## Potential Carbon Dioxide Capture, Compression and Sequestration Costs for Electric Customers of Investor Owned Utilities in North Dakota And Update on Recent Siting Activities of the Commission

Presented by: Commissioner Kevin Cramer

**Public Service Commission** 

Before: Energy Development and Transmission Committee

Senator Rich Wardner, Chairman

Date: 5 August 2008

#### **TESTIMONY**

Mr. Chairman and members of the committee, I am Kevin Cramer speaking on behalf of the North Dakota Public Service Commission. I am here to address two topics:

- Potential carbon dioxide capture, compression and sequestration costs for electric customers of investor owned utilities in North Dakota
- Provide a short update on recent siting activities of the Public Service Commission related to crude oil pipelines, proposed wind projects; and transmission siting

# Potential Carbon Dioxide Capture, Compression and Sequestration Costs for Electric Customers of Investor Owned Utilities in North Dakota

First I would like to emphasize that this is a complex topic. The information I am going to share is preliminary due to the fact no carbon dioxide legislation has been passed on the federal level. However a number of states in the country have passed this type of legislation so there are models you can study.

#### Some of the key issues, which also will determine potential costs are:

- Should carbon dioxide emissions be capped at the level which occurred in a particular year (example 1990) and should a trading market be established for carbon credits? (Cap and Trade)
- What will be the cost for carbon credits? If a market is established, the cost for carbon credits will vary with the market price, but the cost to consumers will depend, for example, on whether the market price is \$40 per ton of CO2 or higher or lower.
- Should there be a federal carbon tax on each kwh of electricity produced?

- How should the money which is collected via the carbon tax be used? Should a portion of the money be returned to some or all ratepayers via credits to help offset anticipated rate increases? Should a portion of the money be used for enhanced technology development which could help lower carbon capture and sequestration costs? Should a portion of the money be used for funding activities to hold down usage of electricity (demand side management and energy conservation activities)? Even if the money is collected by the federal government, should a portion of the tax money be given back to each state to determine how best to use the tax dollars?
  - What is the scope of the program? The Antelope Valley Power Plant near Beulah which produces 900 mw of electricity, produced 8.7 million tons of carbon dioxide emissions in 2006. For example, if every kwh of electricity is assessed a carbon tax of .00043 which is paid to the federal government, this plant alone would need to pay a tax of over three million dollars per year. Or, at \$40 per ton of carbon dioxide for carbon credits, (in a cap and trade program) carbon credits might cost the Antelope Valley Power Plant \$156 million per year, assuming they have 55% of the cost covered by offsets or credits. These costs would be passed through to customers. Multiply

either number times all of the potential electric generation plants using natural gas or coal, and you can begin to understand the huge amounts of money these concepts involve.

THESE ARE JUST A FEW OF THE ISSUES BEING CONSIDERED WHICH WILL DETERMINE COST OF CARBON CAPTURE LEGISLATION TO END USE CUSTOMERS.

What other factors will affect how costly proposed carbon legislation is for the electric customers of Investor Owned Utilities in North Dakota?

Every utility in North Dakota has its own mix of resources from which it generates electricity. NSP's resource mix includes nuclear, coal, natural gas, wind, hydro and biofuels. MDU's resource mix includes coal, natural gas and wind. Otter Tail's resource mix includes coal, wind, natural gas, and hydro. Carbon taxes could be assessed on all electric generation sources that are carbon rich, such as coal and natural gas.

What if North Dakota investor owned utilities capture and sequester the carbon dioxide rather than pay a tax on kwh sales? How much will this cost?

As you know, Basin Electric Power Cooperative has been capturing carbon dioxide at the coal gasification plant and sending it by pipeline to be

used for enhanced oil recovery. Technology to capture carbon dioxide from electric power plants is still being developed. There is a small test going on in Wisconsin and Basin Electric hopes to receive funding for a larger demonstration project. These research projects hope to be able to remove 90% of carbon dioxide. It will take new technology to remove all of the carbon dioxide. Adding all of the equipment to a power plant to remove carbon dioxide could have a high cost.

While some carbon dioxide can be captured and used for enhanced oil recovery most will need to be sequestered in underground storage. Unless a power plant is situated above a storage formation pipelines will need to be built to transport the carbon dioxide. Therefore compressing and injecting carbon dioxide into storage areas and transporting it could add substantial costs.

How will the Public Service Commission deal with projected rate increases?

In the last legislative session you passed House Bill 1221, Rate Adjustment for Environmental Mandates. I have attached a copy of this legislation. This bill provides for "an adjustment of rates to recover jurisdictional capital costs and associated operating expenses incurred by a

public utility to comply with <u>federal</u> environmental mandates on existing electricity generating stations." (emphasis added).

The bill requires the company (1) file a tariff which must meet certain requirements contained in the legislation. The Commission may reject, approve or modify the tariff. Then (2) the Company must file a rate adjustment. (3)The Commission shall approve the rate adjustment unless "the commission determines the rate adjustment does not comply with the tariff, or the incurred costs and expenses to meet federal environmental mandates are not reasonable and prudent."

#### **Update on Recent Siting Activities of the Commission**

I have attached an updated spreadsheet showing siting projects before the Commission. I will briefly review the spreadsheet and take any questions you may have regarding these activities.

This concludes my testimony. I will be happy to answer any questions you may have.

## Sixtieth Legislative Assembly of North Dakota In Regular Session Commencing Wednesday, January 3, 2007

HOUSE BILL NO. 1221 (Representatives Keiser, Delmore, Vigesaa) (Senators Heitkamp, Klein, Wanzek)

AN ACT to create and enact a new section to chapter 49-05 of the North Dakota Century Code, relating to public utility rate adjustments for recovery of costs resulting from federal environmental mandates on existing electricity generating stations.

#### BE IT ENACTED BY THE LEGISLATIVE ASSEMBLY OF NORTH DAKOTA:

**SECTION 1.** A new section to chapter 49-05 of the North Dakota Century Code is created and enacted as follows:

#### Rate adjustment - Federal environmental mandate costs.

- 1. The commission may approve, reject, or modify a tariff filed under section 49-05-06, which provides for an adjustment of rates to recover jurisdictional capital costs and associated operating expenses incurred by a public utility to comply with federal environmental mandates on existing electricity generating stations. For purposes of this section, federal environmental mandates are limited to any requirements under the Clean Air Act, the Clean Water Act, or any other federal law or rule designed to protect the environment. Associated operating expenses are costs incurred by the public utility to comply with the environmental mandate. The tariff must:
  - a. Allow the public utility to recover on a timely basis its investment in capital costs and associated operating expenses incurred to meet federal environmental mandates not reflected in the utility's general rate schedule.
  - b. Allow a return on the public utility's investment made to meet federal environmental mandates at the level approved in the utility's most recent general rate case.
  - c. Provide a current return on construction work in progress to meet federal environmental mandates provided the cost recovery from retail customers of the allowance for funds used during construction is not sought through any other means.
  - d. Terminate cost recovery after the public utility's costs and expenses to meet federal environmental mandates have been recovered fully or have been reflected in the utility's general rate tariffs.
- 2. Rate adjustments filed under the tariff must be accompanied by:
  - <u>a.</u> A description and quantification of the costs and expenses incurred by the public utility to meet federal environmental mandates which are subject to recovery;
  - b. A schedule for implementation of the applicable projects; and
  - <u>c.</u> <u>Calculations to establish that the rate adjustment is consistent with the terms of the tariff.</u>
- 3. Upon receipt of a rate adjustment filed under the tariff, the commission shall approve the rate adjustment to become effective unless, after notice and opportunity for hearing and comment, the commission determines the rate adjustment does not comply with the tariff or the incurred costs and expenses to meet federal environmental mandates are not reasonable and prudent. The commission may order the expenses of investigating rate

adjustments to meet federal environmental mandates under this section be paid by the public utility in accordance with section 49-02-02. The public utility has the burden of proving that the rate adjustment complies with the tariff and that the costs and expenses incurred to meet federal environmental mandates are reasonable and prudent.

S	peaker of t	he Hous	Se		President of the Senate			
C	hief Clerk o	of the Ho	ouse		Secre	etary of the S	Senate	
This certifies t Assembly of N	hat the wit orth Dakot	thin bill a and is	originated known on	in the I	House of Re ords of that b	presentative ody as Hou	es of the Sixtieth Lose Bill No. 1221.	
House Vote:	Yeas	78	Nays	16	Absent	0		
Senate Vote:	Yeas	43	Nays	1	Absent	3		
Received by th	ie Governo	r at	M. (	on		Clerk of the	House , 2007.	
Approved at	M	l. on					, 2007.	
					Gover	nor		
Filed in this offi	ice this		day of		W-T01-1		, 2007,	
at o	'clock	M.						
					Secre	tary of State		

## Recent Electric Siting Projects before the Public Service Commission August 5, 2008

#### **Eastern North Dakota:**

Case No. PU-07-759: Northern States Power Company

Fargo-Monticello 345 kV Cap-X Electric Transmission Line – approximately 250 miles long in Cass and possibly Richland Counties.

Letter of Intent received Nov 2007 and acknowledged in December 2007.

#### Southeast North Dakota:

Case No. PU-08-375: FPL Energy, LLC 150 MW Wind Farm in Dickey County

• Letter of Intent received June 2008 and acknowledged July 2008. Awaiting Application.

#### West Central North Dakota:

Case No. PU-08-400: FPL Energy, LLC

1,000 MW Wind Farm in Oliver and Morton Counties

Letter of Intent received June 2008 and acknowledged July 2008. Awaiting Application.

#### Valley City Area

<u>Case No. PU-08-32: Ashtabula Wind, LLC</u> (a subsidiary of FPL Energy LLC) 200 MW Wind Farm in Barnes County.

Site Certificate issued May 30, 2008. Under Construction.

#### Case No. PU-08-73: Ashtabula Wind, LLC

Ashtabula to Pillsbury 230 kV Electric Transmission Line -, approximately 9.5 miles long in Barnes County.

• Route Permit issued May 30, 2008. Under Construction.

#### Case No. PU-08-34: M-Power, LLC

150 MW Laverne Wind Farm in Griggs and Steele Counties.

Continued hearing scheduled August 25, 2008 in Cooperstown.

#### Case No. (docket pending): M-Power, LLC

M-Power to Laverne 230 kV Transmission Line – approximately 13 miles long in Barnes and Steele Counties.

Hearing held July 28, 2008 in Cooperstown. Decision pending.

#### Case No. PU-08-48: Minnkota Power Cooperative

Pillsbury to Maple River 230 kV Electric Transmission Line – approximately 61.6 miles long in Barnes, Cass and Steele Counties.

Route Permit issued June 6, 2008 and amended July 14 was appealed to District Court.
 Under Construction.

#### Case No. PU-07-54: Just Wind - Wind Farm Development

150 MW wind farm in Logan County.

Letter of Intent received February 2007. Partial application received June 2007.

#### Southwest North Dakota

Case No. PU-07-169: Basin Electric Power Cooperative, Inc.

Belfield to Rhame 230 kV Electric Transmission Line – approximately 74 miles long in Stark, Hettinger, Slope and Bowman Counties.

• Hearing held July 29, 2008 in New England. Decision pending.

#### Case No. PU-08-46: Crown Butte Wind Power LLC

200 MW Wind Farm in Adams and Bowman Counties.

Letter of intent received and acknowledged February 08. Awaiting application.

### <u>Case No. PU-08-52: South Heart Coal LLC</u> (a subsidiary of Great Northern Power Development)

Coal to synthetic natural gas production facility in Stark County, near South Heart.

Letter of Intent received in January 2008. Awaiting application.

#### Case No. PU-07-516: Westmoreland Power, Inc.

500 MW Gascoyne Generating Station in Bowman County.

Letter of Intent received in July 2007 and acknowledged in August.

#### Northeast North Dakota

<u>Case No. PU-07-722: Langdon Wind, LLC</u> (a subsidiary of FPL Energy, LLC) 40 MW wind farm expansion in Cavalier County.

• Site Permit issued May 7, 2008. Under Construction.

#### **Northwest North Dakota**

Case No. PU-07-671: Basin Electric Power Cooperative, Inc.

Williston to Tioga 230 kV Electric Transmission Line – approximately 50 miles, Williams County.

Letter of Intent received and acknowledged in September 2007. Awaiting application.

#### Case No. PU-08-75: Prairie Winds ND1 (a subsidiary of Basin Electric)

150 MW wind farm in Ward County - southwest of Minot.

 Letter of Intent received February 2008 and acknowledged in March 2008. Awaiting application.

#### Case No. PU-08-597: Hartland Wind Farm, LLC

2,000 MW Wind Farm in Ward, Burke & Mountrail Counties

Letter of Intent received July 2008.

Company Type		Letter of Intent	LOI Acknowleged	Route/Site Application	Route/Site Order	Description		imated Cost
South Heart Coal LLC (a subsidiary of Great Northern Power Development)	Coal Beneficiation Facility	23-Jan-08		Awaiting		100 million cubic feet per day (MMSCFD) coal-to-synthetic natural gas manufacturing plant nea South Heart, Stark County.		1,400,000,000
	TOTAL ESTIMATED INVESTMENT - COAL BENEFICIATION FACILITY		TOTAL ESTIMATED INVESTMENT - COAL BENEFICIATION FACILITY	\$ 1	\$ 1,400,000,000			
Westmoreland Power, Inc.	Generating Station	20-Jul-07	8-Aug-07	Awaiting		500 MW Gascoyne Generating Station in Bowman County.	\$	900,000,000
						TOTAL ESTIMATED INVESTMENT - GENERATING STATION	\$	900,000,000
Plains All American Pipeline LP	Pipeline	30-Jun-08	16-Jul-08	Awaiting		6-inch, 33-mile, 10,000 barrel per day crude oil pipeline connecting its Kildeer Gathering System and its Dickinson Gathering System (a point on its existing 6-inch ppipe 2 miles northwest of Dickinson). Pumps to be located at the current Kildeer Station.	\$	16,000,000
Enbridge Pipelines (North Dakota) LLC	Pipeline	19-Dec-07	16-Jan-08	20-Feb-08	4-Jun-08	Pump station upgrades: Alexander Station and Trenton Station, Portal System Pump station upgrades: Beaver Lodge Station and Stanley Station. Portal System Pump station upgrades: Blaisdell Station, Denbigh Station, Penn Station, and Larimore Station. Portal System Pump station upgrades: Minot Station, Pleasant Lake Station, and Bartlett Station. Portal System	\$	119,700,000
Enbridge Pipelines (North Dakota) LLC	Pipeline	9-Aug-07	13-Aug-07	9-Aug-07	19-Sep-07	Amendment of Route Permit 49 to construct an 8-inch crude petroleum pipe segment approximately 350 feet north and around Garden Valley Elementary School within the S1/2 of Section 36, Township 156 North, Range 101 West, Williams County. Approximately 1600 feet of pipe will be abandoned in-place as a follow-up to the reroute. <b>Portal System</b>	\$	500,000
Belle Fourche Pipeline Company	Pipeline	2-Aug-07	8-Aug-07	18-Sep-07	09-Nov-07 and 18-Jan- 08	31.3 miles, 8-inch, crude petroleum pipeline paralleling the existing 6-inch line from Bowline Field to a connection point with Enbridge Pipelines (North Dakota) LLC near Alexander (McKenzie County) [increasing capacity of the system from 10,000 bb/day to 30,000 bb/day. Project called the Alexander 8-inch Crude Oil Loop [Belle Fourche Pipeline]	\$	10,200,000
Dakota Gasification Company	Pipeline	7-May-07	16-May-07	11-May-07	27-Jun-07	Reconstruct a portion of its <b>CO2 pipeline</b> across Lake Sakakawea. 11,400 feet, 14-inch OD, 2,700 psig. The abandoned portion of the original pipeline will be removed from the lakebed.	\$	10,500,000
Enbridge Energy, Limited Partnership	Pipeline	16-Mar-07	21-Mar-07	16-Jul-07	31-Dec-07	1,000 miles, 36-inch liquid petroleum pipeline from Hardisty, Alberta, Canada to Superior WI, 325 miles in the US, 28 miles in embina County ND parallel to existing pipelines. [Alberta Clipper Pipeline] Lakehead System	\$	63,500,000
Enbridge Pipelines (Southern Lights) L.L.C.	Pipeline	22-Feb-07	7-Mar-07	16-Apr-07	31-Dec-07	313 miles, 20-inch OD crude oil pipeline parallel to existing pipelines, extending from Cromer, Manitoba to Clearbrook MN tankage facilities; approx 28 miles in ND in Pembina County ND [LSr Pipeline] Lakehead System	\$	31,528,809

	Туре	Letter of Intent	LOI Acknowleged	Route/Site Application	Route/Site Order	Description		timated Cost
	Pipeline	22-Sep-06		11-Apr-07	21-Feb-08; 23-May-08; 30-May-08; 19-Jun-08; 02-Jul-08	new 1,830-mile, 30-inch, 435,000 bbl/day [217 miles in ND] crude petroleum pipeline in Pembina, Cavalier, Walsh, Nelson, Steele, Barnes, Ransom, and Sargent Counties from the Western Canadian crude oil supply hub near Hardisty, Alberta, Canada to existing terminals in Wood River and Patoka IL and maybe Cushing OK.	\$	277,000,000
Enbridge Pipelines (North Dakota) LLC	Pipeline	4-Aug-06	9-Aug-06	4-Aug-06	20-Sep-06	new Blaisdell, Denbeigh, Penn, Larimore crude oil pump stations. Portal System	\$	16,925,000
Enbridge Pipelines (North Dakota) LLC	Pipeline	26-Jul-06	28-Jul-06	26-Jul-06	20-Sep-06	Trenton to Beaver Lodge Line Loop adjacent to and parallel to existing crude oil pipeline in Williams County. Portal System	\$	25,122,200
Enbridge Pipelines (North Dakota) LLC	Pipeline	19-Jul-06	26-Jul-06	19-Jul-06	23-Aug-06; 12-Oct-06	Pump station upgrades: Alexander Station and Trenton Station, Portal System  Upgrade the existing Beaver Lodge and Stanley Crude oil pump stations. Portal System	\$	16,450,000
Enbridge Pipelines (North Dakota) LLC	Pipeline	3-May-05	24-May-05	3-May-05	28-Jul-05	upgrade Alexander Station and Trenton Station, construct new East Fork pump station [crude oil pump stations on the exstng line]. Portal System	\$	3,200,000
Plains Pipeline, L.P.	Pipeline	28-Mar-05	6-Apr-05	26-Jul-05	22-Nov-05	the Buford Expansion: a 10-inch crude oil pipeline beginning approximately 11 miles southwest of the city of Williston in Section 30, Township 152 North, Range 104 West, McKenzie County, at the Montana/North Dakota border and extending northeast approximately 2.75 miles to the Southwest Quarter of Section 16, Township 152 North, Range 104 West, Williams County, just south of the Fort Buford Historic Site. Trenton Pipeline System: McKenzie County, Williams County.	\$	1,500,000
Plains Pipeline, L.P.	Pipeline	28-Jan-05	6-Apr-05	20-Jun-05	5-Oct-05	the Trenton Expansion: a 10-inch crude oil pipeline beginning at an intersection with Plains' existing pipeline in the SW 1/4 of Section 10, T153N, R102W and extending approximately 2.3 miles northeast, and an additional 1000 feet of 6-inch pipe continuing to Section 3, T153N, R102W where it intersects with an existing segment of dual 4-inch pipe. Trenton Pipeline System: McKenzie County, Williams County	\$	1,500,000
Cenex Pipeline LLC	Pipeline	30-Oct-02	5-Nov-02	30-Oct-02	4-Dec-02	479 feet of 8-inch outside diameter pipeline beginning at a point on Cenex's existing pipeline and extending easterly for approximately 295 feet then northerly for approximately 184 feet to rejoin the existing pipeline, all within the NW ¼ of the SW ¼ of Section 33, T 140 N, R 49 W	\$	15,000
Dakota Gasification Company	Pipeline	5-Jan-96	7-Feb-96	29-Jan-98	L.	167 mile, 14 and/or 12 inch CO2 pipeline and a compressor station from DGC's Synfuels Plant located 6 miles NW of Beulah proceeding W to a point N of Dunn Center and then NW around the Killdeer Mountains and across the Little Missouri River. It then generally proceeds N under Lake Sakakawea through portions of McKenzie, Williams and Divide Counties, North Dakota. At a point south of Noonan, North Dakota, the route angles to the northwest to the Canadian border just north of Crosby	\$	40,000,000
						TOTAL ESTIMATED INVESTMENT - PIPELINES	\$	633,641,009
И-Power, LLC	Transmission Line	4-Mar-08	26-Mar-08	21-May-08		230 kV transmission line - approximately 13 miles long in Barnes and Steele Counties.	\$	4,550,000

Company	Туре	Letter of Intent	LOI Acknowleged	Route/Site Application	Route/Site Order	Description	Estimated Cost	
Ashtabula Wind, LLC	Transmission Line	20-Feb-08	27-Feb-08	24-Mar-08	30-May-08	Ashtabula to Pillsbury 230 kV Electric Transmission Line - approximately 9.5 miles long	\$	3,000,000
Minnkota Power Cooperative	Transmission Line	5-Feb-08	13-Feb-08	18-Mar-08	6-Jun-08 and 14-Jul-08	Pillsbury to Maple River 230 kV electric transmission line - approximately 61.6 miles lon in Barne Cass and Steele Counties. Was appealed to District Count. Under Construction.		29,000,000
Northern States Power Company	Transmission Line	14-Nov-07	14-Dec-07	Awaiting		Fargo-Monticello 345 kV Cap-X Electric Transmission Line - approximately 250 miles long in Cass and possibly Richland Counties.	\$	390,000,000
Basin Electric Power Cooperative, Inc.	Transmission Line	13-Sep-07	19-Sep-07	Awaiting		Williston to Tioga 230 kV electric transmission line - approximately 50 miles long in Williams County. Awaiting application.	\$	20,500,000
Basin Electric Power Cooperative, Inc.	Transmission Line	26-Apr-07	25-Jul-07	18-Apr-08		Belfield to Rhame 230 kV electric transmission line - approximately 74 miles long in Stark, Hettinger, Slope and Bowman Counties. Hearing held 7/29/08 in New England. Decision pending.	\$	33,000,000
						TOTAL ESTIMATED INVESTMENT - TRANSMISSION LINES	\$	480,050,000
Hartland Wind Farm, LLC	Wind Farm	21-Jul-08		3		2,000 MW wind farm in Ward, Burke and Mountrail Counties.	\$ 4	1,000,000,000
FPL Energy, LLC	Wind Farm	26-Jun-08	2-Jul-08	Awaiting		1,000 MW Wind Farm in Oliver and Morton Counties		2,000,000,000
FPL Energy, LLC	Wind Farm	23-Jun-08	2-Jul-08	Awaiting		150 MW Wind Farm in Dickey County	Ś	300,000,000
Prairie Winds ND1 (a subsidiary of Basin Electric)	Wind Farm	21-Feb-08	12-Mar-08	Awaiting		150 MW wind farm in Ward County, southwest of Minot. Awaiting application.	\$	240,000,000
Crown Butte Wind Power, LLC	Wind Farm	4-Feb-08	13-Feb-08	Awaiting		200 MW wind farm in Adams and Bowman Counties. Awaiting application.	\$	350,000,000
M-Power, LLC	Wind Farm	17-Jan-08	27-Feb-08	16-May-08		150 MW wind farm in Griggs and Steele Counties. First hearing held 7/28/08. Continued hearing scheduled 8/25/08 in Cooperstown.	\$	300,000,000
Ashtabula Wind, LLC	Wind Farm	14-Jan-08	30-Jan-08	24-Mar-08	30-May-08	200 MW Wind Farm in Barnes County	\$	350,000,000
Langdon Wind, LLC (a subsidiary of FPL Energy, LLC)	Wind Farm	15-Oct-07	24-Oct-07	5-Feb-08	7-May-08	40 MW wind farm expansion in Cavalier County. Under construction.	\$	73,000,000
Just Wind - Wind Farm Development	Wind Farm	8-Feb-07	23-Feb-07	1-Feb-08		150 MW wind farm in Logan County. Partial application submitted February 1, 2008.	\$	285,000,000
						TOTAL ESTIMATED INVESTMENT - WIND FARMS	\$ 7	,898,000,000