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**Direct Testimony and Schedule
Steven W. Wishart**

**Before the North Dakota Public Service Commission
State of North Dakota**

**In the Matter of the Application of
Northern States Power Company, a Minnesota Corporation
for Advance Determination of Prudence for a
200 MW Prairie Rose Wind Generation Project and
Power Purchase Agreement with Geronimo Wind Energy, LLC**

**Case No. PU-12-059
Exhibit___(SWW-1)**

Strategist Modeling

48 PU-12-59 Filed: 10/22/2012 Pages: 10
Exhibit 5

Northern States Power Company



Table of Contents

I.	Introduction and Qualifications	1
II.	Strategist Resource Planning Model	2
III.	Strategist Results Supporting the Reasonableness of the Prairie Rose PPA	4

Schedules

Resume	Schedule 1
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1 The model proceeds one year at a time, simulating the hourly system dispatch,
2 and tracking generation, system costs, and emissions. When Strategist reaches
3 a year in which peak demand plus required reserve margin exceeds available
4 resources, the Proview module will add various combinations of generic
5 resources to meet the required reserves and track total system costs for each
6 combination. At the end of the model run, Strategist identifies the least cost
7 expansion plan as well as any sub-optimal plans evaluated during the
8 simulation. Total system costs for each plan are summarized as the present
9 value of revenue requirement (“PVRR”).

10
11 For the Prairie Rose analysis Strategist was first run with the project “hard
12 coded” into the models expansion plan. Next the Prairie Rose project was
13 removed from the model and simulation re-run. Comparison of the two
14 model runs reveals the incremental costs or savings from the project and also
15 identifies what type of energy resources the project is likely to displace.

16
17 Q. IS STRATEGIST A WIDELY-USED MODELING TOOL IN THE UTILITY INDUSTRY?

18 A. Yes. According to Ventyx (a subsidiary of ABB and developer of Strategist),
19 they have 42 clients running the Strategist model including utilities,
20 consultants, and state public utility commissions.

21
22 Q. IN YOUR OPINION WHY ARE THE RESULTS OF STRATEGIST RELIABLE FOR
23 PLANNING PURPOSES?

24 A. Strategist has been used for several years by utilities, consultants, and state
25 public utility commissions to evaluate a variety of long-term resource planning
26 issues. The software’s longevity and market penetration are the result of the
27 confidence end users have in its capabilities. The software includes significant

1 detail on system load and generation characteristics as well as detailed
2 modeling capability for capital projects. Model results can be analyzed down
3 to unit level performance for each month over the 40-year time horizon. This
4 level of granularity allows the user to build a model that closely mimics the
5 actual system and allows for robust quality checks on the model output.
6

7 Q. ARE YOU AWARE OF WHETHER ANY UTILITY REGULATORY COMMISSIONS HAVE
8 RELIED UPON THE RESULTS OF STRATEGIST AS A PART OF APPROVING THE
9 COMPANY'S RESOURCE PROCUREMENTS IN THE PAST?

10 A. Yes. The Company has used Strategist analysis in support of resource
11 procurement in Texas, New Mexico, Colorado, Wisconsin, Minnesota, and
12 North Dakota. The Minnesota and Wisconsin Commission Staffs have their
13 own Strategist licenses and conducts their own analysis when reviewing
14 applications for new resources. The Colorado Commission retained an
15 independent evaluator who ran Strategist to verify the results of our
16 Company's bid evaluation. In addition, Ventyx estimates that utility
17 commissions in ten other states have also used Strategist in resource
18 procurement decisions.
19

20 **III. STRATEGIST RESULTS SUPPORTING THE**
21 **REASONABLENESS OF THE PRAIRIE ROSE PPA**
22

23 Q. DID THE COMPANY UTILIZE STRATEGIST TO DETERMINE THE TOTAL PVRR
24 WITH AND WITHOUT THE PRAIRIE ROSE PPA?

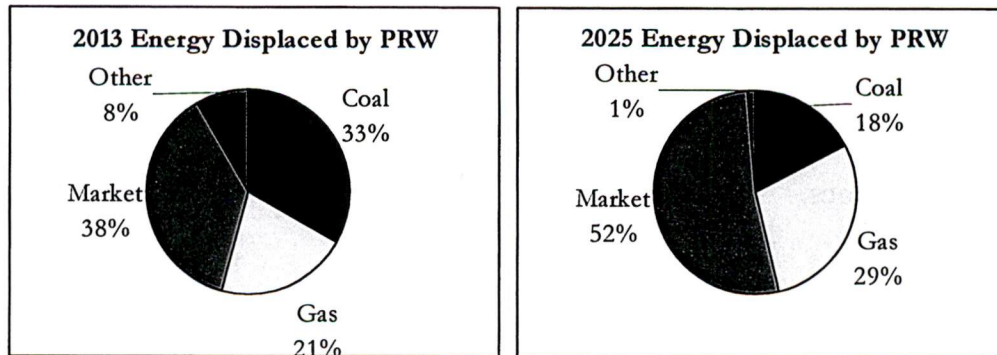
25 A. Yes. Our original analysis estimated that the project was approximately
26 breakeven with a net PVRR impact of \$5 million. If one were to remove the
27 capacity credit assumption, the PVRR impact would increase to \$23 million.

1 Given that the total net present value (“NPV”) of the PPA is \$280 million, the
2 additional \$18 million in PVRR impact represents only 6 percent of the
3 relative contract value. For reasons discussed by Company witness Mr. Kurtis
4 Haeger, even with the net PVRR impacts, the Prairie Rose PPA continues to
5 be a reasonable resource procurement, which provides benefits to customers.
6

7 Q. DID THE COMPANY USE STRATEGIST TO DETERMINE WHAT IMPACT THE
8 PRAIRIE ROSE PPA WOULD HAVE ON THE COMPANY’S FUEL SUPPLY MIX?

9 A. Yes. We used Strategist to estimate which resources Prairie Rose is likely to
10 displace in the system dispatch and how our fuel supply mix will change.
11 Strategist found that throughout the 20-year PPA term, Prairie Rose primarily
12 displaces volatile market energy in addition to smaller amounts of coal and gas.
13 Model results also indicated the PPA will displace small amounts of energy
14 from our woody biomass and refuse derived fuel projects.
15
16

Figure 1: Energy Displaced by the Prairie Rose PPA



17
18
19 The displacement of market energy and fossil-fueled generation by the Prairie
20 Rose PPA provides benefits by protecting customers from potential
21 fluctuations in fuel costs.
22

- 1 Q. WHAT ABOUT THE IMPACT OF CURRENTLY LOWER NATURAL GAS PRICES?
- 2 A. Although current prices for market energy and natural gas are relatively low,
3 the following figure illustrates that historically the price of these energy
4 resources has been extremely volatile and that the proposed PPA will provide
5 greater price certainty in the future. From this perspective, the Prairie Rose
6 PPA can be thought of as a low-cost hedge for customers against uncertainty
7 in the natural gas and wholesale power markets.

8
9 **Figure 2: Natural Gas and Market Prices vs. PRW**

10 **[BEGIN TRADE SECRET**

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14
15
16
17 **END TRADE SECRET]**

- 18
- 19 Q. DOES THIS CONCLUDE YOUR TESTIMONY?
- 20 A. Yes, it does.

Steven W. Wishart Jr.

(612) 508-0869
Steve@Wishart.com

1814 Kohinoor Pl.
Golden CO, 80401

EXPERIENCE

Xcel Energy, Minneapolis MN, Denver CO 5/12-Current
Director – Resource Planning & Bidding

Xcel Energy, Minneapolis MN, Denver CO 4/06-05/12
Manager / Sr. Analyst / Analyst – Strategic Analytics

Responsibilities:

- Oversee economic evaluation of large power supply projects for Xcel Energy.
- Prepare analysis for senior leadership that reports on expected value and value at risk for new generation assets, power purchases, conservation programs, wholesale sales, and other projects.
- Maintain complex model of the three Xcel Energy power systems for use in, project evaluation, rate forecasting, and policy analysis.
- Manage a group of quantitative analysts that evaluate various supply and demand side alternatives for all three Xcel Energy service territories.
- Serve as quantitative expert for resource planning and purchased power related dockets.

Major Projects:

- Colorado Clean Air Clean Jobs Act – Retire/repower 900MW of existing coal units in PSCo service territory for compliance with regional NOx legislation.
- 2010 Minnesota Resource Plan – 10 year projection of new resource acquisitions, retirements, renewable energy standard compliance, and enhanced conservation programs.
- Jones Station Repowering – Convert existing 240MW gas steam unit to 650MW combined cycle in SPS service territory.
- 2009 PSCo All-Source Solicitation – Modeling/evaluation of bids totaling 20,000MW. Including Gas, wind, solar PV, solar thermal with storage, compressed air storage, pumped hydro, wind/battery combo, and solar augmented combined cycle.
- Manitoba Hydro CON – Economic valuation of 10yr \$1.6B purchase from MH.
- Nuclear Uprate Projects – Economic evaluation and expert witness for Prairie Island and Monticello nuclear uprate proceeding in NSP service territory.
- CO2 Regulation - Forecasted rate impacts of American Clean Energy and Security Act (ACES) on the Xcel Energy operating companies.
- Other - Bottom up redesign of Xcel's long-range planning models, focusing on consistency across jurisdictional operating companies and integration of best practices including Monte-Carlo simulation for risk evaluation. Represented Xcel Energy at MISO board of directors/stakeholder meetings on the topic of wind integration. Long range rate forecasts for management and stakeholders. Financial and economic analysis for Excelsior IGCC project. Analysis of long term power purchase from Manitoba Hydro. EEI regulatory accounting seminar.

Software:

- Strategist, Matlab, Prosym, Excel, Access.

Xcel Energy, Minneapolis MN

Demand Side Management (DSM) Technical Analyst 2/05-4/06

Responsibilities:

- Managed cost/benefit analysis of NSP's \$45 million annual conservation and load management activities, including forecasting of financial incentives, and strategic planning.

Projects:

- Evaluation and contract negotiations of DSM bids in Colorado service territory.
- Conservation rulemaking in New Mexico, including design of financial incentive mechanism.
- Cost benefit analysis of NSP's three-year conservation and load management strategic plan.

Software:

- Strategist, DSManager, Matlab, Excel.

The Solar Store, Tucson AZ

10/98-8/00

Accountant

- AR/AP, payroll, inventory management, sales, solar energy system design & installation.
- Member of Concerned Arizonans for Renewable Energy (CARE) lobbied in support of solar tax credits in Arizona.

EDUCATION

PhD (all but dissertation) Applied Economics, University of Minnesota, 3.7GPA

8/02-1/05

Course Work:

- Emphasis - environmental and natural resource economics. Other course work - Financial economics, econometrics, dynamic programming, production economics, non-parametric frontier analysis, managerial economics, international trade, macro- and microeconomics.

Software:

- SAS, Matlab, Gauss, Stata, Mathematica.

MS Economics, University of Arizona, 3.8GPA

8/00-5/02

Course Work:

- Environmental economics, environmental law, econometrics, linear and quadratic programming, production economics, consumer economics.

Software:

- SAS, Stata, LimDep, Gams, Lindo, Gauss.

BS Finance, University of Arizona

8/92-12/96

Course Work:

- Financial markets and instruments, corporate finance, accounting, statistics, economics, marketing, Russian, French.