

Minnesota Public Utilities Commission

Staff Briefing Papers

Meeting Date: January 28, 2016 **Agenda Item # 5

Company: Minnesota Power (MP or the Company)

Docket No. **E-015/M-15-773**

In the Matter of the Petition of Minnesota Power for Approval of Investments and Expenditures in the Camp Ripley Solar Project for Recovery through Minnesota Power's Renewable Resources Rider Under Minn. Stat. § 216B.1645 and Related Tariff Modifications

Issues: Should the Commission approve MP's request for approval to recover investments and expenditures related to the Camp Ripley 10 MW solar project?

Should the Commission approve MP's request to add a Solar Renewable Factor separate from the existing Renewable Resource Factor to the Company's Renewable Resource Rider in order to allocate project costs between solar-exempt and solar-paying customers?

Should the Commission approve MP's request to add a Solar Energy Adjustment (SEA) in addition to the existing Fuel and Purchased Energy Adjustment (FPE Rider) in order to allocate project costs between solar-exempt and solar-paying customers?

Should the Commission approve MP's request to adjust its current FPE Rider to exclude solar costs and energy?

Should the Commission approve MP's request to itemize on customer bills the proposed Solar Energy Adjustment (SEA) and the Solar Renewable Factor?

Staff: Susan Mackenzie.....651-201-2241

Relevant Documents

MP's initial petition (PUBLIC AND NON-PUBLIC)..... August 21, 2015
Letter from Minnesota Army and Air Force National Guard..... August 27, 2015
Letter from Rep. Kresha/Senators Gazelka and Ruud..... September 11, 2015
DOC initial comments (PUBLIC AND NON-PUBLIC).....October 14, 2015

OAG-RUD initial comments	October 14, 2015
MP reply comments	October 23, 2015
Fresh Energy reply comments	October 23, 2015
OAG-RUD reply comments	October 23, 2015
MP supplemental reply comments.....	October 28, 2015
DOC reply comments (PUBLIC AND NON-PUBLIC).....	November 2, 2015
MP (Sedway Consulting report, PUBLIC version)	December 8, 2015

The attached materials are workpapers of the Commission Staff. They are intended for use by the Public Utilities Commission and are based upon information already in the record unless noted otherwise.

This document can be made available in alternative formats (i.e., large print or audio) by calling (651) 296-0406 (voice). Persons with hearing loss or speech disabilities may call us through their preferred Telecommunications Relay Service.

Statement of the issue

Should the Commission approve MP's request for approval to recover investments and expenditures related to the Camp Ripley 10 MW solar project?

Should the Commission approve MP's request to add a Solar Renewable Factor separate from the existing Renewable Resource Factor to the Company's Renewable Resource Rider in order to allocate project costs between solar-exempt and solar-paying customers?

Should the Commission approve MP's request to add a Solar Energy Adjustment (SEA) in addition to the existing Fuel and Purchased Energy Adjustment (FPE Rider) in order to allocate project costs between solar-exempt and solar-paying customers?

Should the Commission approve MP's request to adjust its current FPE Rider to exclude solar costs and energy?

Should the Commission approve MP's request to itemize on customer bills the proposed Solar Energy Adjustment (SEA) and the Solar Renewable Factor?

Background

On August 21, 2015, MP filed its petition for approval of the Camp Ripley project.

On August 27, 2015, MP filed a letter from the Minnesota Army/Air Force National Guard. On September 11, 2015, Representative Kresha and Senators Gazelka and Ruud filed a letter.

On October 14, 2015, the Department of Commerce (DOC) and the Office of the Attorney General (OAG) filed comments. On October 23, 2015, MP, Fresh Energy and the OAG filed reply comments.

On October 28, 2015, MP filed supplemental reply comments. On November 2, 2015, DOC filed reply comments.

Project description

The Camp Ripley project proposed by MP is a 10 MW solar PV project designed to meet the Company's state solar energy standard (SES) pursuant to Minn. Stat. § 216B.1691, subd. 2f.

The project will be located at Camp Ripley, on the southwestern edge of MP's service territory near Little Falls, in Morrison County. Camp Ripley is the largest National Guard base in Minnesota. The project will be the largest solar project on any National Guard base in the nation and will be sited on 80 acres inside the 53,000 acre base.

The project will have a 35 year life and is estimated to cost \$30 million. MP will own and operate the project through a lease agreement with a partner bank that includes an option for MP to purchase the assets when the lease expires. The Company will incur capital costs of about \$6.9 million for costs not covered by the lease agreement, including \$2.3 million in distribution

system upgrades. MP plans to work with a solar developer who will engineer, procure and construct the project (“EPC Partner”) and then turn it over to the MP.

MP will pay the National Guard a one-time payment of \$272,800 and subsequent annual payments for a total of \$1.6 million over the 35 years of the land lease for access to the land.

The project will provide MP with experience in the development and operation of a utility-scale solar facility at the site of one of its Large Light & Power (LL&P) customers. A Memorandum of Understanding (MOU) between MP and the Minnesota National Guard outlines plans that will help both parties meet their energy objectives.¹

Introduction

These briefing papers are divided into two sections: (1) Resource Selection, and (2) Cost Recovery. The Commission is in a position to make a decision on resource selection in the current docket. However, it could decide to defer some aspects of the cost recovery issue to a subsequent proceeding.

Summary of the parties’ positions

Minnesota Power (MP)

MP proposed the Camp Ripley project as a cost-effective way to meet about one-third of its SES requirement, which MP estimates will require 32 MW of solar capacity or 55,035 MWh of solar energy by 2020.² According to MP, because of the small size of the project (relative to its overall system) and avoided cost of energy the project will displace, the increase in power supply costs that will result from the project will be minimal.³ MP seeks:

- Approval of investments and expenditures to qualify to satisfy the SES (Minn. Stat. § 216B.1691, subd. 2f) and to qualify for current cost recovery under Minn. Stat. § 216B.1645.
- Approval to recover investments and expenditures under Minn. Stat. § 216B.1645, subd. 2a. [Under this subdivision, MP must “petition the commission for eligibility for cost recovery under this section prior to requesting cost recovery for the facility.”]
- Approval to add a Solar Renewable Factor separate from the existing Renewable Resource Factor to the Renewable Resource Rider (under Minn. Stat. § 216B.1645, subd. 2a) to allocate costs of the project to solar-paying customers.⁴

¹ The MOU is attached to MP’s Petition, August 21, 2015, Appendix A. It includes an agreement to work together on conservation programs, the Camp Ripley project, and backup generation technology.

² MP 2015 SES Report, Docket 15-462, p. 9.

³ The project is a fixed-tilt system that will use about 118,000 thin film solar panels. The project will interconnect to MP’s distribution system through a 34.5 kV distribution line. MP currently owns distribution equipment at the Camp Ripley site.

⁴ MP explained that because the term “solar-paying” is less confusing than the term “non-exempt,” the term “solar-paying” is used in its Petition to describe customers who are not exempt from paying the costs of complying with the SES under Minn. Stat. § 216B.1691, subd. 2f(d).

- Approval to add a Solar Energy Adjustment in addition to its existing fuel clause--Fuel and Purchased Energy Adjustment (FPE Rider)--to allocate costs to solar-paying customers.
- Approval to adjust the FPE to exclude solar costs and energy.
- Approval to itemize on customer bills both the Solar Renewable Factor and the Solar Energy Adjustment (SEA).

MP concluded that “The Camp Ripley Project will further Minnesota Power’s initiative towards reshaping its generation portfolio and obtaining additional carbon emission reduction as detailed in Minnesota Power’s *EnergyForward* strategy. This opportunity brings a unique solar project that reduces emissions, leverages a strategic partnership with an existing customer, and takes advantage of the federal ITC with a small increase to power supply costs for customers.”⁵

Department of Commerce (DOC)

The DOC argued that MP is paying a significant premium for the project but recommended approval based on the fact that there are difficult-to-quantify benefits. These benefits include that the project: (1) is part of a larger initiative that will allow MP to work closely with an existing large customer exploring future technologies, including smart grid, microgrid, and DSM projects, (2) is located to allow direct connection to MP’s distribution system, (3) will allow MP to take advantage of the ITC through its financing arrangement before the ITC expires,⁶ and (4) will allow MP to gain experience operating a utility-scale solar facility on its system. According to the DOC, “the critical question for the Commission is whether these benefits offset the premium ratepayers would be paying.”⁷

MP proposed a lease arrangement in which a partner bank would finance construction of the majority of the project and lease the equipment back to MP after some period of time. The DOC recommended that the Commission require MP to file a petition at least one year in advance of the timeline indicated in the lease contract explaining and requesting authorization from the Commission for MP’s decision.⁸ MP agreed to do so.

The DOC also recommended that the Commission approve MP’s overall proposal for project cost recovery and allocating project costs between SES-exempt and non-SES exempt customers. However, the DOC recommended that MP’s method for determining the Solar Energy Adjustment (SEA) should be further evaluated in a subsequent cost recovery filing and should include an on-peak energy offset.

The DOC stated: “On balance, the Department concludes that the proposed Project is reasonable, particularly if the issue of the land lease can be reasonably resolved. As the project is small, the increased cost to ratepayers is modest and thus the benefits outweigh those costs. Moreover, it would be helpful for MP to gain experience on its system. However, the

⁵ MP Petition, p. 36.

⁶ DOC comments were filed prior to the December 2015 extension of the ITC.

⁷ DOC comments, October 14, 2015, p. 8.

⁸ DOC comments, October 14, 2015, pp. 6-7 (NON-PUBLIC version).

Department recommends that future additions of solar be acquired through a competitive process that allows bidders to propose projects at multiple locations.”⁹

Office of Attorney General (OAG)

The OAG argued that MP’s proposal for solar cost allocation does not account for all the system benefits that will be provided by the project. Therefore, MP’s proposal will result in unfair cross-subsidies from solar-paying customers to non-solar paying customers. The OAG recommended that MP be required to credit solar-paying customers for the solar generation at a rate and using the Value of Solar (VOS) Methodology that fully accounts for these benefits.

Fresh Energy

Fresh Energy agreed with the DOC and the OAG that MP’s proposal for cost recovery does not fairly allocate costs and benefits between SES-exempt and non-SES exempt customers. It recommended MP’s proposal be further evaluated in a subsequent cost recovery filing to fairly account for actual avoided energy costs due to solar additions, and to incorporate the appropriate distribution-connected solar benefits as identified in the VOS Methodology.

Letters of support from the U.S. Department of Defense (Minnesota Army and Air Force National Guard) and the Minnesota State Legislature

There were clear indications of support for the project from both the Minnesota National Guard and members of the Minnesota State legislature. The Departments of the Army and Air Force National Guard wrote a joint letter in support of the Camp Ripley project emphasizing its long term environmental benefits, such as MP’s assistance in meeting the state energy reduction goal of 3% a year and community outreach events and environmental learning at Camp Ripley. This letter gave particular emphasis to the cooperative partnership between the armed services and MP, and the ways in which the Company’s CIP had been of help to them in their strategy of “net zero” use of energy, waste levels and water consumption.

Representative Ron Kresha and State Senators Paul Gazelka and Carrie Ruud also submitted a letter strongly supporting the effects of the project on “security and sustainability for one of our most important military installations,” emphasizing how such a partnership will provide a model of cooperative job creation in Morrison County and Little Falls.

Resource selection

MP’s underlying assumptions and resource selection approach

MP’s approach to selecting the project started with the identification of an appropriate site. Prior to the issuance of the request for proposals (RFP), Camp Ripley was identified as the preferred site because it allowed for a customer partnership at a location within MP’s service area with favorable solar irradiance. In response to DOC IR #2, asking whether MP had evaluated other sites, had data regarding capacity factors, interconnection costs, site acquisition costs, or other costs at comparable sites, the Company responded:

⁹ DOC comments, October 14, 2015, p. 8.

Minnesota Power used several criteria to identify a site to develop its first utility scale solar project. These criteria include the value of working with an important partner, the quality of solar resource, land usage considerations, constructability of the site, and the opportunity to explore future technologies. The Company used these criteria to broadly evaluate sites across its service territory and the Camp Ripley site was ultimately selected. Detailed evaluation was not conducted on other sites once the Camp Ripley site was selected.¹⁰

MP summarized its reasons for selecting the Camp Ripley site as follows:

- The site location in the southwestern corner of MP's service territory provides for a strong solar resource, offering slightly better solar capacity factors than if the project was sited elsewhere in MP's service territory.
- The Camp Ripley site is in close proximity to an interconnection point on MP's distribution system.
- The site allows for the use of an underutilized brownfield with low quality vegetation rather than taking agricultural land out of production or using recreational lands.
- The site has favorable site conditions for solar construction, including topography (appropriate grade and drainage features) and geology (allowing post driven foundations) for solar PV panels.
- The project location is on a customer site, allowing for a "beneficial customer partnership" and the execution of the MOU between MP and the MN National Guard.

On August 27, 2014, MP signed a memorandum of understanding (MOU) with the Minnesota National Guard. The Camp Ripley project is one of several initiatives included in the MOU. The customer partnership established as a result will: (1) help Camp Ripley reduce its energy usage by 30 percent, (2) be a starting point to install backup generation at the site for a future microgrid installation that will allow the solar facility to operate during emergency situations when the electric grid is down, providing enhanced security for the military site and a public benefit to Minnesotans, and (3) open communications and cooperation between MP and the National Guard in preparation for emergency situations.¹¹ The project will also help the National Guard to meet its energy goals as set out by the U.S. Department of Defense, including increased energy sustainability through support and use of local renewable energy, increased conservation, and energy security.

In addition to pre-selecting the site, MP also identified the size of the project prior to issuing the RFP. Rather than pursuing an open-bidding alternative, both the customer-utility partnership (site) and size of the project were strategically-driven choices based on the Company's long-term vision to comply with the SES and locate solar resources within its service territory. The DOC

¹⁰ MP response to DOC IR#2, Attachment 2 to DOC comments, October 14, 2015, and attached to these briefing papers. IR#2 was initially designated NON-PUBLIC, but later re-designated as PUBLIC.

¹¹ These benefits are all part of the MOU but not necessarily part of the project before the Commission for recovery/approval. MP noted that all upgrades will be "smart grid compatible".

asked MP if it had considered pursuing a larger solar project or joint ownership of a larger project, and whether the cost effectiveness of a larger project was evaluated. MP responded:

Minnesota Power identified through its solar strategy in the 2014 Solar Energy Standard Progress Report (Docket No. E999/M-15-462) that adding 10 MW of solar energy prior to the end of 2016 was beneficial in capturing an additional 20 percent investment tax credit on the projects (the ITC is currently scheduled to go from 30 percent in 2016 to 10 percent in 2017), while balancing the immediate cost impact to our customers resulting from adding projects that are still higher than other forms of energy available. Once the Company determined that 10MW was a beneficial size to cost-effectively add solar resources to its system, larger projects were not seriously pursued.¹²

MP also explained that the project size selection was guided by its 2013 Integrated Resource Plan (IRP) and the Company's Energy**Forward** resource strategy. The Energy**Forward** strategy aims for an energy mix of one-third renewable energy, one-third coal, and one-third natural gas. MP's solar strategy consists of three pillars: customer, community and utility. The Camp Ripley project was formed with these goals in mind. MP also noted that the project is part of its current IRP (15-690), and is compatible with its 2013 IRP. In its 2014 SES Program Report, in Docket No. 15-462, MP reported the need for about 32 MW of solar energy to meet the SES by 2020.¹³

MP's decision process

MP retained Sedway Consulting, Inc. to oversee the RFP process for the Camp Ripley project and to perform an independent evaluation of bids compared to a Company-owned, self-build alternative. In so doing, MP first followed a "prequalification process," in which it sought pre-qualification information from prospective bidders on financial, bonding, legal, and insurance matters, as well as those with national experience. This process limited to 13 the number of bidders who were invited to participate in the site-specific bid. The Company also was interested in participating in the bid process. Bidders were instructed to provide an Engineer, Procure, Construct (EPC) option, along with a PPA option, in their bids.

Although 13 bidders were pre-qualified, only six EPC proposals and three PPA proposals were received after the RFP was issued on January 16, 2015. EPC bids were due February 23, 2015; PPA bids were due March 23, 2015. Pricing and commercial terms of the PPA proposals were not shared with MP employees who evaluated EPC proposals. MP evaluated the EPC proposals and selected one developer to work with to provide its own EPC bid. MP's EPC bid was provided to the independent consultant, along with the three PPA proposals. The RFP requested bidders to provide pricing under two different assumptions—that panels would be "American-made" or "Non-American-Made." The RFP set the annual price escalation for PPA pricing at 1% per year. The RFP also required bidders to provide pricing for a 25-year transaction with buy-out options at the end of years 10, 15, 20, and 25.

MP's EPC bid was deemed by the independent consultant as the lowest net cost option to develop the Camp Ripley project. The "Independent Evaluation Report" (by Sedway

¹² DOC IR #3, Attachment 3 to DOC comments, October 14, 2015.

¹³ The SES requires that 1.5 percent of a public utility's retail sales, net of customer exclusions, must be procured from solar energy resources by the end of 2020.

Consulting) is attached to MP's petition as Appendix B.¹⁴ Sedway Consulting developed its own evaluation model and conducted an analysis of the relative costs and benefits of MP's self-build alternative compared with the three other proposals. They also tested their results by conducting a variety of sensitivity analyses relating to interconnection costs, interest rate changes, forecasted REC prices, and debt equivalence costs. Their overall conclusion was robust to these sensitivity analyses and found unambiguously that the MP self-build alternative offered the highest net benefits and that the other proposals entailed significant additional costs.

In its initial petition, MP provided an estimate of the "power supply resource cost" per MWh for the project for solar-paying customers under the SES. This number includes the cost of all distribution upgrades required for the project and has been designated NON-PUBLIC.¹⁵ It represents the Company's best estimate of the levelized cost of energy (LCOE) for the project but it is not an "all in" PPA price, and could change depending on the final cost of project installation.¹⁶

MP's Strategist modeling

MP also performed a power supply cost analysis using Strategist to evaluate the cost effectiveness of the project as part of its overall system (i.e. the IRP model was used to run total system costs with and without the project). The project was added to MP's current supply portfolio to determine the customer impact of the project in starting in 2016. The results show that the project will: (1) displace mostly on-peak wholesale market purchases and some fossil fuel based generation, (2) reduce total CO₂ and other emissions, and (3) increase power supply costs by \$3.2 to \$4.7 million for MP's solar-paying customers over the 35 year life of the project, depending on the inclusion of CO₂ values.¹⁷ This is an increase of about \$0.56/month for the average residential customer.¹⁸ MP argued this is a small increase in power supply costs for a project required to meet the SES.

Table 6: Strategist Power Supply Cost Summary (\$2015, NPV 2015-2034)¹⁹

Power Supply Costs Comparison	Base Assumption with CO ₂ Tax in 2019 at \$21.50/ton	Base Assumption without CO ₂ Regulation Cost
	(\$ in Millions, 2015 \$)	
Power Supply Cost Without Camp Ripley	\$8,680.6	\$7,560.8
Change in Cost with Camp Ripley	\$3.2	\$4.7

¹⁴ Appendix B is designated NON-PUBLIC. On December 8, 2015, MP filed a PUBLIC version.

¹⁵ MP petition (NON-PUBLIC), August 21, 2015, p. 31.

¹⁶ MP provided the calculations upon which this number is based in response to DOC IR#7 (NON-PUBLIC).

¹⁷ This represents a power supply cost increase over the study period of from 0.04 to 0.06 percent.

¹⁸ Table 4, in MP's initial filing (p. 24), presents estimated rate impacts by class for solar-paying customers. Note that the Strategist power supply cost numbers do not represent "rate impacts" i.e. these cost numbers do not reflect the legislated exemptions from these costs for non-solar paying customers.

¹⁹ MP's initial petition, p. 36.

DOC approach and cost analysis

Compatible with MP's IRPs. The DOC noted that while not specifically identified in MP's 2013 IRP, the proposed project and solar addition is "not inconsistent" with MP's 2013 IRP,²⁰ and is included in MP's 2015 IRP.²¹ However, the DOC pointed out that MP did not propose the project in order to meet the size, type, and timing of a need identified in its IRP, but rather to comply with the state SES requirements.

MP's Strategist power supply cost analysis. The DOC obtained and reviewed the Strategist files used by MP in its power supply cost analysis²² and was able to confirm MP's results.²³ However, the DOC noted that it was currently reviewing MP's 2015 IRP and will provide further analysis in that docket.

DOC cost analysis. The DOC recommended approval of the Camp Ripley project but followed a different approach in its review and cost analysis. First, the DOC noted that although MP did issue an RFP for the project, it was limited to the Camp Ripley site. There were thus no bids located at other sites to compare against MP's project bid. The DOC noted that MP provided detailed information in response to DOC IR#2 to explain the criteria used to identify and evaluate the site.

The DOC did not comment on the cost/benefit analysis performed by Sedway Consulting that concluded MP's EPC bid was the least cost bid under a number of different sensitivity analyses, nor did the DOC dispute MP's Strategist power supply cost analysis.

Levelized cost of energy (LCOE) comparison. However, the DOC noted that Xcel recently conducted a solar RFP process that was not limited to one site. Therefore, the DOC decided to compare the average levelized cost of energy (LCOE) of three relatively large Xcel solar projects, ranging in size from 24.75 MW to 100 MW, to MP's estimated LCOE for the 10 MW Camp Ripley project. The average LCOE for the three Xcel projects was \$73.20/MWh.²⁴ According to the DOC, the LCOE for the Camp Ripley project "carries a significant premium,"²⁵ when compared to the utility-scale solar projects Xcel procured in 2015.²⁶

While the DOC noted the relatively high LCOE of MP's Camp Ripley project, it ultimately concluded that the project is not unreasonably outside the range of solar projects that the Commission has approved. For example, the Commission recently approved the Aurora solar project, which has a higher LCOE than the Camp Ripley project. Thus, in part because Camp Ripley falls within the range of large-scale solar projects receiving Commission approval, the DOC does not believe Camp Ripley is unreasonably costly. More broadly, LCOE comparisons across utilities can be "roughly comparable" because different discount factors may be used to

²⁰ MP's 2013 IRP was approved on November 12, 2013, in Docket No. 13-53.

²¹ MP's 2015 IRP was filed on September 1, 2015, in Docket No. 15-690.

²² See MP's response to DOC IR #11, which is Attachment 1 to DOC's October 14 comments.

²³ MP used the same base case assumptions as the modelling used in its 2015 IRP.

²⁴ See *Order Approving Solar Portfolio*, in 14-162, issued March 24, 2015.

²⁵ DOC, October 14, 2015, p. 3.

²⁶ Staff note: The LCOE value for the Camp Ripley project was designated NON-PUBLIC.

determine the LCOE for a specific utility or project. In addition, economies of scale might exist among larger solar projects that could in part explain the relative price difference.

DOC Strategist modeling. To evaluate the potential cost-effectiveness of a solar project on MP's system at reduced costs more similar to the Xcel project bid costs, the DOC re-ran MP's Strategist modeling, reducing the Camp Ripley project price by various increments (i.e. 15%, 25% and 35%). Like MP, it also provided results with and without carbon costs. The results are shown below:

Table 1: Comparison of Reduced Solar Costs²⁷

IRP Scenario	CO ₂ Costs	PVSC	Premium (Difference in PSVC from No Project)
Without Project	included	\$12,121,942	
With Project	included	\$12,124,095	\$2,153
15% Reduction	included	\$12,121,305	\$(637)
25% Reduction	included	\$12,119,447	\$(2,495)
35% Reduction	included	\$12,117,586	\$(4,356)
<hr/>			
Without Project	excluded	\$10,500,005	
With Project	excluded	\$10,504,081	\$4,076
15% Reduction	excluded	\$10,501,291	\$1,286
25% Reduction	excluded	\$10,499,431	\$(574)
35% Reduction	excluded	\$10,497,570	\$(2,435)

The DOC Strategist results above indicate that if project costs are reduced by 15% and carbon costs are accounted for, the project would be cost-effective; in other words, the present value of social costs (PVSC) is lowered by adding the project. Without accounting for carbon costs, the project cost would need to be reduced by 25% in order to be cost-effective.

DOC concerns with the land lease. The DOC's review of MP's project proposal focused in part on the land lease arrangement with Camp Ripley for the use of 80 acres of underdeveloped land for the solar array. MP explained that the land lease would be a 35 year lease with an initial payment of \$272,800 and subsequent annual payments totaling \$1.6 million.²⁸ This value was based on comparisons with similar sites in Morrison County, taking into consideration what MP would actually pay to locate the project on another piece of land, such as base land cost, property taxes, security and permitting costs.

In its initial comments, the DOC questioned the per-acre value of \$2,500 and suggested that while this issue should not prevent the project from going forward, the land lease payment terms should "be held in abeyance until an independent assessment of the land can be completed." The DOC cited the Company's statement that the land has limited value, is an underutilized brownfield site with low quality vegetation, was previously used as a gravel pit but is currently

²⁷ DOC comments, October 14, 2015, p. 4.

²⁸ See MP's response to DOC IR #4 (NON-PUBLIC), Attachment 5, DOC comments, October 14, 2015.

serving as a vegetative buffer for the Mississippi River, and is not being used for operational purposes by the National Guard. Given this description of the land by MP, the DOC questioned the comparison properties provided by MP in response to DOC IR #4 and suggested these may not provide an accurate indication of the value of the land.

In addition to raising questions about the cost of the land lease, the DOC asked: (1) whether MP would ultimately purchase the land at lease expiration; and (2) whether the land could continue to buffer the Mississippi headwaters from storm water once cleared of planted trees for the facility. Notwithstanding these concerns, the DOC concluded that on balance “the proposed project is reasonable, particularly if the issue of the land lease can be reasonably resolved.”²⁹

In its reply comments, MP further detailed reasons why its land lease terms were reasonable. First, it argued that the land value was fair based on similar parcels in the area after adjusting for the fact that locating within Camp Ripley removed considerations for property taxes, security and land permitting, which for a commercial parcel outside of Camp Ripley, customers would be required to pay. MP noted that as “a protected military installation with round the clock security,” located on land owned by the State of Minnesota with ultimate permitting and taxing authority, the Camp Ripley parcel side-stepped these costs. Second, MP noted the Camp Ripley land offers a “prime location” for expansion by either the National Guard or other state organizations such as the DNR or State Patrol Academy, so that restricting its use to a solar facility raises its value in relation to the opportunity cost of these alternative uses. Third, MP clarified that it did not intend to benefit from ultimate ownership of the land when the lease expires in 2050, and that even after construction there will be forested land in a 500 foot buffer between the facility and the Mississippi River, additional vegetation at the site, and a required MPCA storm water permit.³⁰

The DOC responded by repeating its earlier observations concerning the cost of the land lease. Its own assessment concluded that the \$2,500 per acre lease may be about \$200 too high, or \$16,000 over the life of the project. Its final conclusion was: “Therefore, the premium is not material enough to impact the Department’s recommendation to approve the project.”³¹

Unused REC transfer. As part of the land lease arrangement between MP and Camp Ripley, MP agreed to transfer unused RECs from a pool in its M-RETS account associated with purchases from large Manitoba Hydro facilities. Under Minnesota statute, MP cannot count these RECs towards the state RES requirement.³² However, it can transfer them to Camp Ripley, which is not subject to this restriction, helping Camp Ripley to meet its own renewable energy goals.

Based on a May 21, 2015 letter from MP to the National Guard outlining the terms of the land lease, including the REC transfer, the DOC questioned whether the RECs might have some

²⁹ DOC initial comments, October 14, 2015, p. 8.

³⁰ There is no provision in the lease for MP to own the land. Instead, it will lease the land for 35 years at a cost of \$1.6 million, and potentially extend the lease beyond 2050 if necessary.

³¹ DOC reply comments, November 2, 2015, p. 2.

³² Manitoba Hydro RECs do not currently have value in Minnesota for compliance with the Minnesota RES because the definition of “eligible energy technology” under Minn. Stat. § 216B.1691, subd. 1(a) (3) is limited to hydroelectric with a capacity of less than 100 MW. All of MP’s Manitoba Hydro RECs are from existing facilities that are larger than 100 megawatts.

value.³³ However, it did not pursue this issue in its reply comments or as part of a specific recommendation.³⁴ In response to DOC IR#6, MP indicated that various state restrictions “would in many cases apply to Manitoba Hydro RECs and make it difficult to even evaluate a market price now or in the future for stand-alone Manitoba Hydro RECs.”

Staff comments on resource selection

As noted above, the DOC’s finding in favor of the Camp Ripley project as “reasonable” was based in part on “difficult to quantify benefits.” These benefits arise in part as a result of the cooperative understanding between MP and Camp Ripley intended to promote the energy goals of both parties. As noted above, despite the DOC’s reservations over the cost of the project, its approval was based on these difficult-to-quantify considerations. Some of the difficult-to-quantify benefits include:

Benefits of working with the National Guard

- The project advances the State of Minnesota and the MN National Guard as key partners for renewable energy projects, encouraging the National Guard to develop projects at other sites inside and outside of MP’s service territory, such as at armories or airport facilities.
- The project will allow MP to assist the National Guard in meeting energy goals set out by the U.S. Department of Defense, e.g. sustainability--use of local renewable energy, energy conservation and energy security. Camp Ripley will benefit from having a solar resource available during times of grid outage; the interconnection will afford provisions to island a portion of MP’s line and feed energy back to Camp Ripley through automated switching and controls.
- The solar energy from the project will offset on-site fuel use at Camp Ripley, saving the state money and increasing energy security. Opening channels of communication between MP and the National Guard will allow for cooperation in the event of an emergency.
- The “beneficial customer partnership” allows MP to work closely with one of its LL&P customers and to identify customer interests and new products and services that can be deployed across its service territory. This partnership is an example of “open innovation,” in which inflows and outflows of knowledge improve solar innovation capacity benefiting MP, its ratepayers and the National Guard.
- The project provides advantages of immediate land availability and permitting under the terms of the MOU.

Benefits of MP’s knowledge-building and experience with a self-build solar project

³³ See DOC IR#4 (NON-PUBLIC), Attachment 5, DOC October 14, 2015 comments.

³⁴ The land lease agreement will include provisions to address potential beneficial use of the large hydro RECs transferred to Camp Ripley. If RECs are required to demonstrate EPA Clean Power Plan compliance, MP will purchase replacement RECs and transfer these to Camp Ripley at a designated value.

- MP's direct solar investment will result in learning by doing, accelerating its learning curve with "smart grid, micro grid, and DSM"³⁵ and "long-term competencies around the operation of a utility scale solar facility [such as] perspectives into performance and degradation over time."³⁶
- MP will be the first investor-owned utility in Minnesota to own and operate a utility-scale solar facility, gaining knowledge in scheduling solar within the Company's overall load requirements, allowing it to develop day/hour ahead forecasts to optimize power scheduling around solar outages caused by weather, site conditions and maintenance.
- MP, in addition to its bank partner, will take advantage of some of the benefits of the ITC and accelerated tax depreciation that will flow back to ratepayers.

Benefits of direct and indirect employment effects

- Because the Camp Ripley project will use American-made solar panels, it will result in U.S. job creation both directly and indirectly (i.e. wage-multiplier effects).

Benefits of education opportunities

- The planned educational center will provide broad exposure to solar energy, including on-site public educational opportunities.

Benefits of REC value creation

- There are advantages of "unlocking" MP's pool of large hydro RECs. Camp Ripley will use these for its compliance requirements, giving these RECs value they otherwise would not have had.

Benefits of MP developing solar ahead of required SES deadline³⁷

- MP is advancing a solar project four years in advance of the 2020 timeframe in order to help facilitate solar development in Minnesota; moreover, a self-build project may accelerate project implementation.

Cost comparisons

The Camp Ripley project poses a challenge for the Commission because it involves both public and private costs and benefits. The benefits of the project extend not only to ratepayers but involve public goods³⁸ related to national security, renewable energy and diffusion of innovation and knowledge. The Commission's obligation to minimize costs to ratepayers must therefore be balanced against the broader social benefits of a solar project that involves a public/ private cooperative partnership.

³⁵ DOC comments, October 14, 2015, p. 8.

³⁶ DOC comments, October 14, 2015, p. 14.

³⁷ Until late December 2015, this timeliness factor was made more urgent by the expected step-down of the ITC on December 31, 2016. In December 2015, the ITC was extended at 30% through December 31, 2019.

³⁸ Public goods are expenditures that are non-excludable and non-rival.

The Commission should consider whether some portion of the non-quantifiable benefits cited above should be excluded from rates paid by MP ratepayers. These public benefits flow broadly to MP, its shareholders, Camp Ripley, or other entities, and not wholly to MP ratepayers. However, as noted, these are largely public goods, that are by definition non-excludable. The question is whether MP ratepayers should be responsible for funding 100% of benefits associated with the project, such as national security, enabling MP to work more closely with the National Guard, helping the National Guard meet its energy goals, the diffusion of innovation and knowledge, and stimulating U.S. job creation. Accounting for these considerations is what makes the resource selection process complex.

Clearly, as noted above, the parties took different approaches to the resource selection process. MP selected its site and size prior to issuing an RFP, which may have narrowed the pool of bidders. By contrast, the DOC emphasized the need for a more open and more competitive bid process and observed that MP's decision process may have biased bids upward.

Even so, it may not be appropriate to compare LCOE calculations from different project bids that are based on different sets of assumptions. The DOC noted that LCOE comparisons across utilities are "roughly" comparable because utilities use different discount factors consistent with each utility's rate of return (ROR). In this case, the LCOE calculation for the Camp Ripley project may differ from the LCOE calculation for the Xcel solar projects as a result of:

- use of different technologies
- different project scales
- different assumptions regarding interconnection
- different value of the energy depending on where the project is located on the grid and where the energy is delivered
- differences between an estimated price for a self-build project and a PPA bid price
- differences that result when project proposals are submitted at different times

Further insight into the difficulties of cost comparisons comes from a 2014 NRRI report, which indicates that LCOE calculations often lack clarity in reporting assumptions, resulting in widely varying and contradictory results.³⁹ Cost comparisons between the Xcel projects and the Camp Ripley project are difficult. Sedway Consulting performed a completely different cost/benefit analysis, resulting in levelized net costs that included debt equivalence costs, interconnection costs and project benefits. Sedway then compared projects on the basis of these Levelized Net Costs (\$/MWh). Of note, a significant cost included in the LCOE is interconnection costs, which in Xcel's case did not exist because all three of Xcel's solar PPAs provided for the developer to bear all interconnection costs. One could argue that a straight LCOE comparison says little

³⁹ The report notes that one problem is the use of out-of-date data, which overstates current and near future costs because solar costs are falling rapidly. Difficulties also occur when LCOE studies: (a) do not disclose all important assumptions; (b) report national metrics, when location has many known important influences on system cost and performance; (c) ignore technology-specific transmission cost, line losses, interconnection costs and utility-system operating costs; (d) exclude risk and financing factors; (e) exclude differing environmental costs among different technologies; and (f) provide a single snapshot of costs, which is effectively the researchers' best guess, instead of reporting a range of costs along with explanations of the sensitivities to variations in input assumptions that might cause the cost variations. (NRRI Report No. 14-05, p. 12.)

about the merits of a PPA structure without interconnection costs versus a utility-owned and operated project with interconnection costs included.

The NRRI report also indicates that locational value of a project is especially important for distributed solar projects; smaller project sizes allow for grid location optimization. In this case, there is a value to having the Camp Ripley project connect directly to MP's distribution system with no MISO interconnection and congestion risks associated with a project that requires transmission. The project has locational value due to its proximity to load and, as mentioned above, the fact that MP already has existing distribution equipment located at the Camp Ripley site.

Strategist modeling

The Strategist modeling results provided by both MP and the DOC are useful but should not alone constitute the basis for a Commission decision. Slight changes in the assumptions built into the Strategist model can result in significant changes in the power supply costs or the PVSC. In addition, Strategist modeling does not capture the benefits of fuel price certainty and the reduced exposure to MISO markets that the Camp Ripley project or any solar energy project will provide.

As noted, as the costs of the project are debated, the Commission should keep in mind ratepayer benefits and a variety of public goods that did not enter directly into the cost analysis but will result from the project that was reflected in the DOC's recommendation for approval.

Concerns with the overall cost of the project

Regardless of the uncertainties surrounding appropriate cost comparisons or analyses, the project appears more expensive than bids received by Xcel as part of its 2014 solicitation. It also appears more expensive than PPA prices seen nationally. Although nationally most solar PPAs have been in areas with a better solar resource, an LBNL report shows a rough range of between \$40-\$70/MWh for levelized PPA prices for projects executed in the 2014-2015 timeframe.⁴⁰ As noted, the average PPA price for the three recently-approved Xcel solar projects was \$73.20/MWh. Staff notes that the higher PPA and self-build prices generated by MP's RFP were most likely the result of the restricted bid, the decision to utilize American-made panels, and the \$2.3 million in distribution-related upgrades (interconnection costs), which is roughly eight percent of the project cost estimate.⁴¹

Recent studies also indicate that there may be few economies of scale for utility size solar, such that any upward adjustment to the Camp Ripley cost numbers to account for the comparative absence of economies of scale at 10 MW may not be appropriate. The same LBNL Report indicates that for actual utility scale projects completed in 2014 there was no consistent evidence of economies of scale among the PV systems in the pricing sample above 5 MW.⁴²

⁴⁰ Utility-Scale Solar 2014, LBNL-1000917, Figure 19, p. 37, September 2015.

⁴¹ See PUC IR #1 (PUBLIC), attached.

⁴² Utility-Scale Solar 2014, LBNL-1000917, September 2015, p. 16.

In light of these uncertainties, the Commission may wish to consider making an adjustment or capping the level of MP's recovery for the project.⁴³ If the Commission considers the project selection process to be insufficiently competitive, providing too few bids for comparison of its price, it could require MP to issue an unrestricted RFP in order to provide more price information. An unrestricted solar RFP (i.e. allowing installers to offer bids for projects of 30 MW or less, at any location) could provide the Commission with more information but could also significantly delay MP's development of a solar project. Now that the ITC has been extended, however, there may not be the same time pressure to select and to have a project operational prior to December 31, 2016.

The Commission could take other actions as well. For example, it could require that MP's next solar project be acquired through an open bid that does not specify location or size, as initially proposed by the DOC. If the Commission finds the commitment to microgrid development to be uncertain, it could ask MP to further commit to the eventual development of the Camp Ripley microgrid project. In addition, there may be other ways to encourage MP to reduce project costs and bring the project in below budget.

Cost recovery

MP's cost allocation proposal

Minn. Stat. § 216B.1645 allows the Commission to approve a schedule that provides for the automatic adjustment of charges to recover prudently incurred investments, expenses, or costs associated with facilities constructed, owned, or operated by a utility to satisfy the requirements of Minn. Stat. § 216B.1691.⁴⁴ The solar energy generated by the Camp Ripley project qualifies as eligible energy technology under Minn. Stat. § 216B.1691, subd. 1.

Under Minn. Stat. § 216B.1645, subd. 2a, a utility's solar energy capital projects are eligible for current cost recovery.⁴⁵ MP requested Commission approval, pursuant to Minn. Stat. § 216B.1645, subd. 2a, for eligibility to include cost recovery of its investments and costs for the Camp Ripley project through a solar factor as part of the Company's existing Renewable Resources Rider.

⁴³ MP has estimated total project cost to be \$30 million and project investments and expenditures could be capped at this level or adjusted lower if the Commission feels comfortable doing so. The Commission could also attempt to estimate a premium paid as part of the land lease and reduce MP's recovery by this amount.

⁴⁴ Under Minn. Stat. § 216B.1691, subd. 2f (Solar energy standard), MP is required to generate or procure solar energy to meet at least 1.5 percent of the utility's total retail electric sales to retail customers by the end of 2020. MP estimates this to be between 32-33 MW of solar.

⁴⁵ Subd. 2a (a) states: "A utility may petition the commission to approve a rate schedule that provides for the automatic adjustment of charges to recover prudently incurred investments, expenses, or costs associated with facilities constructed, owned, or operated by a utility to satisfy the requirements of section 216B.1691....".

Minn. Stat. § 216B.1691, subd. 2f (d) imposes a requirement to exclude statutorily exempt customers from solar costs.⁴⁶ The cost of solar projects such as Camp Ripley cannot be recovered in MP's current Renewable Resource Rider billing factor or in its current Fuel and Purchased Energy (FPE) adjustment, because the current rider and fuel adjustment are applied to all retail customers, including both solar-paying and solar-exempt.

Since the Commission has not yet initiated a proceeding to determine a method to identify SES-related costs and the allocation of these costs across specific customers groups, MP proposed a method that it believes will meet the legislative requirement.

To exempt certain customers from paying solar costs, MP proposed a new Solar Renewable Factor separate from the existing Renewable Resource Factor. This new factor would allow for the recovery of the utility's capital costs associated with SES projects through its Renewable Resource Rider.⁴⁷ MP noted that because the issues of cost allocation for solar-paying customers will exist in the future, it foresees the need to continue recovering the costs of approved solar activities in the Solar Renewable Factor even after its next general rate case.⁴⁸

MP also proposed a new methodology that calculates the Fuel and Purchased Energy (FPE) adjustment under its existing method and creates a new Solar Energy Adjustment (SEA). The FPE adjustment (with solar costs removed) would be applied to all customer energy usage (as currently) and the SEA would be applied only to the energy usage of solar-paying (non-exempt) customers. The SEA would be calculated with a credit to account for the fact that solar-paying customers also have the FPE factor applied to their usage. MP noted that the SEA would be a charge to solar-paying customers if solar energy costs are higher than non-solar energy costs. However, if solar energy costs are lower, or if there are no purchased energy costs associated with the solar energy (as in the Camp Ripley project), the SEA would represent a credit to solar-paying (non-exempt) customers.

MP proposed four changes in order to segregate and correctly allocate solar costs to solar-paying customers:

- a new Solar Renewable Factor as part of its Renewable Resource Rider
- a new Solar Energy Adjustment (SEA) in conjunction with the Company's existing Fuel and Purchased Energy (FPE) Adjustment Rider
- an adjustment to the Company's existing FPE Adjustment to exclude solar costs and energy
- a change to the current bill format, allowing MP to itemize on customer bills both the Solar Renewable Factor and the SEA

In Appendix C to its initial Petition, MP provided sample calculations of the SEA, with and without solar energy purchases. It also provided red-lined tariff pages showing the proposed

⁴⁶ Minn. Stat. § 216B.1691, subd. 2f (d). This subpart states that certain customers (iron mining, paper mills, wood products etc.) may not have the rates charged to them include any costs of satisfying the solar standard specified by the SES subdivision.

⁴⁷ The Renewable Resource Rider (RRR) currently recovers MP's investments and expenditures related to the Bison 1 and 4 Wind Projects and associated transmission upgrades, and to the Bison 2 and 3 Wind Projects. See Docket No. 14-962.

⁴⁸ Staff notes it is not clear from this statement if, how, and when MP plans to put these costs in rate base.

changes to its Fuel and Purchased Energy (FPE) Adjustment Rider and the new Solar Energy Adjustment (SEA) Rider (see Appendix C to MP's initial comments).⁴⁹

On September 10, 2015, MP filed a proposal for a Community Solar Garden (CSG) program (in 15-825). In that filing, MP sought recovery of investments and expenditures related to a 40 kW CSG project through the Renewable Resource Rider, specifically the Solar Energy Factor. MP's request for cost recovery in the 15-825 docket assumes Commission approval of the Company's cost recovery proposal in the current docket (the Solar Energy Factor, SEA and adjustment to the FPE adjustment).

Should the benefits of solar energy, such as higher on peak energy production, or other benefits associated with solar, be credited back to solar-paying customers?

MP's cost allocation proposal provides for a fuel cost offset for solar paying customers. However, solar-paying customers are credited for these kWh at the average energy cost recovered by the fuel clause adjustment, while the actual energy costs offset by the solar additions will be higher than average fuel costs, because solar produces more energy on-peak (during the summer). The DOC concluded therefore that the credit provided to solar-paying customers should be calculated differently than proposed so as to better reflect the actual avoided energy costs due to the addition of the solar project.

The DOC concluded that as a general approach MP's addition of a Solar Renewable Factor and a SEA Rider is a reasonable way to segregate and allocate solar costs to solar-paying customers. It suggested that the Commission could make a final decision on the appropriate method for allocating solar costs in a subsequent proceeding, specifically one in which MP's requests cost recovery. However, it also suggested that some guidance from the Commission now on how to approach the issue would be helpful.

Therefore, the DOC recommended that the Commission require MP to submit an alternative calculation of the SEA rider that captures on-peak energy offsets or an alternative calculation methodology that more accurately reflects the actual avoided energy costs resulting from solar additions. The DOC suggested that MP file the alternative calculation methodology when it files for cost recovery.

The DOC also noted that MP's proposed SEA only provides a credit for energy costs, but that the project will provide capacity as well as energy. MP estimated that the Camp Ripley project will provide 5 MW of accredited capacity based on current MISO rules.⁵⁰ For this reason, the DOC proposed that in MP's next rate case, a method be determined to appropriately allocate capacity costs between solar-paying and solar-exempt customers.⁵¹

⁴⁹ These red-lined tariff pages will need to be revised based on a Commission decision in this matter.

⁵⁰ For more information on how the MP MISO capacity estimate of 5 MW was determined, see DOC comments, October 14, 2015, Attachment 7, DOC IR#9. This capacity estimate will be updated after actual performance data is collected or if there are changes to the MISO Resource Adequacy Business Practices Manual (BPM).

⁵¹ Assuming the solar facility begins operation before MP's next rate case, exempt customers will be receiving a subsidy for their capacity until new rates (following the rate case) go into effect.

The OAG and Fresh Energy, like the DOC, argued that MP's proposal for cost recovery does not fairly allocate costs and benefits between MP's solar-paying and solar-exempt customers. This is because solar-exempt customers still experience many of the benefits of solar but pay none of the costs. The result is a cross-subsidy because solar-exempt customers receive benefits for which they do not pay. The OAG recommended that the Commission either require MP to use the Value of Solar (VOS) rate to credit ratepayers or provide an alternative calculation that accounts for the full value of solar as determined by the Commission.⁵² In reply comments, the OAG recommended that any alternative calculation account for all of the benefits that the Commission and the DOC determined that solar generation provides. The OAG maintained that the VOS is the best "available proxy" for these benefits, although the Commission may consider specific characteristics of the Camp Ripley project differently than those envisioned when it approved the VOS. Requiring MP to resubmit an alternative credit might allow for this.

Fresh Energy agreed that the methodology for determining the SEA rider should be further evaluated in a subsequent cost recovery filing to fairly account for the actual avoided energy costs due to solar additions. It also agreed with the OAG that solar benefits—as identified in Minnesota's VOS Methodology—be incorporated. Fresh Energy believes that the VOS Methodology should be used as the basis for re-evaluating the SEA, and that all eight of the VOS components developed by the DOC should be considered by the Commission in relation to the Camp Ripley project, noting that these have already undergone stakeholder evaluation.

The DOC and MP rejected the position of OAG and Fresh Energy. The DOC noted that the approach could have "unintended consequences."⁵³ The example they gave was that the credit provided through the SEA rider is intended to offset costs included in the FPE Rider (fuel clause adjustment). For this reason, the credit should be limited to the types of fuel and purchased energy included in the FPE rider.

MP agreed to explore an alternative methodology for estimating the cost savings from solar power produced during peak periods. It also agreed that energy costs offset by solar additions may be higher than the average cost of energy, due to the fact that solar produces more energy during times of peak summer demand. Therefore, to credit solar-paying customers at the average FPE Rider cost may not be an adequate credit. However, MP observed that the current FPE Rider does not include a time-of-day calculation and that the current system used to calculate the FPL Rider does not provide the ability to do so.

MP argued that the DOC's VOS Methodology was accepted by the Commission as required and limited by Minn. Stat. § 216B.164, subd. 10(e). The Commission's Order adopting the methodology indicates a VOS tariff would be filed in lieu of net metering and that filing a tariff is at the discretion of the utility. MP noted a number of concerns about the recommendation to use the VOS for the Camp Ripley project:

⁵² See *Order Approving Distributed Solar Value Methodology*, in Docket No. 14-65, issued April 1, 2014. The VOS methodology, as approved by the Commission, identified eight different value components that distribution-connected solar provides to the utility's system: (1) avoided fuel costs, (2) avoided generation capacity, (3) avoided reserve capacity costs, (4) avoided plant O&M-fixed, (5) avoided plant O&M-variable, (6) avoided transmission capacity, (7) avoided distribution capacity, and (8) avoided environmental costs.

⁵³ DOC comments, November 2, 2015, p. 3.

- The statute exempting certain customers from paying the costs of the SES does not allow for these customers to pay for the VOS. If the VOS were adopted to credit solar-paying customers for the benefits of the solar energy from the project, the costs, as well as the benefits, would need to be borne only by the solar-paying customers.
- The VOS is intended to be used as an alternative tariff to net metered and small cogeneration facilities less than 1 MW. Minn. Stat. § 216B.164, subd. 10(b) states that the alternative tariff (VOS) is in lieu of the applicable rate under subdivision 3 and 3a, which describe distributed generation projects less than 1 MW. The project does not qualify as a facility for the VOS because it is too large and is not a distributed energy resource owned or operated by customers (Minn. Stat. § 216B.164, subd. 10).
- MP has not established a VOS nor submitted one for Commission approval. The statute establishing the legal framework for the VOS is permissive (“A public utility may apply for commission approval for an alternative tariff...”).⁵⁴
- The VOS does not qualify for current cost recovery under Minn. Stat. § 216B.1645, subd. 2a. This statute lists costs that may be recovered for a utility’s renewable facilities, but the additional benefits determined by the VOS proceeding are not included in this list.

The OAG and Fresh Energy agreed that the issue could be decided in a subsequent cost recovery filing. MP filed supplemental comments, however, requesting that the issue of the application of the VOS be decided in the current Docket. MP argued that waiting to decide the issue in a subsequent filing may create regulatory uncertainty over the implementation of the VOS and could encourage legal challenges from SES-exempt customers based on Minn. Stat. § 216B.1691, subd. 2f (d). Resulting delays could also adversely affect other solar projects, including MP’s Community Solar Garden proposal. Finally, the Company indicated that it needs time to prepare its internal infrastructure and procedures to accommodate the proposed SEA and Solar Renewable Factor so that calculation and billing systems are in place when costs are recovered from solar-paying customers.

Staff comments on cost recovery

The Commission could adopt the broader rate design structure of MP’s cost recovery proposal as recommended by the DOC, including addressing the statutory exemptions from costs for certain customers, by setting up a Solar Renewable Factor, Solar Energy Adjustment, and adjustment to the existing FPE. Next, the Commission could also decide whether to adopt either: (1) the agreement by MP and the DOC for MP to file an alternative SEA calculation reflecting and limited to actual avoided energy costs,⁵⁵ or (2) take the further step recommended by the OAG and Fresh Energy to adopt the DOC proposal but require evaluation of whether the additional eight VOS factors should be further considered in the alternative SEA calculation.

Although the parties agreed that the broad mechanics of MP’s recovery proposal could be adopted now and the method for the alternative SEA calculation filed later, in supplemental comments MP asked the Commission to decide that an alternative SEA calculation be based solely on avoided energy costs due to solar additions now. If the Commission requires an

⁵⁴ Minn. Stat. § 216B.164, subd. 10(a).

⁵⁵ The DOC also suggested that, in its next rate case, MP provide a method to appropriately allocate capacity costs. Staff does not believe MP responded directly to this proposal but may support it.

additional filing, it will need to decide when the filing should be made--within a set time to be designated by the Commission (e.g. 60 days) or later in a cost recovery docket.

A basic issue is whether the Commission requires MP to account for VOS factors and to what extent. Decisions made in the VOS proceeding identifying the avoided costs of solar did not contemplate their use in this case, which centers on a credit to the fuel clause adjustment. The DOC objected to a broad application of the VOS factors warning against “unintended consequences.” Whatever the DOC meant, it did not develop these consequences with specificity and provided only one example. In any event, there is no consensus among the parties over whether or how to implement the VOS factors. Even if the VOS Methodology appears applicable in principle, issues of implementation may need further discussion by MP and the parties. The probable need for this discussion is shown by the DOC, which developed the methodology, but raised flags over its direct application in this specific context.

Therefore, notwithstanding the inherent importance of the VOS Methodology and the benefits solar brings to the system, it may not be appropriate to apply the VOS avoided cost factors, over and above avoided fuel and capacity costs, in this docket. The VOS Methodology may not translate directly into exact costs to be applied for purposes of rate recovery. At a minimum, the Commission may wish to recognize the avoided on-peak fuel costs and avoided capacity benefits as proposed by the DOC. As experience with solar facilities increases, it may be possible to incorporate more factors included in the VOS Methodology. At this point, the application of VOS factors to MP in the context of a fuel clause credit may be sufficient.

The VOS Methodology does not address and was not intended to address the issue of how to exempt certain customers from solar system costs. The difficulties of determining and allocating solar costs to exempt and non-exempt customers are the direct result of legislatively mandated exemptions. The SEA adjustments, disputed alternative calculations, and a new Solar Renewable Factor would not be necessary under traditional ratemaking principles. It is these exemptions that have led to difficulty in identifying, separating and allocating to specific customers the costs of solar resources and facilities that operate as part of the larger utility system. The Commission will need to decide if the cost exemptions for certain customers are independent of the benefits of adding solar to the system or whether exempt customers should pay for some of these benefits. Stated differently, the Commission may wish to consider whether solar-paying (non-exempt) customers should pay the incremental system costs of adding solar to the system or the full project costs without regard to system benefits.

Recognizing the avoided fuel cost in the fuel clause as a solar benefit does not preclude the recognition of other factors that are part of the VOS Methodology. The VOS Methodology may still be the best existing methodology for determining these factors. Therefore, the Commission could decide to leave the door open to eventual consideration of the application of these factors in determining a credit to solar-paying (non-exempt) customers in a future docket. The decision in this docket, however, would be limited to the SEA as an adjustment to the fuel clause.

The Commission could also decide to adopt the OAG and Fresh Energy position regarding the full application of the VOS Methodology at this time. However, if the Commission feels it needs to develop the record further before making any decision, it could require MP to make an additional filing within 60-90 days, explaining more fully why the VOS factors should not apply in this context. The Commission could ask MP to meet with parties, or not. It could direct MP

to address why additional VOS factors, in addition to avoided fuel cost and avoided capacity costs, should not be accounted for in apportioning costs to solar-paying customers, or ask MP to review the feasibility of including additional VOS-type factors in its proposal for allocating costs. The Commission might also ask MP and the parties to consider whether solar-paying (non-exempt) customers should pay the incremental costs of adding solar to the system rather than full project costs independent of system benefits.

Lastly, the Commission could defer a decision on this matter since there are no project costs to be recovered at this time. MP indicated that neither the Solar Renewable Factor, nor the SEA, will include costs/credits until the Camp Ripley project is in service at the end of 2016.⁵⁶ As part of this option, the Commission could either defer a decision and take no further action or direct staff to issue a notice in the generic SES docket⁵⁷ (involving all utilities subject to the solar cost exemption statute) seeking comments on cost recovery and cost allocation, pursuant to Minn. Stat. § 216B.1691, subd. 2f (d). MP and the parties could then raise the issues and submit the comments presented in the current docket as part of the generic docket. One drawback to this approach is that MP may need a decision regarding recovery and cost allocation sooner, since the project will go into operation at the end of 2016.

Reporting

If the Commission decides to defer the calculation of MP's SEA to a subsequent filing and/or procedure, it will need to decide which one. However, there is also the question of monitoring and reporting on the SES customer exemptions and the costs transferred to solar-paying customers. Utilities already report on their progress towards meeting the SES and the proper calculation of the SES after the removal of exempt-customer retail load. The Commission will need to decide if it wishes to have reported or to provide additional oversight of the additional costs apportioned to SES-paying customers and if so where: (1) in the existing SES annual status report,⁵⁸ (2) as part of the annual fuel clause reports⁵⁹ or, (3) in some other new and separate or existing filing or process.

The SES annual status report filing may be the best option. These reports are filed annually on June 1. Most of the information required relates to utility progress in meeting the SES. However, as part of the reporting, utilities are also required to include information on SES customer exemptions, such as: a list of customers requesting exclusion from the SES, excluded sales from customers that have requested and been approved by utilities for exclusion from the SES, and solar energy requirements to meet the SES, after accounting for excluded sales.

⁵⁶ However, MP could file its Renewable Resource Rider (RRR) for 2017 as early as summer 2016.

⁵⁷ *In the Matter of the Implementation of Solar Energy Standards Pursuant to 2013 Amendments to Minnesota Statutes*, Section 216B.1691, in E-999/CI-13-542.

⁵⁸ See Orders issued in Docket 13-542, April 25, 2014 and November 19, 2014; also Order issued in Docket 15-462, October 28, 2015.

⁵⁹ Staff does not recommend reporting on SES customer cost allocations in the annual fuel clause reports (AAA reports), if any level of oversight is necessary.

Customer bills

Should the costs associated with MP's solar projects be presented as separate line items on customer bills?

MP proposed to include the separate Solar Renewable Factor and the new SEA as separate line items on customer bills. It noted that presenting solar costs separately will help in situations in which a portion of the customer bill is exempt from the SES and a portion is not. MP's billing system requires the SES exemption to be determined at the service agreement level, and in some cases, a customer may have more than one service agreement.⁶⁰

While the DOC did not oppose this proposal, it noted that the issue could be reserved for a subsequent cost recovery proceeding. The DOC attached an example of a current bill to its October 14 comments,⁶¹ but it did not include a recommendation to approve MP's proposal in its final recommendations.

In reply, MP indicated that it preferred to have the Commission decide this issue in the current docket so that the Company has time to prepare its customer billing system to accommodate changes that will be necessary to add new line items onto customer bills that are not exempt from SES costs.

Staff comments on bill format

MP's current bill format already includes separate line items for:

- Affordability Surcharge
- Renewable Adjustment (Renewable Resource Rider)
- Transmission Adjustment
- Boswell 4 Plan Adjustment
- Resource Adjustment (fuel clause adjustment and CIP costs)

MP's proposal would add two more line items to this list: the Solar Renewable Adjustment (Solar Renewable Factor) and the Solar Energy Adjustment (SEA). The Commission may wish to carefully consider this proposal and defer a final decision, as noted by the DOC.

⁶⁰ MP petition, p. 27.

⁶¹ DOC comments, October 14, 2015, Attachment 8 (DOC IR#8).

Decision alternatives

Project approval

1. Find that MP's investments and expenditures for the Camp Ripley project will facilitate MP's compliance with the renewable energy standards set forth in Minn. Stat. § 216B.1691. Approve the investments and expenditures for the Camp Ripley project pursuant to Minn. Stat. § 216B.1645, Subd. 1.

Additional decision alternatives related to project approval

2. Require MP to file a petition at least one year in advance of the timeline for an option regarding this contract explaining and requesting authorization from the Commission of MP's proposed choice. (*DOC and MP*)
3. Require MP to use a competitive process open to numerous locations for future acquisitions of solar generation, unless MP can demonstrate that its choice not to use such a process is fair and reasonable. (*DOC and MP*)
4. As part of its next solar resource acquisition, require MP to use a competitive process open to numerous locations for future acquisitions of solar generation. (*Staff provided*)
5. Require MP to issue another unrestricted, in terms of size and location, RFP in order to provide more price information upon which to evaluate the cost of the Camp Ripley project. (*Staff provided; this option would be adopted if the Commission wished to delay a decision on the project. Staff would then bring the matter back to the Commission for a determination once this additional information is received and commented on.*)
6. Approve MP's investments and expenditures in the Camp Ripley project capped at a specific level (e.g. \$30 million). (*Staff provided; this option, if selected, may need additional detail related to the specifics of how the cap would work.*)
7. Approve MP's investments and expenditures in the Camp Ripley project with an adjustment, to be determined by the Commission, to reflect a premium in the cost of the project. (*Staff provided; this option, if selected, may need additional explanation.*)

Cost recovery

8. Approve the broad structure of MP's rate design proposal: to add a new Rider for Solar Energy Adjustment (SEA Rider) in conjunction with the Company's existing Rider for Fuel and Purchased Energy Adjustment (FPE Rider), and to adjust its existing FPE Rider to exclude solar costs and energy.
 - a. Approve also MP's full cost recovery and cost allocation proposal as proposed in the Company's initial Petition. (*MP's initial position.*)

- b. Require in addition that the methodology for determining the SEA credit be further evaluated in a subsequent filing. MP shall submit an alternative calculation of the SEA Rider as part of a subsequent filing. The alternative calculation methodology in the current docket shall be limited to relying on an on-peak energy offset or another method that would better reflect the actual avoided energy costs due to solar additions. Require MP, in its next rate case, to develop and file as part of its direct testimony, an appropriate methodology to allocate capacity costs between solar-paying (non-exempt) and solar-exempt customers, given that the Camp Ripley project will provide capacity for MP's system. (*DOC, MP*)
 - c. Require in addition that the methodology for determining the SEA credit be further evaluated in a subsequent filing. MP shall submit an alternative calculation of the SEA Rider as part of a subsequent filing. Find that the VOS Methodology should be used as the basis for developing an alternative SEA rider and credit methodology that fully accounts for all benefits of the project, including an evaluation of whether each value component in the VOS Methodology is an appropriate system benefit provided by the Camp Ripley project. Require MP, in its next rate case, to develop and file as part of its direct testimony, an appropriate methodology to allocate capacity costs between solar-paying (non-exempt) and solar-exempt customers, given that the Camp Ripley project will provide capacity for MP's system. (*Fresh Energy, OAG*)
9. For decision alternatives 8b or 8c above, require MP to make the additional filing:
 - (a) Within 60 days of the date of the Order in this matter, or
 - (b) At the time, MP files for project cost recovery.
 10. Require MP to confer with parties in this docket to see if any further agreement can be reached and to file, within 90 days of the issue date of the Order in this matter, more information regarding the VOS Methodology and its potential application in this case and the outcome of the stakeholder discussions. (*Staff provided*)
 11. Take no action on MP's proposal for cost recovery and cost allocation at this time. Direct staff to issue a notice in the generic SES docket (*In the Matter of the Implementation of Solar Energy Standards Pursuant to 2013 Amendments to Minnesota Statutes, Section 216B.1691*, in E-999/CI-13-542) seeking comments on cost recovery and cost allocation, pursuant to Minn. Stat. § 216B.1691, subd. 2f (d), and issues presented in the current docket. (*Staff provided*)

Customer bills

12. Approve MP's request to itemize on customer bills the Solar Renewable Factor and the Solar Energy Adjustment (SEA). (*MP, DOC*)
13. Deny MP's request to itemize on customer bills the Solar Renewable Factor and the Solar Energy Adjustment (SEA).

14. Take no action on MP's request at this time. (*DOC alternative recommendation*)
15. Delegate authority to the Executive Secretary to approve the bill format including the new itemization. MP shall not include the new itemization until the new bill format is approved in a Notice issues by the Executive Secretary. (*Staff provided, if the Commission adopts MP's request to approve bill format as proposed.*)

Reporting

16. Require MP, as part of its SES annual status report, to include all relevant information, including but not limited to:

Total costs that have been apportioned to and recovered from solar-paying (non-exempt) customers under Minn. Stat. § 216B.1691, subd. 2f (d) that would have been recovered from exempt customers.

17. Take no action on reporting requirements at this time.

Compliance filings

18. Require MP, within 30 days of the issue date of the Order in this matter, to make the appropriate compliance filings reflecting all relevant Commission decisions made in the current docket.

**Attachment 1
DOC IR #2**

MP's partial response to DOC IR #2 seeking information on whether MP had evaluated other sites (for full IR response see DOC comments, October 14, 2015, Attachment 2):

Partnership

Minnesota Power views solar development as an opportunity to work with both customers and communities to create partnerships that benefit all parties, rather than viewing solar from a purely compliance standpoint. The partnership with the Minnesota National Guard was developed so that both parties could work together to meet their shared objectives including Minnesota Power's compliance with the Solar Energy Standard, increased resiliency for the largest military installation and alternate site of government in Minnesota, and increased emphasis on conservation. These shared objectives were captured in the MOU signed between the Minnesota Department of Military Affairs and Minnesota Power on August 27, 2014.

Solar Resource

Solar is similar to wind in that different geographic locations contain better resources. Generally solar resource increases as project sites move to the south and to the west both within the state and nationally. To evaluate the variety of solar resource within Minnesota Power's service territory a commercially available solar program, PVSYST was used in conjunction with publically available (http://rredc.nrel.gov/solar/old_data/nsrdb/1991-2005/tmy3/by_state_and_city.html) NREL TYM3 data to identify available global solar irradiance across its service territory.

- Hibbing Chisholm 1193 kWh/m²
- International Falls 1261 kWh/m²
- Duluth International Airport 1342 kWh/m²
- St Cloud Regional Airport 1412 kWh/m²

Solar differs from wind development in that local topography such as hills and ridges are not expected to create dramatic changes in the available solar resource, assuming any shading is accounted for. With these basic principles, Minnesota Power chose to identify a project in the southwest portion of the Company's service territory in which a good partnership had been developed. These principles were validated using commercially available solar modeling tools to create quantitative comparison tools and showed the best available irradiance within Minnesota Power's service territory was near St. Cloud.

There are many system factors included in estimating the capacity factor of a solar project, including component choice, DC to AC ratio and system losses. Minnesota Power requested that the EPC contractors design a system during the RFP process that resulted in the lowest levelized cost of energy at the Camp Ripley site.

Land Usage

Solar projects can have a large footprint in relation to the amount of energy they are capable of producing and there are differing viewpoints as to the level in which communities or neighbors are in favor of or apprehensive towards large solar developments. These apprehensions could be a result of loss of agricultural production, unsightliness of the installation or loss of land with a

higher economic development potential. With this in mind, Minnesota Power identified the Camp Ripley Solar Project having a single large continuous site that is well insulated from neighbors, while also not impacting other economic development or taking lake land out of agricultural production.

In addition to local land use considerations, there is inconsistency across the state as to the land use approval process required by local jurisdictions. Located on State of Minnesota land, the Camp Ripley Project offered a clear site approval pathway as negotiated through the land lease agreement.

Constructability

Constructability of a project is a qualitative measure of the ability to accurately estimate the construction costs and ensure that the costs are able to be kept as low as possible. When constructing a utility scale solar installation, the primary variables in determining the construction costs are the site grade and geotechnical attributes. The Camp Ripley site has a nearly perfect site grade and drainage for solar, and will require minimal earthwork to achieve a proper mix of site drainage without requiring additional storm water drainage control measures.

There are several methods of constructing solar foundations including ballasted, driven post and poured pier, each with varying cost. The most typical and cost effective construction method for utility scale projects is the driven post. Based on preliminary visits, the Company felt confident this site would allow a driven post construction method. These assumptions were validated by additional geotechnical exploration. In choosing the Camp Ripley site, construction costs were able to be lowered and made more predictable.

Minnesota Power conducted a preliminary and conservative assessment of the interconnection costs that is included within the project economics. Minnesota Power expects the initial estimate of interconnection costs to provide ample contingency for any change as the design changes from preliminary to construction.

Site Acquisition Costs

Minnesota Power employed a market based approach when valuing the land leased from Camp Ripley, as it would have at any site. Therefore the prices are consistent with what would have been paid in different locations.

Exploration of New Technologies

As Minnesota Power learns new skills and technologies, the Company is able to better serve customers in the future. From a development standpoint, the Company has a preference for choosing projects that encourage development of new knowledge, especially when choosing these projects does not result in increased costs. The Camp Ripley Solar Project includes an opportunity to be involved in a future potential microgrid project that includes innovative integration of renewable and back-up generation energy sources.

Attachment 2

This question is:

Public

X

**State of Minnesota
Public Utilities Commission
Utility Information Request**

Docket Number: E-015/M-15-773

Date of Request: December 16, 2015

Requested From: David Moeller, Minnesota Power,

Response Due: December 28, 2014

Analyst Requesting Information: Susan Mackenzie

Type of Inquiry:

	Financial		Rate of Return		Rate Design
	Engineering		Forecasting		Conservation
	Cost of Service		CIP	x	Other:

If you feel your response contains non-public information, please indicate.

Request Number	
1.	Please explain why the average levelized cost of \$73.20/MWh for Xcel Energy's three solar projects is or is not comparable to the project levelized cost of [TRADE SECRET DATA EXCISED] provided by the Company in response to DOC IR #7.

Response:

When comparing the price received in Xcel Energy's request for proposal (RFP) to the project selected in the site specific Camp Ripley RFP, several factors need to be evaluated in order to have a fair comparison of prices. These factors include more favorable solar design conditions and available resources in southwestern Minnesota where the bulk of the Xcel RFP projects are located, the risks and costs to deliver solar energy from outside Minnesota Power's service territory back to the service territory through MISO, and the scale of projects being developed. Without detailed information on the bids submitted in the Xcel Energy RFP, the Company can only make educated guesses on the impact on delivered cost to Minnesota Power's electric

grid. One might expect decreased costs in Xcel Energy's RFP compared to the Camp Ripley Project due to the following:

Impact of production related design factors	10%
Impact of scale on capital cost	10%
Premium for American-made panels	2% - 10% depending on modules
Transmission and congestion	15%
Total of these items	37% - 45%

Some of the factors which would decrease costs for a large project similar to Xcel Energy's RFP compared to the Camp Ripley Project are described below.

Transmission Considerations for a Large Scale Project in Southwestern, MN

- Transmission interconnection – impact depends on site and scale
- Transmission and congestion
- Risks of future costs/congestion/curtailment
- Transmission system upgrade cost potential
- Contrary to distributed generation principles
- Contrary to highest value land usage principles
- Does not create partnerships with customers

Production Related Factors

- Greater Irradiance. As projects move towards the south and west in Minnesota and nationally, the available solar resource increases. For example a project located near Sioux Falls, South Dakota would be expected to receive 1474 kWh/m²-month versus 1412 kWh/m²-month of global irradiance for a project located near St. Cloud, Minnesota. A project in Las Vegas would be expected to have 2057 kWh/m²-month. The greater available irradiance is directly related to greater solar capacity factor.
- Decreased Soiling. Projects in northeastern Minnesota would be expected to see more severe weather, especially prolonged periods where snow is unable to shed from the solar panels, a condition known as soiling. To account for this, additional consideration needs to be placed on the soiling of the panels in northern Minnesota versus southwestern Minnesota.
- Greater design freedom. Minnesota Power took a conservative approach to the design by utilizing a fixed tilt orientation. The Company felt the climate in northeastern Minnesota had too high a risk of increased O&M costs over the life of the project that would have resulted in increased costs and decreased reliability. As more solar systems are built, perhaps there will be a larger case history of tracking systems installed in similar conditions that can be drawn upon for future consideration.

If a same Camp Ripley Project were designed in Southwestern Minnesota using less conservative soiling factors, a single axis tracking system, it is expected that the

production would have increased by at least 10 percent, which would decrease the levelized project costs by approximately 10 percent.

Transmission Risks and Costs

- The large projects in Xcel Energy's RFP utilize transmission level interconnects and the price is delivered to the substation. There would be additional costs and inefficiencies that are not accounted for in the Xcel average price that would need to be accounted for to deliver the energy to Minnesota Power's service territory including congestion, potential system upgrades, transmission access, risks of future congestion and curtailments. Most of the electric transmission required would be during peak periods.
- Minnesota Power feels strongly in advancing local solar and distributed generation and a project in southwestern Minnesota that carries uncertain transmission risks was not in the interest of advancing solar energy in northeastern Minnesota.
- Minnesota Power's price includes distribution interconnections and upgrades that eliminate any cost or transmission risk of delivering the energy to our system and to our customers.

Based on 2014 LMP differences between Marshal, Minnesota and the MP.MP node, we would assume a 15 percent increase in costs to transmit energy from a large centralized project to the Minnesota Power service territory.

Risks and Costs of Larger Solar Projects

- Economies of scale are likely to result in lower capital and project costs; Minnesota Power is proposing a project that is sized to its initial need of 10 MW with future projects required to meet the mandate. We feel that this is the best way to meet the project mandate while protecting customers from additional costs. We expect that the ITC will be extended at 30 percent while solar projects continue to decline resulting in the opportunity for even lower solar costs in the future.
- Larger projects carry increased permitting and execution risks; also the Company believes that not all stakeholders are interested in very large scale industrial solar development.
- A 10 MW size was considered to be a good balance of the Company's current solar needs and good land usage principles. It does however result in some increased costs. The cost per MW of a 65 MW project is expected to be approximately 15 percent less per MW than the Camp Ripley Project. This 10 percent decrease in capital intensity could be expected to decrease the LCOE by 10 percent.