

DIRECT TESTIMONY AND SCHEDULES
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**STATE OF NORTH DAKOTA
BEFORE THE
NORTH DAKOTA PUBLIC SERVICE COMMISSION**

NORTHERN STATES POWER COMPANY
ADVANCE PRUDENCE – 1,550 MW WIND PORTFOLIO
APPLICATION

CASE No. PU-17-_____

Policy Testimony

Exhibit__ (AHC-1)

March 29, 2017

PUBLIC DOCUMENT
TRADE SECRET DATA EXCISED
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Schedules

Statement of Qualifications

Schedule 1

1 Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

2 A. The purpose of my testimony is to provide support for our request for an
3 Advance Determination of Prudence (ADP) for a 1,550 MW portfolio of
4 wind generation (the Wind Portfolio) to be added to the integrated NSP
5 System. In my testimony, I discuss the policy issues related to the
6 Company's request. Specifically, my testimony covers the following topics:

7

- 8 • An overview of our proposed resource acquisitions;
- 9 • An overview of the process by which the projects comprising the Wind
10 Portfolio were selected;
- 11 • The regulatory issues related to and impact of adding the Wind Portfolio;
- 12 • The prudence of our proposal; and
- 13 • An introduction of the other witness testifying on behalf of the
14 Company.

15

16 II. OVERVIEW OF THE WIND PORTFOLIO

17

18 Q. PLEASE DESCRIBE THE COMPANY'S WIND PORTFOLIO.

19 A. The Wind Portfolio consists of seven wind projects of varying sizes, totaling
20 approximately 1,550 MW of additional generation resources, located in
21 Minnesota, North Dakota, South Dakota, and Iowa. They consist of four
22 self-build projects (Blazing Star I, Blazing Star II, Foxtail, and Freeborn),
23 one combined Power Purchase Agreement (PPA) and Build-Own-Transfer
24 (BOT) project (Crowned Ridge), one BOT project (Lake Benton), and one
25 PPA project (Clean Energy #1), as summarized below:

26

Project Name	Size	Type	Location	In-Service Date	Levelized Cost (\$/MWh)
[TRADE SECRET BEGINS]					
Blazing Star I	200 MW	Self-Build	Lincoln County, MN	4Q 2019	_____
Blazing Star II	200 MW	Self-Build	Lincoln County, MN	3Q 2020	_____
Foxtail	150 MW	Self-Build	Dickey County, ND	3Q 2019	_____
Freeborn	200 MW	Self-Build	Freeborn County, MN, and Worth and Mitchell Counties, IA	4Q 2020	_____
Crowned Ridge	600 MW	Combined BOT and PPA	Codington County, SD	4Q 2019	_____
Lake Benton	100 MW	BOT	Pipestone County, MN	4Q 2019	_____
Clean Energy #1	100 MW	PPA	Mercer and Morton Counties, ND	4Q 2019	_____

[TRADE SECRET ENDS]

1

2 While I briefly describe these projects below, Company witness Mr. P.J.
3 Martin discusses the proposed resources in more detail in his Direct
4 Testimony.

5

6 Q. PLEASE SUMMARIZE THE PROJECTED TOTAL CONSTRUCTION COSTS FOR THE
7 SELF-BUILD PROJECTS IN THE WIND PORTFOLIO.

8 A. For the four self-build projects, the total capital costs are estimated as
9 follows:

10

Project	Estimated Total Capital Cost (millions)
[TRADE SECRET BEGINS]	
Blazing Star I	_____
Blazing Star II	_____
Foxtail	_____
Freeborn	_____
[TRADE SECRET ENDS]	

11

1 The above costs include the estimated transmission upgrades and
2 interconnection costs as well as anticipated siting and permitting costs and
3 AFUDC.

4
5 Q. PLEASE SUMMARIZE THE PROJECTED TOTAL CONSTRUCTION COST OF THE
6 OTHER PROJECTS IN THE WIND PORTFOLIO.

7 A. Crowned Ridge consists of two parts: a BOT with NSP purchasing the
8 project upon completion for [TRADE SECRET BEGINS
9 TRADE SECRET ENDS], which includes the total purchase price, Xcel
10 Energy's direct costs, and AFUDC, and a PPA with the purchase price of
11 electric energy starting at [TRADE SECRET BEGINS

12 TRADE
13 SECRET ENDS].

14
15 Regarding Lake Benton, NSP is purchasing the project upon completion for
16 [TRADE SECRET BEGINS TRADE SECRET ENDS],
17 which includes the total purchase price, Xcel Energy's direct costs, and
18 AFUDC.

19
20 As a PPA project, the Clean Energy #1 project has no construction cost for
21 the Company. Under the PPA, NSP will be purchasing electric energy at a
22 price of [TRADE SECRET BEGINS

23
24 TRADE SECRET ENDS].

25
26 Q. WHY IS THE COMPANY PROPOSING THE WIND PORTFOLIO?

1 A. The Wind Portfolio is intended to lock in long-term value for our customers.
2 Our Wind Portfolio is not driven by any renewable energy or other mandate
3 in North Dakota or any other state served by Xcel Energy. Rather, our
4 Wind Portfolio is the result of our analysis of market conditions, including
5 the extension of the Federal Production Tax Credit (PTC), that provide us
6 the opportunity to acquire a significant amount of wind resources at
7 extremely attractive pricing. Our analysis indicates the addition of these
8 resources will provide substantial quantitative and quantitative benefits to
9 our customers.

10
11 Q. WHAT ARE THE QUANTITATIVE BENEFITS OF THE WIND PORTFOLIO?

12 A. The addition of the Wind Portfolio to the NSP System could result in
13 savings of approximately \$1.6 billion on a Present Value of Revenue
14 Requirements (PVRR) basis over the assets' life. These benefits come from
15 offsetting more costly fuel and market purchases through the use of wind
16 energy. I discuss this further in Section V, below.

17
18 Q. WHAT ARE THE QUALITATIVE BENEFITS OF THE WIND PORTFOLIO?

19 A. The Wind Portfolio will bring lasting social and economic benefits to the
20 communities where the projects are located through the creation of jobs, tax
21 payments, and lease payments to landowners. Additionally, the addition of
22 the Wind Portfolio will help enable the Company to continue along a path of
23 improved environmental performance by contributing to the Company's
24 carbon reduction goals. The Wind Portfolio also will help the Company
25 comply with state and federal energy policies in a cost-effective manner. I
26 discuss these qualitative benefits further in Section V, below.

27

1 **III. BACKGROUND**

2
3 Q. HOW DID XCEL ENERGY DEVELOP THE WIND PORTFOLIO?

4 A. The development of our Wind Portfolio has been many months in the
5 making and progressed through several stages. We first began by proposing
6 material wind additions in our 2016-2030 Integrated Resource Plan (IRP)
7 filed in North Dakota (Case No. PU-15-19) and Minnesota (Docket No.
8 E002/RP-15-21). When the Federal PTCs were extended in December
9 2015, we identified a window of opportunity to capture significant value for
10 our customers by accelerating the wind additions proposed in the IRP.
11 Achieving safe harbor to capture the PTCs required us to act quickly.
12 Therefore, we began developing our self-build projects. Later we initiated a
13 RFP process to further test the marketplace. The RFP projects that best met
14 our selection criteria plus our self-build projects then became our proposed
15 Wind Portfolio. We are now bringing forward the Wind Portfolio for the
16 reasons I have already mentioned and consistent with the Minnesota Public
17 Utilities Commission's (MPUC) IRP order approving at least 1,000 MW of
18 wind additions.

19
20 Q. DID THE MPUC MAKE ANY SPECIFIC FINDINGS WITH RESPECT TO XCEL
21 ENERGY'S ACQUISITION OF WIND RESOURCES IN THE IRP PROCEEDING?

22 A. Yes. The MPUC found that the addition of significant amounts of wind in
23 the next five years represents a major part of a least-cost method of meeting
24 Xcel Energy's near-term resource needs. The acquisition of wind was found
25 to be least-cost even without a capacity deficit until the mid-2020s because it
26 will provide incrementally lower-cost energy, thereby reducing system costs.
27 The relevant portion of the MPUC order is as follows:

1 Despite slight variations in exact timing and magnitude,
2 the record clearly showed that acquisition of wind and
3 possible solar resources in the next five years represents
4 the least-cost method of meeting Xcel's near-term
5 resource needs. The Commission finds that the record
6 shows that it is reasonable to acquire at least 1000 MW of
7 wind by 2019. This acquisition is least-cost even though
8 Xcel does not show a planning capacity deficit until the
9 mid-2020s because it will provide incrementally lower-
10 cost energy, thereby reducing system costs. Upon
11 submission of evidence such as price, bidder qualification,
12 rate impact, transmission availability and location,
13 additional acquisition may be approved.¹

14
15 Q. DID THE MPUC ADDRESS ANY OTHER ISSUES RELEVANT TO THE WIND
16 PORTFOLIO IN ITS IRP ORDER?

17 A. Yes, the MPUC approved an alternative process for our wind acquisition
18 efforts.

19
20 Q. HOW DID THIS ALTERNATIVE PROCESS COME ABOUT?

21 A. To acquire owned resources, the Company typically must follow a process,
22 which involves a contested case process administered by an administrative
23 law judge. The administrative law judge evaluates the proposals submitted
24 into the process before making a recommendation to the MPUC. To say the
25 least, this is a timely process. In this instance, the Company proposed an
26 alternative process that allows for a faster regulatory processing of our
27 proposal.

28

¹ *In the Matter of Xcel Energy's 2016-2030 Integrated Resource Plan*, Docket No. E002/RP-15-21, ORDER APPROVING PLAN WITH MODIFICATIONS AND ESTABLISHING REQUIREMENTS FOR FUTURE RESOURCE PLAN FILINGS at 7 (Jan. 11, 2017).

1 Q. WHY DID THE COMPANY SEEK OUT APPROVAL OF AN ALTERNATIVE
2 RESOURCE ACQUISITION PROCESS?

3 A. Following this process enables us to quickly take advantage of the Federal
4 PTCs by avoiding the need to obtain Certificates of Need for the Minnesota
5 projects. As I discuss below, we will seek a Certificate of Public
6 Convenience and Necessity (CPCN) from the Commission for the Foxtail
7 project at a later date. NextEra will obtain the necessary approvals from the
8 South Dakota Public Utilities Commission for the Crowned Ridge Project.

9

10 Q. WHAT STEPS ARE INCLUDED IN THE ACQUISITION PROCESS?

11 A. The process is comprised of the following steps:

12 (1) The Company issues an RFP for wind resources.

13 (2) The day before receiving wind bids from the RFP, the Company
14 submits to the MPUC its own self-build proposal including estimates
15 of final costs.

16 (3) The Company evaluates the bids and selects projects based on the
17 following factors:

18 (a) Levelized cost;

19 (b) Financial capability;

20 (c) Project schedule;

21 (d) Project design;

22 (e) Project risks;

23 (f) MISO queue position status;

24 (g) Interconnection and network upgrades;

25 (h) Energy production profile;

26 (i) Site control;

27 (j) Project output delivery plan;

28 (k) Expected turbine availability;

- 1 (l) Pricing options;
2 (m) Project development milestones;
3 (n) Exceptions to standard contract terms and conditions; and
4 (o) Other relevant factors.
- 5 (4) The Company files with the MPUC the results of the bidding process,
6 project rankings, analysis, and the results of a third-party auditor
7 report of its bidding and review process.
8

9 Q. DID XCEL ENERGY FOLLOW THIS PROCESS?

10 A. Yes.

- 11 • On September 22, 2016, the Company issued an RFP seeking up to 1,500
12 MW of wind generation projects and giving potential developers until
13 October 25, 2016 to provide RFP responses.
- 14 • On October 24, 2016, the day before receiving wind bids in response to
15 the RFP, the Company submitted to the MPUC its own self-build
16 proposal, including estimates of final costs.
- 17 • On October 25, 2016, we received the bids submitted in response to the
18 RFP and began analyzing them to both select projects and measure the
19 prudence of our self-build proposals against what was available in the
20 third-party market. The Company evaluated the bids and selected
21 projects based on the factors I listed earlier.
- 22 • On December 9, 2016, the Company presented to the Auditor its short-
23 list of RFP projects (including two back-up projects), and the Auditor
24 approved the short-list before we entered negotiations.
- 25 • On March 15, 2017, we made a filing with the MPUC with our final
26 recommendation proposing the entire 1,550 MW Wind Portfolio for
27 consideration and providing the results of the bidding process, project

1 rankings, analysis, and the results of a third-party auditor report.

- 2 • On March 29, 2017, we filed this Application for an ADP with the
3 Commission for our 1,550 MW Wind Portfolio.

4
5 **IV. DEVELOPMENT OF THE WIND PORTFOLIO**

6
7 Q. WHAT IS THE PURPOSE OF THIS SECTION OF YOUR TESTIMONY?

8 A. In this section of my testimony, I describe in detail the development of the
9 self-build projects and provide, for context, an overview of the RFP process
10 which, together, formed the basis for our development of the Wind
11 Portfolio. Company witness Mr. P.J. Martin discusses the RFP process in
12 more detail in his Direct Testimony.

13
14 **A. Self-Build Project Development**

15
16 Q. HOW DID THE COMPANY SELECT THE SELF-BUILD PROJECTS?

17 A. We undertook a comprehensive site selection process before selecting the
18 four projects included in the Wind Portfolio. The goal of our selection
19 process was to acquire sites that could offer cost-competitive wind energy to
20 our customers by focusing on self-build projects that could capture the full
21 value of the PTCs, had reasonable transmission interconnection and delivery
22 options, and had a reasonable likelihood of being constructed.

23
24 Q. PLEASE DESCRIBE THE KEY ELEMENTS OF THE SELECTION PROCESS.

25 A. Our selection process had three key components: (1) cost analysis; (2) wind
26 performance analysis; and (3) due diligence reviews.

27

1 Q. HOW DID THE COMPANY PERFORM ITS COST ANALYSIS?

2 A. We based our cost analysis on our wind project balance of plant (BOP)
3 construction and operating cost model, with our Master Supply Agreement
4 (MSA) with our turbine supplier as a significant input. Our cost model has
5 been used for several projects, including most recently the Courtenay wind
6 project in the upper Midwest, as well as the Rush Creek wind project in
7 Colorado. The cost model used for the self-build projects reflects our prior
8 experience with constructing and operating wind farms, as well as cost
9 trends in the wind energy industry.

10

11 Q. WHAT DID THE COMPANY CONSIDER IN ITS WIND PERFORMANCE ANALYSIS?

12 A. Our wind performance analysis involved the verification of the potential
13 wind energy production of the proposed sites. To do this, we retained a
14 reputable wind consulting company, AWS True Power (AWS), to perform
15 independent wind analysis based on project layout, wind data, site details,
16 and turbine information. We used this analysis to develop Net Capacity
17 Factors (NCF) for the selected sites in our Wind Portfolio. By analyzing the
18 NCF capable at different sites, we could determine the value of the wind
19 resource available at them.

20

21 Q. WHAT WAS THE FOCUS OF THE COMPANY'S DUE DILIGENCE ANALYSIS?

22 A. The due diligence process helped ensure that proposed project sites can be
23 properly developed and are ready and feasible to support our planned
24 project construction schedule.

25

1 Q. HOW DID THE COMPANY PERFORM THE DUE DILIGENCE ANALYSIS?

2 A. The due diligence process involved asking developers an extensive list of
3 questions about their proposed wind sites that fall into eight general
4 categories: (1) land control; (2) wind data; (3) siting and permitting; (4)
5 technical attributes; (5) site-specific cost considerations; (6) transmission and
6 interconnection; (7) legal; and (8) environmental. Company personnel with
7 relevant skill sets and expertise in these eight categories reviewed the due
8 diligence risk assessments for each proposed site.

9

10 Q. AS IT ANALYZED THE SELF-BUILD PROJECTS, DID THE COMPANY ALSO
11 CONSIDER ELIGIBILITY FOR THE PTCs?

12 A. Yes. This is an essential part of the financial considerations that makes these
13 wind resources so economic for our customers.

14

15 Q. WHAT WAS THE RESULT OF THE SITE SELECTION PROCESS?

16 A. The result of our process was that we selected the Blazing Star I, Blazing
17 Star II, Foxtail, and Freeborn wind projects. Upon their selection, we
18 negotiated and then ultimately entered into Purchase and Sale Agreements
19 (PSAs) with the developers of these sites to purchase the assets and transfer
20 permits and real-estate rights. All the PSAs provide that obtaining an ADP
21 from the Commission for the projects by August 2017 is a condition to
22 closing.

23

24 Q. HOW WILL THE COMPANY BUILD THE SELF-BUILD PROJECTS?

25 A. We will enter into BOP construction contracts with third-party construction
26 companies experienced in wind project construction. The BOP contracts
27 will be fixed-price contracts, which will minimize schedule and cost risk. On

1 February 15, 2017, we issued a firm-price RFP for construction companies
2 to provide bids to provide BOP services in support of our self-build
3 projects. The scope of the BOP contracts will include installation of the
4 wind turbines and construction of the site infrastructure. Site infrastructure
5 includes access roads, turbine foundations, an electrical cable collection
6 system, collection substations, and an operations and maintenance building.
7 The RFP bids were due to be submitted to us by March 27, 2017, which will
8 support the completion of all proposed projects before the 2020 PTC
9 deadline.

10
11 Q. IS THE COMPANY CONTINUING TO REVIEW THESE PROJECTS?

12 A. Yes. To help ensure prudent management of these projects, and consistent
13 with general industry practice, we will continue with iterations of the due
14 diligence review process until the closing date of the PSAs for each of the
15 four selected sites. The continued due diligence process is typical and
16 necessary to ensure the contractual deliverables for the site development are
17 timely received, and to further support our project development,
18 engineering, construction, and commissioning toward the planned in-service
19 dates.

20
21 Q. ARE THERE RISKS RELATED TO THE COMPANY'S DEVELOPMENT OF THE
22 SELF-BUILD PROJECTS?

23 A. Yes. As with any development project of size and scope, there are always
24 development risks. Xcel Energy has taken reasonable and prudent steps to
25 identify and mitigate these risks. I discuss these risks and the Company's
26 mitigation strategy later in my Direct Testimony.

27

1 **B. RFP Process**

2
3 Q. WHAT STEPS DID THE COMPANY UNDERTAKE TO INITIATE THE RFP PROCESS
4 FOR THE PPA AND BOT PROJECTS?

5 A. One initial step was to develop the RFP itself. The RFP identified eligible
6 resource options, outlined the treatment of transmission and interconnection
7 costs, explained how multiple proposals for the same project would be
8 treated, and provided a model wind PPA, sample BOT Term Sheet, and
9 Standard Bidder Forms. To ensure that the RFP process provided adequate
10 information and avoided bias, the Company hired an independent auditor,
11 Leidos Engineering, LLC. Mr. Martin expands on the Company's RFP
12 process in his Direct Testimony.

13
14 Q. WHAT KIND OF RESPONSE DID THE COMPANY GET TO THE RFP?

15 A. The RFP response was robust and included 17 bidders, 48 different wind
16 projects, nearly 10,000 MW of total proposed wind resources, and 95
17 proposals.

18
19 Q. HOW WERE THE BIDS EVALUATED?

20 A. We used a four-step evaluation, which included: (1) review for completeness
21 and satisfaction of threshold criteria; (2) calculation of the LCOE for all
22 PPA and BOT proposals; (3) non-price score and qualitative risk assessment;
23 and (4) final ranking of proposed projects and determination of the short-list
24 of projects to proceed to negotiations.

25

1 Q. DID THE COMPANY UNDERTAKE ADDITIONAL STEPS TO LEARN ABOUT THE
2 PROJECTS AFTER THEY WERE RANKED?

3 A. Yes. After we developed a short-list of projects to move forward, the
4 Company initiated conversations and negotiations with the parties whose
5 bids were selected for the short-list. Concurrent with negotiations, the
6 Company began thorough due diligence of the technical aspects of each
7 project.

8
9 Q. HOW DID THE COMPANY MAKE THE FINAL SELECTIONS?

10 A. We compared terms and inputs used to evaluate the self-build and RFP
11 projects as well as evaluate the total portfolio. We carefully considered the
12 fact that wind energy is at historically low prices, the proposed mix of owned
13 projects and purchased projects, and the economic effects of these projects
14 together as an aggregate. We concluded that each of the projects comprising
15 this portfolio is cost-effective and will result in significant customer benefits
16 on its own; that the RFP results confirmed the competitiveness of our self-
17 build portfolio; and that considered in the aggregate, the seven projects
18 comprising the Wind Portfolio are reasonable, prudent, and will bring
19 significant benefits to our customers.

20
21 Q. WAS THE PROCESS REVIEWED AND APPROVED BY THE INDEPENDENT
22 AUDITOR?

23 A. Yes. The independent auditor's report confirmed that the process utilized
24 was appropriate and that the Company complied with the process. Mr.
25 Martin supports the independent auditor's report in his Direct Testimony.

26

V. REGULATORY MATTERS

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26

Q. IS THE WIND PORTFOLIO CONSISTENT WITH THE COMMISSION’S APPROACH TO RESOURCE PLANNING?

A. The Commission has historically stated that its primary consideration in assessing the prudence of resource additions is that they be needed and least cost. We recognize that the Wind Portfolio is somewhat inconsistent with this paradigm, because we do not anticipate a load serving need to arise until the mid-2020s, after the Wind Portfolio will be fully in-service. The proposed Wind Portfolio is least-cost even though the load serving need will not arise for some years. This is because the Wind Portfolio will drive down overall system costs over its life and add capacity to the NSP System in anticipation of the 2025 need.

Q. HAS THE COMMISSION PREVIOUSLY APPROVED WIND PROJECTS FOR SIMILAR REASONS AS THE COMPANY IS REQUESTING FOR THE WIND PORTFOLIO?

A. Yes. The Commission approved the Courtenay, Odell, Pleasant Valley, and Border Winds projects in Case Nos. PU-13-706, PU-13-707, PU-13-708, and PU-13-742, respectively. The ADP that we seek in this proceeding is similar to the ADPs granted for those projects.

Q. WAS THE DECISION TO MOVE AHEAD WITH THE SPECIFIC PROJECTS COMPRISING THE WIND PORTFOLIO DRIVEN BY RENEWABLE ENERGY MANDATES?

A. No. Our Wind Portfolio is the result of our analysis of market conditions, the development of four well-priced Company-sponsored projects, and the

1 result of an RFP process that yielded substantial proposals at extremely
2 attractive pricing.

3
4 Q. SHOULD THE COMMISSION CONSIDER THE PROJECTS AS ONE INTEGRATED
5 PORTFOLIO?

6 A. Yes, the Company is requesting that the Commission grant an ADP for the
7 entire Wind Portfolio. However, we understand that the Commission may
8 elect to issue an ADP for certain projects in the Wind Portfolio and not
9 others.

10
11 Q. HOW IS THE WIND PORTFOLIO IMPLICATED IN THE COMPANY'S RESOURCE
12 TREATMENT FRAMEWORK (RTF) PROCEEDING?

13 A. As part of our proposed RTF, we have suggested that it may be appropriate
14 to not allocate the capacity, energy, revenues, and costs of the Wind
15 Portfolio to our North Dakota customers as part of a larger overall solution.
16 As discussed in the RTF application, we look forward to engaging in
17 discussions with the Commission and its Staff along with our stakeholders in
18 Minnesota and other NSPM states regarding how our Wind Portfolio should
19 be addressed as part of a broader solution. Consequently, the final
20 disposition of the Wind Portfolio could change as a result of the RTF
21 proceeding.

22
23 Q. DO ANY OF THE PROJECTS INCLUDED IN THE WIND PORTFOLIO REQUIRE
24 ADDITIONAL APPROVALS FROM THIS COMMISSION?

25 A. Yes. The Company plans to apply for a CPCN for the Foxtail project closer
26 to its completion and before closing the MSA with NextEra. Additionally,
27 we will require the Certificate of Site Compatibility for the Foxtail project be

1 transferred from its developer, NextEra, to the Company prior to owning
2 the project. NextEra will request that transfer closer to the closing of the
3 transaction.

4
5 I note that, under the Settlement Agreement in Case No. PU-12-813, the
6 Company may not recover any of the costs of the PPA projects – Clean
7 Energy #1 and the PPA portion of the Crown Ridge project – without the
8 Commission’s issuance of an ADP.

9
10 Consistent with the Commission’s precedent in Case No. PU-15-173, the
11 Company need not obtain merger approval pursuant to N.D.C.C. § 49-04-06
12 for the BOT contracts or the PSAs. Further, Xcel Energy is not aware of
13 any affiliate interest filings that must be made to consummate the self-build
14 projects.

15
16 With that said, should the Commission deem it necessary to issue approvals
17 pursuant to other sections of the North Dakota Century Code for the
18 Company to purchase, develop, and own any of the projects that make up
19 the Wind Portfolio, Xcel Energy respectfully requests that the Commission
20 grant such approvals should it grant ADPs for the Wind Portfolio.

21
22 Q. HAS THE COMPANY FILED ITS ADP REQUEST CONSISTENT WITH ITS FILING
23 OBLIGATIONS?

24 A. Yes. The Wind Portfolio is a resource addition larger than 50 MW so the
25 Company is obligated to file an ADP consistent with the Settlement
26 Agreement in Case No. PU-07-776. We are making this application within
27 fourteen days from the date we filed for approval in Minnesota, consistent

1 with our commitments in Case No. PU-12-59. Further, consistent with the
2 Commission's requirements in Case No. PU-12-59, the Company has
3 included conditions precedent in all of our contracts for the Wind Portfolio.
4

5 Q. IS THERE A TIMELINE BY WHICH THE COMPANY ASKS THAT THE ADP BE
6 GRANTED?

7 A. Yes, we request that an ADP be issued by the Commission in July 2017 to
8 facilitate timely project development.
9

10 VI. PRUDENCE OF THE RESOURCE ADDITION

11
12 Q. ARE THE PROPOSED RESOURCE ADDITIONS PRUDENT?

13 A. Yes. The Wind Portfolio will provide both quantitative and qualitative
14 benefits to our customers, and appropriately balances benefits and risks.
15

16 Q. PLEASE SUMMARIZE THE SYSTEM COST IMPACT OF THE WIND PORTFOLIO.

17 A. The Wind Portfolio represents a significant opportunity for the Company to
18 drive down overall system costs by capturing the lowest cost wind projects
19 that we have seen to date. This is due, in part, to the ability to fully capture
20 the Federal PTCs. Production at these facilities will displace more expensive
21 fossil fuel generation in our system or purchases in the MISO wholesale
22 market. Our modeling analysis indicated approximately \$1.6 billion in PVRR
23 savings to the NSP System over the life of the Wind Portfolio resulting from
24 making the resource additions, as compared to adding no wind in the same
25 period. We have analyzed the Wind Portfolio under a number of modeling
26 scenarios and in each and every one, adding the Wind Portfolio to the NSP

1 System provides material benefits to our customers through cost savings.
2 Company witness Mr. Martin discusses this savings impact in more detail.

3
4 Q. PLEASE SUMMARIZE ANY ADDITIONAL BENEFITS FROM ADDING THESE
5 RESOURCES.

6 A. The Wind Portfolio will also bring lasting social and economic benefits to
7 the communities where the projects are located and for all of the NSPM
8 states. These include the provision of low-cost energy to meet our
9 customers' needs, income to landowners in exchange for wind easements on
10 their property, the creation of hundreds of construction jobs, the creation of
11 dozens of ongoing maintenance jobs, and the contribution of tax revenues
12 and other fees for our communities and states.

13
14 Q. DO ANY OF THE PROJECTS IN THE WIND PORTFOLIO ENJOY A REBUTTABLE
15 PRESUMPTION OF PRUDENCE?

16 A. Yes. Because they are located in North Dakota, there is a rebuttable
17 presumption that the Foxtail and the Clean Energy #1 projects are prudent.
18 The Commission, in determining whether Foxtail and Clean Energy #1 are
19 prudent, must also consider the benefits of having these resource additions
20 located in North Dakota.

21
22 Q. WHAT ARE THE BENEFITS FOR NORTH DAKOTA FROM HAVING THE FOXTAIL
23 AND CLEAN ENERGY #1 PROJECTS LOCATED THERE?

24 A. Construction of the Foxtail and Clean Energy #1 projects will bring
25 numerous benefits to North Dakota. At Foxtail, approximately 150 workers
26 will be employed during the construction phase, and there will be
27 approximately 8 full-time jobs connected to the project once it is

1 operational. At Clean Energy #1, approximately 100 workers will be
2 employed during the construction phase, and there will be about 6 full-time
3 jobs connected to the project once it is operational. As to both projects, the
4 construction activity will result in activity for local businesses (stores, hotels,
5 services, housing, etc.) and sales and use tax contributions to the State of
6 North Dakota. The landowners will receive payment for use of their land,
7 and the project will generate several hundred thousand dollars of property
8 taxes each year for the State of North Dakota.

9
10 **VII. PRUDENT RISK MANAGEMENT**

11
12 Q. HAS THE COMPANY IDENTIFIED ANY RISKS ASSOCIATED WITH THE
13 PROPOSED WIND PORTFOLIO?

14 A: Yes. As with any large generating project, there are risks associated with the
15 development and operation of our proposed projects, whether self-build,
16 BOT, or PPA. However, we believe that we have identified, assessed and
17 mitigated major risks through prudent contracting practices and that it is
18 reasonable and in our customers' interest for the Commission to authorize
19 us to proceed with these projects.

20
21 Q: WHAT AREAS OF RISK HAS THE COMPANY IDENTIFIED?

22 A. The primary areas of risk we have identified are: (1) risks related to
23 qualifying for the Federal PTCs; (2) construction risks; (3) transmission risks;
24 (4) environmental risks; (5) operational risks; and (6) wind curtailment.
25 Below, I address the Company's mitigation of each of these risks in turn.

26

1 **A. PTC Risk**

2
3 Q. WHAT IS THE REQUIREMENT FOR THE COMPANY’S SELF-BUILD PROJECTS TO
4 QUALIFY FOR 100 PERCENT OF THE PTC AMOUNT?

5 A. In order to qualify for 100 percent of the PTC amount, our self-build
6 projects must begin construction in 2016 to qualify for the PTC “safe
7 harbor.”

8
9 Q. WHEN IS CONSTRUCTION CONSIDERED STARTED FOR PURPOSES OF THE SAFE
10 HARBOR?

11 A. By law, there are two ways to begin construction for purposes of the safe
12 harbor: (1) commencing “physical work of significant nature” at the project
13 site or at a factory on equipment for the project or (2) incurring at least five
14 percent of the total project cost. With respect to the five percent method, it
15 is important to note that costs are not incurred merely by spending money;
16 the developer must actually take delivery of the equipment within certain
17 timeframes. Under either safe-harbor method, the projects must be placed
18 in service within four years from the end of the year that construction
19 commenced.

20
21 Q. WHAT STEPS HAS THE COMPANY TAKEN TO MEET THE PTC SAFE HARBOR
22 REQUIREMENTS?

23 A. To meet the safe harbor requirements, **[TRADE SECRET BEGINS**

1 **TRADE SECRET**

2 **ENDS].**

3
4 Q. HOW HAS THE COMPANY MITIGATED THE RISKS RELATED TO QUALIFYING
5 FOR THE FEDERAL PTCs FOR ITS BOT AND PPA PROJECTS?

6 A. We have taken steps to maximize the chance that all seven of the projects in
7 the Wind Portfolio will qualify for 100 percent of the PTCs, and to
8 reasonably mitigate the risk of failing to so qualify.

9
10 In both the PPA and BOT agreements, the bidders assume the risk of
11 completing projects in the timeframe required to achieve the full PTC
12 benefit. Risk is further mitigated because we required the bidders to confirm
13 that they have turbines that qualify for PTCs through safe-harbor
14 mechanisms, and because Xcel Energy has its own portfolio of safe-harbor-
15 qualifying turbines that can also be used for the projects. As to the self-build
16 projects, the Company has purchased enough turbines to support our
17 projects and meet the five-percent safe-harbor requirement in September
18 2016. In addition, we have developed a comprehensive project schedule that
19 involves the sequenced construction of the four self-build projects and aims
20 to keep the projects on track to ensure qualification for 100 percent of the
21 PTCs.

22
23 Q. DOES THE TIMING OF OBTAINING APPROVAL FOR THE REQUESTED ADP
24 ALSO AFFECT PTC ELIGIBILITY?

25 A. Yes. In order to capture the full value of the PTCs, all projects in the Wind
26 Portfolio must be completed by 2020. Accordingly, we have developed a
27 project schedule that optimizes pricing and involves the sequenced

1 construction of the four self-build projects in the Wind Portfolio. To meet
2 our projected construction milestones, we will need to provide several
3 months' advanced notice to our suppliers and contractors. Therefore, to
4 meet our commitments and keep the projects on track to ensure
5 qualification for 100 percent of the PTCs, we respectfully request that the
6 Commission complete deliberations in this Case sometime in July 2017.

7
8 **B. Construction Risk**

9
10 Q: HOW DID THE COMPANY MITIGATE THE CONSTRUCTION RISK?

11 A: With regard to the BOT proposals, the projects all have agreements that
12 assign construction risk to the bidder. NSP does not purchase the projects
13 until construction is completed. This mitigates risk to the Company and to
14 its customers by eliminating any detrimental financial impact prior to the
15 projects' completion. In addition, the parties have also agreed to [TRADE
16 SECRET BEGINS

17
18 **TRADE**
19 **SECRET ENDS]**. Additionally, for BOT agreements, we have required
20 the bidders to meet our technical criteria for Company-owned facilities.
21 These technical criteria are based on our experience operating similar
22 facilities, and compliance with the criteria should mitigate the risk of
23 construction problems or setbacks.

24
25 With regard to the PPA agreements, NSP is also not obligated to make
26 payments to counterparties prior to the commercial operation date of the
27 projects. These agreements also have provisions similar to the BOT damage

1 provisions. Specifically, damages are recouped in the form of a security
2 requirement paid to NSP in the amount of [TRADE SECRET BEGINS
3 TRADE SECRET ENDS].
4

5 Finally, our self-build proposals have mitigated construction risk for our
6 customers by developing them as a single portfolio. This allows the
7 Company to spread construction risk among the four projects, so that a
8 construction issue with one project can be offset or balanced by efficiencies
9 achieved across the Wind Portfolio. Second, we have proposed the four 750
10 MW self-build projects as a group. In managing the projects this way, we
11 will be able to leverage economies of scale in project planning and execution,
12 and reduce the schedule-related risks typically associated with individual
13 projects.
14

15 **C. Transmission Risk**
16

17 Q. ARE THERE INTERCONNECTION AND OTHER TRANSMISSION RISKS
18 ASSOCIATED WITH THE PROPOSED RESOURCE ACQUISITIONS?

19 A. Yes. In fact, interconnection and other transmission risks can be some of
20 the largest development risks associated with our proposed wind additions.
21 To understand the interconnection and transmission issues, it is necessary to
22 provide a detailed explanation of the Midcontinent Independent System
23 Operator (MISO) network upgrade process.
24

25 Q. PLEASE DESCRIBE MISO'S NETWORK UPGRADE PROCESS.

26 A. All generation projects, including each of our four self-build projects, are
27 subject to MISO's Attachment X, Generator Interconnection Procedures

1 (GIP), which determine the network upgrades that will be required to
2 interconnect a certain project to the MISO transmission system. Pursuant to
3 the GIP, wind projects are assigned to one of the two annual Definitive
4 Planning Phase (DPP) cycles, according to the date each project satisfies all
5 of the requirements to enter a particular cycle. MISO is currently studying
6 the February 2016 DPP.

7
8 Q. HOW DOES MISO'S DPP PROCESS AFFECT ESTIMATION OF THE COSTS OF
9 NETWORK UPGRADES?

10 A. Estimating potential network upgrades costs for projects in upcoming DPP
11 cycles has always involved some level of uncertainty, but is more challenging
12 today than in the past. This is largely due to the amount of wind generation
13 that producers are asking to add to the MISO system, the delays associated
14 with processing of the MISO interconnection queue, the way that upgrades
15 and their costs are assigned to projects in the queue, and the number of
16 projects that actually move forward once the studies are complete. For
17 example, if MISO were to determine that a significant network upgrade
18 (such as a new transmission line) were required for the August 2015 DPP
19 cycle, it would apportion the costs of that upgrade to the projects within that
20 DPP cycle. Each individual project developer would then decide whether to
21 proceed with their project in light of the assigned network upgrade costs. If
22 some of the projects withdraw their interconnection application to MISO,
23 the costs of the network upgrades are reallocated to the remaining projects
24 in that DPP cycle. If all—or enough projects to eliminate the need for the
25 upgrade within a DPP cycle—drop out, then the network upgrade is not
26 completed during that cycle and will likely get passed onto the next DPP
27 cycle.

1
2 In this way, network upgrades can “cascade” through the MISO queue
3 depending on whether developers ahead in the queue decide to proceed with
4 their projects and the assigned upgrades, or withdraw their interconnection
5 applications due to the upgrade costs. This cascade effect has also required
6 MISO to restudy projects later in the MISO queue to determine how to
7 reallocate network upgrades and costs when earlier projects withdraw. This
8 process—combined with the increased number of total projects in the
9 MISO queue—has created significant uncertainty for any project that does
10 not already have a signed interconnection agreement. This uncertainty will
11 apply to both our self-build Wind Portfolio and any project bids received in
12 the RFP process that do not already have a signed interconnection
13 agreement.

14
15 Q. IN LIGHT OF THIS UNCERTAINTY, HOW DID THE COMPANY ADDRESS THE
16 RISKS ASSOCIATED WITH THE MISO QUEUE AND NETWORK UPGRADES FOR
17 ITS SELF-BUILD PROJECTS?

18 A. We addressed the risks associated with the MISO queue and network
19 upgrades in two ways. First, we analyzed each of our projects and their
20 respective positions in the MISO queue, and we have included a good-faith
21 estimate of capital for network upgrades for certain projects. Second, as we
22 did in connection with the Borders Winds project, we have negotiated
23 contractual rights in each of our site PSAs that give us the ability to
24 terminate the contracts if network upgrade costs exceed a predetermined
25 amount in each contract, making the project unviable.

26

1 Q. HOW HAS THE COMPANY MITIGATED POTENTIAL TRANSMISSION RISKS FOR
2 THE BOT AND PPA PROJECTS?

3 A. With regard to Crowned Ridge, Lake Benton, and Clean Energy #1, we
4 believe transmission risk has been reasonably mitigated in our agreements
5 with developers, and by prioritizing transmission certainty within the MISO
6 study queue process as a factor in the Non-Price Review.

7

8 **D. Environmental Risks**

9

10 Q. HOW HAS THE COMPANY MITIGATED POTENTIAL ENVIRONMENTAL RISKS
11 FOR THE SELF-BUILD PROJECTS?

12 A. For the self-build projects, the developers are responsible for applicable
13 environmental permits, licenses, and approvals from any governmental
14 authority required under applicable laws for construction, ownership,
15 operations, and maintenance of the site prior to transfer of ownership to the
16 Company. Xcel Energy will obtain the necessary construction storm water
17 permit, but all other permits are obtained by the developer prior to
18 construction.

19

20 For all four of the self-build projects, pre-construction wildlife studies have
21 been initiated or completed in general accordance with Tiers 1 through 3 of
22 the U.S. Fish and Wildlife Service's (USFWS) Land Based Wind Energy
23 Guidelines. For Freeborn and Blazing Star I & II, these studies support an
24 Avian and Bat Protection Plan (ABPP), which is required by the State of
25 Minnesota. A draft ABPP for Blazing Star I was filed with a draft site

1 permit for the project in late 2016,² and ABPPs for Blazing Star II and
2 Freeborn are expected to be developed in coordination with their respective
3 site permit applications, which have not yet been filed. Although the State
4 of North Dakota does not currently require an ABPP for issuance of a CSC,
5 Tier 1 through 3 studies have been completed for the Foxtail project and will
6 be used to characterize risks to wildlife within the framework of a voluntary
7 wildlife conservation strategy created by the developer. Additional
8 consultation with the USFWS on the self-build projects will occur once
9 transfer of ownership of the self-build projects is complete.

10
11 Q. HOW HAS THE COMPANY MITIGATED POTENTIAL ENVIRONMENTAL RISKS
12 FOR THE PPA AND BOT PROJECTS?

13 A. For the PPA and BOT projects, the agreements provide that the bidder is
14 responsible for all applicable environmental permits, licenses, and approvals
15 from any governmental authority required under applicable laws for
16 construction, ownership, operations, and maintenance of the facility prior to
17 transfer of ownership to the Company.

18
19 Each of the PPA and BOT projects are expected to have minimal impact on
20 avian and bat species, based on research that has been performed in the
21 region specific to the environmental impacts of wind energy. For Clean
22 Energy #1, ACE has completed the studies related to the ABPP as required
23 by the State of Minnesota and received its permit through the Large Wind
24 Energy Conversion System (LWECS) permitting process. As such, we
25 believe the environmental risk related to this project has been sufficiently

² *In the Matter of the Application of Blazing Star Wind Farm, LLC for a Site Permit for the up to 200 Megawatt Blazing Star Wind Project in Lincoln County, Minnesota*, Docket No. IP6961/WS-16-686, SITE PERMIT APPLICATION at Appendix G (Sept. 2, 2016).

1 mitigated. With regard to Crowned Ridge and Lake Benton, NextEra has
2 begun these studies and will provide the permits once available. Xcel Energy
3 has also conducted its own analysis to assess the risks related to
4 environmental permitting. We believe that these projects are likely to receive
5 the permitting required and will be able to reach commercial operation in the
6 timeline proposed by NextEra.

7
8 **E. Operational Risk**

9
10 Q: HOW DID THE COMPANY ADDRESS ANY OPERATIONAL RISKS FOR THE PPA
11 PROJECTS?

12 A: Once in service, the projects face operational risks, principally uncertainty as
13 to the amount of annual generation and the real-time delivery of that power
14 to our customers, resulting from power production and curtailment.
15 Crowned Ridge and Clean Energy #1 are designed to compensate the
16 counterparties for the actual electric energy delivered from the wind farms.
17 This incentivizes the counterparties to properly maintain their turbines and
18 maximize production. The operational risks associated with owned projects
19 (whether BOT or self-build) remain with the Company through its
20 ownership, but are largely offset by the benefits of ownership. With respect
21 to curtailment, wind developers are typically paid by the utility in the event
22 that their project is curtailed. Additionally, our customers will not pay for
23 curtailments associated with emergencies or transmission system
24 maintenance outages.

25
26 Q. HOW HAS THE COMPANY MITIGATED OPERATIONAL RISKS FOR THE
27 PROJECTS IT WILL ULTIMATELY OWN?

1 A. For the self-build and the BOT projects, the operational risks remain with
2 the Company, through its ownership. Additionally, owned projects have
3 some uncertainty in annual costs for operation and maintenance. However,
4 these risks are offset by higher estimated benefits from Company ownership.
5 For example, to the extent that annual generation at the Company-owned
6 projects is lower than expected, the overall cost-effectiveness of the project
7 would decrease. Conversely, however, if annual generation is greater than
8 expected, our customer benefits from the project would increase.

9

10 Q. HAS THE COMPANY DONE ANYTHING ELSE TO MITIGATE OPERATIONAL
11 RISKS?

12 A. Yes. We included what we believe to be conservative assumptions in our
13 economic analysis, and also included sensitivities that explore the impacts of
14 a number of different downside scenarios. Likewise, we have adjusted
15 capacity factors based on direction from our consultants, and our sensitivity
16 analyses that use even lower capacity factors still demonstrate substantial
17 savings for customers.

18

19 Q. IS WIND CURTAILMENT A CONCERN WITH REGARD TO THE WIND
20 PORTFOLIO?

21 A. Yes. Some level of wind curtailment occurs during the life of all wind
22 projects.

23

24 Q. WHAT IS DRIVING WIND CURTAILMENT?

25 A. The largest driver of curtailment over the life of the seven projects in the
26 Wind Portfolio is likely to be regional congestion. Recently, regional
27 transmission has suffered from congestion due to the significant

1 concentration of wind facility operations in southern Minnesota and all
2 through Iowa, which is continuing to increase. The required transmission
3 upgrades for some of the new wind projects going into service between 2016
4 and 2020 will not all be in service by the time the projects begin producing
5 energy. This will have a negative effect on Locational Marginal Pricing
6 (LMP) in MISO that could potentially also impact real-time wind generation
7 on the NSP System. On the other hand, we expect that significant planned
8 transmission improvements in the region, such as the CapX2020
9 transmission projects (CapX2020) and the MISO Multi-Value Projects
10 (MVP), will positively impact curtailment of our proposed wind projects by
11 creating additional transmission outlet and reducing local and regional
12 congestion. Ultimately, the amount of curtailment will depend on the in-
13 service timing of the numerous wind generation projects currently in the
14 development queue.

15
16 Q. HAS THE COMPANY ANALYZED THE POSSIBILITY OF WIND CURTAILMENT AS
17 IT MAY AFFECT THE SEVEN PROJECTS IN THE WIND PORTFOLIO?

18 A. Yes. To analyze the potential level of curtailment, we performed PROMOD
19 studies, used historical curtailment data along with knowledge of the
20 transmission system, and reviewed other studies. Our PROMOD
21 simulations indicated curtailments will be minimal for the seven projects in
22 the Wind Portfolio. The historical curtailment data indicated that wind
23 curtailment is small compared to the total wind generation delivered:
24 between 2003 and 2016, the amount of curtailment varied year by year, but
25 eventually stabilized below 3.8 percent. In addition, the RFP requested that
26 the bidders provide an analysis and discussion of the issues surrounding
27 congestion and expected curtailments pertaining to their project(s). The

1 analysis provided by the winning bidders (and other bidders not chosen
2 under this RFP) all indicated minimal curtailment risk for projects.

3
4 Q. WHEN WILL THE SEVEN PROJECTS IN THE WIND PORTFOLIO BE MOST
5 AFFECTED BY WIND CURTAILMENT?

6 A. Curtailment is expected to be higher around the time the projects go online,
7 and then is expected to decline as new transmission and other changes on
8 the MISO system occur to better accommodate the increase in wind
9 generation resulting from the addition of the projects. The reason
10 curtailment is expected to be higher at the beginning is that one or more of
11 the projects may go into service before all required transmission facilities are
12 completed, both locally and regionally on the MISO system.

13
14 Q. WHAT DOES THE COMPANY EXPECT THE AMOUNT OF WIND CURTAILMENT
15 TO BE FOR THE WIND PORTFOLIO?

16 A. We expect curtailment to range from as low as two percent to as high as six
17 percent. Curtailment rates may initially be high and then decline to a lower
18 rate such as the two percent in the MRITS. Therefore, our estimate is that
19 over the lifetime of these wind projects the overall average curtailment rate
20 will be approximately four percent.

21
22 Q. HOW DOES THE STRUCTURAL DIVERSITY OF THE WIND PORTFOLIO FURTHER
23 REDUCE RISK?

24 A. The 1,550 MW Wind Portfolio contains a mix of both PPA and Company-
25 owned resources. Specifically, 1,150 MW will be Company-owned and 400
26 MW will be PPAs. A balance of ownership structures ensures that our
27 customers obtain the benefits of each ownership structure, and that the cost

1 and risks are appropriately balanced. By diversifying locations, ownership
2 structures, and timelines, the risks associated with any one project are
3 minimized and balanced by the existence of other projects.
4

5 **VIII. PRESENTATION OF WITNESSES**

6
7 Q. WHO ARE THE WITNESSES FOR THE COMPANY IN THIS PROCEEDING?

8 A. In addition to my Policy Testimony, the Company sponsors the following
9 witness:

- 10
- 11 • P.J. Martin addresses the process by which the resource additions
12 comprising the Wind Portfolio were identified and developed, including
13 the Company's RFP and its analysis of the bids received; provides a
14 detailed description of the projects comprising the Wind Portfolio; and
15 provides a detailed discussion of the economic analysis and rate impacts
16 associated with the Wind Portfolio.
17

18 **IX. CONCLUSION**

19
20 Q. PLEASE SUMMARIZE YOUR TESTIMONY.

21 A. We have a unique opportunity to prudently secure a significant amount of
22 wind resources at the lowest-cost we have seen to date. We undertook a
23 detailed process of identifying competitive projects and analyzing the
24 potential costs and risks. The result was the Wind Portfolio. The Wind
25 Portfolio will provide significant quantitative and qualitative benefits to our
26 customers, and appropriately balances benefits and risks.
27

- 1 Q. DOES THIS CONCLUDE YOUR PRE-FILED DIRECT TESTIMONY?
- 2 A. Yes, it does.

Aakash H. Chandarana
Regional VP, Rates and Regulatory Affairs
NSPM

Aakash Chandarana is Regional Vice President of Rates and Regulatory Affairs – Minnesota. He is responsible for Xcel Energy’s regulatory filings with the utility commissions in Minnesota, North Dakota, and South Dakota.

Chandarana joined Xcel Energy in 2013 as Lead Assistant General Counsel – Regulatory North where he was the lead regulatory attorney for Xcel Energy’s operations in Minnesota, North Dakota, South Dakota, Wisconsin, and Michigan. He represented Xcel Energy in regulatory proceedings and handled most issues related to rate cases, nuclear issues, fuel costs, depreciation, renewable energy, and resource planning. In January 2015, he was promoted to his current role. He has more than 10 years of experience in energy and regulation.

Chandarana serves on the Finance Board of the Boys and Girls Club. He also is a member of the Minnesota State Bar Association.

Prior to joining Xcel Energy, Chandarana was a partner at the law firm of Briggs and Morgan where his practice focused on the energy industry. He represented utilities in commercial transactions involving generation interconnection agreements, power purchase agreements, and regulatory proceedings.

Chandarana received his B.A. in biology and business management from Washington University in St. Louis and his law degree from Washington University in St. Louis School of Law.

