



IN THE MATTER OF THE APPLICATION
OF PUBLIC SERVICE COMPANY OF
COLORADO FOR APPROVAL OF ITS 2009
RENEWABLE ENERGY STANDARD
COMPLIANCE PLAN

DOCKET NO. 08A-____E

DIRECT TESTIMONY

OF

KEITH A. PARKS

**BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF COLORADO**

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**DIRECT TESTIMONY OF
KEITH A. PARKS**

1 **Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.**

2 A. My name is Keith A. Parks. My business address is 550 15th St., Denver,
3 Colorado 80202.

4 **Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT POSITION?**

5 A. I am employed by Xcel Energy Services, Inc., a wholly-owned subsidiary
6 of Xcel Energy Inc., the parent company of Public Service Company of
7 Colorado. My job title is Senior Trading Analyst.

8 **Q. ON WHOSE BEHALF ARE YOU TESTIFYING IN THE PROCEEDING?**

9 A. I am testifying on behalf of Public Service Company of Colorado ("Public
10 Service" or the "Company").

11 **Q. HAVE YOU INCLUDED A DESCRIPTION OF YOUR QUALIFICATIONS,
12 DUTIES, AND RESPONSIBILITIES?**

13 A. Yes. A description of my qualifications, duties, and responsibilities is
14 included as Attachment A.

15 **Q. WHAT IS THE PURPOSE OF YOUR DIRECT TESTIMONY?**

1 A. The purpose of my testimony is to describe the Company's proposal to
2 develop a new wind-forecasting tool, hereinafter called WiP (Wind
3 Predictor), to more accurately project electricity production sourced from
4 the wind turbines.

5 **Q. WHY IS THE COMPANY PROPOSING TO USE THE NEW WIND-**
6 **FORECASTING TOOL?**

7 A. Wind is an intermittent resource. Because of this intermittency, the
8 Company must have other generation resources ready to serve customer
9 loads while responding to wind projection error. By increasing the
10 accuracy of projected wind production, the Company hopes to be able to
11 reduce the amount of integration costs attributable to wind output
12 uncertainty.

13 **Q. HOW MUCH ERROR EXISTS BETWEEN PROJECTED AND ACTUAL**
14 **WIND PRODUCTION?**

15 A. I have estimated that there is approximately 18 percent error between
16 actual and projected wind production. For the first and second quarter of
17 2008, I have estimated that this forecasting error has cost \$12 million
18 more than it would have cost if we had perfectly forecast the wind.

19 **Q. PLEASE DESCRIBE HOW YOU HAVE PERFORMED THIS**
20 **ESTIMATION.**

21 A. To estimate the cost attributable to the wind forecasting error, I have
22 analyzed actual results, and compared them to what the Company
23 projected. Through monthly backcasts, we can essentially view results as

1 if we had 20/20 hindsight. We have compared what the Company
2 projected the wind to be to the actual wind production. While in the real
3 world it is not possible to have a perfect wind projection, this backcasting
4 method is useful to identify how much cost can be assigned to forecasting
5 error.

6 **Q. HAVE YOU ALSO TRIED TO IDENTIFY THE COST SAVINGS FOR**
7 **EACH PERCENT OF ERROR?**

8 A. Yes. I estimate for each percentage improvement in forecasting error, the
9 savings equal approximately \$1,379,000 per year.

10 **Q. PLEASE DESCRIBE HOW THE WIP CAN PROVIDE A GREATER**
11 **DEGREE OF ACCURACY?**

12 A. Weather models are traditionally generalized to identify extreme events
13 that pose risk to life and property, not wind energy production. In addition,
14 these models cover large geographic areas such as the entire Western
15 United States, thereby losing the resolution necessary to accurately
16 forecast wind speeds and direction on a localized basis. Lastly, traditional
17 models are restricted in the number and timeliness of meteorological
18 inputs used to capture the state of the atmosphere.

19 An improved forecast begins with better tuning of the model and
20 timely inclusion of voluminous meteorological data. The new forecasting
21 tool will use the latest in weather prediction technology to create a much
22 more granular forecast optimized for the needs of wind energy production.

1 It will incorporate a much larger amount of real-time meteorological
2 information.

3 **Q. HOW MANY PERCENTAGE POINTS DOES THE COMPANY ESTIMATE**
4 **THE NEW FORECASTING TOOL WILL IMPROVE UPON ITS ERROR**
5 **RATE?**

6 A. As described above, currently we estimate the wind forecasting error to
7 be in the range of 18 percent. By using the WiP, the Company estimates
8 a reduction in forecast error of two percentage points, or to 16 percent
9 forecasting error. This is a conservative estimate drawn from the
10 experience of the California ISO's reported 11-14% error after
11 implementing a comparable system, as presented at the February Utility
12 Wind Integration Group (UWIG) conference. Colorado has significantly
13 more complex weather and terrain to consider than California, which
14 tempers my expectations for greater improvements.

15 **Q. WHAT ARE THE ASSOCIATED SAVINGS WITH THIS TWO PERCENT**
16 **REDUCTION IN ERROR?**

17 A. As described above, the Company estimates a \$1,379,000 cost savings
18 with every percent reduction in error – therefore, I estimate the savings of
19 a two percent reduction to generate \$2,758,000 in annual savings.

20 **Q. WHAT ARE THE COSTS OF THE NEW FORECASTING TOOL?**

21 A. The estimated total cost for the new system includes \$2.6 million for
22 implementation of the weather models and approximately \$0.75 million for
23 data acquisition hardware and software at the wind farms. However, all

1 three Xcel Energy operating companies will benefit from the new weather
2 models, so PSCo's share of the total cost will only be \$1,287,423. Xcel
3 Energy proposes to share the cost of this new system among its three
4 operating companies based upon the relative levels of installed wind
5 capacity on each of these three utilities. Therefore, one year of projected
6 savings for Public Service would be greater than the projected costs
7 allocated to Public Service. However, not all of the projected WiP costs
8 are in the 2009 budget. Only \$113,077 of the Wip projects costs are
9 included. Public Services share of the revenue requirement associated
10 with the 2009 capital investment is \$35,343. It is my understanding that in
11 the pending rate case, Public Service has removed this same amount.

12 **Q. HOW DOES PUBLIC SERVICE PROPOSE TO RECOVER THE COSTS**
13 **OF THIS NEW FORECASTING TOOL?**

14 A. Dan Ahrens addresses the cost recovery mechanism in his testimony.

15 **Q. HOW DOES THE COMPANY PROPOSE TO INCLUDE THE**
16 **RESULTING BENEFITS?**

17 A. As described in the testimony of Mr. Warren, the Company has included a
18 modeling scenario in which the integration costs have been reduced to
19 reflect the resulting savings derived from the new wind-forecasting tool.
20 The actual benefits will flow through the Company's Electric Commodity
21 Adjustment as a reduction in fuel costs.

22 **Q. DOES THIS CONCLUDE YOUR TESTIMONY?**

23 A. Yes, it does.

Statement of Qualifications

Keith A. Parks

I received a Bachelors of Engineering Degree in 1996 from the University of Auckland, New Zealand with emphasis in Engineering Science (aka Applied Mathematics).

I began my professional career in 1997 with the Henwood Energy Services Inc (HESI) as a computer programmer maintaining and developing the PROSYM model. In 1999, I transferred to HESI's consulting department and worked on asset valuation and electricity market forecast studies in California, Australia, and Great Britain.

In 2000, I joined Stratus Consulting in Boulder, CO. I developed an economic model to value carbon trading impacts on the global airline market. In the same year, I moved to Xcel Energy as a Generation Modeling Analyst in the Risk Department. I was responsible for forecasting buy/sell signals for month-ahead energy trading, budget forecasting, and analysis for special projects such as the impacts of the Energy Clause Adjustment.

In 2002, I left my energy modeling career for three years and worked as an outdoor guide. In early 2005, I returned as a Staff Analyst at the National Renewable Energy Laboratory's (NREL) Strategic Energy Analysis Center (SEAC). I was a lead developer for the Hydrogen Deployment System (HyDS): a supply-side, GIS-enabled hydrogen infrastructure forecasting tool. I also performed research in systematic electric-drive impacts (See paper *Costs and Emissions Associated with Plug-In Hybrid Electric Vehicle Charging in the Xcel Energy Colorado Service Territory*; May 2007).

In late 2006, I joined Xcel Energy's Commercial Operation's group as a Trading Analyst. I was promoted to Senior Trading Analyst in 2008. My duties have included performing the FCA wholesale customer post-process activity, metric development to track forecasting accuracy, optimize day-ahead and real-time trading activities, plus perform various studies from spinning reserve value to wind integration impacts.