BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF COLORADO

Docket No. 11A-917E

IN THE MATTER OF THE APPLICATION OF PUBLIC SERVICE COMPANY OF COLORADO FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY FOR THE HAYDEN EMISSIONS CONTROL PROJECT

ANSWER TESTIMONY

OF

LESLIE GLUSTROM

FEBRUARY 10, 2012

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This testimony has been written with a short lead time and this week Ms. Glustrom's father has been in intensive care for serious heart problems, so she apologizes in advance for the roughness in the writing and organization of this testimony.

LIST OF EXHIBITS

Exhibit 1
Data on Xcel's Coal Plants from Clean Air Clean Jobs
Discovery Response LWG 1-6, Docket 10M-245E

Exhibit 2
Background Information on the Hayden Coal Plants
Discovery Request LWG 4-7, Docket 11A-917E

Exhibit 3
Italic for Description
Regular Font for source

Exhibit 4
Italic for Description
Regular Font for source

Exhibit 5
Limon and Limon II Wind Farm Prices
Exhibit KJH-2 (Xcel Witness Kurt Haeger), Docket 11A-689E

Exhibit 6
2004 Colorado Coal Production by Mine Description
From Division of Minerals and Geology, Colorado Department of Natural Resources

Exhibit 7
2010 Colorado Coal Production by Mine Description
From Division of Reclamation, Mining and Safety, Colorado Department of Natural Resources

Exhibit 8
Boulder 2010 Load by Day and Hour
Provided to the City of Boulder by Xcel

Exhibit 9
Xcel Energy Letter to City of Boulder on Stranded Cost Obligation
June 3, 2011 Letter from Bill Dudley, Assistant General Counsel, Xcel to Thomas A. Carr , Boulder City Attorney

Exhibit 10
Table and Worksheets from Xcel Regarding Boulder Stranded Cost Estimate
Provided to the City of Boulder from Xcel, Summer 2011

Exhibit 11
2011 (Through September) Colorado Coal Production by Mine Description
From Division of Reclamation, Mining and Safety, Colorado Department of Natural Resources

Exhibit 12
Public Service of Colorado DSM Costs Actual Achievements 2006 and 2007
Exhibit 150, Docket 07A-447E, Colorado PUC

Exhibit 13
2006 Xcel No Analysis of Coal Supplies
RUC 2-10 (g), Docket 06S-234EG (From Hearing Exhibit 118)

Exhibit 14
Hayden Carbon Dioxide Emissions 2012 to Retirement
Xcel Response to Glustrom Request 8-12, Docket 11A-917E, Colorado PUC

Exhibit 15
Xcel Coal Costs are Estimates; Will Not Accept Limit on Cost Recovery for Coal Costs
Xcel Response to Glustrom Request 1-20 and 1-21, Docket 11A-917E, Colorado PUC

Exhibit 16
2008 Xcel No Analysis of Coal Supplies
LWG 5-12, Docket 07A-447E

Exhibit 17
2008 Xcel Projection of Coal Costs
Xcel Response to LWG1-4, Docket 07A-447E, Colorado PUC

Exhibit 18
2011 Xcel Coal Costs
Xcel Response to LWG 1-7, Docket 11A-869E, Colorado PUC

Exhibit 19
Coal Costs by State 2004-2009
Data from Electric Power Monthly, Table 4.10B (Energy Information Administration

I. INTRODUCTION AND SUMMARY

Q: PLEASE STATE YOUR NAME, ADDRESS AND CONTACT INFORMATION

A: My name is Leslie Glustrom. I live at 4492 Burr Place, Boulder, Colorado. My phone number is 303-245-8637 and my e-mail address is lglustrom(at)gmail.com.

Q: ARE YOU AN XCEL RATEPAYER AND HAVE YOU PARTICIPATED IN OTHER COLORADO PUC DOCKETS?

A: Yes, I am an Xcel ratepayer and I have been or I am an intervenor and active participant in the following dockets at the Colorado PUC:

05A-072E Comanche-Daniels Park Transmission
07A-107E/07A-196E 2013 Contingency Plan/Tri-State Gas Contracts
07A-421E Pawnee-Smoky Hill Transmission
07A-521E Interruptible Service Option Credit
07A-447E Xcel 2007 Resource Plan
07A-469E Fort St. Vrain Turbines
08S-520E Xcel 2009 Rate Increase
09AL-299E Xcel 2010 Rate Increase
09A-772E Xcel 2010 Renewable Energy Compliance Plan and Windsource
10A-124E Smart Grid Certificate of Public Convenience and Necessity
10M-245E "Clean Air Clean Jobs" Coal Plant Retirement or Retrofitting
10A-377E Xcel Amendment to the 2007 Resource Plan
11A-135E Restart of Xcel's Solar Rebate Program
11A-325E Pawnee Emission Control Project
11A-418E Xcel 2012 Renewable Energy Compliance Plan
11A-833E Xcel Windsource Revisions
11A-869E Xcel 2011 Resource Plan
11A-917E Hayden Emission Control Project
11AL-947E Xcel Rate Increase

In addition, I have followed many other Colorado PUC dockets related to Xcel and have read much of the testimony and many of the decisions in these other dockets.

Q: HAVE YOU ATTACHED A COPY OF YOUR QUALIFICATIONS AND BACKGROUND? A: Yes, Attachment A is a summary of my background and qualifications.

Q: PLEASE SUMMARIZE THE PURPOSE OF YOUR TESTIMONY.

A: The primary purpose of my testimony is to provide a public record of what is known about the current and future costs of the decision to add emission controls to the Hayden coal plant and to argue that it will be a mistake to add these pollution controls to aging coal plants for a wide variety of reasons.

Hayden is a two-unit 446 MW coal plant near the town of Hayden, west of Steamboat Springs, Colorado. Xcel owns 135 MW of Unit 1 which was commissioned in 1965 and 98 MW of Unit 2 which was commissioned in 1976.

The Colorado PUC is presently facing the consequences of having ignored the data that was repeatedly entered into the record regarding the excess capacity on Xcel's system and the result has been a significant rate increase for Black Hills customers (11L-382/387E)—and a request for a significant rate increase for Xcel customers (Docket 11AL-947E).

If the Commission continues to ignore the data that has been repeatedly entered into the record—as happened with the case of excess capacity- then the Commission and Xcel's Colorado ratepayers will be paying the price for many years to come of the clearly non-economic decisions to make large investments in old coal plants such as the Hayden plants

Hayden Unit 1 is now 46 years old and Hayden Unit 2 is 35 years old. For the reasons explained below, it would be a bad investment for ratepayers to spend money on these aging coal plants. Given the large amount of excess capacity on Xcel's system as well as an assessment of the full costs of maintaining these aging plants in operation for another 18-23 years, it would be

the better solution to retire these coal plants and then invest the money in 21st century demand and supply side solutions.

It is widely known that the addition of pollution controls to these plants was part of the (unwritten) Clean Air Clean Jobs "deal"—but if the Commission continues to cover its eyes and ignore the full impact of this decision on ratepayers, the Commission will be abrogating its fundamental duty to protect the ratepayers and to ensure that rates are "just and reasonable."

Allowing Xcel's faulty modeling and projection of coal costs to once again go unchallenged while forcing ratepayers to pay all the costs of operating these plants (including the opportunity costs of not investing in cleaner alternatives) will be to do a serious disservice to present and future ratepayers—to say nothing of the planet and Colorado's air and water resources.

II. BACKGROUND ON THE HAYDEN PLANTS

Q: PLEASE SUMMARIZE WHAT WE KNOW ABOUT THE SIZE AND HISTORY OF THE HAYDEN COAL PLANTS.

A: Information on Xcel's coal plants is provided in Exhibits LWG-1 and LWG-2. It is summarized below for the Hayden 1 and Hayden 2 plants.

Table LWG-1
Summary Data for the
Hayden 1 and Hayden 2 Coal Plants

Unit	Date Comm-issioned	Total MW	Xcel's % Share	MW Owned by	Age as of 2012	Expected Retirement Date	Original Cost (Using	Net Plant Value for Xcel as of December 31,

				Xcel		**(Age at retirement)**	**Exhibit LWG-2)[1]**	**2011 (Using Exhibit LWG-2)**
Hayden 1	1965	184 MW	75.5%	139MW	46 years old	2030[2] (65 years old)	$87.8 million	$27.4 million
Hayden 2	1976	262 MW	37.4%	98 MW	35 years old	2036 (60 years old)	$118.9 million	$63.8 million

As can be seen from Table LWG-1, Hayden 1 is presently 46 years old and Hayden 2 is 35 years old. [3]As discussed below, these aging coal plants will need on-going capital investments to keep them operational in the coming years.

In this 11A-917E docket, Xcel has stated they intend to operate the Hayden 1 plant until 2030,[4] while in the 10M-245E Clean Air Clean Jobs Docket, Xcel indicated they only intended to operate the Hayden plant until 2025. (See Exhibit LWG-1, Part 2, Spreadsheet)

III. XCEL'S PROPOSAL FOR THE HAYDEN PLANTS

Q: PLEASE SUMMARIZE XCEL'S PROPOSAL IN THIS DOCKET FOR THE HAYDEN COAL PLANTS.

A: Xcel's Application in this asks the Commission to grant a Certificate of Public Convenience and Necessity ("CPCN") for installation of Selective Catalytic Reduction ("SCR") for control of emissions on nitrogen oxides ('NOx") on Hayden 1 and Hayden 2. The Hayden 1 SCR would be installed by 2015 and the Hayden 2 SCR by 2016. The expected cost of the project is $164.9

[1] There are discrepancies between Exhibit LWG-1 and LWG-2 with respect to the initial capital investment for the Hayden coal plants. Table LWG-1 uses the information f rom Exhibit LWG-2.
[2] The fact that Xcel intends to operate the Hayden 1 plant until 2030 was provided in the corrected response to Discovery Request LWG 2-11, provided on January 4, 2011.
[3] As discussed on page 76, lines 13-21 of the Direct Testimony of Xcel Witness Karen Hyde in the 11A-947E rate increase docket, Xcel acquired ownership interests in the Hayden coal plants as a result of the 1992 Colorado Ute Electric Association bankruptcy.

[4] The fact that Xcel intends to operate the Hayden 1 plant until 2030 was provided in the corrected response to Discovery Request LWG 2-11, provided on January 4, 2011.

million of which about $90 million would be Xcel's share.[5] Xcel's projected share of the cost for Unit 1 is $55.8 million and for Unit 2 is $34 million.[6]

As can be seen from Table LWG-1, above, the $55.8 million that would be spent for the SCR on Hayden 1 would approximately triple the value of the plant which currently has a net value of only about $27.4 million. In the case of Hayden 2, the relative cost of the SCR to Xcel's share of the plant is not quite as large, but $34 million is still over half of the present net value of the plant.

IV. COST IMPACTS OF XCEL'S PROPOSAL

Q: PLEASE SUMMARIZE THE COST IMPACTS OF XCEL'S PROPOSAL FOR THE HAYDEN COAL PLANTS

A: There is a host of likely cost impacts of Xcel's proposal for the Hayden coal plants including (but not limited to) the following:

- "Return of" the capital investment
- "Return on" the capital investment
- Coal Cost and Supply Issues
- Increased Fixed Operating and Maintenance ("FOM") costs
- Increased Variable Operating and Maintenance ("VOM") costs
- Capital expenditures to maintain aging coal plants
- Possible increased costs due to more stringent environmental controls
- Possible costs related to carbon dioxide emissions

[5] See Xcel's Application in this 11A-917E docket, pages 3-4.
[6] See Xcel's Application in this 11A-917E docket, page 5.

Each of these cost impacts will be discussed below and then will be followed by an analysis of Xcel's claim related to the costs

A."Return of" the capital investment

The obvious cost impact of Xcel's proposal for the Hayden plant is that Xcel's ratepayers will be expected to pay the "return of" the capital investment of approximately $89.8 million ($55.8 million for Unit 1 and $34 million for Unit 2, as discussed above.)

B."Return on" the capital investment

After making a capital investment, Xcel expects to recover not just that capital investment, but also a "return on" that investment which is typically Xcel's weighted average cost of capital ("WACC") times the capital investment.

Xcel's analysis of the rate impact of the "return on" investment is found in Exhibit LWG-3.

C.Coal Cost and Supply Issues

1. Xcel Has Acknowledged the Clean Air Clean Jobs Coal Estimates Were Wrong

Xcel witness Susan Arigoni has acknowledged that the coal cost estimates used in the Clean Air Clean Jobs 10M-245E docket (as provided by the Wood Mackenzie consulting firm) were wrong and she has provided the following updated coal costs on page 12 of her Direct Testimony.

	$/MMBtu	
Year	Wood Mackenzie Forecast	Negotiated Prices
2012	$1.92	$2.19
2013	1.96	2.23
2014	2.02	2.31
2015	1.85	2.36
2016	1.89	2.40
2017	1.98	2.48
2018	1.50	2.53
2019		2.57
2020		2.66
2021		2.71
2022		2.76
2023		2.80
2024		2.85
2025		2.90
2026		2.95
2027		3.01

2. Xcel is Unwilling to Accept a Limit on Future Coal Cost Recovery

In response to discovery questions, Xcel has indicated that the coal cost estimates in Ms. Arigoni's testimony were estimates and that Xcel is unwilling to accept a limit on future cost recovery for coal costs for the Hayden plants. Given Xcel's extremely poor track record on predicting coal costs, as discussed below, there is no reason for the Commission, the parties or Xcel ratepayers to have confidence in Xcel's coal cost estimates as discussed below.

3.Xcel Has a Very Poor Track Record of Predicting Coal Costs

Xcel has a long track record of failing to analyze coal cost and supply issues and of failing to analyze their coal supplies and of failing to accurately project future coal costs. See Exhibits LWG-13 and LWG-16 for Xcel's acknowledgement that they had not conducted any analyses of coal supply in 2006 or 2008.

In 2008, Xcel provided the following projections of future coal costs in the 07A-447E (2007 Resource Plan). See Exhibit LWG-17.

[Rest of page left intentionally blank.]

Year	Nuclear	Coal - Delivered	Natural Gas
2007	$0.50	$1.02	$6.97
2008	$0.57	$1.02	$7.31
2009	$0.74	$1.03	$7.24
2010	$0.95	$1.08	$7.12
2011	$1.14	$1.04	$6.87
2012	$1.24	$1.06	$6.78
2013	$1.30	$1.07	$6.45
2014	$1.27	$1.08	$6.56
2015	$1.20	$1.08	$6.97
2016	$1.14	$1.10	$7.24
2017	$1.09	$1.13	$7.27
2018	$1.07	$1.15	$7.40
2019	$1.07	$1.17	$7.64
2020	$1.08	$1.19	$7.96
2021	$1.11	$1.21	$8.19
2022	$1.13	$1.23	$8.50
2023	$1.17	$1.24	$8.84
2024	$1.20	$1.26	$9.14
2025	$1.23	$1.28	$9.37
2026	$1.27	$1.29	$9.63
2027	$1.30	$1.31	$9.96
2028	$1.34	$1.33	$10.35
2029	$1.39	$1.35	$10.69
2030	$1.42	$1.37	$11.02
2031	$1.46	$1.40	$11.28
2032	$1.51	$1.43	$11.54
2033	$1.55	$1.47	$11.81
2034	$1.56	$1.50	$12.09
2035	$1.61	$1.54	$12.37
2036	$1.66	$1.57	$12.66
2037	$1.71	$1.61	$12.95
2038	$1.75	$1.65	$13.25
2039	$1.80	$1.68	$13.56
2040	$1.85	$1.72	$13.88
2041	$1.90	$1.76	$14.20
2042	$1.95	$1.81	$14.53
2043	$2.01	$1.85	$14.87
2044	$2.06	$1.89	$15.22
2045	$2.12	$1.93	$15.57
2046	$2.18	$1.98	$15.94

From Exhibit LWG-18, Xcel provided that:

> The following are Public Service Company of Colorado's average delivered coal costs for 2011.

2011	Coal Cost ($)	$/MMBtu
PSCo	$ 342,082,971	$ 1.75

As can be seen, the $1.75/MMBTU that Xcel paid for coal in 2011 was a price that in 2008 they projected they wouldn't pay until approximately 2040.

4. Xcel 's Coal Costs Have Been Going Up Over 5% Per Year

As can be seen from the table below, Xcel's coal costs have typically been going up over 5% per year.[7]

Xcel's Coal Cost Escalation for 10M-245E Coal Plants
2005-2009 Average Cost Escalation

(Using Data from Xcel found in Docket 10M-245E, Exhibits LWG 1-3, with Hearing Exhibit 121.[8])

Coal Plant	**2005 Coal Cost** (a)	**2009 Coal Cost** (b)	**% Increase 2005-2009** (b-a)/a x 100 = I	**Average Increase/Year 2005-2009** c/4 = (d)
Arapahoe	$1.01	$1.47	45.54%	**11.39%**
Cherokee	$1.06	$1.86	75.47%	**18.86%**
Hayden	$1.01	$1.41	39.6%	**9.90%**
Pawnee	$0.98	$1.05	7.14%	**1.78%**
Valmont 5	$1.49	$1.99	33.55%	**8.39%**

[7] The apparently low cost escalation for the Pawnee coal plant was discussed at length in Ms. Glustrom's testimony in the 10M-245E docket.

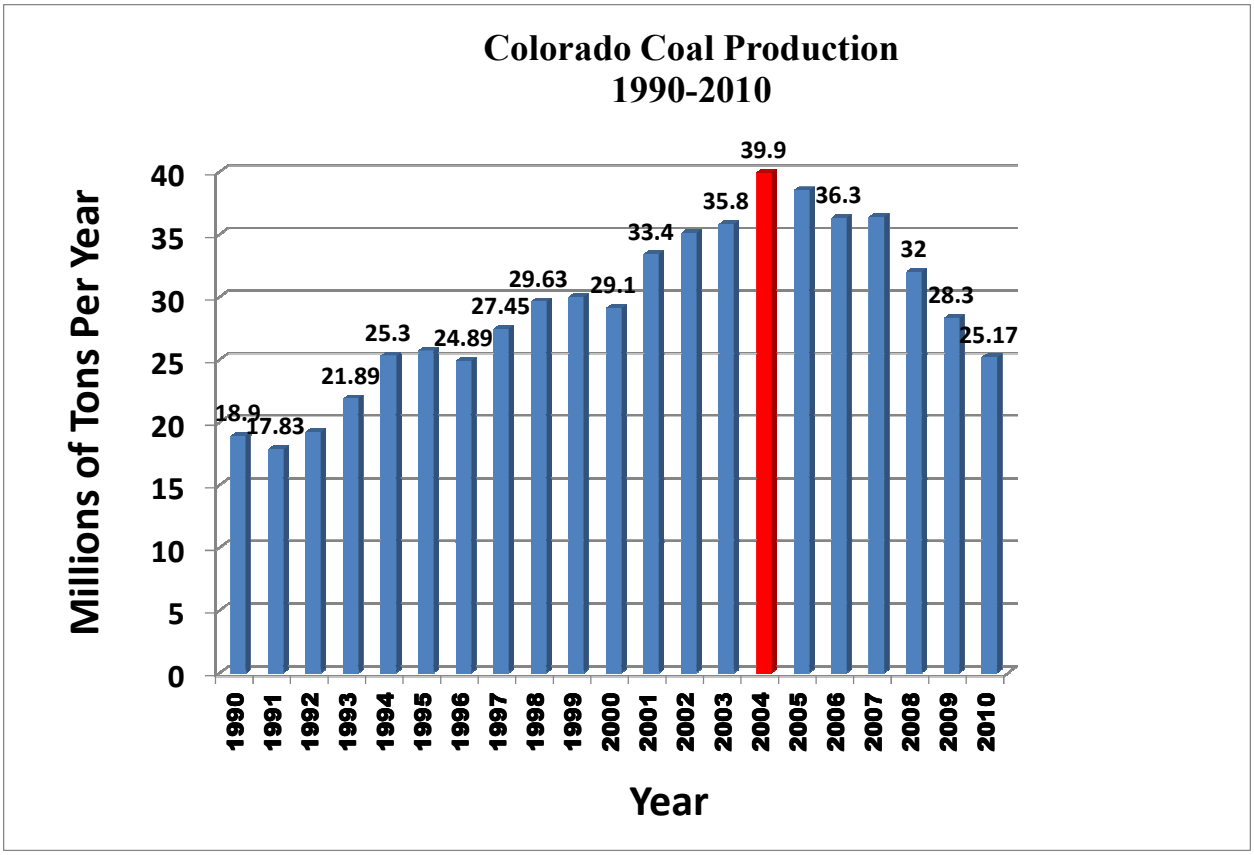
[8] Exhibits LWG1-3 are Xcel's Colorado coal costs as provided by Xcel. These are found as Attachments to the Answer Testimony of Leslie Glustrom submitted on September 17, 2010, Hearing Exhibit 121.

5. Nationally, Coal Costs Have Been Going Up About 10% Per Year

Nationally, coal costs have been going up approximately 10% per year since 2004 when many long-term coal contracts began expiring as shown in Exhibit LWG-19.

6. Colorado Coal Production is Dropping Dramatically Since Apparent Peak in 2004

An examination of Colorado coal production indicates that Colorado production likely peaked in 2004 just short of 40 million tons. Coal production data by state is available in the Energy Information Administration Annual Coal Reports available from http://www.eia.gov/coal/annual/. Since that time, Colorado coal production has dropped by over a third and in 2010 Colorado coal production was a little above 25 million tons. As can be seen from Exhibits LWG-6 and LWG-7 (showing Colorado coal production in 2004 and 2010 by mine) this drop in production appears to be driven by mines closing and production dropping at many other mines. As is typically the case with non-renewable resources such as coal, the more easily accessible resources are mined first and as they play out it becomes increasingly expensive to mine the coal, coal costs rise and production begins to fall off as the more easily accessible resources are depleted. This declining production does not appear likely to turn around and with declining supplies this could easily drive the prices of Colorado coal up.



D. Increased Fixed Operating and Maintenance ("FOM") costs

Xcel's analysis of increase Fixed Operation and Maintenance ("FOM") costs is shown in Exhibit LWG-4. These costs will be passed on to ratepayers.

E. Increased Variable Operating and Maintenance ("VOM") costs

Xcel's analysis of increase Variable Operation and Maintenance ("VOM") costs is shown in Exhibit LWG-4. These costs will be passed on to ratepayers.

F. Capital expenditures to maintain aging coal plants

Xcel has acknowledged that keeping these coal plants going will require on-going capital expenditures for the plants. These needs were detailed in Discovery Responses SC 2-7 and

Glustrom 4-5 and 8-1. Ratepayers will be responsible for return of and return on these investments.

G. Possible increased costs due to more stringent environmental controls

As we go through the next 25 years to 2036, there is good reason to believe that environmental regulations will become more stringent. Costs to comply with these increased costs are typically passed on to ratepayers.

V. PROBLEMS WITH XCEL'S ALTERNATIVE ANALYSIS

Examples of problems with Xcel's Retirement Option include:

- Failure to consider the excess capacity on Xcel's system as shown in the Loads and Resources Table below. In years when there is excess capacity, then Xcel would not need to build new generic resources to replace the Hayden coal plant
- Failure to consider the fact that Boulder may leave Xcel's system freeing up additional excess capacity. (See Exhibits LWG 9 and 10.)
- Failure to consider the availability of gas turbines that have already been built and which would otherwise be stranded. These gas turbines (e.g. the Southwest Generation Resources) can be seen in the Loads and Resources Table below.
- Failure to consider the very serious impacts of climate change as underscored in 2011 by the Berkeley Earth study summarized below.
- Failure to consider the very likely cheaper option of managing demand instead of building new capacity to meet peak demand—which by definition occurs only

one hour of the year. (See exceedance data for Xcel's load below.) Coal plants that operate almost around the clock are not good resources to meet peak demand.

- Failure to consider health and environmental costs of coal-fired generation as was done in the 10M-245E docket.
- Failure to consider the possibility of more stringent environmental regulations related to issues such as coal ash and mercury.
- Failure to consider the costs associated with locking in infkexible resources when in the 21st century increasing levels of renewable energy are best complemented by more flexible resources, including natural gas turbines—not inflexible coal plants.
- Combining a low coal cost escalation rate with a discounting of future fuel and chemical costs at 7.6% per year.
-

Data supporting these concerns is shown below.

Loads and Resources from 11A-869E Showing Excess Capacity
(Resource Plan Docket; Volume 2; page 2-339)

[Rest of page left intentionally blank.]

Attachment 2.11-1 RAP L&R

	A	B	C	D	E	F	G	H	I
1	PSCo Loads & Resources Balance Summer 2011- 2022								
2	September 2011 Demand Forecast								
3		2011	2012	2013	2014	2015	2016	2017	2018
4	**Installed Net Dependable Capacity**	5,376	5,376	5,376	5,376	5,376	5,376	5,376	5,376
5									
6	**Planned Retirements**								
7	Arapahoe 3				-44	-44	-44	-44	-44
8	Cherokee 1		-107	-107	-107	-107	-107	-107	-107
9	Cherokee 2		-106	-106	-106	-106	-106	-106	-106
10	Cherokee 3						-152	-152	-152
11	Valmont 5								-184
12	Zuni 2					-65	-65	-65	-65
13									
14	**Planned Additions**								
15	Cherokee 2X1 CC						569	569	569
16	**Company Owned Subtotal**	**5,376**	**5,163**	**5,163**	**5,119**	**5,054**	**5,471**	**5,471**	**5,287**
17									
18	**Firm Purchased Capacity**								
19	Basin Electric Power Cooperative No.1	100	100	100	100	100			
20	Basin Electric Power Cooperative No.2	75	75	75	75	75			
21	Tri-State G&T No.2	100	100	100	100	100	100		
22	Tri-State G&T No.3	25	25	25	25	25			
23	Tri-State G&T No.5	100							
24	PacifiCorp (w/ reserves)	161	150	150	150	176	176	176	176
25	Wheeling Losses	(10)	(8)	(8)	(8)	(8)	(2)	0	0
26	**Thermal Non-Facility Specific Subtotal**	**551**	**442**	**442**	**442**	**468**	**274**	**176**	**176**
27									
28	ManChief Power Company	258	258	258	258	258	258	258	258
29	SWG Valmont 7 & 8	78	78						
30	SWG Arapahoe 5, 6, 7	121	121						
31	SWG Fountain Valley Midway	243	243						
32	Brush 1&3	78	78	78	78	78	78		
33	Brush 4D	133	133	133	133	133	133	133	133
34	Tri-State Limon	0	0	68	68	68			
35	Tri-State Brighton (Knudsen)	0	0	136	136	136			
36	Cogentrix Plains End	221	221	221	221	221	221	221	221
37	Thermo Fort Lupton	129	129	129	129	129	129	129	129
38	Thermo Power (UNC)	65	65	65					
39	Invenergy Spindle CT	284	284	284	284	284	284	284	284
40	Small QFs	38.8	37.1	34.6	34.0	33.9	33.9	33.8	23.7
41	WM Landfill Gas	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
42	**Thermal Facility Specific Subtotal**	**1,652**	**1,650**	**1,410**	**1,344**	**1,344**	**1,140**	**1,062**	**1,052**
43									
44	FPL Wind	50.1	50.1	50.1	50.1	50.1	50.1	50.1	50.1
45	Cedar Creek Wind	37.6	37.6	37.6	37.6	37.6	37.6	37.6	37.6
46	Cedar Creek II Wind	31.3	31.3	31.3	31.3	31.3	31.3	31.3	31.3
47	Twin Buttes Wind	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4
48	Colorado Green Wind	20.3	20.3	20.3	20.3	20.3	20.3	20.3	20.3
49	enXco Ridge Crest Wind	3.7	3.7	3.7	3.7	3.7	3.7		
50	Invenergy Spring Canyon Wind	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
51	Northern Colorado Wind I and II	21.8	21.8	21.8	21.8	21.8	21.8	21.8	21.8
52	Cedar Point Wind		31.5	31.5	31.5	31.5	31.5	31.5	31.5
53	Limon Wind			25.0	25.0	25.0	25.0	25.0	25.0
54	Limon II Wind (Approval Pending)			25.0	25.0	25.0	25.0	25.0	25.0
55	Ponnequin Wind	0.7	0.7						
56	Alstom NWTC	0.4	0.4	0.4	0.4	0.4			
57	Siemens NWTC	0.3	0.3	0.3	0.3	0.3			
58	NREL NWTC	0.5	0.5	0.5	0.5	0.5			
59	**Wind Subtotal**	**183**	**215**	**264**	**264**	**264**	**263**	**259**	**259**
60									
61	SunE Alamosa1	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8
62	Greater Sandhills I	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4
63	San Luis Solar		16.6	16.6	16.6	16.6	16.6	16.6	16.6
64	Cogentrix of Alamosa		16.6	16.6	16.6	16.6	16.6	16.6	16.6
65	Amonix SolarTAC 1	0.3	0.3	0.3	0.3	0.3			
66	On-Site PV (36 MW-Yr discounted)	31.0	44.9	58.4	71.4	83.7	95.3	106.8	118.3
67	**Solar Subtotal**	**44**	**92**	**105**	**118**	**130**	**142**	**153**	**165**
68									
69	**SPS Diversity Exchange**	**101**	**101**	**101**	**101**	**101**	**101**	**101**	**101**
70									
71	**PSCo Net Dependable Capacity**	**7,907**	**7,662**	**7,485**	**7,388**	**7,361**	**7,390**	**7,223**	**7,040**
72									
73	**PSCo Load**								
74	Sep 2011 Budget Forecast	6,628	6,391	6,464	6,521	6,599	6,682	6,743	6,797
75	Interruptible Load	252	261	262	263	264	265	266	267
76	Saver's Switch	159	179	198	215	228	239	250	260
77	Firm Sale PSCo-SPS 6/1/11 - 9/30/11	109							
78	**Firm Obligation Load**	**6,326**	**5,952**	**6,004**	**6,043**	**6,107**	**6,178**	**6,227**	**6,270**
79									
80	**Base Reserve Margin %**	16.3%	16.3%	16.3%	16.3%	16.3%	16.3%	16.3%	16.3%
81	Reserve Margin Requirement (MW)	1,031	970	979	985	995	1,007	1,015	1,022
82	IREA & HCEA Backup	40	40	40	40	40	40	40	40
83	Actual Reserve Capacity	1,581	1,710	1,481	1,345	1,254	1,212	996	770
84	**Resource Need MW (long)**	**(510)**	**(700)**	**(462)**	**(320)**	**(219)**	**(165)**	**59**	**292**
85		2011	2012	2013	2014	2015	2016	2017	2018

1

Percentage of Time that Xcel's Load Was Exceeded in 2011
Data from LWG 1-10 in Docket 11A-869E

0%	6,862
2%	5,945
4%	5,627
6%	5,397
8%	5,222
10%	5,078
12%	4,950
14%	4,838
16%	4,749
18%	4,668
20%	4,592
40%	4,139
60%	3,820
80%	3,352
100%	2,602

Berkeley Earth Study on Climate Change Released in 2011.

Papers submitted for peer review in October 2011
http://berkeleyearth.org/available-resources/

http://berkeleyearth.org/study/

A New Assessment of Global Warming

The most important indicator of global warming, by far, is the land and sea surface temperature record. This has been criticized in several ways, including the choice of stations and the methods for correcting systematic errors. The Berkeley Earth Surface Temperature study sets out to do a new analysis of the surface temperature record in a rigorous manner that addresses this criticism. We are using over 39,000 unique stations, which is more than five times the 7,280 stations found in the Global Historical Climatology Network Monthly data set (GHCN-M) that has served as the focus of many climate studies.

Our aim is to resolve current criticism of the former temperature analyses, and to prepare an open record that will allow rapid response to further

criticism or suggestions. Our results include not only our best estimate for the global temperature change, but estimates of the uncertainties in the record.

Partial funding from the Koch

http://berkeleyearth.org/donors/

Donors

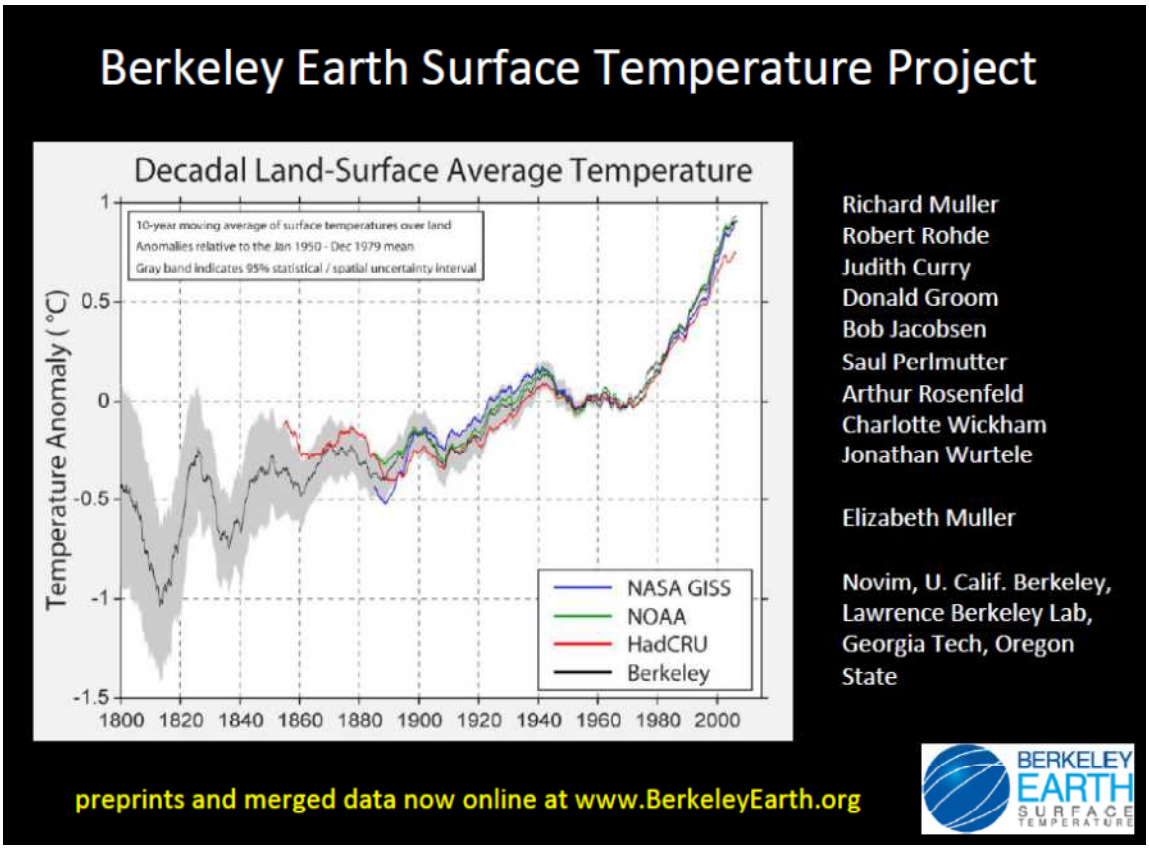
- The Lee and Juliet Folger Fund ($20,000)
- William K. Bowes, Jr. Foundation ($100,000)
- Fund for Innovative Climate and Energy Research (created by Bill Gates) ($100,000)
- Charles G. Koch Charitable Foundation ($150,000)
- The Ann & Gordon Getty Foundation ($50,000)

We have also received funding from a number of private individuals, totaling $14,500 as of June 2011.

http://berkeleyearth.org/pdf/berkeley-earth-averaging-process.pdf

In so doing, we find that the global land mean temperature has increased by 0.911 ± 0.042 C since the 1950s (95% confidence for statistical and spatial uncertainties). This change is consistent with global land-surface warming results previously reported, but with reduced uncertainty.

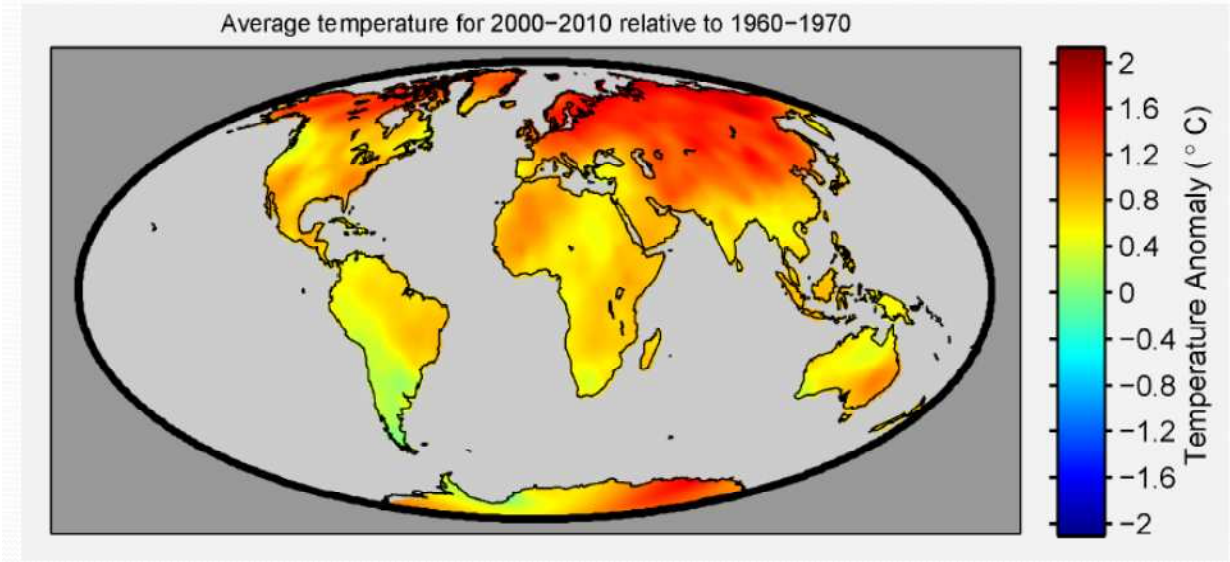
http://berkeleyearth.org/pdf/berkeley-earth-santa-fe.pdf



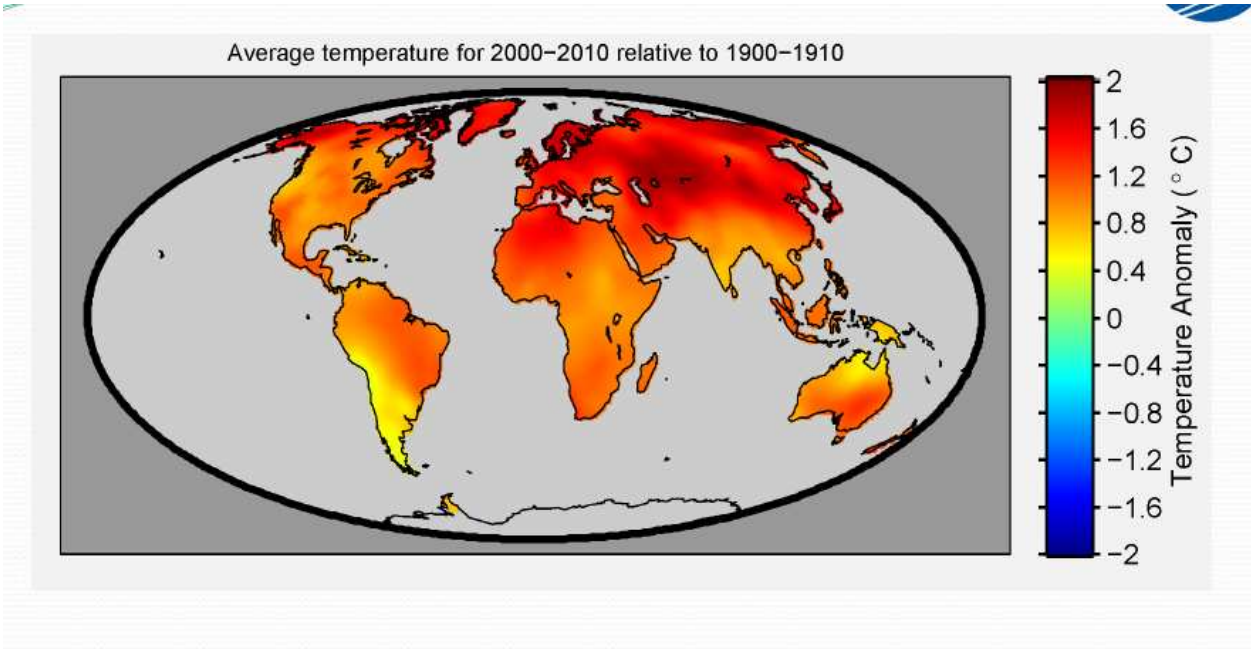
A You Tube video graphic of global temperatures using the Berkeley data set can be viewed here

http://www.youtube.com/watch?v=gHZzACcYJRo&feature=related

http://berkeleyearth.org/pdf/berkeley-earth-santa-fe-robert-rohde.pdf



http://berkeleyearth.org/pdf/berkeley-earth-santa-fe-robert-rohde.pdf



If you are wondering how "global warming" can lead to record winters and snow storms in the higher latitudes go to this You Tube for an explanation of why Arctic warming is like "leaving the fridge door open" leading to cooling and anomalous winters in places like the United States.

http://www.youtube.com/watch?v=HBlLP6KTrsE&feature=related

Q: DOES THIS COMPLETE YOUR TESTIMONY AT THIS TIME

A: Yes

ATTACHMENT A

Summary of Qualifications for Leslie Glustrom

Leslie Glustrom is an independent energy consultant and the part-time Director of Research and Policy for Clean Energy Action, a non-profit group based in Boulder, Colorado that engages in fact-based energy education for the 21st century. She is a frequent intervenor at the Colorado Public Utilities Commission where, as a non-attorney, she represents herself.

From 1975-1977, Ms. Glustrom was a science writer for the University of Wisconsin-Madison. From 1977-1983, she was a science policy analyst for the Wisconsin State Legislature. From 1983-1996 she taught chemistry, biochemistry and environmental chemistry at two colleges in Arizona. From 1996-2004 she managed a protein structure research lab at the University of Colorado-Boulder. In 2004, she began working full time on climate change and clean energy issues and has spoken throughout Colorado and in several other states on energy policy for the 21st century.

Relevant Publications

- **"Coal: Cheap and Abundant—Or Is It? Why Americans Should Stop Assuming That the U.S. Has a 200-Year Supply of Coal."** (February 2009)
  This report has over 200 hyperlinked references and is available for free download at http://www.cleanenergyaction.org/sites/default/files/Coal_Supply_Constraints_CEA_021209.pdf.

- Co-author of the Harvard study on the **"Full Cost Accounting for the Life Cycle of Coal,"** published in the Annals of the New York Academy of Science 1219, 73-98 (February 2011). This academic study can be accessed at http://onlinelibrary.wiley.com/doi/10.1111/j.1749-6632.2010.05890.x/full. Copies are also available from Ms. Glustrom

Selected Speaking Engagements on 21st Century Energy Policy

- 2006-2007—Numerous talks in Colorado on Concentrating Solar Power
- February 2007—IGCC—Asking the Hard Questions, Denver, Colorado
- November 2008—Environmental Protection Agency, Seattle, Washington
- February 2009—UN Association of USA, Denver, Colorado
- September 2009—Next Agenda Conference, San Francisco (Videotaped interview)
- October 2009—Harvard True Cost of Coal Conference, Washington, DC
- November 2009—Michigan Future's Conference, Crystal Mountain Resort, Michigan
- April 2010—PLAN Boulder, Boulder, Colorado
- September 2010—Frasier Meadows, Boulder, Colorado
- June 2011—Environmental Protection Agency, Denver, Colorado
- July 2011—Southeast Colorado Renewable Energy Society, Colorado Springs, Colorado
- September 2011—Environmental and Clean Energy Groups, Durango, Colorado
- January 2012—Coal and Finance Workshop, New York, New York
- January 2012—Renew Wisconsin Summit, Madison, Wisconsin

Awards for Energy Work

- 2006—Colorado Solar Energy Society--President's Award
- 2009—Boulder County Audubon Society--Community Conservation Award
- 2011—PLAN Boulder County—Gilbert White Award
- 2011—Colorado Renewable Energy Society--Larson-Notari Award
- 2011—Rocky Mountain Peace and Justice Center—Peacemaker of the Year Award

Education

B.S. and M.S. Biochemistry, University of Wisconsin-Madison