MINNESOTA DEPARTMENT OF COMMERCE

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February 20, 2014

Burl W. Haar
Executive Secretary
Minnesota Public Utilities Commission
121 7th Place East, Suite 350
St. Paul, Minnesota 55101-2147

RE: **Reply Comments of the Minnesota Department of Commerce, Division of Energy Resources**
Docket No. E999/M-14-65

Dear Dr. Haar:

Attached are the Reply Comments of the Minnesota Department of Commerce, Division of Energy Resources (Department) in the following matter:

> In the Matter of Establishing a Distributed Solar Value Methodology under Minn. Stat. § 216B.164, subds.10 (e) and (f).

The Department recommends that the Minnesota Public Utilities Commission (Commission) **approve the methodology initially proposed by the Department with modifications** and is available to answer any questions the Commission may have.

Sincerely,

/s/ HOLLY LAHD
Rates Analyst

/s/ LISE TRUDEAU
Engineer

HL/LT/ja
Attachment

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BEFORE THE MINNESOTA PUBLIC UTILITIES COMMISSION

REPLY OF THE
MINNESOTA DEPARTMENT OF COMMERCE
DIVISION OF ENERGY RESOURCES

DOCKET NO. E999/M-14-65

I. INTRODUCTION

As detailed in the Department's January 31, 2014 filing, the 2013 Legislature passed legislation,[1] which Governor Dayton signed into law, that allows Investor-Owned Utilities (IOUs) to apply to the Commission for approval of a tariff that reflects the value of solar resources (VOS tariff) as an alternative to net metering and as a rate identified for community solar gardens. The Department was assigned the responsibility of developing a proposed methodology for calculating the VOS tariff. If the Commission approves this method, utilities proposing a VOS tariff will be required to follow this methodology when calculating the VOS rate.

The Department's January 31, 2014 filing described the process the Department used both to develop the rate and to engage stakeholders. Many of the participants in the stakeholder process submitted detailed written comments at several stages of the workshop series,[2] in addition to the comments filed in February, 2014 in this proceeding.

On February 13, 14 and 18 2014, the Commission received e-filed Initial Comments from:

- Amy Blumenshine,
- Bill and Nancy Bauer,
- David Boyce,

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1 MN Laws 2013, Chapter 85 HF 729, Article 9, Section 10.

2 http://mn.gov/commerce/energy/topics/resources/energy-legislation-initiatives/value-of-solar-tariff-methodology%20.jsp

- Environmental Law and Policy Center, Fresh Energy, Interstate Renewable Energy Council, Interstate Renewable Energy Council, Institute for Local Self Reliance, Izaak Walton League of America, Sun Edison, the Vote Solar Initiative,
- Michael Krause,
- Rebecca Lundberg,
- Minnesota Power,
- Minnesota Solar Energy Industries Association,
- Otter Tail Power,
- The Alliance for Solar Choice,
- Daniel Williams, and
- Xcel Energy
- Union of Concerned Scientists.

On February 18th, the Commission posted e-mailed Initial Comments from:

- Brian Bakalyar
- Center for Resource Solutions
- Minnesota Renewable Energy Society
- Michael Russelle
- Solar Energy Industries Association
- Kannan Sheshadri and Reema Chatterjee
- Union of Concerned Scientists

The Department's response to comments address the following topics:

- Whether the distributed solar value methodology proposed by the Department complies with the requirements of Minn. Stat. §216B.164, subd. 10 (e) and (f);
- The reasonableness of the proposed methodology

Due to tight statutory time frame for this proceeding, the Department's comments will not focus on tariff-related issues.

The Department responds to the comments of other parties below.

II. DEPARTMENT'S OVERALL RESPONSES TO COMMENTS

Many comments were generally supportive of the Department's proposed VOS method; however, many also had questions or comments. The Department responds to the issues identified by participants either on an overall basis or under the detailed discussion. The Department uses a question-and-answer format in this overview section, which is an introduction to the more detailed response to comments in the next section.

A. Why is solar PV compared to natural gas?

The goal of determining a reasonable value of solar means comparing the costs of solar power to the costs that would have otherwise occurred, much the same way that the Commission determines the value of other generation resources in certificates of need.

As noted by many parties, production of solar power tends to occur during the peak hours of the day and during the days with the most sun and heat – typically, during the peak period of summer-peaking utility such as Xcel. While solar power may, at times, replace other generators that would have been dispatched but for solar power, research by Clean Power Research (CPR), the consultant retained by the Department, indicates that it is reasonable to estimate the value of solar power by comparing solar power to a natural gas peaking plant on a stand-alone basis rather than undertaking a capacity-expansion model. This approach provides a more simple approach to estimating the value of solar.

B. Shouldn't the cost natural gas resources reflect environmental damage?

Such costs are called externalities – environmental costs that have not been "internalized" by the producer of any such damage. The Commission's externality values have been the source of material, complex proceedings, based on clear evidence about the costs of burning fuels to produce electricity. However, the externality values generally have not extended to the environmental damage caused by the production of the fuel (as opposed to the burning of the fuel). Doing so, while possible in theory, would add another layer to an already complex matter.

C. Why should utilities get solar renewable energy credits (SRECs) for "free"?

The transfer of SRECs to the utility is not for "free." The VOS method does something that is not required anywhere else in utility ratemaking – it requires ratepayers to pay for the costs of externalities in their rates. In all other uses of externalities, while these costs are considered for the purposes of deciding whether or not to add a new resource, the VOS tariff is the only place where ratepayers will actually have to pay for the externalities in the rates they pay for solar power.

Minnesota's statute §216B.164, subd. 10 is clear that the SRECs transfer to the utility under the VOS tariff.

D. Why are externalities included in the VOS rate?

The Department concludes that Minnesota Statute §216B.164, subd. 10 (f) is clear that externalities must be included in the rate:

> The distributed solar value methodology established by the department must, at a minimum, account for the value of energy and its delivery, generation capacity, transmission capacity, transmission and distribution line losses, and environmental value.

Just as the other components, such as generation capacity, transmission capacity, etc. are accounted for in the rate, the environmental value must be accounted for. Given that the purpose of this statute is to set a rate as opposed to a planning statute, the Department concludes that this statute requires externalities to be incorporated in the rate.

E. Shouldn't solar PV be valued for its ability to reduce emissions from coal plants?

As noted above, since the purpose is to determine the value of solar, it is necessary to compare the solar production to the electricity production that would otherwise have occurred. The commenters who asked this question also noted correctly that solar produces more energy during peak summer hours, when natural gas is more likely to be used to produce electricity. As a result, it is appropriate to compare solar power to the externalities caused by natural gas generation.

F. Why can't the inflation rate be tied more closely to the cost to deliver electricity?

If it were known at this time what rates would be charged in the future for natural gas electric energy production, transmission and delivery, preferably for each utility in question, such an inflation rate would be helpful. However, these costs are difficult to predict, especially since there are several major regulatory efforts underway to change how electricity is produced, transmitted and delivered. As a result, the best and most transparent information available is the inflation rate recommended by the Department.

G. Why should the VOS method include an escalator for natural gas prices?

This question is the opposite of the preceding question. Since the overall goal of the VOS method is to replace the costs of what the utility would have otherwise incurred to serve its customers, it is necessary to reflect that natural gas generation requires ratepayers to pay for increase in natural gas fuel over time, whereas solar power does not require ratepayers to pay for fuel.

H. What is the basis for concluding that there will be avoided distribution capacity or line losses?

Because this question is fairly complicated, the Department refers to its response in the detailed section below.

However, we note our agreement with some commenters that the effects of distributed solar generation – along with other factors affecting distribution systems such as electric fuel vehicles – should be studied over time and adaptations to the distribution system should be added as needed. Since ratepayers who want to add solar power will have alternatives such as Solar Gardens, it would be helpful for utilities to provide guidelines to ratepayers about the best ways for them to obtain solar power, given the effects on the utility's system

III. KEY ISSUES

In response to Initial Comments, the Department notes these key points:

The statute specifies that the VOS Methodology will account for the value to the utility, its customers, and society for the five required components (energy and its delivery, generation capacity, transmission capacity, transmission and distribution losses, and environmental value).

The VOS Methodology is required to take a broader assessment than current resource planning and thus requires new analytical approaches.

The VOS Methodology must account for all values to the utility, its customers, and society for the five required components.

Any optional components (other than the five required components) to be included must be based on known and measurable evidence of the cost or benefit of solar operation to the utility.

By statute, the VOS is <u>not</u> 'buy-all-sell-all' (the customer is credited through a bill mechanism).

A VOS tariff that appropriately applies the methodology established by the Department will <u>not</u> result in any sale of distributed solar energy by the customer. The customer purchases all of the electricity consumed from the utility at their applicable retail rate and is *credited* for all of the distributed PV energy produced at the VOS tariff rate.

The statute specifies a two Part VOS process: 1. the Methodology, then 2. the Tariff

The current docket (14-65) addresses the Methodology issues

It is anticipated that a future docket will address Tariff issues when a Public Utility applies for approval of an alternative tariff that appropriately applies the Methodology.

The VOS Methodology is designed to be simple (where possible and warranted) **and transparent in order to facilitate understanding and implementation.**

The VOS methodology develops a single VOS rate that is based on the utility fleet of PV.

The value of a kWh of distributed solar PV is not dependent on the type of customer that installed the PV.

IV. DETAILED DEPARTMENT RESPONSES TO COMMENTS

A. CONTRACT PERIOD

Some commenters questioned why the length of the solar contract should be assumed to be 25 years, instead, the proposal was for a 20-year contract.
Enabling Statute Language:
(k) A utility must enter into a contract with an owner of a solar photovoltaic device receiving an alternative tariff rate under this section that has a term of at least 20 years, unless a shorter term is agreed to by the parties.

Department Rationale:
The Department's VOS analysis and assumed contract periods were 25 years to align with expected lifespan of PV panels. There are numerous industry and research sources that identify 25 years as the average lifespan of a PV panel.[3] For the VOS to be successful, the term of the contract should align with the expected useful life of the PV resource. If the contract term and PV lifespan are not equal, PV resources could be undervalued for the value they provide.

An example may help illustrate this point: if a PV resource produces power for 25 years, but its Value of Solar tariff covers the first 20 years, the PV resource would not be eligible to enter into a new Value of Solar tariff for its remaining 5 years of life. It is unclear at this time under which tariff the PV resource could be eligible for during the last 5 years of production.

In addition, the statute does not prescribe that the term must be 20 years; instead, the contract must have a "term of *at least* 20 years" (emphasis added).

B. LOAD-MATCH ANALYSIS

Department Recommendation:
Capacity-related benefits are time-dependent, so it is necessary to evaluate the effectiveness of PV in supporting loads during the critical peak hours. Two different measures of effective capacity are used: Effective Load Carrying Capability (ELCC) and, Peak Load Reduction (PLR).

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[3] U.S. Department of Energy (April 2011). *Linkages from DOE's Solar Photovoltaic R&D to Commercial Renewable Power from Solar Energy*.
http://www1.eere.energy.gov/analysis/pdfs/solar_rd_linkages_report7.18.11.pdf.
National Renewable Energy Laboratory (January 2009). *Own Your Power! A Consumer Guide to Solar Electricity for the Home*. http://www.nrel.gov/learning/pdfs/43844.pdf.
National Renewable Energy Laboratory (April 2010). *Kauai, Hawaii: Solar Resource Analysis and High-Penetration PV Potential Technical Report.* http://www.nrel.gov/docs/fy10osti/47956.pdf.

Enabling Statute:

> (f) The distributed solar value methodology established by the department must, at a minimum, account for the value of energy and its delivery, *generation capacity, transmission capacity*, transmission and distribution line losses, and environmental value. The department may, based on known and measurable evidence of the cost or benefit of solar operation to the utility, incorporate other values into the methodology, including credit for locally manufactured or assembled energy systems, systems installed at high-value locations on the distribution grid, or other factors. (emphasis added)

1. Effective Load Carrying Capability (ELCC)

Some comments, while agreeing with the use of ELCC, requested that the approach used to determine ELCC should be transparent and should recognize the added value of PV panel orientations (e.g. west facing) and technologies (e.g. tracking) that can increase the capacity value.

Department Rationale:
ELCC is the measure of the effective capacity for distributed PV that can be applied to the avoided generation capacity costs, the avoided reserve capacity costs, the avoided generation fixed O&M costs, and the avoided transmission capacity costs.

ELCC is an analytical approach that dis-aggregates the overall power system reliability (determined by Loss of Load Expectation, LOLE) into the individual generator's (power plant), or fleets of generators', contribution to the system reliability. Plants or fleets that are consistently able to deliver during times of high risk (hours of high system demand) have a high ELCC, while less reliable plants have a lower ELCC. For variable generators like solar and wind, the ELCC method can distinguish between solar and wind resources that consistently produce power during high risk hours, sometimes produce power during high risk hours, and rarely produce power during high risk hours.

ELCC is the industry best practice methodology for determining capacity value of variable generation resources such as PV. However, the ELCC methodology requires detailed power system reliability modeling that incorporates not only detailed characteristics of regional conventional generators and multi-year system load data sets but also high quality, multi-year,

multi site PV data sets. These computational challenges have led to the development of methodologies that approximate a full ELCC / LOLE analysis.[4]

Several of the leading methods to approximate ELCC focus on the capacity value during the peak load hours by determining the average capacity factor of the solar or wind plants during system peak load hours. This approach is the most transparent and most easily verified approach to ELCC approximation.

The Midcontinent Independent System Operator (MISO) Business Practices Manual (MISO BPM-011, Section 4.2.2.4, page 35)[5] methodology is an ELCC approximation that uses this approach of capacity value during the peak load hours. By using as an input to the calculation the PV plant outputs that comprise the PV fleet, use of the MISO BPM approach accounts for the added value of those PV plants in the utility PV fleet that have panel orientations (e.g. west facing) and technologies (e.g. tracking) that can increase the capacity value.

2. Peak Load Reduction (PLR)

Some comments questioned whether PLR reflects the variability of solar and whether it recognizes differences in load shape between customer classes (e.g., commercial feeders versus residential feeders); and commented that average PLR should be calculated based on each utility's unique customer mix.

Department Rationale:

PLR does recognize the variability of solar. For example, the PV Fleet Shape is made up of a time series of at least 8760 hours, and each hour shows a different amount of solar production. The hour-to-hour variability is captured. If the "Load Analysis Period" were more than one year, then annual variability would also be captured.

Average, utility-specific PLR can be used when calculating the VOS rate. Avoided Distribution Capacity Costs, which is based on PLR, may be calculated in either of two ways: (1) system-wide; and (2) location-specific. If the utility elects the first method, then PLR would effectively be an average value based on the utility's unique customer mix. In utilities with a relatively high proportion of residential loads, then this would likely result in lower PLR. Conversely, utilities with lower proportion of residential load may have a higher PLR. The PLR is unique to each utility and is based on that utility's hourly load profile and the performance of PV at sites within that utility's service territory.

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[4] P Madaeni, RSioshanis, P Denholm. *Comparison of Capacity Value Methods for Photvoltaics in the Western Unitied States*. National Renewable Energy Laboratory Technical Report. July 2012.

[5] https://www.misoenergy.org/Library/BusinessPracticesManuals/Pages/BusinessPracticesManuals.aspx

C. LOSS-SAVING ANALYSIS

Department Recommendation:
Loss savings must be calculated on a marginal basis.

Enabling Statute:

> (f) The distributed solar value methodology established by the department must, at a minimum, account for the value of energy and its delivery, generation capacity, transmission capacity, *transmission and distribution line losses*, and environmental value. The department may, based on known and measurable evidence of the cost or benefit of solar operation to the utility, incorporate other values into the methodology, including credit for locally manufactured or assembled energy systems, systems installed at high-value locations on the distribution grid, or other factors. (emphasis added)

D. MARGINAL LOSSES

Some comment questions whether average losses should be used in calculating the loss savings rather than marginal losses; and commented that if the losses associated with all uses of the transmission and distribution systems were calculated on a marginal basis, the sum of all the losses would total more than the actual losses.

Department Rationale:
The Department disagrees on the basis that the average costs do not reflect the avoided costs. The avoided costs are those that would be incurred without solar minus the costs that would be incurred with solar. If the costs are avoided, then they should be included in the VOS calculation.

The methodology includes an example: if PV were to produce 1 kW of power when total customer load is 1000 kW, then the avoided losses are the losses that would be avoided by removing 1 kW of load from the total.

For example, if the utility had average losses of 5 percent, then an average loss method would calculate the original losses (without solar) to be 5 percent x 1000 kW = 50 kW and the new losses (with solar) to be 5 percent x 999 kW = 49.95 kW, so the "avoided" losses would be 50 – 49.95 = 0.05 kW. However, this approach is not correct because it assumes that the percentage loss is independent of load, and this is not possible.

The correct way to calculate avoided losses is using a marginal loss method that may be illustrated as follows: assume that load-related losses (expressed as a percentage of load), are linearly related to load. Losses with solar would avoid 5 percent x (999/1000) = 4.995 percent of 999 kW, or 49.9 kW. In this case, the avoided losses would be 50 – 49.9 = 0.10 kW.
In this example, the avoided losses are 0.10 kW, so the avoided costs should be based on this value.

E. DISCOUNT AND ESCALATION/INFLATION FACTORS

Some commenters had questions about the discount and escalation factors used in the Department's analysis. The following discusses both the present value approach and inflation-adjusted rate used in the Department's proposed VOS method.

1. Present Value Approach

Department Recommendation:
The methodology must calculate the present value of the value of solar components. Present value is calculated by escalating solar costs and benefits at the previous 25 year annualized inflation rate, and discounted back to present value by 3 percent for environmental costs, the risk-free U.S. Treasury rate for avoided fuel costs, and the utility's weighted average cost of capital for all other components.

Enabling Statute Language:
(g) The credit for distributed solar value applied to alternative tariffs approved under this section shall represent the present value of the future revenue streams of the value components identified in paragraph (f).

Rationale:
The value of solar methodology is designed to account for the value of solar energy to the utility, its customers, and society. Calculating this value requires the use of present value analysis. Determining the present value of the value of solar components now and into the future requires accounting for inflation of avoided costs and discounting future costs by the utility's rate of return requirements (weighted average cost of capital), the risk-free discount rate to value an investment with no uncertainty, and the environmental discount rate to assess future environmental impacts today.

2. Inflation-Adjusted Rate

Department Recommendation:
The Value of Solar rate must be inflated annually at the prior year's inflation rate.

Enabling Statute Language:
(l) An owner of a solar photovoltaic device receiving an alternative tariff rate under this section must be paid the same rate per kilowatt-hour generated each year for the term of the contract.

Rationale:
Inflation is an important factor in all utility rates. The methodology calls for the conversion of the 25-year levelized value to an equivalent inflation-adjusted credit rate. The inflation-adjusted credit rate is intended to ensure that the credit's value will remain proportional to future costs of other electricity generation methods, while also meeting the statute's requirement that solar generators receiving VOS credits be paid the same rate during the contract's life in real economic value terms.

Whether the rate is levelized or inflation-adjusted has implications for PV project financing and in community solar programs.[6] The relative difference between a VOS and applicable retail rate of a utility customer will impact the size of a potential PV project they may pursue. For example, a utility customer interested in installing a residential PV system may wish to size the project such that the credit from the solar generation is large enough to offset the majority of his/her residential usage bill.[7] The customer would size the project differently under an inflation-adjusted VOS rate than under a 25 year levelized VOS rate.

In addition to residential PV, another potential application of the VOS is in the subscription credit rates in Community Solar Gardens.[8] Once a VOS tariff is approved by the Commission, subscribers to Community Solar Gardens interconnecting after the VOS approval date will receive a VOS rate on the subscription's generation credit. Under a levelized rate subscribers to a Community Solar Garden would receive the same (nominal) rate for 25 years. However, the real value of this rate would be decreasing as inflation increases.

In addition to seeing the increasing difference between their residential bills and solar generation credit, subscribers may have a difficult time selling their subscription to other customers if they no longer are eligible to subscribe to that Community Solar Garden (e.g. the move out of Xcel's service territory) and if the levelized rate is lower than rates for other solar resources at that time. Thus, the marketability and subscription transferability of older Community Solar Gardens could be diminished if a levelized approach is used the rate is not adjusted for inflation, even though the PV installation would still provide value to the utility, its customers, and society. Further, escalating costs and stagnant, nominal revenue may lead to poor maintenance of Community Solar Gardens, and subscribers may bring complaints to the Commission.

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6 Xcel's proposed Community Solar Garden plan is currently before the Commission.

7 This potential generator would still be subject to the net metering statute that limits generation to 120% of a customer's annual load.

8 Xcel's Community Solar Garden proposal is currently before the Commission (13-867).

Thus, the Department concludes that the most appropriate approach to ensure that the value of solar resources are maintained throughout their lives is to avoid using a levelized rate and instead use a rate that is adjusted over time based on the inflation factor used in the VOS method proposed by the Department.

F. AVOIDED FUEL COSTS

Some commenters had questions about the avoided fuel costs used in the VOS method the Department recommends. The Department discusses both the fuel price escalator and the guaranteed fuel price. The Department recommends a revision to the method for calculating the fuel price escalator.

Enabling Statute:

> (f) The distributed solar value methodology established by the department must, at a minimum, account for the value of *energy* and its delivery, generation capacity, transmission capacity, transmission and distribution line losses, and environmental value. The department may, based on known and measurable evidence of the cost or benefit of solar operation to the utility, incorporate other values into the methodology, including credit for locally manufactured or assembled energy systems, systems installed at high-value locations on the distribution grid, or other factors. (emphasis added)

1. Fuel Price Escalation Factor

Some comments suggested that the proposed method for the calculation of the fuel-price escalation factor leads to a fuel price escalation factor that is overly sensitive to near-term market changes in the NYMEX Natural Gas Futures Prices.

Department Response:
The fuel-price escalation factor is a key driver of the Avoided Fuel Costs. In order to avoid a VOS that varies significantly from year-to-year, we agree that the method for obtaining the fuel price escalation factor could be improved, and a change in methodology is proposed as follows.

After further evaluation of the method for calculating the Fuel Price Escalation Factor, the Department recommends that the NYMEX Natural Gas Prices be averaged over a 30-day period to smooth out their variable nature. Thus, to calculate the avoided fuel price in the first year of a VOS analysis, the NYMEX Natural Gas price for each contract month (Jan-Dec) would be averaged over a 30-day period. After which the average monthly values would be averaged to obtain the natural gas price for the first year.

Additionally, the methodology could be further improved by using the general escalation rate as the guaranteed fuel price escalation beyond 12 years. Doing so would yield a value that is stable, transparent, and tied to the cost of energy.

Modified Department Recommendation:

- Fuel Price Escalation Factor: 30-day averages are used for the NYMEX Natural Gas Futures contract prices for years 1 through 12; For years beyond year 12, the general escalation rate is used as the guaranteed fuel price escalation;

2. Guaranteed Fuel Price

Some comments questioned whether the utility incurs costs to hedge fuel prices.

Department Recommendation:
The methodology must include the guaranteed fuel price and offers utilities a choice of three methods by which they can accomplish this objective: (1) obtain a 25-year fixed price quote and use this quote in calculating the VOS; (2) guarantee 25-year fuel pricing by removing fuel adjustment charges from consumed energy; and (3) use NYMEX future prices with a fixed escalation beyond the 12-year trading period.

Rationale
Long term fuel price risk is a cost that is incurred by the utility and passed on to its customers through rate changes in the fuel adjustment clause and elsewhere. When fuel prices increase, the retail rate increases, and when fuel prices fall, the retail rate falls. Therefore, the methodology must include a mechanism for accounting for the cost of fuel price risk in an apples-to-apples comparison.

By way of illustration, if the VOS customer were allowed to serve load directly behind the meter, the customer would benefit by removing all future risk of fuel price uncertainty for the energy derived from the solar generation. However, by feeding all solar generation into the grid, the solar customer passes this savings to all other customers. To reflect this value of solar generation, the VOS rate must provide a mechanism to credit the avoided cost of this risk.

The rationale for the three options is as follows:

- If a utility does not accept the premise that distributed solar avoids the cost of price uncertainty, then it should be satisfied with the option of removing the fuel adjustment charges for VOS customers.
- If a utility does accept the premise that distributed solar avoids this cost, then it should quantify the cost using one of the other two methods. We consider the NYMEX method to be preferred because of its transparency, but the 25-year price quote method to be more analytically robust.

G. AVOIDED GENERATION CAPACITY COSTS

Department Recommendation:
The methodology for the avoided generation capacity cost is based on a weighting of capital cost of combustion turbines (CTs) and combined cycle gas turbines (CCGTs) according to the marginal solar heat rate, which is multiplied by (i.e. reduced by) the Load Match Factor (ELCC) in recognition that capacity related benefits are time-dependent.

Enabling Statute:

> (f) The distributed solar value methodology established by the department must, at a minimum, account for the value of energy and its delivery, *generation capacity*, transmission capacity, transmission and distribution line losses, and environmental value. The department may, based on known and measurable evidence of the cost or benefit of solar operation to the utility, incorporate other values into the methodology, including credit for locally manufactured or assembled energy systems, systems installed at high-value locations on the distribution grid, or other factors. (emphasis added)

1. CT/CCGT Cost Weighting

Some comments suggested that this weighting does not reflect the current investment plans, which call for near term (e.g., 2017) investment of CTs for peaking capacity. Since peaking CTs can be installed at lower cost than CCGTs, the commenters state that the weighting method will result in overstated avoided costs for generation capacity.

Department Rationale:
The goal of the method is to represent the avoided cost of capacity over the full 25 year life of the PV resource, not only the near term avoided capital costs. In the long term, both CCGT and CT capacity will be needed because both intermediate-load resources and peaking resources will be necessary to meet demand. The weighting method is intended to apportion these costs according to what resources will actually be offset.

Furthermore, the avoided fuel and the avoided capacity are somewhat interrelated. For example, if only CT capacity were employed in the future, then future intermediate loads would have to be satisfied by these same CT units. Avoided fuel costs would be much higher due to the higher CT heat rates. To reflect both capacity and fuel costs for natural gas over the life of the solar resource, the weighting method is intended to capture a more typical blend of technology and the trade-off between capital and fuel costs.

2. Market Prices

Some comments suggested that current market prices should be used when valuing the capacity of displaced resources.

Department Response:
The Department agrees that current prices for installed capacity should be used. These prices should reflect the total installed cost of the capacity. The methodology does so by allowing the utility to enter current market prices for CTs and CCGTs in the VOS Data Table, and using this data in the calculations.

3. Capacity Timing

Some comments suggested that additional generation capacity is not needed until a certain year in the future (e.g., 2017), so the capacity credit should not be applied until then.

Department Rationale:
The contribution of distributed solar PV to deferral of new generation capacity must be considered when evaluating the timing of future generation. By statute, the VOS credit "shall represent the present value of the future revenue streams of the value components."

Distributed solar PV is a modular resource that is developed and installed in smaller increments than larger additions of typical utility-sized generation. This feature contrasts with conventional generation resources such as gas peaking units which are added in block increments of several hundred MW each.

Reliability contributions of new generation are recognized each year in the annual planning reserve margin calculation in MISO's annual Loss of Load Expectation (LOLE) study. Here in the Midwest, and throughout most of the United States, reliability regulators such as the Midwest Reliability Organization (MRO) have set reliability targets such that system outages should occur no more than 0.1 days per year, or 1 day per 10 years. To help accomplish this goal, planners annually conduct analyses called Loss of Load Expectations (LOLE) or Loss of Load Probabilities to determine the amount of capacity that is needed to meet this targeted level of reliability.

4. Avoided Reserve Capacity Cost

Some comments suggested that avoided reserve capacity cost should be excluded from the methodology because it contradicts the finding by the Federal Energy Regulatory Commission (FERC) that distributed solar does not lower reserve margin requirements.

Department Recommendation
The methodology for the avoided reserve capacity cost is the same as the generation capacity cost calculation except that utility costs are multiplied by the reserve capacity margin.

Enabling Statute

> (f) The distributed solar value methodology established by the department must, at a minimum, account for the value of energy and its delivery, *generation capacity*, transmission capacity, transmission and distribution line losses, and environmental value. The department may, based on known and measurable evidence of the cost or benefit of solar operation to the utility, incorporate other values into the methodology, including credit for locally manufactured or assembled energy systems, systems installed at high-value locations on the distribution grid, or other factors. (emphasis added)

Department Rationale
FERC's finding is not applicable because it addresses only behind-the-meter generation. Under the VOS statute, the alternative tariff "charges the customer for all energy consumed by the customer." Consequently, none of the energy provided by the solar generated may be used to reduce the load behind the meter, so VOS resources cannot be considered behind-the-meter resources.

They are, however, distributed resources, and they provide corresponding distributed benefits as follows: Reserve margin should be based on total load. Since the utility measures coincident load at the substation (e.g., at the transmission level) then all VOS resources participate in reducing total load. This aggregation provides an extremely high level of redundancy not observed with centralized generation (whether fossil or renewable).

For example, if combined VOS resources are providing 100 MW in a given hour, and if the average VOS system is rated at 50 kW, then a forced outage of a single unit would still allow the aggregate resource to deliver 99.950 MW (99.95 percent retention). Conversely, the loss of a 100 MW gas turbine would result in the loss of the full 100 MW (0 percent retention). Note that the methodology already accounts for weather-related outages through the use of the ELCC metric.

H. AVOIDED TRANSMISSION CAPACITY COST

Some comments suggested that use of the MISO network integration transmission service rate does not represent the marginal cost for avoided transmission and does not reflect system savings. Instead, those comments indicated that avoided transmission cost, to the extent there is

any, should be based on the avoided interconnection cost associated with the interconnection of planned natural gas units.

Other comments noted that distributed solar generation located close to load in the distribution system lowers the overall need for transmission capacity to bring energy from distant generation facilities. These comments supported the use of the MISO Open Access Transmission Tariff (OATT) Schedule 9 as an accurate approach that accounts for the transmission capacity value component by including it from the start of the evaluation period, including avoided transmission operation and maintenance costs, avoided congestion charges and penalties, and other transmission –related avoided costs.

Department Recommendation

The methodology for calculating the avoided transmission capacity cost is based on the utility's 5-year average MISO OATT Schedule 9 which is multiplied by (i.e. reduced by) the Load Match Factor (ELCC) in recognition that capacity related benefits are time-dependent.

Enabling Statute

> (f) The distributed solar value methodology established by the department must, at a minimum, account for the value of energy and its delivery, generation capacity, *transmission capacity*, transmission and distribution line losses, and environmental value. The department may, based on known and measurable evidence of the cost or benefit of solar operation to the utility, incorporate other values into the methodology, including credit for locally manufactured or assembled energy systems, systems installed at high-value locations on the distribution grid, or other factors. (emphasis added)

Department Rationale

In addition to functioning as a generation resource, distributed solar PV is expected to reduce the need for future capacity investments in transmission by serving load locally. Thus, investments such as capacity upgrades to regional transmission lines should be reduced when generation resources are built near the point of consumption. Since transmission tends to be added in rather large increments, the benefits are expected to accrue over time, but are important to recognize in the rates paid for solar energy. Thus the incremental effect of distributed generation to push future transmission capacity requirements farther into the future are correctly recognized for by accounting for transmission capacity benefits over the analysis period.

Regional investments in transmission capacity are made for multiple reasons and values and are expected to be reduced over time as a result of distributed solar generation.

MISO's Network Integration Transmission Service (NITS) is a proper proxy for avoided transmission costs. Xcel has confirmed use of this approach in other dockets.[9] And, because of the MISO revenue crediting mechanism under Schedule 26A, the NITS charge is not unduly impacted by multi-value projects or wind transmission projects.

Solar PV reduces peak demand and the Planning Margin Reserve Requirement (PMRR). The PMRR and transmission loading during peak demands are tied to Xcel's projection of its forecasted peak at the time of the MISO annual peak as well as Xcel's stand-alone peak. During the past 10 years or so, the peak for both native load purposes and the peak for PMRR has always occurred during afternoon daylight hours in July or August, when solar is expected to produce power; further, a key variable in the Xcel forecast is solar irradiance. Solar PV therefore reduces peak demand which reduces peak demand transmission loading.[10]

I. AVOIDED DISTRIBUTION CAPACITY COST

Department Recommendation
The methodology for calculating the avoided distribution capacity cost includes two options – system-wide avoided costs and location-specific avoided costs. The resulting avoided distribution capacity is multiplied by (i.e. reduced by) the Load Match Factor (PLR) in recognition that capacity related benefits are time-dependent.

Enabling Statute

> (f) The distributed solar value methodology established by the department must, at a minimum, account for the value of energy and its *delivery*, generation capacity, transmission capacity, transmission and distribution line losses, and environmental value. The department may, based on known and measurable evidence of the cost or benefit of solar operation to the utility, incorporate other values into the methodology, including credit for locally manufactured or assembled energy systems, systems installed at high-value locations on the distribution grid, or other factors. (emphasis added)

1. Cost Per Unit Growth

Some comments suggested that the methodology should be based on projected growth rather than current (historical) growth; some commented that the current growth rate can result in a null or negative value for the cost of distribution capacity.

[9] IRs C20 and C22 in the Xcel solar PV ELCC docket (GR-10-971 / CI-13-315)
[10] IRs 19 and 20 in the Xcel solar PV ELCC docket (CI-13-315)

Department Response
The Department agrees that the methodology should reflect expected peak-load growth rates, consistent with existing plans, and that the methodology may result in null or negative values. Therefore, we propose the following improvement to the methodology: the utility would estimate distribution peak load growth rate over the next 15 years and show the method for estimating it. If the result is zero or negative (before adding solar PV), set the avoided distribution capacity cost to zero.

Modified Department Recommendation:

- Avoided Distribution Capacity Cost: Set the distribution peak load growth rate based on the utility's estimated future growth over the next 15 years. If the result is zero or negative (before adding solar PV), set the avoided distribution capacity cost to zero.

2. Deferred cost calculation

Some comments suggested that distribution capacity investments are not only driven by load growth, but by other factors as well, such as reliability. In addition, some commented that the methodology should address actual costs per installed capacity; in addition, comments suggested that solar may have little or no impact on the peak demand of residential distribution systems.

Rationale:
The Department agrees that distribution capital costs can be driven by feeder reliability or other issues besides capacity, and that such costs are not avoidable by distributed PV. Therefore, distribution capital costs not related to capacity additions should not be included in the VOS calculation. The methodology accomplishes this goal through two means: (1) selection of FERC accounts; and (2) the selection of capacity percentages.

The methodology clarifies the meaning of deferrable costs, stating: "these costs, however, should be adjusted to consider only capacity-related amounts. As such, the capacity-related percentages shown in Table 14 will be utility specific." This statement means that when the utility calculates its actual historical costs as illustrated in the example of Table 14, the utility should determine the correct "capacity-related" percentages. For example, if $200 million dollars are invested in underground conduit and only 25 percent of this cost is capacity related, then only $50 million dollars is potentially deferrable (this amount may be further reduced, depending on the PLR load match).

The Department agrees that the analysis of planning areas with high proportions of residential loads may result in low a distribution value (due to a low PLR load match factor) and, if so, this result will be reflected in the resulting calculated VOS rate. The utility may elect to either use the system-wide value, in which case the average avoided costs across all VOS participants would be used, or the utility may elect to divide the service territory into areas based on predominate customer classes.

J. AVOIDED ENVIRONMENTAL COST

1. The Social Cost of Carbon

Department Recommendation:
The value of the avoided environmental damage from the avoided release of carbon dioxide is included in the proposed methodology. The methodology uses the U.S. EPA's 3 percent discount factor social cost of carbon values.

Enabling Statute Language:

> (f) The distributed solar value methodology established by the department must, at a minimum, account for the value of energy and its delivery, generation capacity, transmission capacity, transmission and distribution line losses, and *environmental value*. The department may, based on known and measurable evidence of the cost or benefit of solar operation to the utility, incorporate other values into the methodology, including credit for locally manufactured or assembled energy systems, systems installed at high-value locations on the distribution grid, or other factors. (emphasis added)

Rationale:
The VOS statute states that the methodology must account for the environmental value of distributed solar. As with other components, the Department calculates the value as the avoided environmental costs associated with the energy resource, based on the margin the distributed solar is replacing (e.g. natural gas). The avoided environmental cost approach requires calculating the avoided emissions and applying the environmental cost factors to calculate the avoided environmental costs in economic terms (dollars).

The methodology accounts for the environmental values of avoided carbon dioxide (CO_2), carbon monoxide (CO), particular matter (PM_{10}), sulfur dioxide (SO_2), and lead (Pb). These are the pollutants that the Commission requires externality values be applied to in utility Integrated Resource Plans (IRPs).

The methodology uses the externality values published by the Commission for CO, SO_2, Pb, and PM_{10}; the proposed methodology uses the values established in 1997, and indexed for inflation to year 2012.[11] The methodology uses the EPA's 2013 Social Cost of Carbon values.

[11] Docket No. E-999/CI-00-1636. *Notice of Updated Environmental Externality Values* (June 5, 2013).

2. Response to recommendation that no environmental costs be included in the methodology

The statute requires that the VOS tariff "compensates customers through a bill credit mechanism for the value *to the utility, its customers, and society*" (emphasis added). The avoided environmental costs of pollution are more than the utility's avoided pollution mitigation or compliance cost. As such, some commenters argued that no environmental costs should be included in the methodology because Minnesota is currently in compliance with air quality standards, or that there should be no CO_2 value because utilities currently have no compliance costs for that pollutant. The Department concludes that these arguments are not in compliance with the statute.

3. Response to comments that the social cost of carbon is untested

In their comments many Minnesota utilities argued against the use of the federal social cost of carbon values, claiming that these values have not been vetted. This is not true.

The Social Cost of Carbon was developed through a number of federal agency actions. A federal interagency working group was convened by the Council of Economic Advisers and the Office of Management and Budget in 2009-2010 to design an SCC modeling exercise and develop estimates for use in rulemakings. The interagency group was comprised of scientific and economic experts from various federal agencies. The US EPA and Department of Energy hosted a series of workshops in 2010 and 2011 to inform the social cost of carbon. Information from these workshops has been available on the US EPA's website since 2010.[12]

The U.S. EPA committed to updating the SCC values as climate science is updated. In May 2013, the interagency group released revised SCC values. The May 2013 estimates reflect values that are similar to those used by other national governments, international institutions, and major corporations. Those estimates have been available for public comment in several proposed rulemakings since May, and agencies have already received comments that are under review.

The revised Technical Support Document that was issued in November, 2013 is based on the best available scientific information on the impacts of climate change. On November 26, 2013, the Office of Management and Budget requested comments on the November 2013 Social Cost of Carbon Technical Support Document. The comment period is open through February 26, 2014.[13] As of February 14, 2014, 61 comments have been received.

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[12] http://yosemite.epa.gov/ee/epa/eerm.nsf/vwRepNumLookup/EE-0564?OpenDocument.

[13] Office of Management and Budget (2013). Notice of Public Comment Period on *Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866* .http://www.regulations.gov/#!documentDetail;D=OMB_FRDOC_0001-0129.

4. Why the social cost of carbon is more appropriate than the Minnesota IRP CO2 values

In its November 2013 Social Cost of Carbon Fact Sheet the EPA writes:

> The SCC is meant to be a comprehensive estimate of climate change damages and includes, among other things, changes in net agricultural productivity, human health, and property damages from increased flood risk. However, it does not currently include all important damages. As noted by the IPCC Fourth Assessment Report, it is "very likely that [the SCC] underestimates" the damages. The models used to develop SCC estimates do not currently include all of the important physical, ecological, and economic impacts of climate change recognized in the climate change literature because of a lack of precise information on the nature of damages and because the science incorporated into these models naturally lags behind the most recent research. Nonetheless, the SCC is a useful measure to assess the benefits of CO2 reductions.[14]

The U.S. EPA further describes the social cost of carbon as "an estimate of the economic damages associated with a small increase in carbon dioxide (CO_2) emissions, conventionally one metric ton, in a given year. This dollar figure also represents the value of damages avoided for a small emission reduction (i.e. the benefit of a CO_2 reduction)."[15] In other words, the social cost of carbon is used to estimate the value to society of marginal reductions in carbon emissions. Since the VOS methodology is an analysis of the value of solar energy compared to the resources it is displacing on the margin, the use of a marginal carbon damage factor best matches the methodology's framework.

The Department is not aware of publicly-available marginal damage factors for non-CO_2 emissions that are applicable to Minnesota; therefore, the methodology uses the Commission's approved environmental externality costs for non-CO2 avoided emissions. The Department notes that the Commission recently reopened the investigation into environmental and socioeconomic costs under Minn. Stat. § 216B.2422, subd. 3. The Commission directed the

[14] U.S. Environmental Protection Agency (November 2013). Fact Sheet: Social Cost of Carbon. http://www.epa.gov/climatechange/Downloads/EPAactivities/scc-fact-sheet.pdf.
[15] U.S. Environmental Protection Agency (updated November, 2013). *Social Cost of Carbon*. http://www.epa.gov/climatechange/EPAactivities/economics/scc.html

Department and the Minnesota Pollution Control Agency to convene a stakeholder group to address the scope of the investigation.[16] The Department has begun work on that effort.

5. Environmental Discount Factor

The choice of a discount rate, especially over long periods of time, raises contested and difficult questions. In recognition of the issues surrounding the choice of environmental discount factor, and to account for the variation in values resulting from different discount factors, the EPA published social cost of carbon values under three discount factor values: 2.5 percent, 3 percent, and 5 percent. The EPA also published social cost of carbon values which represents the 95th percentile social cost of carbon estimate across all three climate models at a 3 percent discount rate; this value is intended to represent higher-than-expected impacts from temperature change further out in the tails of the social cost of carbon distribution.[17]

On social cost of carbon discount factors, the EPA states:

> The central [discount] value, 3 percent, is consistent with estimates provided in the economics literature and federal Office of Management and Budget's Circular A-4 guidance for the consumption rate of interest. As previously mentioned, the consumption rate of interest is the correct discounting concept to use when future damages from elevated temperatures are estimated in consumption-equivalent units. Further, 3 percent roughly corresponds to the after-tax riskless interest rate.[18]

For these reasons, the Department selected the 3 percent discount factor social cost of carbon values for the proposed methodology. To treat all environmental costs consistently, the 3 percent environmental discount factor was also applied with discounting future non-CO_2 damages to calculate their present value.

6. Non-CO_2 Environmental Values

The methodology uses the midpoint of the low and high urban range of the Commission's 1997 externality values (inflated into 2012 dollars) for carbon monoxide (CO), particular matter (PM_{10}), sulfur dioxide (SO_2), and lead (Pb). In its comments the Minnesota Rural Electric

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[16] Minnesota Public Utilities Commission (February 10, 2014). Order Reopening Investigation and Convening Stakeholder Group to Provide Recommendations for Contested Case Proceeding. Docket No. E-999/CI-00-1636.

[17] U.S. Environmental Protection Agency (updated November, 2013). *Social Cost of Carbon*. http://www.epa.gov/climatechange/EPAactivities/economics/scc.html

[18] U.S. Environmental Protection Agency (updated November, 2013). *Social Cost of Carbon Technical Support Document.* http://www.epa.gov/climatechange/EPAactivities/economics/scc.html

Association questions why the urban values were chosen, when the Metropolitan Fringe or Rural values may be more appropriate for utilities with service territories in greater Minnesota.

The Department used the urban values in the proposed methodology to simplify the data collection process. However, the Department is agreeable to allowing utilities to select the set of non-CO_2 externality values most appropriate to their service territory.

K. SOLAR RENEWABLE ENERGY CREDITS (SRECS)

This section is tied directly to the prior section on environmental costs.

Department Recommendation:
A sREC's compliance value in addition to the avoided environmental cost value is not included in the proposed methodology.

Enabling Statute Language:

> (i) Renewable energy credits for solar energy credited under this subdivision belong to the electric utility providing the credit.
> (a) A public utility may apply for commission approval for an alternative tariff that compensates customers through a bill credit mechanism *for the value to the utility, its customers, and society* for operating distributed solar photovoltaic resources interconnected to the utility system and operated by customers primarily for meeting their own energy needs. (emphasis added)

Rationale:
Environmental commenters[19] argue that, in addition the avoided environmental costs already included in the proposed methodology, a value for sREC should be included. The Commission is currently reviewing comments on sRECs in context of the Solar Energy Standard in Docket E-999/M-13-542.

The Department agrees with the Environmental commenters that sREC valuation poses a challenge. While the quantity of sRECs needed by the utilities for compliance with the Solar Energy Standard can be estimated, the supply of sRECs from residential, Community Solar Gardens, and large installation PV systems by 2020 is unknown. As the ultimate market price of sRECs depends on the demand and supply of sRECs, the value cannot be calculated at this time based on "known and measurable evidence of the cost or benefit of solar operation to the utility" as required by the statute.

[19] Environmental commenters are comprised of Environmental Law and Policy Center (ELPC), Fresh Energy (FE), Interstate Renewable Energy Council, Inc. (IREC), Institute for Local Self-Reliance (ILSR), Izaak Walton League of America (IWLA), SunEdison, LLC (SE), and the Vote Solar Initiative (VSI).

Commenters requested clarification of the attributes that are transferred to the utility with the RECs. The Department agrees that the RECs assigned to the utility by statute include all environmental attributes. The transfer of RECs from the generator to the utility, including all environmental attributes, should be clearly identified in a utility's proposed VOS tariff contract.

The transfer of SRECs to the utility is not for "free." The VOS method does something that is not required anywhere else in utility ratemaking, including the rates for Solar Gardens – it requires ratepayers to pay for the costs of externalities in their rates. In all other uses of externalities, while these costs are considered for the purposes of deciding whether or not to add a new resource, the VOS tariff is the only place where ratepayers will actually have to pay for the externalities in the rates they pay for solar power.

Minnesota's statute §216B.164, subd. 10 is clear that the SRECs transfer to the utility under the VOS tariff under the pricing terms of the statute.

L. DISCUSSION OF REAL AND NOMINAL DISCOUNT FACTORS

The environmental discount factor is a real discount factor, while the weighted average cost of capital discount factor used to value the other solar components is a nominal discount factor.

The weighted average cost of capital (WACC) is the rate that a company is expected to pay on average to all its security holders to finance its assets. This is a nominal rate that takes into account inflation. The 3 percent environmental discount factor is a real discount rate; it does not include inflation.

There are two approaches to calculating the present value with discount factors: 1) inflate costs using assumed inflation rates to estimate future costs, and then discount these costs to the current year using a nominal discount factor, or 2) discount future costs in current dollar values to the current year using a real discount factor.

As the utility's weighted average cost of capital is a nominal interest rate and it is approved by the Commission in a utility's last rate case; for consistency the methodology converts the real environmental discount rate into a nominal rate. The conversion is made using the Fisher equation:

$$(1+ \text{discount rate}_{real}) \times (1+\text{inflationrate})-1 = \text{discount rate}_{nominal}$$[20]

For the inflation rate, the methodology uses the Consumer Price Index inflation rate for the previous 25 years. For 2014 this rate is 2.53 percent.

[20] Formula 11 on page 22 of the proposed methodology.

M. DISCUSSION OF TARIFF-RELATED COMMENTS

Some commenters addressed questions that are not part of the methodology. These questions could be addressed when a VOS tariff is filed, but are discussed here as well.

1. Replacement of "netting" under Subdivisions 3 and 3a

One comment asserts that the alternative VOS tariff under Subdivision 10 would not replace Subdivisions 3 and 3a in their entirety, specifically with respect to the process of "netting" consumption and generation, and that the VOS rate would only replace the applicable rate in Subdivisions 3 and 3a. The Department disagrees with this assertion based on the statute and the stakeholder dialog, as demonstrated by stakeholder presentations and comments in the 2013 workshops to develop the Value of Solar methodology. The Alternative Tariff described in Subdivision 10 includes the billing charge and credit mechanism as described in Subd. 10 (c), parts (3) through (5). The VOS distributed solar value rate developed in the Department's methodology cannot be taken out of the context of the requirements of the Alternative Tariff described in Subdivision 10 and cannot be applied as the applicable rate in Subdivisions 3 and 3a.

2. Public Utility Regulatory Policies Act (PURPA)

One comment asserts that the replacement of Minn. Statute 216B.164, Subd 3 and 3a with a VOS tariff will eliminate the ability for customers to serve on-site load in conflict with the Public Utility Regulatory Policies Act of 1978 (PURPA). The comment raises further concerns that removing a customer's ability to serve on-site load would constitute a regulatory taking. These concerns are unfounded.

Customers with on-site solar PV generation currently have the option not to enter into a net metering agreement. In such cases, as provided by MN Statute 216B.164, Subd. 4(b), "the qualifying facility shall be paid at the utility's full avoided capacity and energy costs as negotiated by the parties, as set by the commission, or as determined through competitive bidding approved by the commission." Similarly, if a utility has an approved Value of Solar Tariff, a customer would still have the option not to enter into a Value of Solar agreement and instead enter into a purchased power agreement contract at avoided cost under Subd. 4(b), for example, to retain the RECs generated on-site. Thus, a Value of Solar Tariff that replaces Subd 3 and 3a does not remove a customer's ability to serve on-site load, if desired.

3. Tax liability

One comment raised concerns that the separate transactions of charging the customer for energy consumption and crediting the customer for energy generation would create tax liability for the customer. The Department disagrees with this assertion on the basis that such charges and

credits are transactions that take place entirely on the utility customer's bill (i.e. the utility does not send the customer a check for energy generated). However, the Department recognizes that the Federal Internal Revenue Service and the Minnesota Department of Revenue have ultimate authority to determine tax liability for federal and state taxation.

V. RECOMMENDATIONS

In response to the Initial Comments filed by parties, the Department recommends that the Commission approve the methodology initially proposed by the Department with these modifications:

- Fuel Price Escalation Factor: 30-day averages are used for the NYMEX Natural Gas Futures contract prices for years 1 through 12; for years beyond year 12, the general escalation rate is used as the guaranteed fuel price escalation; and
- Avoided Distribution Capacity Cost: set the distribution peak load growth rate based on the utility's estimated future growth over the next 15 years. If the result is zero or negative (before adding solar PV), set the avoided distribution capacity cost to zero.

Statute Language - Alternative Tariff / VOS

Subd. 10.**Alternative tariff; compensation for resource value.**

(a) A public utility may apply for commission approval for an alternative tariff that compensates customers through a bill credit mechanism for the value to the utility, its customers, and society for operating distributed solar photovoltaic resources interconnected to the utility system and operated by customers primarily for meeting their own energy needs.

(b) If approved, the alternative tariff shall apply to customers' interconnections occurring after the date of approval. The alternative tariff is in lieu of the applicable rate under subdivisions 3 and 3a.

(c) The commission shall after notice and opportunity for public comment approve the alternative tariff provided the utility has demonstrated the alternative tariff:

(1) appropriately applies the methodology established by the department and approved by the commission under this subdivision;

(2) includes a mechanism to allow recovery of the cost to serve customers receiving the alternative tariff rate;

(3) charges the customer for all electricity consumed by the customer at the applicable rate schedule for sales to that class of customer;

(4) credits the customer for all electricity generated by the solar photovoltaic device at the distributed solar value rate established under this subdivision;

(5) applies the charges and credits in clauses (3) and (4) to a monthly bill that includes a provision so that the unused portion of the credit in any month or billing period shall be carried forward and credited against all charges. In the event that the customer has a positive balance after the 12-month cycle ending on the last day in February, that balance will be eliminated and the credit cycle will restart the following billing period beginning on March 1;

(6) complies with the size limits specified in subdivision 3a;

(7) complies with the interconnection requirements under section 216B.1611; and

(8) complies with the standby charge requirements in subdivision 3a, paragraph (b).

(d) A utility must provide to the customer the meter and any other equipment needed to provide service under the alternative tariff.

(e) The department must establish the distributed solar value methodology in paragraph (c), clause (1), no later than January 31, 2014. The department must submit the methodology to the commission for approval. The commission must approve, modify with the consent of the department, or disapprove the methodology within 60 days of its submission. When developing the distributed solar value methodology, the department shall consult stakeholders with experience and expertise in power systems, solar energy, and electric utility ratemaking regarding the proposed methodology, underlying assumptions, and preliminary data.

(f) The distributed solar value methodology established by the department must, at a minimum, account for the value of energy and its delivery, generation capacity, transmission capacity, transmission and distribution

line losses, and environmental value. The department may, based on known and measurable evidence of the cost or benefit of solar operation to the utility, incorporate other values into the methodology, including credit for locally manufactured or assembled energy systems, systems installed at high-value locations on the distribution grid, or other factors.

(g) The credit for distributed solar value applied to alternative tariffs approved under this section shall represent the present value of the future revenue streams of the value components identified in paragraph (f).

(h) The utility shall recalculate the alternative tariff on an annual cycle, and shall file the recalculated alternative tariff with the commission for approval.

(i) Renewable energy credits for solar energy credited under this subdivision belong to the electric utility providing the credit.

(j) The commission may not authorize a utility to charge an alternative tariff rate that is lower than the utility's applicable retail rate until three years after the commission approves an alternative tariff for the utility.

(k) A utility must enter into a contract with an owner of a solar photovoltaic device receiving an alternative tariff rate under this section that has a term of at least 20 years, unless a shorter term is agreed to by the parties.

(l) An owner of a solar photovoltaic device receiving an alternative tariff rate under this section must be paid the same rate per kilowatt-hour generated each year for the term of the contract. (Emphasis added)

/ja

CERTIFICATE OF SERVICE

I, Sharon Ferguson, hereby certify that I have this day, served copies of the following document on the attached list of persons by electronic filing, certified mail, e-mail, or by depositing a true and correct copy thereof properly enveloped with postage paid in the United States Mail at St. Paul, Minnesota.

Minnesota Department of Commerce
Reply Comments

Docket No. E999/M-14-65

Dated this **20th** day of **February 2014**

/s/Sharon Ferguson

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Kenneth A.	Colburn	kcolburn@symbioticstrategies.com	Symbiotic Strategies, LLC	26 Winton Road Meredith, NH 32535413	Electronic Service	No	SPL_SL_14-65_Interested Parties
Steve	Coleman	scoleman@appliedenergyinnovations.org	Applied Energy Innovations	4000 Minnehaha Ave S Minneapolis, MN 55406	Electronic Service	No	SPL_SL_14-65_Interested Parties
George	Crocker	gwillc@nawo.org	North American Water Office	PO Box 174 Lake Elmo, MN 55042	Electronic Service	No	SPL_SL_14-65_Interested Parties
Mark F.	Dahlberg	markdahlberg@nweco.com	Northwestern Wisconsin Electric Company	P.O. Box 9 104 South Pine Street Grantsburg, WI 548400009	Electronic Service	No	SPL_SL_14-65_Interested Parties

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Lisa	Daniels	lisadaniels@windustry.org	Windustry	201 Ridgewood Avenue Minneapolis, MN 55403	Paper Service	No	SPL_SL_14-65_Interested Parties
Jeffrey A.	Daugherty	jeffrey.daugherty@centerpointenergy.com	CenterPoint Energy	800 LaSalle Ave Minneapolis, MN 55402	Electronic Service	No	SPL_SL_14-65_Interested Parties
Chris	Davis	christopher.davis@state.mn.us	Department of Commerce	Suite 500 85 Seventh Place East St. Paul, MN 551012198	Electronic Service	No	SPL_SL_14-65_Interested Parties
Dustin	Denison	dustin@appliedenergyinnovations.org	Applied Energy Innovations	4000 Minnehaha Ave S Minneapolis, MN 55406	Electronic Service	No	SPL_SL_14-65_Interested Parties
James	Denniston	james.r.denniston@xcelenergy.com	Xcel Energy Services, Inc.	414 Nicollet Mall, Fifth Floor Minneapolis, MN 55401	Electronic Service	No	SPL_SL_14-65_Interested Parties
Curt	Dieren	cdieren@dgrnet.com	L&O Power Cooperative	1302 South Union Street PO Box 511 Rock Rapids, IA 51246	Electronic Service	No	SPL_SL_14-65_Interested Parties
Ian	Dobson	ian.dobson@ag.state.mn.us	Office of the Attorney General-RUD	Antitrust and Utilities Division 445 Minnesota Street, 1400 BRM Tower St. Paul, MN 55101	Electronic Service	Yes	SPL_SL_14-65_Interested Parties
Dan	Donkers	N/A	Saint Paul - Ramsey County Public Health	Environmental Health Section 2785 White Bear Ave. Suite 350 Maplewood, MN 55109	Paper Service	No	SPL_SL_14-65_Interested Parties
Bill	Droessler	N/A	Izaak Walton League of America-MWO	1619 Dayton Ave Ste 202 Saint Paul, MN 55104	Paper Service	No	SPL_SL_14-65_Interested Parties

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Mike	Eggl	smeier@bepc.com	Basin Electric Power Cooperative	1717 East Interstate Avenue Bismarck, ND 58503	Paper Service	No	SPL_SL_14-65_Interested Parties
Kristen	Eide Tollefson	HealingSystems@earthlink.net	R-CURE	P O Box 129 Frontenac, MN 55026	Paper Service	No	SPL_SL_14-65_Interested Parties
Rebecca	Eilers	rebecca.d.eilers@xcelenergy.com	Xcel Energy	414 Nicollet Mall, 7th Floor Minneapolis, MN 55401	Electronic Service	No	SPL_SL_14-65_Interested Parties
Betsy	Engelking	betsy@geronimoenergy.com	Geronimo Energy	7650 Edinborough Way Suite 725 Edina, MN 55435	Electronic Service	No	SPL_SL_14-65_Interested Parties
Oncu	Er	oncu.er@avantenergy.com	Avant Energy, Agent for MMPA	220 S. Sixth St. Ste. 1300 Minneapolis, MN 55402	Electronic Service	No	SPL_SL_14-65_Interested Parties
Rick	Evans	Rick.Evans@xcelenergy.com	Xcel Energy	404 Nicollet Mall Minneapolis, MN 55401	Electronic Service	No	SPL_SL_14-65_Interested Parties
John	Farrell	jfarrell@ilsr.org	Institute for Local Self-Reliance	1313 5th St SE #303 Minneapolis, MN 55414	Electronic Service	No	SPL_SL_14-65_Interested Parties
Pam	Fergen		Henepin County Government Center CAO	A2000 300 S. Sixth Street Minneapolis, MN 55487	Paper Service	No	SPL_SL_14-65_Interested Parties
Sharon	Ferguson	sharon.ferguson@state.mn.us	Department of Commerce	85 7th Place E Ste 500 Saint Paul, MN 551012198	Electronic Service	No	SPL_SL_14-65_Interested Parties
Cathy	Fogale	cfogale@otpco.com	Otter Tail Power Company	215 South Cascade Street PO Box 496 Fergus Falls, MN 56537	Electronic Service	No	SPL_SL_14-65_Interested Parties

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Nathan	Franzen	nathan@geronimoenergy.com	Geronimo Energy	7650 Edinborough Way Suite 725 Edina, MN 55435	Electronic Service	No	SPL_SL_14-65_Interested Parties
Amy	Fredregill	amy@mrets.org	Midwest Renewable Energy Tracking System, Inc.	1885 University Avenue West, #315 St. Paul, MN 55104	Paper Service	No	SPL_SL_14-65_Interested Parties
Lori	Frisk Thompson	lorift@cmmpa.org	Central MN MPA	459 S Grove St Blue Earth, MN 56013	Electronic Service	No	SPL_SL_14-65_Interested Parties
Lee	Gabler	Lee.E.Gabler@xcelenergy.com	Xcel Energy	404 Nicollet Mall Minneapolis, MN 55401	Electronic Service	No	SPL_SL_14-65_Interested Parties
Gary	Garbe	Gary.Garbe@avantenergy.com	Minnesota Municipal Power Agency	200 South Sixth Street Suite 300 Minneapolis, MN 55402	Electronic Service	No	SPL_SL_14-65_Interested Parties
Edward	Garvey	garveyed@aol.com	Residence	32 Lawton St Saint Paul, MN 55102	Paper Service	No	SPL_SL_14-65_Interested Parties
Darrell	Gerber		Clean Water Action Alliance of Minnesota	308 Hennepin Ave. E. Minneapolis, MN 55414	Paper Service	No	SPL_SL_14-65_Interested Parties
Benjamin	Gerber	bgerber@mnchamber.com	Minnesota Chamber of Commerce	400 Robert Street North Suite 1500 St. Paul, Minnesota 55101	Electronic Service	No	SPL_SL_14-65_Interested Parties
Bruce	Gerhardson	bgerhardson@otpco.com	Otter Tail Power Company	PO Box 496 215 S Cascade St Fergus Falls, MN 565380496	Electronic Service	No	SPL_SL_14-65_Interested Parties
Allen	Gleckner	agleckner@elpc.org	Environmental Law & Policy Center	2356 University Ave W. Suite 403 St. Paul, Minnesota 55114	Electronic Service	No	SPL_SL_14-65_Interested Parties

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Elizabeth	Goodpaster	bgoodpaster@mncenter.org	MN Center for Environmental Advocacy	Suite 206 26 East Exchange Street St. Paul, MN 551011667	Electronic Service	No	SPL_SL_14-65_Interested Parties
Bryan	Gower	N/A	APX, Inc.	224 Airport Parkway Suite 600 San Jose, CA 95110	Paper Service	No	SPL_SL_14-65_Interested Parties
Bill	Grant	Bill.Grant@state.mn.us	Minnesota Department of Commerce	85 7th Place East, Suite 500 St. Paul, MN 55101	Electronic Service	No	SPL_SL_14-65_Interested Parties
Lloyd	Grooms	lgrooms@winthrop.com	Winthrop and Weinstine	Suite 3500 225 South Sixth Street Minneapolis, MN 554024629	Electronic Service	No	SPL_SL_14-65_Interested Parties
Timothy	Gulden	info@winonarenewableenergy.com	Winona Renewable Energy, LLC	1449 Ridgewood Dr Winona, MN 55987	Electronic Service	No	SPL_SL_14-65_Interested Parties
Burl W.	Haar	burl.haar@state.mn.us	Public Utilities Commission	Suite 350 121 7th Place East St. Paul, MN 551012147	Electronic Service	Yes	SPL_SL_14-65_Interested Parties
Tony	Hainault	anthony.hainault@co.hennepin.mn.us	Hennepin County DES	701 4th Ave S Ste 700 Minneapolis, MN 55415-1842	Electronic Service	No	SPL_SL_14-65_Interested Parties
J Drake	Hamilton	hamilton@fresh-energy.org	Fresh Energy	408 St Peter St Saint Paul, MN 55101	Electronic Service	No	SPL_SL_14-65_Interested Parties
Samuel	Hanson	N/A	Briggs And Morgan, P.A.	2200 IDS Center E 80 South Eighth Street Minneapolis, MN 55402	Paper Service	No	SPL_SL_14-65_Interested Parties
Sam	Hanson	shanson@briggs.com	Briggs and Morgan, PA	2200 IDS Center 80 South Eighth Street Minneapolis, MN 55402	Electronic Service	No	SPL_SL_14-65_Interested Parties

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Jack	Hays	jack.hays@westwoodps.com	Westwood Professional Services	7699 Anagram Drive Eden Prairie, MN 55344	Electronic Service	No	SPL_SL_14-65_Interested Parties
Bill	Heaney	billheaney@billheaney.com	IBEW Minnesota State Council	3931 Silver Lake Rd NE St. Anthony Village, MN 55421	Electronic Service	No	SPL_SL_14-65_Interested Parties
Brandon	Heath	bheath@misoenergy.org	MISO Energy	1125 Energy Park Drive St. Paul, MN 55108-5001	Electronic Service	No	SPL_SL_14-65_Interested Parties
John	Helmers	helmers.john@co.olmsted.mn.us	Olmsted County Waste to Energy	2122 Campus Drive SE Rochester, MN 55904-4744	Electronic Service	No	SPL_SL_14-65_Interested Parties
Jared	Hendricks	hendricksj@owatonnautilities.com	Owatonna Public Utilities	PO Box 800 208 S Walnut Ave Owatonna, MN 55060-2940	Electronic Service	No	SPL_SL_14-65_Interested Parties
Annete	Henkel	mui@mnutilityinvestors.org	Minnesota Utility Investors	413 Wacouta Street #230 St.Paul, MN 55101	Electronic Service	No	SPL_SL_14-65_Interested Parties
Jessy	Hennesy	jessy.hennesy@avantenergy.com	Avant Energy	220 S. Sixth St. Ste 1300 Minneapolis, Minnesota 55402	Electronic Service	No	SPL_SL_14-65_Interested Parties
Lynn	Hinkle	lhinkle@mnseia.org	Minnesota Solar Energy Industries Association	2512 33rd Ave South #2 Minneapolis, MN 55406	Electronic Service	No	SPL_SL_14-65_Interested Parties
Holly	Hinman	holly.r.hinman@xcelenergy.com	Xcel Energy	414 Nicollet Mall, 6th Floor Minneapolis, MN 55401	Electronic Service	No	SPL_SL_14-65_Interested Parties
Margaret	Hodnik	mhodnik@mnpower.com	Minnesota Power	30 West Superior Street Duluth, MN 55802	Electronic Service	No	SPL_SL_14-65_Interested Parties

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David	Horneck	david.g.horneck@xcelenergy.com	Xcel Energy	1800 Larimer Street Denver, CO 80202	Electronic Service	No	SPL_SL_14-65_Interested Parties
Ashley	Houston			120 Fairway Rd Chestnut Hill, MA 24671850	Paper Service	No	SPL_SL_14-65_Interested Parties
Lori	Hoyum	lhoyum@mnpower.com	Minnesota Power	30 West Superior Street Duluth, MN 55802	Electronic Service	No	SPL_SL_14-65_Interested Parties
Jan	Hubbard	jan.hubbard@comcast.net		7730 Mississippi Lane Brooklyn Park, MN 55444	Electronic Service	No	SPL_SL_14-65_Interested Parties
Jan	Hubbard	Jan@AppliedEnergyInnovations.org	Applied Energy Innovations, LLC	4000 Minnehaha Avenue South Minneapolis, MN 55406	Paper Service	No	SPL_SL_14-65_Interested Parties
Anne	Hunt	anne.hunt@ci.stpaul.mn.us	City of Saint Paul	390 City Hall 15 West Kellogg Boulevard Saint Paul, MN 55102	Electronic Service	No	SPL_SL_14-65_Interested Parties
Steve	Huso	steve.huso@xcelenergy.com	Xcel Energy	G.O. 7th Floor 414 Nicollet Mall Minneapolis, MN 554011993	Electronic Service	No	SPL_SL_14-65_Interested Parties
Casey	Jacobson	cjacobson@bepc.com	Basin Electric Power Cooperative	1717 East Interstate Avenue Bismarck, ND 58501	Electronic Service	No	SPL_SL_14-65_Interested Parties
Ralph	Jacobson	N/A	Innovative Power Systems, Inc.	1413 Hunting Valley Rd Ste 1 Saint Paul, MN 55109-1555	Paper Service	No	SPL_SL_14-65_Interested Parties

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Dwight	Jelle	dkjelle@gmail.com	Best Power International, LLC	P.O. 5126 Hopkins, MN 55343	Electronic Service	No	SPL_SL_14-65_Interested Parties
Alan	Jenkins	aj@jenkinsatlaw.com	Jenkins at Law	2265 Roswell Road Suite 100 Marietta, GA 30062	Electronic Service	No	SPL_SL_14-65_Interested Parties
Eric	Jensen	ejensen@iwla.org	Izaak Walton League of America	Suite 202 1619 Dayton Avenue St. Paul, MN 55104	Electronic Service	No	SPL_SL_14-65_Interested Parties
Linda	Jensen	linda.s.jensen@ag.state.mn.us	Office of the Attorney General-DOC	1800 BRM Tower 445 Minnesota Street St. Paul, MN 551012134	Electronic Service	No	SPL_SL_14-65_Interested Parties
Richard	Johnson	Rick.Johnson@lawmoss.com	Moss & Barnett	90 South 7th Street Suite #4800 Minneapolis, MN 554024129	Electronic Service	No	SPL_SL_14-65_Interested Parties
Larry	Johnston	lw.johnston@smmpa.org	SMMPA	500 1st Ave SW Rochester, MN 55902-3303	Paper Service	No	SPL_SL_14-65_Interested Parties
Nate	Jones	njones@hcpd.com	Heartland Consumers Power	PO Box 248 Madison, SD 57042	Electronic Service	No	SPL_SL_14-65_Interested Parties
Michael	Kampmeyer	mkampmeyer@a-e-group.com	AEG Group, LLC	260 Salem Church Road Sunfish Lake, Minnesota 55118	Electronic Service	No	SPL_SL_14-65_Interested Parties
Mark J.	Kaufman	mkaufman@ibewlocal949.org	IBEW Local Union 949	12908 Nicollet Avenue South Burnsville, MN 55337	Electronic Service	No	SPL_SL_14-65_Interested Parties
Nancy	Kelly	bademailnancyk@eurekarecycling.org	Eureka Recycling	2828 Kennedy Street NE Minneapolis, MN 55413	Paper Service	No	SPL_SL_14-65_Interested Parties

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Kerry	Klemm	kerry.r.klemm@xcelenergy.com	Xcel Energy Services, Inc	414 Nicollet Mall Minneapolis, MN 55401	Electronic Service	No	SPL_SL_14-65_Interested Parties
John	Kluempke	jwkluempke@winlectric.com	Elk River Winlectric	12777 Meadowvale Rd Elk River, MN 55330	Electronic Service	No	SPL_SL_14-65_Interested Parties
Thomas G.	Koehler	N/A	Local Union #160, IBEW	2909 Anthony Ln Minneapolis, MN 55418-3238	Paper Service	No	SPL_SL_14-65_Interested Parties
Mara	Koeller	mara.n.koeller@xcelenergy.com	Xcel Energy	414 Nicollet Mall 5th Floor Minneapolis, MN 55401	Electronic Service	No	SPL_SL_14-65_Interested Parties
Jon	Kramer	jk2surf@aol.com	Sundial Solar	4708 york ave. S Minneapolis, MN 55410	Electronic Service	No	SPL_SL_14-65_Interested Parties
Michael	Krikava	mkrikava@briggs.com	Briggs And Morgan, P.A.	2200 IDS Center 80 S 8th St Minneapolis, MN 55402	Electronic Service	No	SPL_SL_14-65_Interested Parties
Allen	Krug	allen.krug@xcelenergy.com	Xcel Energy	414 Nicollet Mall-7th fl Minneapolis, MN 55401	Electronic Service	No	SPL_SL_14-65_Interested Parties
Scott	Kurtz	Scott.J.Kurtz@xcelenergy.com	Xcel Energy	825 Rice Street St. Paul, MN 55117	Electronic Service	No	SPL_SL_14-65_Interested Parties
Douglas	Larson	dlarson@dakotaelectric.com	Dakota Electric Association	4300 220th St W Farmington, MN 55024	Electronic Service	No	SPL_SL_14-65_Interested Parties

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Deborah Fohr	Levchak	dlevchak@bepc.com	Basin Electric Power Cooperative	1717 East Interstate Avenue Bismarck, ND 585030564	Paper Service	No	SPL_SL_14-65_Interested Parties
Amy	Liberkowski	amy.a.liberkowski@xcelenergy.com	Xcel Energy	414 Nicollet Mall 7th Floor Minneapolis, MN 554011993	Electronic Service	No	SPL_SL_14-65_Interested Parties
John	Lindell	agorud.ecf@ag.state.mn.us	Office of the Attorney General-RUD	1400 BRM Tower 445 Minnesota St St. Paul, MN 551012130	Electronic Service	Yes	SPL_SL_14-65_Interested Parties
Mark	Lindquist	N/A	The Minnesota Project	57107 422nd St New Ulm, MN 56073-4321	Paper Service	No	SPL_SL_14-65_Interested Parties
Matthew P	Loftus	matthew.p.loftus@xcelenergy.com	Xcel Energy	414 Nicollet Mall FL 5 Minneapolis, MN 55401	Electronic Service	No	SPL_SL_14-65_Interested Parties
Bob	Long	rlong@larkinhoffman.com	Larkin Hoffman (Silicon Energy)	1500 Wells Fargo Plaza 7900 Xerxes Ave S Bloomington, MN 55431	Paper Service	No	SPL_SL_14-65_Interested Parties
Rebecca	Lundberg	rebecca.lundberg@powerfullygreen.com	Powerfully Green	11451 Oregon Ave N Champlin, MN 55316	Electronic Service	No	SPL_SL_14-65_Interested Parties
Casey	Maccullum	casey@appliedenergyinnovations.org	Applied Energy Innovations	4000 Minnehaha Ave S Minneapolis, MN 55406	Paper Service	No	SPL_SL_14-65_Interested Parties
Susan	Mackenzie	susan.mackenzie@state.mn.us	Public Utilities Commission	Suite 350121 7th Place East St. Paul, MN 551012147	Electronic Service	No	SPL_SL_14-65_Interested Parties
Kavita	Maini	kmaini@wi.rr.com	KM Energy Consulting LLC	961 N Lost Woods Rd Oconomowoc, WI 53066	Electronic Service	No	SPL_SL_14-65_Interested Parties

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Pam	Marshall	pam@energycents.org	Energy CENTS Coalition	823 7th St E St. Paul, MN 55106	Electronic Service	No	SPL_SL_14-65_Interested Parties
Mary	Martinka	mary.a.martinka@xcelenergy.com	Xcel Energy Inc	414 Nicollet Mall 7th Floor Minneapolis, MN 55401	Electronic Service	No	SPL_SL_14-65_Interested Parties
Mike	McDowell		Heartland Consumers Power District	PO Box 248 Madison, SD 570420248	Paper Service	No	SPL_SL_14-65_Interested Parties
Natalie	McIntire	natalie.mcintire@gmail.com	Wind on the Wires	570 Asbury St Ste 201 St. Paul, MN 55104-1850	Paper Service	No	SPL_SL_14-65_Interested Parties
Dave	McNary	N/A	Hennepin County DES	701 Fourth Avenue South suite 700 Minneapolis, MN 55415-1842	Paper Service	No	SPL_SL_14-65_Interested Parties
John	McWilliams	jmm@dairynet.com	Dairyland Power Cooperative	3200 East Ave SPO Box 817 La Crosse, WI 54601-7227	Electronic Service	No	SPL_SL_14-65_Interested Parties
Valerie	Means	valerie.means@lawmoss.com	Moss & Barnett	Suite 4800 90 South Seventh Street Minneapolis, MN 55402	Electronic Service	No	SPL_SL_14-65_Interested Parties
Stacy	Miller	stacy.miller@state.mn.us	Department of Commerce	State Energy Office 85 7th Place East, Suite 500 St. Paul, MN 55101	Electronic Service	No	SPL_SL_14-65_Interested Parties
David	Moeller	dmoeller@allete.com	Minnesota Power	30 W Superior St Duluth, MN 558022093	Electronic Service	No	SPL_SL_14-65_Interested Parties
Andrew	Moratzka	apmoratzka@stoel.com	Stoel Rives LLP	33 South Sixth Street Suite 4200 Minneapolis, MN 55402	Electronic Service	No	SPL_SL_14-65_Interested Parties

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Ben	Nelson		CMMPA	459 South Grove Street Blue Earth, MN 56013	Paper Service	No	SPL_SL_14-65_Interested Parties
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Michael	Noble	noble@fresh-energy.org	Fresh Energy	Hamm Bldg., Suite 220 408 St. Peter Street St. Paul, MN 55102	Electronic Service	No	SPL_SL_14-65_Interested Parties
Rolf	Nordstrom	rnordstrom@gpisd.net	Great Plains Institute	2801 21ST AVE S STE 220 Minneapolis, MN 55407-1229	Electronic Service	No	SPL_SL_14-65_Interested Parties
Kate	O'Connell	kate.oconnell@state.mn.us	Department of Commerce	Suite 50085 Seventh Place East St. Paul, MN 551012198	Electronic Service	No	SPL_SL_14-65_Interested Parties
Nick	Paluck	nick.paluck@xcelenergy.com	Xcel Energy	7th Floor 414 Nicollet Mall Minneapolis, MN 554011993	Electronic Service	No	SPL_SL_14-65_Interested Parties
James	Pearson	james.g.pearson@xcelenergy.com	Xcel Energy	414 Nicollet Mall Minneapolis, MN 55401	Electronic Service	No	SPL_SL_14-65_Interested Parties
Mary Beth	Peranteau	mperanteau@wheelerlaw.com	Wheeler Van Sickle & Anderson SC	Suite 801 25 West Main Street Madison, WI 537033398	Electronic Service	No	SPL_SL_14-65_Interested Parties
Charlie	Pickard	cpickard@aladdinsolar.com	Aladdin Solar	1215 Lilac Lane Excelsior, MN 55331	Electronic Service	No	SPL_SL_14-65_Interested Parties

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Donna	Pickard	dpickard@aladdinsolar.com	Aladdin Solar	1215 Lilac Lane Excelsior, MN 55331	Electronic Service	No	SPL_SL_14-65_Interested Parties
Joseph V.	Plumbo		Local Union 23, I.B.E.W.	932 Payne Avenue St. Paul, MN 55130	Paper Service	No	SPL_SL_14-65_Interested Parties
Gayle	Prest	gayle.prest@minneapolismn.gov	City of Mpls Sustainability	350 South 5th St, #315 Minneapolis, MN 55415	Paper Service	No	SPL_SL_14-65_Interested Parties
Kent	Ragsdale	kentragsdale@alliantenergy.com	Alliant Energy-Interstate Power and Light Company	P.O. Box 351 200 First Street, SE Cedar Rapids, IA 524060351	Electronic Service	No	SPL_SL_14-65_Interested Parties
Mark	Rathbun	mrathbun@grenergy.com	Great River Energy	12300 Elm Creek Blvd Maple Grove, MN 55369	Electronic Service	No	SPL_SL_14-65_Interested Parties
John C.	Reinhardt		Laura A. Reinhardt	3552 26Th Avenue South Minneapolis, MN 55406	Paper Service	No	SPL_SL_14-65_Interested Parties
Kevin	Reuther	kreuther@mncenter.org	MN Center for Environmental Advocacy	26 E Exchange St, Ste 206 St. Paul, MN 551011667	Paper Service	No	SPL_SL_14-65_Interested Parties
Enio	Ricci	ericci@invenergyllc.com	Invenergy LLC	17830 New Hampshire Ave Ste 300 Ashton, MD 20861	Paper Service	No	SPL_SL_14-65_Interested Parties
Trudy	Richter	trichter@rranow.com	Minnesota Resource Recovery Assn.	477 Selby Avenue St. Paul, MN 55102	Paper Service	No	SPL_SL_14-65_Interested Parties
Michelle	Rosier	michelle.rosier@sierraclub.org	Sierra Club	2327 E. Franklin Avenue Minneapolis, MN 554061024	Paper Service	No	SPL_SL_14-65_Interested Parties

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Craig	Rustad	crustad@minnkota.com	Minnkota Power	1822 Mill Road PO Box 13200 Grand Forks, ND 582083200	Electronic Service	No	SPL_SL_14-65_Interested Parties
Robert K.	Sahr	bsahr@eastriver.coop	East River Electric Power Cooperative	P.O. Box 227 Madison, SD 57042	Electronic Service	No	SPL_SL_14-65_Interested Parties
Raymond	Sand	rms@dairynet.com	Dairyland Power Cooperative	P.O. Box 8173200 East Avenue South LaCrosse, WI 546020817	Electronic Service	No	SPL_SL_14-65_Interested Parties
Richard	Savelkoul	rsavelkoul@martinsquires.com	Martin & Squires, P.A.	332 Minnesota Street Ste W2750 St. Paul, MN 55101	Electronic Service	No	SPL_SL_14-65_Interested Parties
Larry L.	Schedin	Larry@LLSResources.com	LLS Resources, LLC	12 S 6th St Ste 1137 Minneapolis, MN 55402	Electronic Service	No	SPL_SL_14-65_Interested Parties
Matthew J.	Schuerger P.E.	mjsreg@earthlink.net	Energy Systems Consulting Services, LLC	PO Box 16129 St. Paul, MN 55116	Electronic Service	No	SPL_SL_14-65_Interested Parties
Kevin	Schwain	Kevin.D.Schwain@xcelenergy.com	Xcel Energy	404 Nicollet Mall Minneapolis, MN 55401	Electronic Service	No	SPL_SL_14-65_Interested Parties
Dean	Sedgwick	N/A	Itasca Power Company	PO Box 457 Bigfork, MN 56628-0457	Paper Service	No	SPL_SL_14-65_Interested Parties
Janet	Shaddix Elling	jshaddix@janetshaddix.com	Shaddix And Associates	Ste 122 9100 W Bloomington Frwy Bloomington, MN 55431	Electronic Service	No	SPL_SL_14-65_Interested Parties
Gary	Shaver	N/A	Silicon Energy	3506 124th St NE Marysville, WA 98271	Paper Service	No	SPL_SL_14-65_Interested Parties

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Erin	Shea	eshea@silicon-energy.com	Silicon Energy	11168 Sumter Circle Bloomington, MN 55438	Electronic Service	No	SPL_SL_14-65_Interested Parties
Doug	Shoemaker	dougs@mnRenewables.org	MRES	2928 5th Avenue South Minneapolis, MN 55408	Paper Service	No	SPL_SL_14-65_Interested Parties
Mrg	Simon	mrgsimon@mrenergy.com	Missouri River Energy Services	3724 W. Avera Drive P.O. Box 88920 Sioux Falls, SD 571098920	Electronic Service	No	SPL_SL_14-65_Interested Parties
Ken	Smith	ken.smith@districtenergy.com	District Energy St. Paul Inc.	76 W Kellogg Blvd St. Paul, MN 55102	Electronic Service	No	SPL_SL_14-65_Interested Parties
Beth H.	Soholt	bsoholt@windonthewires.org	Wind on the Wires	570 Asbury Street Suite 201 St. Paul, MN 55104	Electronic Service	No	SPL_SL_14-65_Interested Parties
Chanti	Sourignavong	chantipal.sourignavong@honeywell.com	Honeywell	1985 Douglas Drive North MN10-111A Golden Valley, MN 55422-3992	Paper Service	No	SPL_SL_14-65_Interested Parties
Ron	Spangler, Jr.	rlspangler@otpco.com	Otter Tail Power Company	215 So. Cascade St. PO Box 496 Fergus Falls, MN 565380496	Electronic Service	No	SPL_SL_14-65_Interested Parties
Byron E.	Starns	byron.starns@leonard.com	Leonard Street and Deinard	150 South 5th Street Suite 2300 Minneapolis, MN 55402	Electronic Service	No	SPL_SL_14-65_Interested Parties
Erin	Stojan Ruccolo	ruccolo@fresh-energy.org	Fresh Energy	408 Saint Peter St Ste 220 Saint Paul, MN 55102-1125	Electronic Service	No	SPL_SL_14-65_Interested Parties
James M.	Strommen	jstrommen@kennedy-graven.com	Kennedy & Graven, Chartered	470 U.S. Bank Plaza 200 South Sixth Street Minneapolis, MN 55402	Electronic Service	No	SPL_SL_14-65_Interested Parties

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Deb	Sundin	deb.sundin@xcelenergy.com	Xcel Energy	414 Nicollet Mall Minneapolis, MN 55401	Electronic Service	No	SPL_SL_14-65_Interested Parties
Eric	Swanson	eswanson@winthrop.com	Winthrop Weinstine	225 S 6th St Ste 3500 Capella Tower Minneapolis, MN 554024629	Electronic Service	No	SPL_SL_14-65_Interested Parties
Thomas P.	Sweeney III	tom.sweeney@easycleanenergy.com	Clean Energy Collective	P O Box 1828 Boulder, CO 80306-1828	Paper Service	No	SPL_SL_14-65_Interested Parties
Steve	Thompson		Central Minnesota Municipal Power Agency	459 S Grove St Blue Earth, MN 56013-2629	Paper Service	No	SPL_SL_14-65_Interested Parties
SaGonna	Thompson	Regulatory.Records@xcelenergy.com	Xcel Energy	414 Nicollet Mall FL 7 Minneapolis, MN 554011993	Electronic Service	No	SPL_SL_14-65_Interested Parties
Pat	Treseler	pat.jcplaw@comcast.net	Paulson Law Office LTD	Suite 325 7301 Ohms Lane Edina, MN 55439	Electronic Service	No	SPL_SL_14-65_Interested Parties
Lise	Trudeau	lise.trudeau@state.mn.us	Department of Commerce	85 7th Place East Suite 500 Saint Paul, MN 55101	Electronic Service	No	SPL_SL_14-65_Interested Parties
Darryl	Tveitbakk		Northern Municipal Power Agency	123 Second Street West Thief River Falls, MN 56701	Paper Service	No	SPL_SL_14-65_Interested Parties
Kari L	Valley	kari.l.valley@xcelenergy.com	Xcel Energy Service Inc.	414 Nicollet Mall FL 5 Minneapolis, MN 55401	Electronic Service	No	SPL_SL_14-65_Interested Parties
Lisa	Veith	lisa.veith@ci.stpaul.mn.us	City of St. Paul	400 City Hall and Courthouse 15 West Kellogg Blvd. St. Paul, MN 55102	Electronic Service	No	SPL_SL_14-65_Interested Parties

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
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Paul	White	paul.white@prcwind.com	Project Resources Corp./Tamarac Line LLC/Ridgewind	618 2nd Ave SE Minneapolis, MN 55414	Electronic Service	No	SPL_SL_14-65_Interested Parties
Scott M.	Wilensky	scott.wilensky@xcelenergy.com	Xcel Energy	7th Floor 414 Nicollet Mall Minneapolis, MN 554011993	Electronic Service	No	SPL_SL_14-65_Interested Parties
Jason	Willett	jason.willett@metc.state.mn.us	Metropolitan Council	390 Robert St N Saint Paul, MN 55101-1805	Electronic Service	No	SPL_SL_14-65_Interested Parties
Daniel	Williams	DanWilliams.mg@gmail.com	Powerfully Green	11451 Oregon Avenue N Champlin, MN 55316	Electronic Service	No	SPL_SL_14-65_Interested Parties
Steven	Wishart	steven.w.wishart@xcelenergy.com	Xcel Energy	7th Floor 414 Nicollet Mall Minneapolis, MN 554011993	Electronic Service	No	SPL_SL_14-65_Interested Parties
Robyn	Woeste	robynwoeste@alliantenergy.com	Interstate Power and Light Company	200 First St SE Cedar Rapids, IA 52401	Electronic Service	No	SPL_SL_14-65_Interested Parties
Thomas J.	Zaremba		WHEELER, VAN SICKLE & ANDERSON	Suite 801 25 West Main Street Madison, WI 537033398	Paper Service	No	SPL_SL_14-65_Interested Parties