



414 Nicollet Mall  
Minneapolis, MN 55401

February 22, 2016

—Via Electronic Filing—

Daniel P. Wolf  
Executive Secretary  
Minnesota Public Utilities Commission  
121 7<sup>th</sup> Place East, Suite 350  
St. Paul, MN 55101

RE: REPLY COMMENTS  
BIENNIAL DISTRIBUTION GRID MODERNIZATION REPORT  
DOCKET NO. E002/M-15-962

Dear Mr. Wolf:

Northern States Power Company, doing business as Xcel Energy, submits these Reply Comments in response to the parties who submitted comments on January 4, 2016 in the above-referenced Docket.

Pursuant to Minn. Stat. §216.17, subd. 3, we have electronically filed this document with the Minnesota Public Utilities Commission, and copies have been served on all parties on the attached service list. Please contact Carolyn Brouillard at 612-330-5571 if you have any questions regarding this filing.

Sincerely,

/s/

BRIA E. SHEA  
REGULATORY MANAGER

Enclosures  
c: Service List

STATE OF MINNESOTA  
BEFORE THE  
MINNESOTA PUBLIC UTILITIES COMMISSION

|                         |              |
|-------------------------|--------------|
| Beverly Jones Heydinger | Chair        |
| Nancy Lange             | Commissioner |
| Dan Lipschultz          | Commissioner |
| Matthew Schuenger       | Commissioner |
| John Tuma               | Commissioner |

IN THE MATTER OF NORTHERN STATES  
POWER COMPANY'S 2015 BIENNIAL  
DISTRIBUTION GRID MODERNIZATION  
REPORT

DOCKET No. E002/M-15-962

**REPLY COMMENTS**

**OVERVIEW**

Northern States Power Company, doing business as Xcel Energy, submits to the Minnesota Public Utilities Commission these Reply Comments in response to Parties' Comments submitted January 4, 2016 on our Grid Modernization Report. We appreciate the opportunity to respond to Parties and to provide additional support for our request.

The Transmission Cost Adjustment statute requires Commission certification of projects in order for project costs to be recoverable through the Transmission Cost Recovery (TCR) rider.<sup>1</sup> Projects that receive certification by the June 1 statutory deadline may be included in the next TCR rider petition, which is expected to be filed by October 1.<sup>2</sup> So as not to foreclose the opportunity to request cost recovery through our next TCR petition, we respectfully request the Commission certify our proposed priority projects through this proceeding and in accordance with the statutory deadline. With the additional information provided in our Reply, including confirmation that these project costs are not included in our pending rate case, we believe we have provided sufficient information to support a Commission decision that the priority projects we are proposing have merit and may be included in the next TCR rider petition.

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<sup>1</sup> Minn. Stat. § 216B.16, subd. 7b

<sup>2</sup> Minn. Stat. § 216B.2425, subd. 3

Our Reply is organized as follows:

- A. Introduction
- B. Path to Modernizing the Distribution Grid
- C. Delay is Unnecessary
- D. Proposed Projects for Certification
- E. Certification Process
- F. Criteria
- G. Notice Requirements
- H. Future Grid Modernization Filings
- I. Other Issues

## **REPLY COMMENTS**

In these Reply Comments, we address the key issues raised by Parties and supplement the record with additional detail on the proposed projects.

### **A. Introduction**

We are encouraged by the generally broad support for grid modernization and the evolution of the grid from a predominantly one-way system to an integrated network of centralized and decentralized energy resources. Through our own initiatives and continued partnerships with the Electric Power Research Institute and other industry stakeholders, we have taken a number of steps to prepare our distribution grid for the future. Our October 30<sup>th</sup> Report outlined several additional efforts currently underway or under consideration, including two priority projects: (1) Advanced Distribution Management System (ADMS) and (2) Belle Plaine Solar Plus Battery Storage (SPBS) demonstration project. We have great confidence in our ability to test innovative technologies and applications and successfully deploy those that will bring value to our customers.

The amendments to Minn. Stat. § 216B.2425 allowing more timely recovery of grid modernization investments are a signal of support and encouragement to move ahead with prudent and strategic investments that will increase the capabilities of the grid. By allowing for more timely recovery of actual costs outside of a rate case, riders are an effective tool to promote certain types of investments and activities. The Legislature has taken similar steps in the past to promote desired investments and policy objectives, including establishing riders for conservation expenses, renewable energy projects and emissions reduction projects. Recovery through a rider for our proposed grid modernization projects would meet the goal of furthering these efforts

and supporting this policy objective, which is already the focus of the Commission's ongoing investigation on grid modernization.<sup>3</sup>

Our Biennial Transmission and Distribution Report and request for certification of two important grid modernization projects complement the Commission's larger grid modernization investigation, while the rider allows us to begin work on foundational aspects of a modernized distribution grid and obtain the operational experience to prepare for the opportunities of the future. As discussed further below, we believe the Commission can certify our priority projects in this proceeding while the other dockets are ongoing, and that there is no need for a rulemaking prior to reviewing our request to certify our proposed priority projects.

## **B. Path to Modernizing the Distribution Grid**

The utility industry is in a time of change. One of the more exciting changes is the evolution of technology to enable the distribution system to transform from a one-way energy delivery system to a two-way, interoperable network. Grid modernization represents a longer-term evolution of the connection of customers to the energy system and the value chains that will use the distribution grid as a platform. As such, the amendments to Minn. Stat. § 216B.2425 provide utilities with an opportunity to identify priority projects that work toward the benefit of grid modernization efforts, obtain rider recovery for these projects, and continue the work necessary to achieve a modern distribution grid.

Grid modernization will provide significant benefits to our customers and we look forward to capturing these benefits for them as technology continues to evolve. Integral to this evolution are opportunities to learn and deploy technologies in a stepwise manner. We have discussed this "building block" approach in terms of how we envision implementing our grid modernization strategy. Under that approach, we focus first on the foundational technologies and capabilities that are needed to support the next tier of applications and so forth. As we gain experience and technology evolves – including standards, protocols and potentially market rules – we can add more functions and capabilities. By utilizing a building blocks approach, we are structuring our grid modernization efforts in a way that will keep pace with technology while preserving our flexibility to adapt to what the future may hold. This approach is similar to the "walk-jog-run" framework advocated in California's More Than Smart initiative, which allows for development of the distribution system and

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<sup>3</sup> Docket No. E999/CI-15-556

DER integration capabilities over time as DER adoption increases.<sup>4</sup> Attachment A provides a graphic representation of this framework.

Developing our own operational experience in deploying and managing these emerging technologies is part of this process. As the pace of technological innovation continues to move forward, it is important for us to gain our own experience with these emerging technologies to ensure the continued safe and reliable operation of the distribution grid. The development of demonstration projects to understand these technologies, their operations in the Minnesota climate, their impact to the distribution grid, and other opportunities to learn is a key component of our building blocks approach. This knowledge is important for us to develop so that we can understand not only operational aspects of grid modernization technologies, but also begin to create best practices.

Developing this experience falls squarely within our duties as a regulated utility to provide high quality, reliable service that customers can depend on. The services and products available to customers will certainly expand, but this expansion should be achieved in a way that maintains appropriate regulatory oversight over implementation of new technologies to ensure the continued safe and reliable delivery of electricity to customers.

Many states are now in the process of adopting grid modernization efforts into their specific regulatory paradigms or, in places such as New York, completely overhauling their regulatory structures to anticipate and create a different energy future. We believe that the amendments to Minn. Stat. § 216B.2425 signal legislative approval of efforts to modernize the grid within Minnesota's regulatory paradigm—a paradigm that can appropriately guide the evolution of the distribution grid while ensuring a continued focus on the reliability of electric service and protection of customers.

Minnesota has maintained a regulatory compact based on strong regulatory oversight of vertically integrated utilities. This has served customers, utilities, and the state well for many years and we believe will continue to do so into the future. It has enabled the state to be at the forefront of implementation of progressive energy policy while maintaining reliable electric service to customers at reasonable cost. It also allows for a holistic, comprehensive approach to energy system transformation by allowing all components of the energy system to be evaluated together, along with ratemaking and policy decisions. Under this regulatory paradigm, our responsibility as a vertically integrated utility to generate electricity, transmit it to the distribution grid, and distribute it to our customers is integral to our legal obligation to serve within our

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<sup>4</sup> <http://morethansmart.org/mts-walkjogrun-framework/>

statutory service territory. And, under this model, we are held accountable to our customers by the Commission for all aspects of the essential service we provide.

We appreciate commenters', especially Energy Freedom Coalition of America's (EFCA), analysis of the grid modernization efforts underway in other states. The work being done throughout the nation can, and should, inform our work here in Minnesota. However, it is also necessary to recognize the context in which states such as New York and California are pursuing grid modernization. Those states do not maintain a vertically integrated utility model. Rather, they have devolved much of the generation and transmission matters in those states to market forces leaving only the distribution system regulated by the state commission. Based on their market experience, the grid modernization-related regulatory issues in those states are more focused on efficient operation of markets for DERs, as they determine ways to price their value and develop markets. In that context, robust third-party participation at the distribution level is necessary.

In contrast, our grid modernization plans fit well within Minnesota's regulatory structures and provide for continuing Commission oversight and customer protections. As Minnesota stakeholders work together to transform the energy system, we support taking a holistic view to ensure reforms are considered together and result in a package that will support utility financial health. This has been the approach of Minnesota's e21 Initiative. While there may come a time when more of a utility's resource needs are open to competitive solicitation and met by a broader variety of resources, this must be enabled by a regulatory and rate framework that is aligned with those goals and appropriately balances interests.

In the meantime, we believe the priority grid modernization projects we have proposed in this docket move us in the right direction and will help us create the distribution platform that will bring new opportunities for our customers and other stakeholders. Our ADMS project provides a key building block of a modern grid and is a necessary prerequisite for efficient addition of DERs on our system. Our SPBS project is a demonstration project that will provide us with operational experience for the use of battery storage tied directly into our distribution grid. Contrary to the strong instance of some commenters who seek to expand particular business opportunities very early in the grid modernization process, we do not interpret the amendments to Minn. Stat. § 216B.2425 to require an RFP for grid services. Rather, we believe it is intended to provide rate recovery tools to support projects that allow us to modernize the grid in support of evolving technologies while maintaining Commission oversight over the reliability of the distribution grid. Both of our priority projects will be instrumental in meeting these policy goals.

### **C. Delay is Unnecessary**

We recognize there is uncertainty around the outcomes of the Commission’s investigation into grid modernization given that the Staff report has not yet been released or put out for comment. However, we believe that it is appropriate for the Commission to move forward on our request for certification of our two priority projects and that no rulemaking is necessary.

Uncertainty is likely to emerge more frequently as we—as a utility and as a state—navigate technological, market and policy changes. One option is to pause until all questions can be answered, plans finalized, and dockets concluded. Should the Commission wish to move slowly on these issues, this may be a reasonable path. However, the risks of this option include missed opportunities, delayed progress on grid modernization and other efforts, and creation of a static set of rules that are slow or fail to adapt to ongoing change. Another option is to proceed with the best available information, while preserving the opportunity to learn and adapt as we gain additional experience. At this time, we believe the latter path best balances different stakeholder objectives and ensures continued progress.

Similarly, as might be expected with new policy direction from the Legislature, the new grid modernization statute leaves some open questions, including those posed by the Commission in their Notice. While initiating a rulemaking is one option available to answer these questions, we believe the process initiated by the Notice in this docket is the better path for several reasons.

First, we believe there is support for moving ahead with grid modernization investments in the near term. A rulemaking may take several years to complete, during which time there would be considerable uncertainty around the cost recovery pathway, potentially impeding project progress. Additionally, given the ongoing learning in the industry and continued evolution of the technological landscape, it is possible that rules finalized in the near-term would quickly be found to be misaligned or inadequate for the future. Thus, there is the risk that a rulemaking to address issues raised in this docket may not result in the clarity and direction sought by the Department at this time.

Second, we are keenly aware of the resource constraints facing the Department and Commission Staff and the resources required on behalf of all Parties to participate in the myriad dockets currently pending. Undertaking a rulemaking at this time would further burden Parties with a process that could likely be resolved, at least for the instant request, in a less resource-intensive manner through this proceeding.

Finally, we believe a rulemaking in this case is unnecessary as the Commission has a long history of interpreting statute absent formal rulemaking procedures and there are similar processes that could serve as guides for implementation. Given the apparent absence of insurmountable disagreements or barriers in this case, it is unclear what advantage a formal rulemaking process would have over finding ways to move forward in this docket. However, should the Commission agree a rulemaking is necessary, we believe it appropriate to do so in parallel with the review of our Grid Modernization Report, given that our request is narrowly-focused and important to making progress on grid modernization.

### **C. Proposed Projects for Certification**

We appreciate Parties' interest in these projects and their desire to receive additional detail and information. Below we provide further discussion of potential benefits and costs, alternatives considered, and links to state energy policy. But first, we would like to clarify that the ADMS and SPBS project costs proposed for rider recovery are not included in our pending rate case. For the ADMS, there is approximately \$4.4 million included in the pending rate case for related IT design and scoping analysis completed to date, representing the first phase of a much longer effort. While future rider requests will likely include ADMS-related IT investments, we determined the rate case would be the better avenue for the \$4.4 million of known costs attributable to this early phase of work. A new work order will be opened for future IT costs to facilitate clear tracking. For the SPBS project, we believe there might have been some confusion with an unrelated switch replacement project outside the Belle Plaine substation and confirm that those costs are not part of our SPBS request.

#### *1. Advanced Distribution Management System (ADMS)*

As defined by the Department of Energy's (DOE) report "Insights Into Advanced Distribution Management Systems,"<sup>5</sup> an ADMS system is:

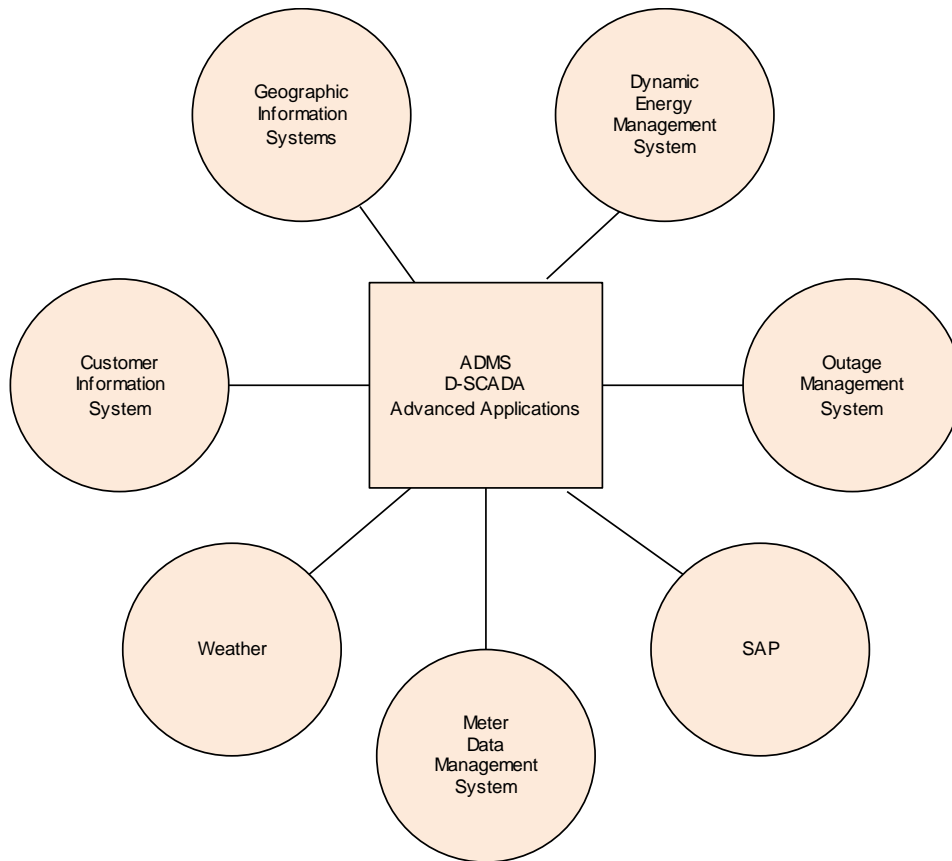
*...a software platform that integrates numerous utility systems and provides automated outage restoration and optimization of distribution grid performance. ADMS functions can include automated fault location, isolation, and service restoration (FLISR); conservation voltage reduction; peak demand management; and volt/ volt-ampere reactive (volt/ VAR) optimization. In effect, an ADMS transitions utilities from paperwork, manual processes, and siloed software systems to systems with real-time and near-real-time data, automated processes, and integrated systems.*

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<sup>5</sup> U.S. Department of Energy. Voices of Experience: Insights into Advanced Distribution Management Systems (February 2015)



As discussed in our Report, the ADMS is a foundational and essential investment in software that makes grid transformation and much of what our stakeholders are asking for possible. For example, as discussed in greater detail below, an ADMS facilitates the expansion of DER by allowing, in conjunction with other controls, active mitigation of potentially problematic voltage and load situations. The following graphic represents the role of ADMS in integrating systems.<sup>6</sup>



#### a. Benefits

The ADMS is expected to enable a broad range of benefits in the following areas:

- Reliability
- Power quality
- Efficiency
- Conservation
- Hosting capacity

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<sup>6</sup> This graphic is illustrative. There are many possible ADMS configurations.

We provide brief discussion of these benefits below. We also refer Parties to the section on ADMS benefits in our October 30<sup>th</sup> Report. Additionally, we are open to further discussion with stakeholders about what ADMS capabilities to enable and when, recognizing that there may at times be trade-offs or need for additional investment.

We also believe ADMS provides for “future-proofing” of the distribution grid by its ability to adapt to open standards and changing communication protocols (*i.e.*, IPv6), as well as by its ability to model future devices and DER, incorporating their behavior into the grid operational model without compromising existing devices or capabilities. This is how we expect new technologies will be enabled on the grid and how interoperability with existing technology will be realized.

*i. Reliability*

There are several ways that ADMS will substantially improve reliability as experienced by our customers. For example, when a fault does occur, the tool will shorten restoration times. Working in conjunction with modern relays, it accomplishes this through calculating the probable location of the problem, which identifies where we need to send line workers. Additionally, through automated switching (*i.e.*, FLISR), we will be able to quickly isolate the affected area, restoring service to the majority of affected customers within seconds. Both of these capabilities are “enabled” applications; maximizing the benefit depends on continued investments in relays and switches.

ADMS will also help us avoid outages by warning of impending overloads. We can use the tool to accurately predict circuit loading before switching events, and, when coupled with forecasting tools, we will be able to avoid overloads that may occur due to a sudden increase of load or a decrease in distributed generation output.

We estimate that automation of approximately 100 feeders over the next three years would result in a 3.4 minute reduction in SAIDI for the Minnesota jurisdiction, equivalent to 4,240,000 Customer Minutes Out of Service (CMO). An incremental investment in automated switches will also be needed to achieve this benefit. Additional improvement will be realized in subsequent years as we continue to invest in switches.

*ii. Power Quality*

Because ADMS will enable better insight and control over voltage levels, we will reduce the risk of over or under-voltage. While these situations are rare, they can result in serious problems for customer equipment.

*iii. Efficiency*

The ADMS will suggest switching that could reduce distribution line losses. Because there are other considerations such as reliability, we are unsure to what extent we will be able to act on these suggestions, but having the recommendation is the initial step and represents new information that we currently do not have.

*iv. Conservation*

Establishing ADMS is a prerequisite to implementation of the Integrated Voltage and VAR Optimization (IVVO) application, which could enable a one percent reduction in the total NSP-MN demand. The investments we have made to install capacitor controllers have already paid dividends in efficiency by improving power factor (reducing losses), and can be leveraged to provide the additional benefits of demand response and/or lowered energy use.

Energy conservation then can be achieved by using IVVO in a mode whereby we reduce operating voltage to the lower end of permissible bandwidth, a mode commonly referred to as Dynamic Voltage Optimization (DVO) or Conservation Voltage Reduction (CVR). Demand response can be achieved by using the same technology to reduce voltage (and thus load) coincident with a specific need, such as loss of generation. Automated Metering Infrastructure (AMI) is the best method to ensure DVO performance provides adequate voltage for all customers. Some investment in the substation will be necessary for communications and control equipment as well. ADMS will be specified to provide all foreseeable control methodologies.

*v. Hosting Capacity*

ADMS will increase hosting capacity, which is the amount of distributed energy that can be hosted on the distribution system. As penetration levels increase and drive the need, we expect ADMS to inform and/or control DER setpoints. We believe that this will result in more precise controls, which would allow for higher penetration. In addition, ADMS will enable planned and real-time analysis of DER hosting capacity for abnormal system configurations. We believe this will mitigate potential hosting

limitations for abnormal configurations. At high penetrations, forecasting DER output and interfacing with operational awareness will be valuable for both.

While analysis has yet to be done to quantify the increase that may result from ADMS, we agree with researchers who believe that ADMS may provide a substantial hosting capacity improvement.

#### b. Costs

Designing and deploying an ADMS over a large geographic footprint is a complex effort that we expect to take two to four years. To support our decision-making on implementing an ADMS, we reached out to others in the industry to learn from their experiences. For example, we consulted multiple utilities who had implemented various aspects of ADMS. Each utility shared their challenges associated with the implementation, but also validated the benefits they realized with their new ADMS. One of these challenges is articulated in the DOE report referenced above, which states:

*Making the business case is one of the most significant challenges associated with ADMS. An ADMS can be difficult to justify using traditional business case methodology that compares the cost of the technology to the cost savings or increased revenue associated with the benefits. Time frames for implementation tend to be long, and because it is an emerging technology, there is a lack of solid information about the true cost and the long-term benefits of this significant investment.<sup>7</sup>*

We note this to highlight the different nature of many grid modernization investments compared to more traditional investments and the continued need to capture the information and experience necessary to assign quantifiable benefits and costs to future grid modernization investments.

Notwithstanding this challenge, we are working to refine our cost estimates and expect to have complete budget estimates in time for our October 1, 2016 rider petition. The Company has recently completed an extensive vendor selection process and is currently working to select a Systems Integrator to support the design and implementation of the ADMS. The costs listed below are preliminary and provide an illustrative ballpark of total expected costs. Cost accuracy improves significantly after the detail design phase of the project is completed. Thus, while these are our best and most current estimates of ADMS project costs, they are preliminary and subject to change as we work with our selected vendor to finalize the design and implementation

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<sup>7</sup> Ibid

plan. Again, we commit to providing a complete analysis in our October 1, 2016 petition.

The cost estimates below are based on vendor software, hardware, and implementation estimates, System Integrator labor estimates, and Xcel Energy project planning estimates. The project has not yet started detailed design, so these costs will have a wide range of variability at this point in the project. Although ADMS is an Xcel Energy-wide project, we have included below the Minnesota estimates based on the specifics for the NSP-Minnesota system.

### Preliminary Cost Estimates – ADMS

| Summary of Costs (2016-18) |                     |
|----------------------------|---------------------|
| Hardware                   | \$5,000,000         |
| Software                   | \$4,000,000         |
| Labor                      | \$18,000,000        |
| <b>Total Cost</b>          | <b>\$27,000,000</b> |

#### c. Consideration of Alternatives

As noted in the DOE report,

*ADMS is an optimization tool. It is possible to do similar functions using other systems, but it cannot be done as well. Once implemented, an ADMS offers additional functionality that you cannot get following a traditional path of siloed systems.<sup>8</sup>*

Therefore, at this time there is no true substitute for an ADMS, but there are alternatives that come with significant trade-offs. As discussed in our response to the Office of the Attorney General (OAG) Information Request No. 4, we considered multiple alternatives, including the following:

- Do nothing – This alternative would maintain status quo, keeping current grid capabilities. This option limits the ability to integrate higher levels of DG and other advanced technologies, and minimizes the ability to improve grid efficiency and reliability.
- Purchase a Distribution Management System (DMS) and integrate with existing SCADA and OMS systems – This alternative does not provide the platform

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<sup>8</sup> Ibid

necessary for advanced applications to enable a fully integrated grid. This alternative requires complex interfaces between systems and synchronization of network models that has proven to be problematic and application prohibitive in the industry.

- Purchase an ADMS system that integrates SCADA, DMS, and Outage Management System (OMS) in one system – This alternative provides the platform and applications necessary to enable integration of the grid. The Advanced Applications associated with the ADMS system leverage one SCADA and one network model to efficiently manage the information available to enable grid integration and improve grid efficiency and reliability.

We believe the ADMS is necessary to fully implement the vision of the future grid that is starting to emerge, including achieving greater system efficiency and optimization; expanded reliance on DER; improved system reliability, resiliency and safety; and greater customer engagement. It is a prerequisite for these benefits, which supports its standing as a priority project. Additionally, this project appears to have general support from Fresh Energy and MCEA and the Energy Freedom Coalition of America, though they would like to ensure the ADMS delivers its full functionalities, which we are willing to discuss as the design phase progresses. With the additional detail provided in this Reply, we request the support of the other Parties as well.

#### d. Link to State Energy Policy

As a software platform, the ADMS is an enabling and foundational technology that supports greater grid functionalities and capabilities. It clearly supports goals surrounding grid modernization, but also facilitates achievement of other state energy policy goals. Above we discussed the role of ADMS in accommodating higher penetrations of DER, which promotes renewable energy and reduced carbon emissions. Additionally, the ADMS can support demand-side management goals through use of IVVO.

#### 2. *Belle Plaine Solar Plus Battery Storage Project (SPBS)*

We appreciate Parties' interest in this exciting project. We agree with the Minnesota Energy Storage Collaborative (MESC) that energy storage is “an important linchpin to a modern, efficient, and low carbon grid” and “[w]e need to start building the future grid now.”<sup>9</sup> We also agree with MESC that there is no substitute for the learning that comes from a Minnesota-specific deployment.

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<sup>9</sup> See Comments filed by the Minnesota Energy Storage Collaborative on January 4, 2016 in Docket No. E002/M-15-962.

It is essential that we learn how best to integrate and leverage storage technologies before costs drop to the level where adoption becomes more widespread. Given that adoption could be quick once it begins, it is prudent to start now to build the in-house capabilities and knowledge necessary to effectively benefit from this technology.

a. Research Questions

With the SPBS project, we will be investigating the ability of battery systems to provide multiple capabilities. As discussed in our Report, the battery system will be installed to address overloading on the feeder and transformer. The battery system, combined with a 1 MW PV system, can defer capital investments associated with overloading. Because the system only needs to address overloading during certain times of the year, the battery system also has the capability to perform other functions, including voltage regulation, solar smoothing, MISO frequency regulation, and power quality management. Utilizing the battery storage system to perform multiple capabilities is more technically challenging, but this strategy is also the key to making battery systems more cost-effective for grid solutions. Since battery storage technology is still evolving, we feel it is necessary to demonstrate this technology and ensure that the systems deliver their purported claims. We plan to investigate how well the battery system and solar array perform in this application, and this performance can help inform specifications on future projects. We also seek to understand communications and integration requirements, as they are evolving and not standardized today.

In summary, the SPBS project is designed to answer the following research questions:

- 1) How effective is the SPBS project at deferring capital investment associated with overloaded feeders and transformers?
- 2) How effective is the SPBS project at integrating renewable resources?
- 3) How does the battery perform in providing the following services or outcomes:
  - a. Volt/VAr control (voltage regulation)
  - b. Frequency regulation
  - c. Power quality management
  - d. Smoothing of variable resources, such as solar
  - e. System loss impacts
- 4) What is the potential for stacking of multiple functions?
- 5) What value can be quantified for these functions?
- 6) How can the overall value and benefit be optimized?

Answering these questions with field data specific to Minnesota will assist in integrating energy storage into the grid in a way that is cost-effective and beneficial to our customers.

With respect to Fresh Energy's suggestions related to the SPBS project, we support the development of a robust benefit-cost methodology. We are members of EPRI and have been discussing our methodological approach with them. We also believe that information gained from this demonstration will be useful for future applications, both in terms of costs and specifications. Smart inverter technologies are in various stages of development and some functionalities, codes and standards are not finalized. We expect to select the most sophisticated technology in the market that meets all the applicable codes and standards.

We also support looking at whether energy efficiency and demand response can reduce peak demand on the distribution feeder. We are currently working with the Center for Energy and Environment (CEE) to examine similar geo-targeting approaches.

#### b. Benefits

As suggested above, one of the primary benefits of this particular project is to better understand how batteries could be deployed in Minnesota (and as part of the MISO market) to maximize value to the system and to customers. More broadly, we expect energy storage to provide unique benefits, including the flexibility to meet a range of system needs and ability to respond to those needs quickly (in the milliseconds range) and with great accuracy.

#### c. Costs

Below we provide a breakdown of our original cost estimate. As noted in the October 30<sup>th</sup> Report, these costs are preliminary and subject to change as we move through the design phase. In particular, there is uncertainty around the battery costs, given the nascent state of battery storage systems. For example, our early price inquiries found wide variability in pricing, with some battery storage vendors providing prices in ranges that were double that of other providers. Also, due to the objectives to operate the battery system with multiple capabilities, we will need sophisticated communications, monitoring and controls. Because few approaches today are standard, we expect some ongoing uncertainty in price. We are proceeding with the scoping of this project and plan to issue a Request for Information (RFI) and Request for Proposal (RFP) before the June decision in this docket.



## Preliminary Cost Estimates - SPBS

| Summary of Costs (2016)      |                     |
|------------------------------|---------------------|
| Land/civil construction      | \$1,000,000         |
| PV Installation              | \$3,200,000         |
| Battery storage system       | \$6,000,000         |
| Engineering/interconnection  | \$525,000           |
| Substation SCADA and breaker | \$295,000           |
| Contingency (~ 15%)          | \$1,480,000         |
| <b>Total Cost</b>            | <b>\$12,500,000</b> |

### d. Consideration of Alternatives

Although more traditional grid solutions may be available today at lower cost, it is critical to understand battery storage technology capabilities. Industry experts expect to see significant declining prices, and because of their flexibility, we expect to see battery systems solve grid solutions in a cost-effective way in the future. Please refer to the discussion of “Alternative Options Considered” in our October 30<sup>th</sup> Report for additional information, which discusses the three battery scenarios that could potentially defer building a new substation, including:

- 1) use several batteries to reduce load at risk on a feeder;
- 2) reduce an overload at a smaller substation with one large battery; and
- 3) use a large centralized battery to reduce multiple feeder risks.

Through this analysis, we determined that the SPBS project provided the best opportunity to deploy a demonstration battery project compared to other opportunities available. We found that a battery installation that could provide peak output capability of 1.3 MW and approximately 4-6 MWH at this location would reduce the overload from 113% down to 100% and thus defer the distribution project up until the transmission conversion is required. We also found that an addition of 1 MW of solar on the feeder could theoretically reduce the battery size down from 4 MWH to 2.25 MWH (with peak output of 1 MW). Given these considerations, we recommended scenario 2, the battery and solar solution.

### e. Link to State Energy Policy

As noted above, energy storage has the potential to help overcome the existing barriers to very high penetrations of renewable energy (utility scale and distributed), which is needed to achieve the state’s carbon reduction goals. Like ADMS, battery storage technology also supports greater grid functionalities and capabilities, which will contribute to a more modern grid. Additionally, because of its rapid response time

and flexibility, battery storage systems can perform multiple grid functions and may become a tool for customers to better manage their energy bills. Last, obtaining operational experience with storage technology will provide us with the necessary foundation to continue to understand this evolving technology and further overall grid modernization efforts.

#### **D. Certification Process**

We agree with the Department and the OAG that certification has the consequence of qualifying the project costs for recovery in a rider and that this is a reasonable expectation for what certification will mean going forward. As noted by the OAG, certification is an “early decision” that finds a project is prudent and rider recovery is appropriate.

For future reports and certification requests, we believe it is reasonable to establish certification as the process by which statutory compliance, prudence and any other criteria required by the Commission are determined. Upon such a finding, the utility would have the assurance the approved costs are recoverable through the rider, subject to annual review.

This first report and request is unique because of the timing issues we faced and may justify slightly different treatment. In particular, the enabling legislation requires requests for certification to be filed by November 1<sup>st</sup> on each odd-numbered year, which was this past November. Because the legislation was signed into law less than five months prior to the deadline for the Report, there was a shorter time window than anticipated to develop the complete specifications and analysis for these complex projects, as well as secure vendor bids and contracts. With regard to the ADMS project, while we have made progress in scoping the project, cost estimates are still preliminary and should not form the basis of any potential cost recovery limit. Similarly, the costs of the SPBS will not be finalized until we complete the design phase, select a vendor, and receive a final cost estimate. We do not believe that the current scoping status of these projects should inhibit their certification since the Commission retains continuing oversight, on an annual basis, of our cost projects and spending through the TCR process.

Based on our analysis of the Transmission Cost Adjustment statute (Minn. Stat. § 216B.16, subd. 7b), it is necessary for the Commission to take action on certification in accordance with the statutory timeline in order for projects to be recoverable through the TCR rider. Thus, given the biennial nature of Minn. Stat. § 216B.2425, failing to certify our priority projects now could have the effect of delaying them for another two years, since they are not included in our currently pending rate case

request. If a project is not certified through this process, the alternative is to include these projects in our next rate case. So as not to potentially delay the implementation of these priority projects by foreclosing the opportunity for rider recovery, we respectfully request the Commission certify the projects for recovery.

## **E. Criteria**

Given the range of Comments received on this topic, we address each Party's comments individually, as applicable.

### *1. Department of Commerce*

In their Comments, the Department correctly acknowledges that the statute is silent on the criteria to be applied to distribution projects and recommends that the Commission apply the transmission project criteria until such time as a rulemaking can establish distribution-specific criteria. We express our concerns with the rulemaking approach above and here respond to the application of transmission criteria to distribution projects.

As a practical matter for this first request, we believe the transmission criteria, which are specific to high-voltage transmission lines, can serve as a guide, but should not be strictly applied. For example, one criterion is a finding that the line is "necessary to maintain or enhance the reliability of electric service to Minnesota consumers." While reliability is certainly an important benefit and may be the primary benefit of some grid modernization investments, other investments may only have an indirect tie to reliability, but provide benefits in other important areas specified in the statute.

For those projects whose primary purpose is maintaining or enhancing reliability, we agree that metrics are valuable tools to gauge the impact of such projects. What metrics most directly measure the project's benefits should be considered on a project-by-project basis. In some cases measurements of system-wide reliability, such as SAIDI and SAIFI, may be the best metric. However, these metrics are not relevant to all projects that could fall under the scope of Minn. Stat. § 216B.2425, Subd 2(e) and thus should not be a required metric or criterion for all projects.

Similarly, we believe the Certificate of Need criteria are not relevant to the projects likely to be in question.<sup>10</sup> However, we agree that the three questions posed by the

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<sup>10</sup> Certificates of Need are required for Large Energy Facilities, as defined in Minn. Stat. § 216B.2421. They include but are not limited to: (1) any electric power generating plant or combination of plants at a single site with a combined capacity of 50,000 kilowatts or more and transmission lines directly associated with the plant

Department regarding need, alternatives and energy policy goals should be answered in a certification request, though the kind of analysis and response may differ from transmission projects. We have included this information for both projects in this Reply.

Finally, we believe “public interest” should be generally considered, as opposed to formally evaluated through an environmental review.

## *2. Office of the Attorney General*

The OAG recommends the Commission evaluate several factors for determining certification, generally related to consistency with statute, prudence, and demonstration of priority status (and eventually if proposed projects are consistent with the Commission’s grid modernization principles once those are established). We generally agree that these are the relevant factors the the Commission should consider and both our ADMS Project and SPBS project meet these criteria.

With respect to the first criteria, consistency with statute, both of these projects are consistent with the types of grid modernizations described in the amendments to Minn. Stat. § 216B.2425. No party to this docket has claimed otherwise.

With respect to the second criteria, prudence, we agree with the OAG that the Commission will need to understand what problems or needs are addressed by the investment and what benefits it is expected to provide. We have included additional information in this filing demonstrating this and clarifying the projects’ benefits and role in our grid modernization strategy.

We also agree that it is appropriate to review the available alternatives as suggested by the OAG. However, while it is always a goal to select the most cost-effective option, we agree with Fresh Energy and MCEA that positive net present value in year one should not be the most important factor in making a prudence determination. Further, some projects may have benefits (or costs) that are difficult to quantify, but represent important and prerequisite building blocks on the way to a modern grid. Again, we agree the consideration of alternatives is important, but encourage the Commission to consider other factors beyond traditional benefit-cost analysis.

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that are necessary to interconnect the plant to the transmission system; (2) any high-voltage transmission line with a capacity of 200 kilovolts or more and greater than 1,500 feet in length; (3) any high-voltage transmission line with a capacity of 100 kilovolts or more with more than ten miles of its length in Minnesota or that crosses a state line.

With respect to the third criteria, priority, it is clear that laying the foundation for grid modernization through ADMS and obtaining operational experience with emerging technology through the SPBS are priorities with respect to further grid modernization in Minnesota. With that said, we recommend the Commission not place undue emphasis on how the OAG has interpreted the concept of priority given that: 1) we believe Minn. Stat. § 216B.2425, Subd. 2(e) to be most reflective of legislative intent (vs. administrative adjustments in other sections), and 2) priority projects are not defined in statute. It appears the OAG's primary concern is to set a reasonable limit on the type and amount of projects that are recovered through the rider. We agree with this concept and commit to making a clear showing, as we believe we have in this docket, that proposed projects squarely meet the legislative intent of grid modernization. Meeting this intent will allow the concept of priority as it relates to grid modernization to evolve over several cycles of biennial grid modernization reports while Commission oversight will provide reasonable safeguards that only appropriate projects are recovered through riders.

### *3. Fresh Energy and MCEA*

We support Fresh Energy and MCEA's suggestion that a criterion should be promotion of efficient use of the grid and expect this concept to eventually be included in any grid modernization principles put forth by the Commission. Our proposed priority projects meet this goal. Their other suggestions are addressed in our response to the OAG.

### *4. Energy Freedom Coalition of America*

Like other commenters, EFCA looks to other statutes for guidance, including Minn. Stat. § 216B.243, which governs Certificates of Need. We addressed the potential application of those criteria in our above response to the Department's comments. However, they take a different approach to the consideration of alternatives, which we respond to below.

As noted in their Comments, EFCA is a national advocacy group made up of companies that sell DER products and services. It appears they are suggesting that Minnesota leap headlong onto a similar path as is being contemplated in New York and allow for competition at the distribution level, specifically through the competitive procurement of third-party alternatives to utility distribution system investments. To date in Minnesota, the evaluation of third-party alternatives is used in generation, but not distribution. This structure makes sense in a state supporting a vertically integrated utility model that participates in an organized market like MISO and is in the early stages of grid transformation.

As previously discussed, we believe that grid modernization efforts in Minnesota should be done in a way consistent with the State’s regulatory paradigm and that the vertically integrated utility model is fully compatible with the modernization of the distribution system. Currently, there is insufficient experience with the deployment of grid modernization technology and third-party participation models to fully understand its interaction with our regulatory paradigm and our existing investment in the safety and reliability of the existing distribution grid. Our “building block” framework is intended to provide swift but gradual implementation of grid modernization so that we can gain that understanding in Minnesota.

Given this uncertainty, we are concerned that under the third-party provider model advocated by EFCA, a provider of grid services is not directly accountable to the Commission and the utility is reliant on the performance of the third-party provider to maintain reliability of the distribution grid. Not only is significantly more operational experience necessary to ensure that third-party grid services can be reliably provided, the development of contracting best practices will also be necessary to ensure appropriate accountability of the third party provider to customers and possibly the Commission. Our SPBS demonstration project is intended to provide us with necessary experience to begin to understand the relevant issues. Currently, only the Community Solar Garden program provides third parties an opportunity to provide electric service to a limited amount of customers through unregulated contracts. And, importantly, these services are provided behind the meter and are not directly providing support services to the distribution grid. We do not yet have enough experience with this program to appropriately assess the provision of this service by third parties behind the meter, let alone in support of the distribution system itself. Relying on third parties to provide grid services before they are fully vetted could negatively impact our ability to maintain the reliability and resiliency of the distribution system.

Additionally, while we maintain that there are important differences between Minnesota and New York, it is perhaps instructive to note that both priority projects proposed for certification in this docket would qualify for utility ownership under New York’s Reforming the Energy Vision (REV) framework. Our ADMS project would qualify as being appropriate for utility ownership because, as EFCA acknowledges, there is no immediately available third-party substitute for utility investment in the ADMS infrastructure and information technology. Additionally, our SPBS project would likely qualify for utility ownership as both an “energy storage and generation [project] located on utility property” which “will support greater understanding of how storage strategically used on the grid can support greater

penetration of intermittent renewable resources without compromise to system reliability” and as a “demonstration project.”<sup>11</sup>

## **F. Notice Requirements**

We agree with the general premise that customers, communities and stakeholders should have the opportunity to engage in the regulatory process and provide input on issues that interest or affect them. However, we believe there are sufficient avenues to meet that objective without encumbering the grid modernization process with additional notice requirements or procedural steps (and the associated costs). We maintain our original position that there are fundamental differences between the kinds of transmission projects that gave rise to the notice requirements in Minn. R. 7848.1900 and distribution projects, which may be completely or mostly invisible to customers and certainly do not have the same kind of property rights and land impact implications as high voltage transmission lines.

It is important to recognize that the notice requirements of Minn. R. 7848.1900 are necessary because a transmission project certified through the Biennial Transmission Report does not require a Certificate of Need. Because of this, the notice provisions for Certificates of Need would not be implemented for a certified transmission project. This appropriately requires alternative notice requirements as provided in Minn. R. 7848.1900 to ensure affected landowners are aware that a transmission project may be proceeding. In contrast, distribution projects do not require a Certificate of Need and there would not normally be a formal notice requirement for implementing distribution projects. Consequently, the notice requirements of Minn. R. 7848.1900 need not be applicable to distribution projects certified under Minn. Stat. § 216B.2425.

As mentioned above, we envision more transparent and integrated system planning processes, which should facilitate greater engagement. Similarly, we are open to posting project information on our website. This will be in addition to the typical permitting and other local processes we follow, which provide another avenue for notice and input. For example, in the case of the Belle Plaine project we contacted both the City of Belle Plaine and the County to discuss our proposal and gather their feedback on the proposed concept. Our Community Relations, Project Management, and Project Siting staff have held face-to-face meetings with both entities and plan to continue to discuss the proposal with them as it develops. This local engagement will

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<sup>11</sup> NY PSC CASE 14-M-0101, ORDER ADOPTING REGULATORY POLICY FRAMEWORK AND IMPLEMENTATION PLAN (February 26, 2015), pp.68-70.

likely include public presentations, including presentations to the County Planning Commission and other local government entities.

Thus, we respectfully request the Commission find that Minn. R. 7848.1900 does not apply to distribution projects filed pursuant to Minn. Stat. § 216B.2425. Should the Commission find otherwise, we request the Commission approve our request for a variance.

### **G. Future Grid Modernization Filings**

We have reviewed Parties' comments related to the features of a distribution study and have no additional comments at this time. Similarly, we appreciate the comments received on the features of future grid modernization reports and believe there are many ideas worth considering. Our only caution at this time is that changes to interconnection processes be considered in a separate venue and not as part of a utility's grid modernization filing, as proposed by Fresh Energy and MCEA. We look forward to continued discussion on future requirements and the integration of these filings with the outcomes of the Commission's grid modernization proceeding.

### **H. Other Issues**

The Department introduced an idea for an auction process to allocate interconnection points. We believe this idea is problematic for a number of reasons, but are willing to discuss alternatives that reach the same objectives. However, we believe that discussion is beyond the scope of this docket and recommend that it be addressed elsewhere, as appropriate.

## **CONCLUSION**

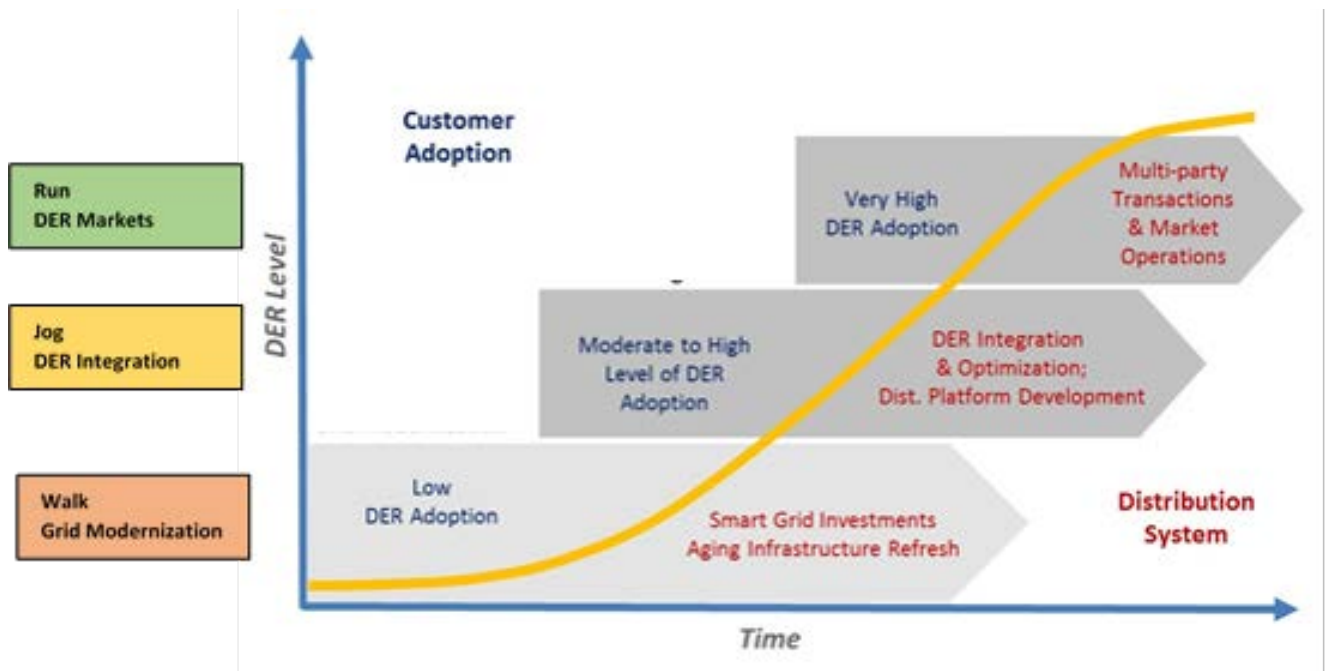
We appreciate the opportunity to respond to Parties' comments and to provide additional information on the ADMS and SPBS projects. We believe this additional information provides sufficient basis for the Commission to make a decision on certification. We respectfully request that the Commission certify these projects for inclusion in the TCR rider. Given the unique circumstances surrounding this first request, we propose to update the cost estimates and provide any additional analysis requested by the Commission as part of our October 1, 2016 TCR petition. We request that the Commission reserve judgment on the appropriate cost levels until they are presented with our final budget and implementation plan in the October 1 filing.



Dated: February 22, 2016

Northern States Power Company

### More Than Smart Walk/Jog/Run Framework



## CERTIFICATE OF SERVICE

I, Carl Cronin, hereby certify that I have this day served copies of the foregoing document on the attached list of persons.

xx by depositing a true and correct copy thereof, properly enveloped with postage paid in the United States mail at Minneapolis, Minnesota

xx electronic filing

**Docket No. E002/M-15-962**

Dated this 22nd day of February 2016

/s/

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Carl Cronin  
Regulatory Administrator

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| Emma       | Fazio      | emma.fazio@stoel.com            | Stoel Rives LLP                     | 33 South Sixth Street<br>Suite 4200<br>Minneapolis,<br>MN<br>55402               | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Sharon     | Ferguson   | sharon.ferguson@state.mn.us     | Department of Commerce              | 85 7th Place E Ste 500<br><br>Saint Paul,<br>MN<br>551012198                     | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| John       | Fernandes  | john.fernandes@res-americas.com | RES                                 | 11101 W. 120th Ave<br>Suite 400<br>Broomfield,<br>CO<br>80021                    | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Nathan     | Franzen    | nathan@geronimoenergy.com       | Geronimo Energy                     | 7650 Edinborough Way<br>Suite 725<br>Edina,<br>MN<br>55435                       | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Amy        | Fredregill | amyfred14@hotmail.com           | In Transition                       | 1885 University Avenue<br>West, #315<br><br>St. Paul,<br>MN<br>55104             | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| John       | Fuller     | john.fuller@senate.mn           | MN Senate                           | 75 Rev Dr Martin Luther<br>King Jr Blvd<br>Room G-17<br>St. Paul,<br>MN<br>55155 | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Hal        | Galvin     | halgalvin@comcast.net           | Provectus Energy<br>Development llc | 1936 Kenwood Parkway<br><br>Minneapolis,<br>MN<br>55405                          | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Gary       | Garbe      | Gary.Garbe@avantenergy.com      | Minnesota Municipal Power<br>Agency | 220 South Sixth Street<br>Suite 1300<br>Minneapolis,<br>MN<br>55402              | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Edward     | Garvey     | garveyed@aol.com                | Residence                           | 32 Lawton St<br><br>Saint Paul,<br>MN<br>55102                                   | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |

| First Name | Last Name  | Email                              | Company Name                   | Address  | Delivery Method    | View Trade Secret | Service List Name                      |
|------------|------------|------------------------------------|--------------------------------|--|--------------------|-------------------|--|
| Bruce      | Gerhardson | bgerhardson@otpc.com               | Otter Tail Power Company       | PO Box 496<br>215 S Cascade St<br>Fergus Falls,<br>MN<br>565380496   | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Allen      | Gleckner   | gleckner@fresh-energy.org          | Fresh Energy                   | 408 St. Peter Street<br>Ste 220<br>Saint Paul,<br>Minnesota<br>55102 | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Bryan      | Gower      | bgower@apx.com                     | APX, Inc.                      | N/A  | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Timothy    | Gulden     | info@winonarenewableenergy.com     | Winona Renewable Energy, LLC   | 1449 Ridgewood Dr<br><br>Winona,<br>MN<br>55987                      | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Tony       | Hainault   | anthony.hainault@co.hennepin.mn.us | Hennepin County DES            | 701 4th Ave S Ste 700<br><br>Minneapolis,<br>MN<br>55415-1842        | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Jim        | Hawley     | jim.hawley@deweysquare.com         | Mission:data Coalition         | 1020 16th Street, Suite 20<br><br>Sacramento,<br>CA<br>95814         | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Todd       | Headlee    | theadlee@dvigridsolutions.com      | Dominion Voltage, Inc.         | 701 E. Cary Street<br><br>Richmond,<br>VA<br>23219                   | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Duane      | Hebert     | duane.hebert@novelenergy.biz       | Novel Energy Solutions         | 1628 2nd Ave SE<br><br>Rochester,<br>MN<br>55904                     | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| John       | Helmers    | helmers.john@co.olmsted.mn.us      | Olmsted County Waste to Energy | 2122 Campus Drive SE<br><br>Rochester,<br>MN<br>55904-4744           | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Jared      | Hendricks  | hendricksj@owatonnautilities.com   | Owatonna Public Utilities      | PO Box 800<br>208 S Walnut Ave<br>Owatonna,<br>MN<br>55060-2940      | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |

| First Name | Last Name | Email                        | Company Name                                  | Address   | Delivery Method    | View Trade Secret | Service List Name                      |
|------------|-----------|------------------------------|---|---|--------------------|-------------------|--|
| Annete     | Henkel    | mui@mutilityinvestors.org    | Minnesota Utility Investors                   | 413 Wacouta Street<br>#230<br>St. Paul,<br>MN<br>55101      | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Shane      | Henriksen | shane.henriksen@enbridge.com | Enbridge Energy Company, Inc.                 | 1409 Hammond Ave FL 2<br><br>Superior,<br>WI<br>54880       | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Lynn       | Hinkle    | lhinkle@mnseia.org           | Minnesota Solar Energy Industries Association | 2512 33rd Ave South #2<br><br>Minneapolis,<br>MN<br>55406   | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Margaret   | Hodnik    | mhodnik@mnpower.com          | Minnesota Power                               | 30 West Superior Street<br><br>Duluth,<br>MN<br>55802       | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Michael    | Hoppe     | il23@mtn.org                 | Local Union 23, I.B.E.W.                      | 932 Payne Avenue<br><br>St. Paul,<br>MN<br>55130            | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Jim        | Horan     | Jim@MREA.org                 | Minnesota Rural Electric Association          | 11640 73rd Ave N<br><br>Maple Grove,<br>MN<br>55369         | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Ashley     | Houston   |                              |   | 120 Fairway Rd<br><br>Chestnut Hill,<br>MA<br>24671850      | Paper Service      | No                | OFF_SL_15-962_Official<br>Service List |
| Lori       | Hoyum     | lhoyum@mnpower.com           | Minnesota Power                               | 30 West Superior Street<br><br>Duluth,<br>MN<br>55802       | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Jan        | Hubbard   | jan.hubbard@comcast.net      |   | 7730 Mississippi Lane<br><br>Brooklyn Park,<br>MN<br>55444  | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Casey      | Jacobson  | cjacobson@bepc.com           | Basin Electric Power Cooperative              | 1717 East Interstate Avenue<br><br>Bismarck,<br>ND<br>58501 | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |

| First Name | Last Name | Email                     | Company Name                            | Address   | Delivery Method    | View Trade Secret | Service List Name                      |
|------------|-----------|---------------------------|---|---|--------------------|-------------------|--|
| John S.    | Jaffray   | jjaffray@jirpower.com     | JJR Power                               | 350 Highway 7 Suite 236<br>Excelsior,<br>MN<br>55331                                    | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Alan       | Jenkins   | aj@jenkinsatlaw.com       | Jenkins at Law                          | 2265 Roswell Road<br>Suite 100<br>Marietta,<br>GA<br>30062                              | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Richard    | Johnson   | Rick.Johnson@lawmoss.com  | Moss & Barnett                          | 150 S. 5th Street<br>Suite 1200<br>Minneapolis,<br>MN<br>55402                          | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Nate       | Jones     | njones@hcpd.com           | Heartland Consumers<br>Power            | PO Box 248<br><br>Madison,<br>SD<br>57042   | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Michael    | Kampmeyer | mkampmeyer@a-e-group.com  | AEG Group, LLC                          | 260 Salem Church Road<br><br>Sunfish Lake,<br>Minnesota<br>55118                        | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Mark J.    | Kaufman   | mkaufman@ibewlocal949.org | IBEW Local Union 949                    | 12908 Nicollet Avenue<br>South<br><br>Burnsville,<br>MN<br>55337                        | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Jennifer   | Kefer     | jennifer@dgardiner.com    | Alliance for Industrial<br>Efficiency   | David Gardiner &<br>Associates, LLC<br>2609 11th St N<br>Arlington,<br>VA<br>22201-2825 | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Julie      | Ketchum   | N/A                       | Waste Management                        | 20520 Keokuk Ave<br><br>Lakeville,<br>MN<br>55044                                       | Paper Service      | No                | OFF_SL_15-962_Official<br>Service List |
| Hudson     | Kingston  | hkingston@mncenter.org    | MN Center for<br>Environmental Advocacy | 26 East Exchange Street,<br>Suite 206<br><br>St. Paul,<br>Minnesota<br>55101            | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
|            |           |                           |   |   |                    |                   |  |

| First Name | Last Name | Email                     | Company Name                      | Address   | Delivery Method    | View Trade Secret | Service List Name                   |
|------------|-----------|---------------------------|-----------------------------------|---|--------------------|-------------------|-------------------------------------|
| Brad       | Klein     | bklein@elpc.org           | Environmental Law & Policy Center | 35 E. Wacker Drive, Suite 1600<br>Suite 1600<br>Chicago,<br>IL<br>60601 | Electronic Service | No                | OFF_SL_15-962_Official Service List |
| Madeleine  | Klein     | mklein@socoreenergy.com   | SoCore Energy                     | 225 W Hubbard Street<br>Suite 200<br>Chicago,<br>IL<br>60654            | Electronic Service | No                | OFF_SL_15-962_Official Service List |
| John       | Kluempke  | jwkluempke@winlectric.com | Elk River Winlectric              | 12777 Meadowvale Rd<br><br>Elk River,<br>MN<br>55330                    | Electronic Service | No                | OFF_SL_15-962_Official Service List |
| Thomas     | Koehler   | TGK@IBEW160.org           | Local Union #160, IBEW            | 2909 Anthony Ln<br><br>St Anthony Village,<br>MN<br>55418-3238          | Electronic Service | No                | OFF_SL_15-962_Official Service List |
| Brian      | Krambeer  | bkrambeer@tec.coop        | Tri-County Electric Cooperative   | PO Box 626<br>31110 Cooperative Way<br>Rushford,<br>MN<br>55971         | Electronic Service | No                | OFF_SL_15-962_Official Service List |
| Jon        | Kramer    | jk2surf@aol.com           | Sundial Solar                     | 4708 york ave. S<br><br>Minneapolis,<br>MN<br>55410                     | Electronic Service | No                | OFF_SL_15-962_Official Service List |
| Michael    | Krause    | michaelkrause61@yahoo.com | Kandiyo Consulting, LLC           | 433 S 7th Street<br>Suite 2025<br>Minneapolis,<br>Minnesota<br>55415    | Electronic Service | No                | OFF_SL_15-962_Official Service List |
| Michael    | Krikava   | mkrikava@briggs.com       | Briggs And Morgan, P.A.           | 2200 IDS Center<br>80 S 8th St<br>Minneapolis,<br>MN<br>55402           | Electronic Service | No                | OFF_SL_15-962_Official Service List |
| Matthew    | Lacey     | Mlacey@grenergy.com       | Great River Energy                | 12300 Elm Creek Boulevard<br><br>Maple Grove,<br>MN<br>553694718        | Electronic Service | No                | OFF_SL_15-962_Official Service List |
|            |           |                           |                                   |   |                    |                   |                                     |

| First Name   | Last Name     | Email                          | Company Name                       | Address  | Delivery Method    | View Trade Secret | Service List Name                   |
|--------------|---------------|--------------------------------|------------------------------------|--|--------------------|-------------------|-------------------------------------|
| Holly        | Lahd          | lahd@fresh-energy.org          | Fresh Energy                       | 408 St. Peter Street Ste 220<br><br>St. Paul, MN 55102                           | Electronic Service | No                | OFF_SL_15-962_Official Service List |
| James D.     | Larson        | james.larson@avantenergy.com   | Avant Energy Services              | 220 S 6th St Ste 1300<br><br>Minneapolis, MN 55402                               | Electronic Service | No                | OFF_SL_15-962_Official Service List |
| Douglas      | Larson        | dlarson@dakotaelectric.com     | Dakota Electric Association        | 4300 220th St W<br><br>Farmington, MN 55024                                      | Electronic Service | No                | OFF_SL_15-962_Official Service List |
| Joel         | Larson        | jl Larson@minnkota.com         | Minnkota Power Cooperative, Inc.   | 1822 Mill Road<br><br>Grand Forks, ND 58203                                      | Electronic Service | No                | OFF_SL_15-962_Official Service List |
| Paul J.      | Lehman        | paul.lehman@xcelenergy.com     | Xcel Energy                        | 414 Nicollet Mall<br><br>Minneapolis, MN 554011993                               | Electronic Service | No                | OFF_SL_15-962_Official Service List |
| Dean         | Leischow      | dean@sunriseenergyventures.com | Sunrise Energy Ventures            | 601 Carlson Parkway, Suite 1050<br><br>Minneapolis, MN 55305                     | Electronic Service | No                | OFF_SL_15-962_Official Service List |
| Deborah Fohr | Levchak       | N/A                            | Basin Electric Power Cooperative   | 1717 East Interstate Avenue<br><br>Bismarck, ND 585030564                        | Paper Service      | No                | OFF_SL_15-962_Official Service List |
| Annie        | Levenson Falk | annie.levensonfalk@lec.leg.mn  | Legislative Energy Commission      | State Office Building, Room 65<br><br>100 Rev MLK Jr. Blvd<br>St. Paul, MN 55155 | Electronic Service | No                | OFF_SL_15-962_Official Service List |
| John         | Lindell       | agorud.ecf@ag.state.mn.us      | Office of the Attorney General-RUD | 1400 BRM Tower<br>445 Minnesota St<br>St. Paul, MN 551012130                     | Electronic Service | Yes               | OFF_SL_15-962_Official Service List |
|              |               |                                |                                    |  |                    |                   |                                     |

| First Name | Last Name  | Email                                | Company Name                        | Address  | Delivery Method    | View Trade Secret | Service List Name                      |
|------------|------------|--------------------------------------|-------------------------------------|--|--------------------|-------------------|--|
| Susan      | Ludwig     | sludwig@mnpower.com                  | Minnesota Power                     | 30 West Superior Street<br><br>Duluth,<br>MN<br>55802                    | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Rebecca    | Lundberg   | rebecca.lundberg@powerfullygreen.com | Powerfully Green                    | 11451 Oregon Ave N<br><br>Champlin,<br>MN<br>55316                       | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Casey      | MacCallum  | casey@appliedenergyinnovations.org   | Applied Energy Innovations          | 4000 Minnehaha Ave S<br><br>Minneapolis,<br>MN<br>55406                  | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Kavita     | Maini      | kmairi@wi.rr.com                     | KM Energy Consulting LLC            | 961 N Lost Woods Rd<br><br>Oconomowoc,<br>WI<br>53066                    | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Pam        | Marshall   | pam@energycents.org                  | Energy CENTS Coalition              | 823 7th St E<br><br>St. Paul,<br>MN<br>55106                             | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Samuel     | Mason      | smason@beltramelectric.com           | Beltrami Electric Cooperative, Inc. | 4111 Technology Dr. NW<br>PO Box 488<br>Bemidji,<br>MN<br>56619-0488     | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Erica      | McConnell  | mcconnell@smwlaw.com                 | Shute, Mihaly & Weinberger LLP      | 396 Hayes St<br><br>San Francisco,<br>California<br>94102-4421           | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Dave       | McNary     | David.McNary@hennepin.us             | Hennepin County DES                 | 701 Fourth Ave S Ste 700<br><br>Minneapolis,<br>MN<br>55415-1842         | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| John       | McWilliams | jmm@dairy.net                        | Dairyland Power Cooperative         | 3200 East Ave SPO Box 817<br><br>La Crosse,<br>WI<br>54601-7227          | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Thomas     | Melone     | Thomas.Melone@AllcoUS.com            | Minnesota Go Solar LLC              | 222 South 9th Street<br>Suite 1600<br>Minneapolis,<br>Minnesota<br>55120 | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |

| First Name | Last Name | Email                            | Company Name                          | Address   | Delivery Method    | View Trade Secret | Service List Name                      |
|------------|-----------|----------------------------------|---------------------------------------|---|--------------------|-------------------|--|
| David      | Moeller   | dmoeller@allete.com              | Minnesota Power                       | 30 W Superior St<br><br>Duluth,<br>MN<br>558022093                                    | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Andrew     | Moratzka  | apmoratzka@stoel.com             | Stoel Rives LLP                       | 33 South Sixth Street<br>Suite 4200<br>Minneapolis,<br>MN<br>55402                    | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Martin     | Morud     | mmorud@trunorthsolar.com         | Tru North Solar                       | 5115 45th Ave S<br><br>Minneapolis,<br>MN<br>55417                                    | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Michael    | Murray    | mmurray@missiondata.org          | Mission:Data Coalition                | 1020 16th St Ste 20<br><br>Sacramento,<br>CA<br>95814                                 | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Carl       | Nelson    | cnelson@mncee.org                | Center for Energy and<br>Environment  | 212 3rd Ave N Ste 560<br><br>Minneapolis,<br>MN<br>55401                              | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Ron        | Nelson    | ron.nelson@ag.state.mn.us        | Office of the Attorney<br>General-RUD | Bremer Tower, Suite 1400<br>445 Minnesota Street<br>Saint Paul,<br>Minnesota<br>55101 | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Ben        | Nelson    |                                  | CMPMA                                 | 459 South Grove Street<br><br>Blue Earth,<br>MN<br>56013                              | Paper Service      | No                | OFF_SL_15-962_Official<br>Service List |
| David W.   | Niles     | david.niles@avantenergy.com      | Minnesota Municipal Power<br>Agency   | Suite 300<br>200 South Sixth Street<br>Minneapolis,<br>MN<br>55402                    | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Rolf       | Nordstrom | rnordstrom@gpisd.net             | Great Plains Institute                | 2801 21ST AVE S STE 220<br><br>Minneapolis,<br>MN<br>55407-1229                       | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Samantha   | Norris    | samanthanorris@alliantenergy.com | Interstate Power and Light<br>Company | 200 1st Street SE PO Box<br>351<br><br>Cedar Rapids,<br>IA<br>524060351               | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |



| First Name | Last Name | Email                           | Company Name                          | Address  | Delivery Method    | View Trade Secret | Service List Name                      |
|------------|-----------|---------------------------------|---------------------------------------|--|--------------------|-------------------|--|
| Jeff       | O'Neill   | jeff.oneill@ci.monticello.mn.us | City of Monticello                    | 505 Walnut Street<br>Suite 1<br>Monticello,<br>Minnesota<br>55362            | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Gary       | Oetken    | goetken@agp.com                 | Ag Processing, Inc.                   | 12700 West Dodge Road<br>P.O. Box 2047<br>Omaha,<br>NE<br>681032047          | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Russell    | Olson     | rolson@hcpd.com                 | Heartland Consumers<br>Power District | PO Box 248<br><br>Madison,<br>SD<br>570420248                                | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Dan        | Patry     | dpatry@sunedison.com            | SunEdison                             | 600 Clipper Drive<br><br>Belmont,<br>CA<br>94002                             | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Jeffrey C  | Paulson   | jeff.jcplaw@comcast.net         | Paulson Law Office, Ltd.              | 7301 Ohms Ln Ste 325<br><br>Edina,<br>MN<br>55439                            | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Mary Beth  | Peranteau | mperanteau@wheelerlaw.com       | Wheeler Van Sickle &<br>Anderson SC   | 44 E. Mifflin Street, 10th<br>Floor<br><br>Madison,<br>WI<br>53703           | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Jennifer   | Peterson  | jjpeterson@mnpower.com          | Minnesota Power                       | 30 West Superior Street<br><br>Duluth,<br>MN<br>55802                        | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Donna      | Pickard   | dpickard@aladdinsolar.com       | Aladdin Solar                         | 1215 Lilac Lane<br><br>Excelsior,<br>MN<br>55331                             | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Hannah     | Polikov   | hpolikov@aee.net                | Advanced Energy<br>Economy Institute  | 1000 Vermont Ave, Third<br>Floor<br><br>Washington,<br>DC<br>20005           | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| David G.   | Prazak    | dprazak@otpc.com                | Otter Tail Power Company              | P.O. Box 496<br>215 South Cascade Street<br>Fergus Falls,<br>MN<br>565380496 | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |

| First Name | Last Name  | Email                              | Company Name                          | Address   | Delivery Method    | View Trade Secret | Service List Name                      |
|------------|------------|------------------------------------|---------------------------------------|---|--------------------|-------------------|--|
| Gayle      | Prest      | gayle.prest@minneapolis.gov        | City of Mpls Sustainability           | 350 South 5th St, #315<br>Minneapolis,<br>MN<br>55415             | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Gregory    | Randa      | granda@lakecountrypower.com        | Lake Country Power                    | 2810 Elida Drive<br>Grand Rapids,<br>MN<br>55744                  | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Mark       | Rathbun    | mrathbun@greenergy.com             | Great River Energy                    | 12300 Elm Creek Blvd<br>Maple Grove,<br>MN<br>55369               | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Michael    | Reinertson | michael.reinertson@avantenergy.com | Avant Energy                          | 220 S. Sixth St. Ste 1300<br>Minneapolis,<br>Minnesota<br>55402   | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| John C.    | Reinhardt  |                                    | Laura A. Reinhardt                    | 3552 26Th Avenue South<br>Minneapolis,<br>MN<br>55406             | Paper Service      | No                | OFF_SL_15-962_Official<br>Service List |
| Kevin      | Reuther    | kreuther@mncenter.org              | MN Center for Environmental Advocacy  | 26 E Exchange St, Ste 206<br>St. Paul,<br>MN<br>551011667         | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Michael    | Riewer     | MRiewer@otpc.com                   | Otter Tail Power Company              | PO Box 4496<br>Fergus Falls,<br>MN<br>56538-0496                  | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Michelle   | Rosier     | michelle.rosier@sierraclub.org     | Sierra Club                           | 2327 E. Franklin Avenue<br>Minneapolis,<br>MN<br>554061024        | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Craig      | Rustad     | crustad@minnkota.com               | Minnkota Power                        | 1822 Mill Road<br>PO Box 13200<br>Grand Forks,<br>ND<br>582083200 | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Robert K.  | Sahr       | bsahr@eastriver.coop               | East River Electric Power Cooperative | P.O. Box 227<br>Madison,<br>SD<br>57042                           | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |

| First Name  | Last Name   | Email                               | Company Name                      | Address  | Delivery Method    | View Trade Secret | Service List Name                   |
|-------------|-------------|-------------------------------------|-----------------------------------|--|--------------------|-------------------|-------------------------------------|
| Richard     | Savelkoul   | rsavelkoul@martinsquires.com        | Martin & Squires, P.A.            | 332 Minnesota Street Ste W2750<br><br>St. Paul, MN 55101                     | Electronic Service | No                | OFF_SL_15-962_Official Service List |
| Thomas      | Scharff     | thomas.scharff@newpagecorp.com      | New Page Corporation              | P.O. Box 8050<br>610 High Street<br>Wisconsin Rapids, WI 544958050           | Electronic Service | No                | OFF_SL_15-962_Official Service List |
| Larry L.    | Schedin     | Larry@LLSResources.com              | LLS Resources, LLC                | 12 S 6th St Ste 1137<br><br>Minneapolis, MN 55402                            | Electronic Service | No                | OFF_SL_15-962_Official Service List |
| Jacob J.    | Schlesinger | jschlesinger@kfwlaw.com             | Keyes, Fox &Wiedman LLP           | 1400 16th St.<br>16 Market Sq., Suite 400<br>Denver, CO 80202                | Electronic Service | No                | OFF_SL_15-962_Official Service List |
| Christopher | Schoenherr  | cp.schoenherr@smmpa.org             | SMMPA                             | 500 First Ave SW<br><br>Rochester, MN 55902-3303                             | Electronic Service | No                | OFF_SL_15-962_Official Service List |
| Dean        | Sedgwick    | N/A                                 | Itasca Power Company              | PO Box 457<br><br>Bigfork, MN 56628-0457                                     | Paper Service      | No                | OFF_SL_15-962_Official Service List |
| Maria       | Seidler     | maria.seidler@dom.com               | Dominion Energy Technology        | 120 Tredegar Street<br><br>Richmond, Virginia 23219                          | Electronic Service | No                | OFF_SL_15-962_Official Service List |
| William     | Seuffert    | Will.Seuffert@state.mn.us           |                                   | 75 Rev Martin Luther King Jr Blvd<br>130 State Capitol<br>St. Paul, MN 55155 | Electronic Service | No                | OFF_SL_15-962_Official Service List |
| Patricia    | Sharkey     | psharkey@environmentalawcounsel.com | Midwest Cogeneration Association. | 180 N. LaSalle Street<br>Suite 3700<br>Chicago, Illinois 60601               | Electronic Service | No                | OFF_SL_15-962_Official Service List |
| Bria        | Shea        | bria.e.shea@xcelenergy.com          | Xcel Energy                       | 414 Nicollet Mall<br><br>Minneapolis, MN 55401                               | Electronic Service | No                | OFF_SL_15-962_Official Service List |

| First Name | Last Name     | Email                          | Company Name                      | Address  | Delivery Method    | View Trade Secret | Service List Name                      |
|------------|---------------|--------------------------------|-----------------------------------|--|--------------------|-------------------|--|
| Doug       | Shoemaker     | dougs@mnRenewables.org         | MRES                              | 2928 5th Ave S<br><br>Minneapolis,<br>MN<br>55408                        | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Mrg        | Simon         | mrgsimon@mrenergy.com          | Missouri River Energy<br>Services | 3724 W. Avera Drive<br>P.O. Box 88920<br>Sioux Falls,<br>SD<br>571098920 | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Anne       | Smart         | anne.smart@chargepoint.com     | ChargePoint, Inc.                 | 254 E Hacienda Ave<br><br>Campbell,<br>CA<br>95008                       | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Ken        | Smith         | ken.smith@districtenergy.com   | District Energy St. Paul Inc.     | 76 W Kellogg Blvd<br><br>St. Paul,<br>MN<br>55102                        | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Ken        | Smith         | ken.smith@ever-greenenergy.com | Ever Green Energy                 | 1350 Landmark Towers<br>345 St. Peter St<br>St. Paul,<br>MN<br>55102     | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Beth H.    | Soholt        | bsoholt@windonthewires.org     | Wind on the Wires                 | 570 Asbury Street Suite<br>201<br><br>St. Paul,<br>MN<br>55104           | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Ron        | Spangler, Jr. | rlspangler@otpc.com            | Otter Tail Power Company          | 215 So. Cascade St.<br>PO Box 496<br>Fergus Falls,<br>MN<br>565380496    | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Sky        | Stanfield     | stanfield@smwlaw.com           | Shute, Mihaly &<br>Weinberger     | 396 Hayes Street<br><br>San Francisco,<br>CA<br>94121                    | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Tom        | Stanton       | tstanton@nrri.org              | NRRI                              | 1080 Carmack Road<br><br>Columbus,<br>OH<br>43210                        | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |
| Byron E.   | Starns        | byron.starns@stinson.com       | Stinson Leonard Street LLP        | 150 South 5th Street<br>Suite 2300<br>Minneapolis,<br>MN<br>55402        | Electronic Service | No                | OFF_SL_15-962_Official<br>Service List |

| First Name | Last Name   | Email                             | Company Name                             | Address  | Delivery Method    | View Trade Secret | Service List Name                   |
|------------|-------------|-----------------------------------|--|--|--------------------|-------------------|-------------------------------------|
| James M.   | Strommen    | jstrommen@kennedy-graven.com      | Kennedy & Graven, Chartered              | 470 U.S. Bank Plaza<br>200 South Sixth Street<br>Minneapolis,<br>MN<br>55402 | Electronic Service | No                | OFF_SL_15-962_Official Service List |
| Eric       | Swanson     | eswanson@winthrop.com             | Winthrop Weinstine                       | 225 S 6th St Ste 3500<br>Capella Tower<br>Minneapolis,<br>MN<br>554024629    | Electronic Service | No                | OFF_SL_15-962_Official Service List |
| Thomas P.  | Sweeney III | tom.sweeney@easycleanenergy.com   | Clean Energy Collective                  | P O Box 1828<br><br>Boulder,<br>CO<br>80306-1828                             | Electronic Service | No                | OFF_SL_15-962_Official Service List |
| SaGonna    | Thompson    | Regulatory.records@xcelenergy.com | Xcel Energy                              | 414 Nicollet Mall FL 7<br><br>Minneapolis,<br>MN<br>554011993                | Electronic Service | No                | OFF_SL_15-962_Official Service List |
| Steve      | Thompson    | stevet@cmmpa.org                  | Central Minnesota Municipal Power Agency | 459 S Grove St<br><br>Blue Earth,<br>MN<br>56013-2629                        | Electronic Service | No                | OFF_SL_15-962_Official Service List |
| Stuart     | Tommerdahl  | stommerdahl@otpc.com              | Otter Tail Power Company                 | 215 S Cascade St<br>PO Box 496<br>Fergus Falls,<br>MN<br>56537               | Electronic Service | No                | OFF_SL_15-962_Official Service List |
| Pat        | Treseler    | pat.jcplaw@comcast.net            | Paulson Law Office LTD                   | Suite 325<br>7301 Ohms Lane<br>Edina,<br>MN<br>55439                         | Electronic Service | No                | OFF_SL_15-962_Official Service List |
| Lise       | Trudeau     | lise.trudeau@state.mn.us          | Department of Commerce                   | 85 7th Place East<br>Suite 500<br>Saint Paul,<br>MN<br>55101                 | Electronic Service | No                | OFF_SL_15-962_Official Service List |
| Karen      | Turnboom    | karen.turnboom@newpagecorp.com    | NewPage Corporation                      | 100 Central Avenue<br><br>Duluth,<br>MN<br>55807                             | Electronic Service | No                | OFF_SL_15-962_Official Service List |
| Darryl     | Tveitbakk   | dalene@mncable.net                | Northern Municipal Power Agency          | 123 2nd St W<br><br>Thief River Falls,<br>MN<br>56701                        | Electronic Service | No                | OFF_SL_15-962_Official Service List |

| First Name | Last Name | Email                           | Company Name                                       | Address   | Delivery Method    | View Trade Secret | Service List Name                   |
|------------|-----------|---------------------------------|--|---|--------------------|-------------------|-------------------------------------|
| Lisa       | Veith     | lisa.veith@ci.stpaul.mn.us      | City of St. Paul                                   | 400 City Hall and Courthouse<br>15 West Kellogg Blvd.<br>St. Paul,<br>MN<br>55102 | Electronic Service | No                | OFF_SL_15-962_Official Service List |
| Roger      | Warehime  | warehimer@owatonnautilities.com | Owatonna Public Utilities                          | 208 South WalnutPO Box 800<br><br>Owatonna,<br>MN<br>55060                        | Electronic Service | No                | OFF_SL_15-962_Official Service List |
| Jenna      | Warmuth   | jwarmuth@mnpower.com            | Minnesota Power                                    | 30 W Superior St<br><br>Duluth,<br>MN<br>55802-2093                               | Electronic Service | No                | OFF_SL_15-962_Official Service List |
| Paul       | White     | paul.white@prcwind.com          | Project Resources Corp./Tamarac Line LLC/Ridgewind | 618 2nd Ave SE<br><br>Minneapolis,<br>MN<br>55414                                 | Electronic Service | No                | OFF_SL_15-962_Official Service List |
| Jason      | Willett   | jason.willett@metc.state.mn.us  | Metropolitan Council                               | 390 Robert St N<br><br>Saint Paul,<br>MN<br>55101-1805                            | Electronic Service | No                | OFF_SL_15-962_Official Service List |
| Daniel     | Williams  | DanWilliams.mg@gmail.com        | Powerfully Green                                   | 11451 Oregon Avenue N<br><br>Champlin,<br>MN<br>55316                             | Electronic Service | No                | OFF_SL_15-962_Official Service List |
| Cam        | Winton    | cwinton@mnchamber.com           | Minnesota Chamber of Commerce                      | 400 Robert Street North<br>Suite 1500<br>St. Paul,<br>Minnesota<br>55101          | Electronic Service | No                | OFF_SL_15-962_Official Service List |
| Robyn      | Woeste    | robynwoeste@alliantenergy.com   | Interstate Power and Light Company                 | 200 First St SE<br><br>Cedar Rapids,<br>IA<br>52401                               | Electronic Service | No                | OFF_SL_15-962_Official Service List |
| Daniel P   | Wolf      | dan.wolf@state.mn.us            | Public Utilities Commission                        | 121 7th Place East<br>Suite 350<br>St. Paul,<br>MN<br>551012147                   | Electronic Service | Yes               | OFF_SL_15-962_Official Service List |
|            |           |                                 |  |   |                    |                   |                                     |

| First Name  | Last Name | Email                   | Company Name                      | Address  | Delivery Method    | View Trade Secret | Service List Name                   |
|-------------|-----------|-------------------------|-----------------------------------|--|--------------------|-------------------|-------------------------------------|
| Thomas J.   | Zaremba   | TZaremba@wheelerlaw.com | WHEELER, VAN SICKLE & ANDERSON    | 44 E. Mifflin Street, 10th Floor<br><br>Madison, WI 53703      | Electronic Service | No                | OFF_SL_15-962_Official Service List |
| Christopher | Zibart    | czibart@atcllc.com      | American Transmission Company LLC | W234 N2000 Ridgeview Pkwy Court<br><br>Waukesha, WI 53188-1022 | Electronic Service | No                | OFF_SL_15-962_Official Service List |