assembly plants.

Wind and Coal – Different Markets

There are many counties engaged in North Dakota's coal industry that could enjoy the economic benefits from wind development without negatively impacting the current coal industry. Wind energy is not meant to replace coal or other forms of generation, but rather to complement them. The market for wind energy is growing at an increasing rate. This market is not necessarily in North Dakota. For example, Northern States Power in Minnesota has a requirement to purchase a total of 825 MW of wind energy by the year 2012 (about 300 MW have been added so far). Major cities such as Chicago, Denver, and Kansas City have increasing demand for wind energy. Green power marketing projects are starting up all over the country. The Federal government is also required to purchase renewable energy. All of these markets can be served by wind energy from North Dakota. Coal-fired generation cannot supply the green power demand of this new market.

Transmission Issues

The electrical grid is somewhat like a vast ocean, with buckets of water being added and drawn off at many points along the shore. Adding 1000 MW of wind energy to our regional grid, the Mid-continent Area Power Pool (MAPP), is comparable to a drop in the ocean. Preliminary studies performed by Western Area Power Administration (WAPA) indicate that the grid can absorb new generation at various locations in increments of 25 MW to 150 MW. However, the export of thousands of megawatts of new generation will require building new transmission lines. Coal and wind interests will both benefit by working together to develop new transmission access to the marketplace. In the short term, North Dakota should develop those 25 MW to 150 MW parcels. Wind energy means rural economic development and it's good for all of North Dakota.

Griggs/Steele Wind Power Group

HB 1221- 1222
1223

Chairman -- Carlson

Vice-chairman -- ??? — & Committee Members

- Thank you for allowing me to talk on the economic development potential of wind power.
- My name is Keith Monson, and I am here testifying as Chairman of the Griggs/Steele Wind Power Group.
- I don't have a long history in economic development efforts, but I have been around long enough to know that the first and most troublesome hurdle in any effort is usually the funding. Wind Power development has been the single exception to this rule that I have encountered to date. Funding and the expertise to actually construct these projects is readily available, and in fact pushing local groups and the State as a whole to let it happen.
- The second largest hurdle in economic development is usually an agreement as to whether there is sufficient local resources to sustain the effort. In this case the wind regime in ND as a whole is well documented and is literally in everyone's face every day. And, I've never seen anything, especially when it involves using someone else's property for the development, that has what can probably be called unanimous support from those most directly impacted.
- The Griggs/Steele Wind Power Group is currently waiting to hear if its' bid is on a short list for the 80 MW project requested by NSP, now Excel Energy. If I could, I would like to detail some of the benefits we are hoping to receive if this project were to be built in our area.

1. In anticipation of the project we already have landowners receiving easement payments on land the project would be constructed on.
2. In the short term we would be looking at a construction boom as the project is being built.
3. Long-term landowners would receive payments based on the actual production from the turbines on his property. These payments would vary

based on the size of the turbine used, but a figure of $3000 per turbine per year, should be a conservative number, for a total of about $200,000/year.

4. In addition, the local property tax generated -- using the rates proposed in the pending legislation --- would amount to about $250,000 per year.
5. It is also anticipated that this project would create 8 to 10 full time jobs during the life of the project. That conservatively equates to another $200,000 per year pumped into the local economy.
6. Totaling the straight up cash inflows on a yearly basis, yields $450,000 per year on what is a relatively small project in light of the potential.
7. Even though these calculations are only valid for the anticipated 20 year life of the contract with NSP, I can't believe wind generated electricity won't be continue to be utilized way into the future.

- In a news conference late last year I forwarded the idea of looking at the generation of electricity, or electricity itself as a product. A product not unlike wheat, barley, or any other of a variety of products that we produce here, for export. Electricity is electricity, - it's a product, - we produce it for export, - and someone on the other end sends us money. That's new wealth, which we then spend in our daily activities that creates additional economic activity.
- California is currently demonstrating a dramatic shortage of a product which we can produce in abundance, with very little investment, and which, as enumerated above has a huge potential for creating new wealth.
- Even though we have the best wind regime in the Nation here in North Dakota, there are concerted efforts going on all over the country, seeking to fill that need. I would like to see North Dakota as a State, take a proactive stance in making sure that everything that can be done, is done, in promoting electricity as a product for export.

Kit Moxon

Chairman

[redacted] REMARKS HB 1221 1222 1223

- Good morning S[redacted] for Mr. Carlson), my name is Mike Hohl president of DMI, manufacturing firm in West Fargo
- I appreciate the opportunity to talk to you about DMI and the importance of the wind industry to our future.
- I would like to start out by giving you a short history of our company. Dakota Machine Tool was stated back in 1978 [redacted] to service the sugarbeet industry in the Red River valley.
- 1st products were sugarbeet pilers and as the company grew we began to branch out into manufacturing process equipment for the sugar factories not only here in the valley but across the US.
- Then a couple of years ago as we saw the struggles that the ag industry was encountering we looked for other opportunities to provide some stability to our company.
- Cold call to Vestas.
- 1st order spring of 1999 – 14 – 65 -- meter towers delivered to WPS NW of Green Bay, WI near Lake Michigan.
- 2000 – 84 various towers to 8 states and Canadian provinces.
- Expect to manufacture about 150 towers in 2001.
- **So why is this important to you and North Dakota?**
- In 1999 wind towers occupied approximately 7% of our gross sales which declined approx 22% from 98.
- In 2000 wind towers comprised about 80 % of our gross sales which declined another 29% from 99.
- In 2001 we expect wind towers to occupy in excess of 90% of our gross sales which is budgeted to increase 50% from 2000.
- "DMI would NOT be around today without wind power and the associated 120 jobs would not be there either!
- **Wind power = economic development – that is [redacted] the message we want you to take away with you today.**
- As you ND #1 in the world for wind resources.
- I am also sure that you have access to data indicating the wind power potential in ND – depending on who you talk to, the numbers can vary BUT even the most conservative number indicates that this industry has the potential of contributing billions with a "B" over the next fifty years.
- Rough #'s in current dollars, **each megawatt cost about $1mm installed** – that means that **over that 50 year period $5bb** of direct funds would be pumped back into our state not say anything about the **$2 – 3 thousand of income per wind turbine per year each farmer** would reap as well as how many times that sum will be rolled over in each community indirectly with what workers and others employed by the industry spend.
- That's our story.
- Are there any questions

Tower – 10% of cost

Major Utility RFP. for 400 towers

Iowa CA
Kansas Alberta
Oregon

COMMISSIONER OF AGRICULTURE
ROGER JOHNSON

PHONE (701) 328-2231
(800) 242-7535
FAX (701) 328-4567

DEPARTMENT OF AGRICULTURE
State of North Dakota
600 E. Boulevard Ave. Dept. 602
Bismarck, ND 58505-0020

Testimony of Roger Johnson
Agriculture Commissioner
House Bill 1221, House Bill 1222, and House Bill 1223
Senate Finance and Taxation Committee
Brynhild Haugland Room
March 14, 2001

Chairman Urlacher and members of the Senate Finance and Taxation Committee, I am Commissioner of Agriculture Roger Johnson. I am here today in support of HB 1221, HB 1222, and HB 1223, which relate to wind energy development and taxation in North Dakota.

HB 1221 provides a sales and use tax exemption for wind energy equipment, HB 1222 seeks to equalize the taxation value of wind farms with that of coal-fired plants of similar size, and HB 1223 deals with state income tax credits for wind energy turbines on leased land.

There is great potential for wind energy development in North Dakota. Wind energy experts estimate that North Dakota has the potential to generate 138,400 megawatts of power per year, which is more than any other state in the country. Wind Powering America estimates that the average annual income for a farmer is $2000 per wind turbine.

Landowner and public interest in wind energy and other renewable energies is growing in North

Dakota and throughout the Untied States. Wind energy is environmentally friendly and allows us to capitalize on an abundant natural resource.

I believe that wind energy development offers a unique opportunity for our state to complement our existing coal and hydropower energy industries, and to offer a new, supplemental source of income for landowners.

While developing new sources of energy is a good idea, one of the biggest hurdles is going to be transmission of power. Therefore, the best way to overcome the hurdle is to make sure the energy partners work together so we can export energy to bigger markets.

Chairman Urlacher and committee members, I ask for your favorable consideration of HB 1221, HB 1222 and HB 1223. I would be happy to answer any questions you may have.

Senate Finance and Taxation Committee
March 14, 2001
Testimony of Harlan Fuglesten,
Communications and Government Relations Director
North Dakota Association of Rural Electric Cooperatives
on HB 1221, HB 1222, and HB 1223

Mr. Chairman and Members of the Senate Finance and Taxation Committee. My name is Harlan Fuglesten, Communications and Government Relations Director for the North Dakota Association of Rural Electric Cooperatives. Our Association represents 17 distribution cooperatives and five generation and transmission cooperatives based or doing business here in North Dakota. Together, our members are responsible for nearly 90 percent of the investment in coal-based electric generation in North Dakota, and our members sell more than 40 percent of the retail electricity in the state.

In addition to our strong support of our state's coal-based electric generation industry, our electric cooperatives also recognize that wind is another important regional energy resource. Our Association and its members support research and development of renewable energy resources such as wind, water, solar, and geothermal. Great River Energy was one of the pioneers of wind energy development in Minnesota. Basin Electric is actively involved in making renewable wind energy available to its member cooperatives through its PrairieWinds Project, and Minnkota Power's Infinity Wind Energy program will provide wind energy to its member systems. Tentative plans call for both these programs to be operational as early as this fall. While these are small scale wind energy projects, they may pave the way for larger projects in the future.

On behalf of the North Dakota Association of Rural Electric Cooperatives and its member systems, we urge a DO PASS on HB 1221, HB 1222, and HB 1223.

Testimony on HB 1221, HB 1222, and HB 1223
Senate Finance and Taxation Committee
March 14, 2001

Mr. Chairman, for the record my name is Dale Niezwaag and I am representing Basin Electric Power Cooperative. Basin Electric Power Cooperative supports HB 1221,1222, and 1223.

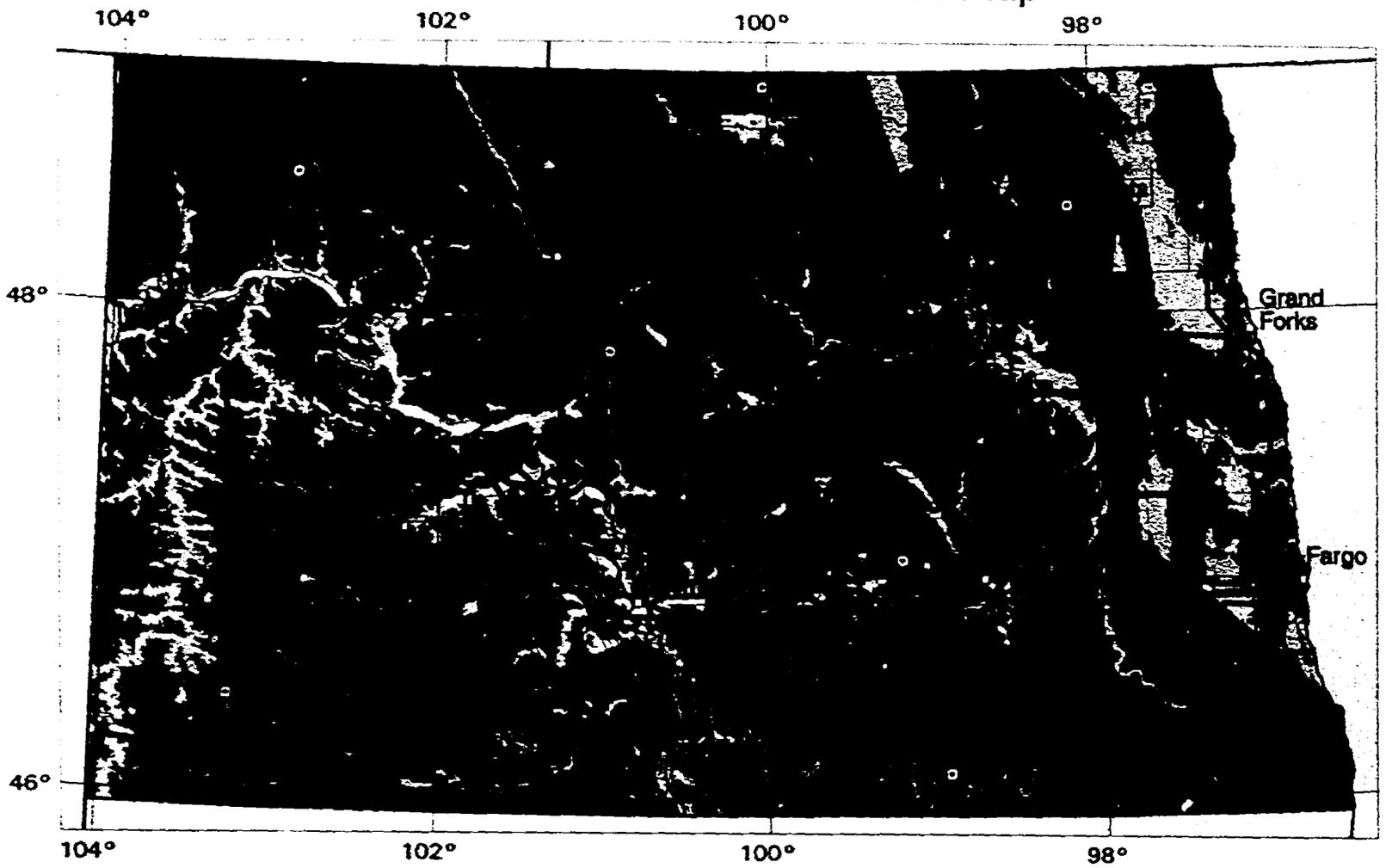
New technologies need governmental support through research and incentives to give them momentum to grow. In the energy industry, much progress must be credited to good public policy and government incentive. Many of our members want access to renewable energy. The Basin Electric board of Directors, in recognition of growing interest in renewable energy recently approved a wind power development program. Our program will give our members access to wind power either through outside sources or by helping install equipment for groups of cooperatives.

In January Basin Electric was awarded the first-ever loan guarantee for wind energy from the Rural Utilities Service. That loan-guarantee will be used to finance the construction of up to three turbines. The electricity generated from those turbines will be distributed throughout the Basin Electric service area. Several of member cooperatives in North Dakota have already initiated plans to provide their consumers with an option to purchase wind energy.

Where will wind energy go? We don't know for sure, but we do feel it is important to evaluate it, and the incentives proposed for the state along with the efforts of Basin Electric and its members is a good place to start. Similar legislation has also been passed in South Dakota.

Basin Electric and its members have always been advocates of sound environmental stewardship and progressive alternate energy research. The development of wind energy and is in keeping with that heritage.

North Dakota - Wind Resource Map



Wind Power Classification

Wind Power Class	Resource Potential	Wind Power Density at 50 m W/m²	Wind Speed[a] at 50 m m/s	Wind Speed[a] at 50 m mph
2	Marginal	200 - 300	5.6 - 6.4	12.5 - 14.3
3	Fair	300 - 400	6.4 - 7.0	14.3 - 15.7
4	Good	400 - 500	7.0 - 7.5	15.7 - 16.8
5	Excellent	500 - 600	7.5 - 8.0	16.8 - 17.9
6	Outstanding	600 - 800	8.0 - 8.8	17.9 - 19.7

[a] Wind speeds are based on a Weibull k value of 2.0

- WAPA Study Site
- City or Town
- Empowerment Zone

40 0 40 80 120 160 Kilometers
25 0 25 50 75 100 Miles

Transmission Line Voltage

- 69 Kilovolts
- 115 Kilovolts
- 230 Kilovolts
- 345 Kilovolts
- Under Construction

Indian Reservations

1. Turtle Mountain
2. Devil's Lake Sioux
3. Lake Traverse
4. Standing Rock
5. Fort Berthold

U.S. Department of Energy
National Renewable Energy Laboratory

NREL

Benefits of Wind Development In North Dakota

By Jay Haley
EAPC Architects Engineers
Grand Forks, ND
3-14-01

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Wind development also results in increased tourism. People will travel a long way to see a wind farm. Communities in southern Minnesota and northern Iowa have experienced a distinct increase in business volume for hotels, motels, restaurants, gas stations, convenience stores, hardware stores, lumber yards, and cement plants.

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