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# GERONIMO ENERGY'S DISTRIBUTED SOLAR ENERGY PROPOSAL

**In the Matter of the Petition of Northern States Power Company to Initiate a Competitive Resource Acquisition Process**

**Docket No. E002/CN-12-1240**

**Submitted April 15, 2013**

**STATE OF MINNESOTA**
**BEFORE THE**
**PUBLIC UTILITIES COMMISSION**

| | |
|---|---|
| Beverly Jones Heydinger | Chair |
| David C. Boyd | Commissioner |
| Nancy Lange | Commissioner |
| J. Dennis O'Brien | Commissioner |
| Betsy Wergin | Commissioner |

**IN THE MATTER OF THE PETITION OF NORTHERN STATES POWER COMPANY TO INITIATE A COMPETITIVE RESOURCE ACQUISITION PROCESS**

**GERONIMO ENERGY'S DISTRIBUTED SOLAR ENERGY PROPOSAL**

**DOCKET NO. E002/CN-12-1240**

**SUMMARY OF FILING**

Pursuant to Minnesota Statutes, section 216B.2422, subdivision 5, Geronimo Energy filed a Distributed Solar Energy Proposal to provide up to 100 megawatts alternating current of solar energy to meet a portion of Xcel Energy's capacity and energy needs between 2017 and 2019. Geronimo proposes to construct and operate distributed solar energy facilities, ranging from 2 to 10 MW, located on up to 31 sites adjacent to distribution or transmission substations dispersed throughout Xcel Energy's Upper Midwest Service Territory. Geronimo proposes an in-service date for the Project of December, 2016. This will allow the capacity to be available to meet Xcel Energy's peak demand for the summer season of 2017.

As proposed, the 100 MW Project will provide Xcel Energy with 72 MW of accredited capacity to meet its peak capacity obligations in the Midwest Independent System Operator's Planning Reserve Sharing Pool. The Project will also provide approximately 200,000 MWh of energy in Year 1 of which 70 percent is on peak and 100 percent is produced during the hours of 5:00 a.m. and 9:00 p.m. CST. In addition, the Project will supply renewable energy credits that Xcel Energy can use to meet its Renewable Energy Standards. As a renewable resource, the Distributed Solar Energy Proposal has a number of significant environmental benefits, as it has no carbon or other air emissions and minimal water usage and environmental impacts.

# GERONIMO ENERGY'S DISTRIBUTED SOLAR ENERGY PROPOSAL

## Table of Contents

**Appendices:**

**Figures:**



**Tables:**

# GERONIMO ENERGY'S DISTRIBUTED SOLAR ENERGY PROPOSAL

## 1.0 EXECUTIVE SUMMARY

Geronimo Wind Energy, LLC d/b/a Geronimo Energy ("Geronimo") is pleased to offer Northern States Power Company d/b/a Xcel Energy ("Xcel Energy") an innovative approach to meet a portion of its capacity and energy needs between 2017 and 2019. Geronimo proposes to construct and operate up to 100 megawatt ("MW") alternating current ("AC") of distributed solar energy, located on up to 31 sites adjacent to distribution or transmission substations dispersed throughout Xcel Energy's Upper Midwest service territory (the "Project").

As a non-wind variable generation resource, the proposal will provide Xcel Energy with 72 MW of accredited capacity to meet its peak capacity obligations in the Midwest Independent Transmission System Operator's ("MISO") Planning Reserve Sharing Pool and up to 200,000 MWh of primarily on-peak energy each year. In addition, the Project will supply Renewable Energy Credits ("RECs") that Xcel Energy can use to meet its Renewable Energy Standards or Objectives or a specific solar requirement in the states in which it serves. Xcel Energy could also market the Solar Renewable Energy Credits ("S-RECs") to other utilities that need to meet solar-specific requirements in other states.

Geronimo proposes an aggregate in-service date for the Project of December, 2016 with the flexibility to bring a portion online in 2014 and 2015 to meet demand as warranted. This will allow the capacity to be available to meet Xcel Energy's peak demand for the summer season of 2017 as required and meet any interim capacity need fluctuations.

The Distributed Solar Energy Proposal meets each of the four criteria the Commission uses to determine whether to grant a Certificate of Need to a large generating facility:

> *A. The probable result of denial would be an adverse effect upon the future adequacy, reliability or efficiency of energy supply to the applicant, to the applicant's customers, or to the people of Minnesota and neighboring states.*

The Minnesota Public Utilities Commission has determined that Xcel Energy has demonstrated a need for 150 MW of capacity and associated energy by 2017, which will increase up to 500 MW of capacity by 2019. Denial of the Distributed Solar Energy Project would result in Xcel Energy's failure to meet its customers' peak demand and its obligations as a member of the MISO Reserve Sharing Pool.

> *B. A more reasonable and prudent alternative to the proposed facility has not been demonstrated by a preponderance of the evidence on the record.*

The Project has a number of advantages when compared with possible alternatives to meet Xcel Energy's needs. The project is cost-competitive with fossil fuel alternatives, especially when considering environmental costs. The modular nature of the Project provides flexibility to advance, phase or delay the Project to match Xcel Energy's fluctuating resource needs. The Project also supplies RECs that can be used to meet Xcel Energy's Renewable Energy Standards.

Finally, the distributed nature of the project will reduce losses, increase reliability and enhance ease of interconnection.

> *C. The proposed facility will provide benefits to society in a manner compatible with protecting the natural and socioeconomic environments, including human health.*

The Project has no air emissions and extremely low environmental impacts. It will displace pollutants emitted by fossil fuel-fired generating resources, including carbon dioxide, which is considered a significant contributor to climate change. It will meet the needs of many of the state's electric consumers at a competitive cost and assist Xcel in meeting its renewable energy standards, while enhancing the economic base in at least 18 Minnesota counties and creating up to 500 temporary construction jobs and 10 permanent positions.

> *D. The record does not demonstrate that the design, construction, or operation of the proposed facility…will fail to comply with relevant policies, rules, and regulations of other state and federal agencies and local government.*

The Project will comply will all relevant requirements and in addition will fulfill important state energy policies with respect to renewable energy and environmental protection. In particular, the facility meets the requirements of Minnesota Statutes §§ 216B.2422, subd. 4 and 216B.243, subd. 3a, which state that the Commission may not approve a nonrenewable energy facility unless it determines that a renewable facility is not in the public interest, or more expensive than the nonrenewable facility including consideration of environmental costs. It is further consistent with state policies relating to the promotion of distributed energy resources and the reduction of greenhouse gasses.

This Distributed Solar Energy Proposal offers a cost-competitive and environmentally superior alternative to fossil fuel generators that is clearly in the public interest and can reliably deliver accredited capacity, energy, RECS and other environmental attributes to meet Xcel Energy's needs for new generation. Approval of the Project is in the public interest because it meets all of Minnesota's laws supporting acquisition of clean, renewable energy and moves Xcel forward on its long-term resource acquisition where a majority of its new and refurbished generation resources come from renewable energy and demand side management.

Geronimo respectfully requests that the Commission approve this Distributed Solar Energy Proposal to meet up to 100 MW (AC) of Xcel Energy's 2017 generation needs.

## 2.0 BACKGROUND

On August 2, 2010, Xcel Energy filed its 2011-2025 Resource Plan with the Minnesota Public Utilities Commission ("Commission"). Among other things, Xcel Energy proposed closing down the remaining coal units at its Black Dog Generating Plant and constructing a new, 700 MW natural-gas combined cycle plant at the same site to meet a 2016 resource need caused by a combination of load growth and retiring generation. On March 15, 2011, Xcel Energy filed a Certificate of Need ("CN") for the Black Dog Repowering Project in a competitive acquisition process at the Commission. Calpine Corporation filed an alternative proposal to meet Xcel Energy's need.

Over the same period, Xcel Energy's forecast of load growth declined significantly, reducing and delaying its need for future resources. On December 1, 2011, Xcel Energy filed an update to its Resource Plan filing, modifying its expected resource needs.[1] On December 7, 2011, it petitioned the Commission to withdraw its CN application for the Black Dog facility.[2]

Due to additional changes in load forecasts, costs of alternative resources and uncertainties in federal regulations, on April 2, 2012, Xcel Energy further modified its analysis regarding resource needs by providing a Notice of Changed Circumstances and petition to change and delay implementation of the extended power uprate at the Prairie Island Nuclear Generating Plant.

When Xcel Energy's 2011-2025 Resource Plan came before the Commission for approval, the Commission determined that Xcel Energy had demonstrated a need for an additional 150 MW of capacity in 2017, increasing up to 500 MW in 2019. The Commission determined that this need should be met through Xcel's competitive acquisition process and that it was appropriate to consider a variety of proposals, including resources that meet all or a portion of the need; peaking resources, intermediate resources, or a combination of the two; and resources from new or existing generation. Consistent with the Commission's Order, Xcel Energy issued a Notice of Competitive Acquisition Process providing notice that the Commission would be considering alternative proposals in this docket.

This proposal follows the content requirements established by the Commission for competitive acquisition proposals. Appendix A includes a table summarizing the content requirements and provides a completeness checklist referencing where each data requirement can be found in this filing. Appendix B provides a list of acronyms used throughout this proposal.

Geronimo believes that the dynamic nature of Xcel Energy's 2011-2025 Integrated Resource Plan underscores the importance of approving a resource that can flexibly meet Xcel Energy's established need for new generation by 2017 while also cost-effectively meeting the State's important renewable and environmental policies and goals. This Project will allow Xcel Energy to meet a portion of its capacity needs while also providing Xcel Energy and its customers with a number of other valuable benefits, especially when compared with traditional fossil fuel alternatives. The distributed nature of the Project increases reliability, reduces losses and transmission costs and offers modular development that can be phased to more closely match Xcel Energy's resource needs. The Project also provides further diversification of Xcel Energy's energy mix.

[1] Xcel Energy's Resource Plan Update, *In the Matter of the Petition of Northern States Power Company, a Minnesota Corporation, for Approval of the 2011-2025 Resource Plan,* Docket No. E002/RP-10-825 (December 1, 2011).

[2] Xcel Energy's Motion to Withdraw Application, *In the Matter of the Petition of Northern States Power Company for a Certificate of Need for the Black Dog Generating Plant Repowering Project*, Docket No. E002/CN-11-184 (December 7, 2011).

# 3.0 GENERAL PROJECT INFORMATION

## 3.1 PROJECT DESCRIPTION

The Project consists of distributed photovoltaic power plants to be located at up to 31 sites serving Xcel Energy loads in MISO Planning Resource Zone 1.[3] The distributed solar facilities range in size from 2 MW to 10 MW and will utilize a linear axis tracker to increase the accredited capacity of the systems to 72 percent, based on MISO's accreditation methods for non-wind variable generation resources.

Geronimo has sized the solar facilities on an individual basis to offset approximately 20 percent of the existing load at each respective substation. By locating the solar facilities in close proximity to existing substations (for the purposes of this filing, the areas surrounding the substations are referred to as "Distributed Energy Generation Zones" or "DEGZ"), the Project is able to make efficient use of existing transmission facilities equipment. Each Distributed Energy Generation Zone ranges in size from 20 to 70 acres and has been selected based on availability of land, proximity to Xcel Energy distribution or MISO transmission substations, and limited environmental impacts.

Geronimo has secured site control or is in final negotiations for approximately 50 percent of the Project located within the targeted Distributed Energy Generation Zones. Site control over the remaining sites is expected to be complete in the summer of 2013. This proposal included analysis for 31 primary and alternate sites that have currently been identified and are located throughout Xcel Energy's Upper Midwest service territory. Geronimo may add additional future sites that meet the same peaking loading and other performance-related characteristics.

The Project's primary components include a nominal 300 watt photovoltaic module mounted on a linear axis tracking system and a centralized inverter(s). The tracking system foundations will utilize a driven pier and do not require concrete. Balance of plant components includes electrical cables, conduit, step up transformers and metering equipment. The solar facilities will be fenced and seeded in a low growth seed mix to reduce run-off from existing conditions and improve water quality. **Figure 1** is a photograph of the existing Saint John's University Solar Farm in Collegeville, Minnesota ("Saint John's Solar Farm"). The Project will utilize similar components and look very similar to the Saint John's Solar Farm.

[3] Geronimo's proposed Distributed Energy Generation Zones are at locations serving Xcel load. They are in Xcel's local balancing area, which MISO has assigned to Planning Resource Zone 1. See map at https://www.midwestiso.org/_layouts/MISO/ECM/Redirect.aspx?ID=143520 at page 11.

**Figure 1 Photograph of Saint John's University Solar Farm, Collegeville, Minnesota**

### 3.2 GERONIMO'S EXPERIENCE, QUALIFICATIONS AND FINANCIAL STRENGTH

Geronimo, a Minnesota limited liability company, is a Midwest-focused renewable energy development company headquartered in Minneapolis, Minnesota with satellite offices in central Minnesota, southwest Minnesota, North Dakota, Illinois and Michigan. Geronimo has a three gigawatt development pipeline, with active developments in seven states throughout the Midwest. Geronimo has fully developed three renewable energy projects, including the 20 MW Odin Wind Farm near Odin, Minnesota, the 18.9 MW Marshall Wind Farm near Marshall, Minnesota, and the 200 MW Prairie Rose Wind Farm near Hardwick, Minnesota. These wind farms became commercially operational in 2007, 2009 and 2012, respectively.

Renewable energy from the Prairie Rose Wind Farm is being sold to Xcel Energy pursuant to a power purchase agreement. Geronimo was one of 143 bidders that participated in Xcel Energy's 2010 RFP and was selected from a pool totaling over 9,000 MW. Geronimo's strategic partner, Enel Green Power North America, Inc. ("EGPNA"), provided common equity for the Prairie Rose project (approximately $149 million) along with GE Financial Services (approximately $156 million). The Prairie Rose Wind Farm tax equity (totaling $190 million) was provided by a syndicate led by JP Morgan, which includes Wells Fargo and Metropolitan Life Insurance Company.

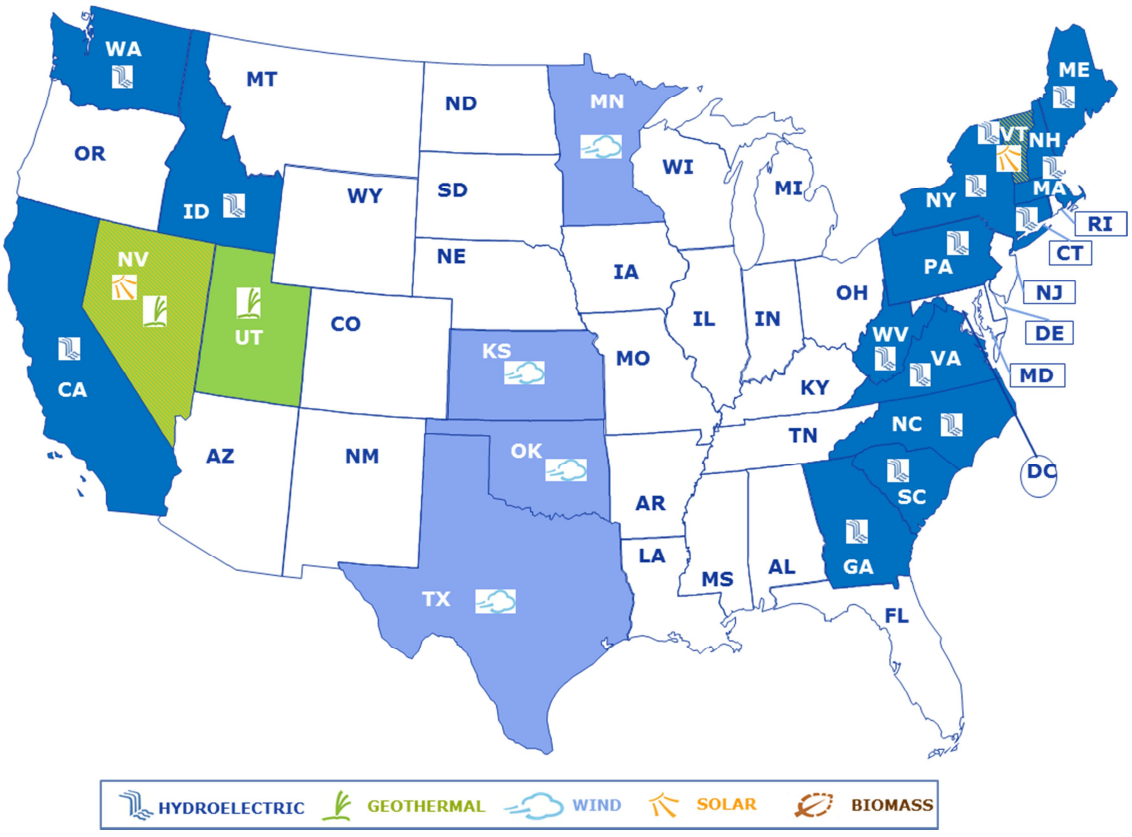
Geronimo's team of 33 employees has expertise in wind and solar development, wind and solar resource assessment, finance, land acquisition, title services, environmental permitting, energy policy, transmission, and utility planning. Geronimo's Chairman, Noel Rahn, has lifelong roots in Minnesota's rural economy and an extensive resume as a Wall Street executive. Our Director of Solar, Nathan Franzen, is the former General Manager of Westwood Renewables, LLC. There, he developed both the 400 kW Saint John's Solar Farm and the 600 kW Minneapolis Convention Center Solar Project. As the Director of Solar at Westwood Professional Services, Inc., he worked on more than 100 solar projects totaling more than 1000 MW, including the 2 MW Slayton Solar Project that recently came on line on Xcel Energy's system. He also

manages the operation and maintenance for over 1 MW of solar in Minnesota. Geronimo's extensive experience in renewable project development will ensure a smooth and timely process in all phases of the Project.

EGPNA is a leading owner and operator of renewable energy plants in North America with projects operating and under development in 21 U.S. states and three Canadian provinces. EGPNA owns and operates over 90 plants with an installed capacity of more than 1.2 GW powered by renewable hydropower, wind, geothermal, solar and biomass energy. This dedication to a diverse suite of renewable technologies sets EGPNA apart from other independent power producers.

EGPNA employs more than 320 people in North America with technical, operational, and financial expertise. As depicted in Figure 2, EGPNA owns and operates 1,239 MW of renewable projects with an asset base of approximately $2.5 billion. EGPNA currently operates over 90 projects with a total installed capacity of 1,239 MW, which consists of: 832 MW of wind power, 313 MW of hydropower, 21 MW of biomass power, 47 MW of geothermal power and 26 MW of solar.

**Figure 2 Map of EGPNA's Existing U.S. Renewable Energy Facilities**




EGPNA is the North American wholly-owned subsidiary of Enel Green Power ("EGP"). EGP is the second leading producer of renewable energy in the world, with a total installed capacity of 8 GW produced from about 700 renewable energy facilities in operation worldwide, including over 160 MW of solar energy that is has operated for over 18 years. EGP has assets of $21 billion

and 2012 revenues of $3.3 billion. EGP is a wholly-owned subsidiary of Enel SpA, which is one of the world's largest power companies with 98 GW of net installed capacity worldwide and trades on the Milan stock exchange. Enel SpA has an investment-grade credit rating from S&P (BBB+), Moody's (Baa2), and Fitch (BBB+).

As Geronimo's largest shareholder, EGPNA supports Geronimo's project development and working capital needs. Geronimo will leverage EGPNA's vast experience and technical expertise in the renewable energy industry, along with its sources of capital, equipment and services to develop, construct and operate solar energy facilities in a competitive, cost effective manner. EGPNA provides Geronimo access to solar equipment from top-tier manufacturers at preferred prices and to tax equity investors and lenders to finance solar projects at competitive rates. Geronimo and EGPNA work together on all strategy, project development, and bidding activities to ensure that each project has the necessary resources and support to succeed. Geronimo believes its strategic relationship with EGPNA allows it to develop, construct and finance solar energy projects at the most competitive prices in the industry, which translates to competitive energy prices for utility ratepayers.

### 3.3 PROJECT MANAGEMENT

The Geronimo project management team consists of:

Nathan Franzen, the project manager for the Project, is the Director of Solar at Geronimo Energy. His responsibilities include all oversight and project management, including maintaining the project schedule and budget. His experience comprises oversight and project management of over 100 commercial and utility-scale solar projects in 16 states. He was the project manager for two of the Midwest's first solar projects: the 400kW Saint John's Solar Farm which has a power purchase agreement with Xcel Energy and the 600kW Minneapolis Convention Center Solar Project located with Xcel Energy's service territory. The Saint John's Solar Farm has a power purchase agreement with Xcel Energy and utilizes the same technology that is proposed for the Project. In addition, he served as the engineering manager for the 2 MW Slayton Solar project in Slayton, Minnesota.

Betsy Engelking, Vice President of Development at Geronimo Energy, will act as an advisor to the Project. Her experience includes employment as Director of Resource Planning at Xcel Energy, as well as similar positions with Great River Energy and the Minnesota Public Utilities Commission.

Glen Skarbakka, Geronimo's Vice President of Transmission, will also act as an advisor to the Project. His experience includes employment as Manager of Resource Planning at Great River Energy, as well as more than thirty years of experience in the transmission and power resources segments of the electric industry.

### 3.4 PROJECT CONTACTS

| | | |
|---|---|---|
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## 4.0 NEED SUMMARY

In its March 5, 2013 Order on Xcel Energy's Resource Plan[4], the Commission determined the Xcel Energy had demonstrated need for an additional 150 MW of capacity in 2017, increasing up to 500 MW in 2019. It further determined that in Xcel Energy's competitive acquisition process, parties could propose a variety of resources to meet Xcel Energy's need, including resources that address all or a portion of the identified need; peaking resources, intermediate resources, or a combination of the two; and resources that rely on new or existing generation.

Geronimo's Distributed Solar Energy Proposal will supply Xcel Energy with 72 MW of accredited capacity from 100 MW (AC) of newly constructed ground-mounted solar generation facilities located in advantageous locations throughout Xcel Energy's Upper Midwest service territory. This expected accredited capacity value is based on MISO's capacity accreditation method for non-wind variable resources, which is derived from historical hourly net output for the hours of 1500-1700 EST during June, July and August over the most recent three consecutive years. While there is no historical information associated with the proposed Project, Geronimo used generation data from two existing solar facilities and industry leading modeling software, PVSyst, to determine the expected accredited capacity value.

Geronimo proposes to complete the Project over a two year period, with the Project fully operational by December, 2016. The proposal, however, offers Xcel Energy an unprecedented level of flexibility that will permit the Company, within certain parameters, to advance, delay or otherwise phase the Project to more closely match its capacity needs. Over the past decade, Xcel Energy's demand forecast has changed frequently, and sometimes rapidly, at times requiring the Company to either file emergency requests to build peaking facilities or cancel or delay planned facilities. With longer lead times required for many electric generation facilities, it can be difficult for Xcel Energy to respond quickly to demand fluctuations that suddenly change the need for resources. Geronimo's Project can be partially in service as early as 2014, or could, if desired, be spread over a number of years, providing Xcel Energy with an incremental amount of capacity each year.[5]

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[4] *In the Matter of Xcel Energy's 2011-2025 Integrated Resource Plan*, ORDER APPROVING PLAN, FINDING NEED, ESTABLISHING FILING REQUIREMENTS, AND CLOSING DOCKET, DOCKET E-002/RP-10-825.

[5] To the extent that the investment tax credit for solar is not extended, installations that come on line after 2016 may be subject to a price increase.

In addition to MISO accredited capacity, the Project will supply Xcel Energy with approximately 200,000 MWH annually of reliable, deliverable on-peak energy. The geographic dispersion of the Project will increase reliability, because the total Project will be less susceptible to outages due to equipment failure or transmission outage. Because each facility will be located at a distribution substation and be sized as a fraction of the peak load on the substation, the Project will experience substantially lower losses than most conventional power plants. In addition, the distribution level interconnections will have less lead time, lower risk and lower cost than typical transmission interconnections.

## 5.0 DISTRIBUTED SOLAR PROJECT

### 5.1 PROJECT DESCRIPTION

The Project will consist of up to 100 MW of distributed photovoltaic power plants to be located at up to 31 sites serving Xcel Energy loads in MISO Planning Resource Zone 1.[6] The distributed solar facilities range in size from 2 MW to 10 MW and will utilize a linear axis tracker to increase the accredited capacity of the systems to 72 percent, based on MISO accreditation methods for non-wind variable generation resources. Should MISO's accreditation rules be modified, system modifications may be required to optimize the facilities under the new rules. This could result in the elimination of the tracker mechanism.

Geronimo has sized the systems on an individual basis to offset approximately 20 percent of the existing load at each respective substation. The location of each Distributed Energy Generation Zone was selected to make efficient use of existing transmission facilities equipment. Each Distributed Energy Generation Zone ranges in size from 20 to 70 acres, is in close proximity to Xcel Energy distribution or MISO transmission substations and has limited environmental impacts.

The Project's primary components include a nominal 300 watt photovoltaic module mounted on a linear axis tracking system and a centralized inverter(s). The tracking system foundations will utilize a driven pier and do not require concrete. Balance of plant components includes electrical cables, conduit, step up transformers and metering equipment. The solar facilities will be fenced and seeded in a low growth seed mix to reduce run-off from existing conditions and improve water quality.

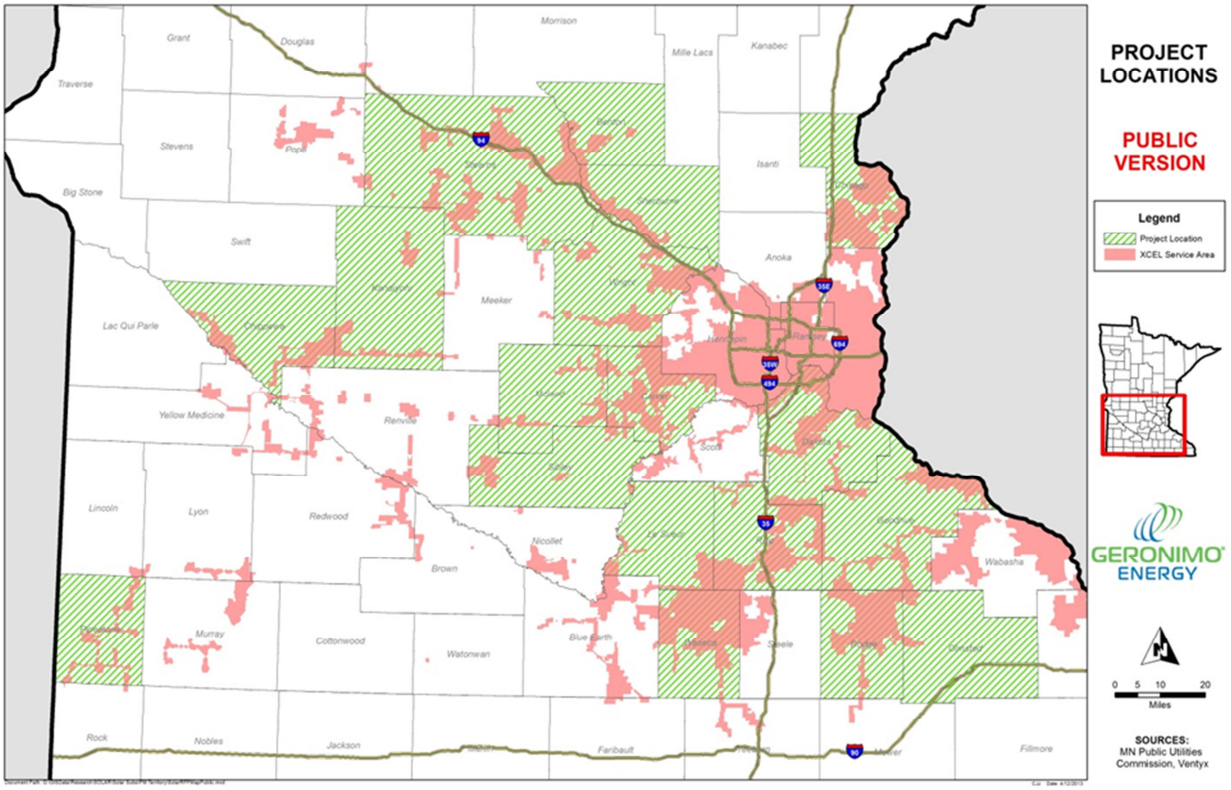
The Project will generate electricity from sunlight; therefore, no fuel is required. Further, heat rates are not applicable to solar facilities.

[6] Geronimo's proposed Distributed Energy Generation Zones are at locations serving Xcel load. They are in Xcel's local balancing area, which MISO has assigned to Planning Resource Zone 1. See map at https://www.midwestiso.org/_layouts/MISO/ECM/Redirect.aspx?ID=143520 at page 11.

### 5.2 FACILITY LOCATIONS

The proposed facilities are at sites serving Xcel Energy loads in MISO Planning Resource Zone 1. Figure 3 shows the counties where the Distributed Energy Generation Zones are located as well as Xcel Energy's service territory.

**Figure 3 Counties Hosting Distributed Solar Facilities**




Trade Secret Appendix C contains detailed site location maps.[7] Geronimo has currently identified 31 Distributed Energy Generation Zones as primary and alternative locations, and expects that other sites may be considered if they meet the peak-load and other operating characteristics of this proposal. The locations are currently designated as Trade Secret because land acquisition negotiations are ongoing at approximately 50 percent of the sites. Once all negotiations are final, Geronimo will provide a public filing showing the locations. Geronimo expects site control to be complete in the summer of 2013.

### 5.3 NOMINAL GENERATION CAPABILITY

The nameplate generation capability of the Project is proposed to be 100 MW AC. Each facility will be designed utilizing a DC to AC ratio that optimizes the accredited capacity of the array

[7] As an independent power producer, Geronimo does not have a system map. The maps in Figure 3 and Appendix C are provided as an alternative to this data requirement.

according to MISO guidelines, the site specific interconnection capacity and the losses associated with cable losses, thermal losses and other associated derates. A total of 31 Distributed Energy Generation Zones have been evaluated and identified as suitable for development. The installed capacity for the selected sites is 133 MW which will be reduced to 100 MW during final design, permitting and engineering processes. This provides flexibility in the siting, sizing and permitting of the facilities based on site specific constraints.

There are over 150 additional Distributed Energy Generation Zones within Planning Resource Zone 1 and with a capacity of 2 MW or greater are available as substitute project site locations should additional locations be required or desired to increase the scale of the Project due to its unique value proposition.

Due to the modular nature of the proposed facilities, the total nameplate generation capabilities can be adjusted in terms of system size and scheduling of installation. This provides Xcel Energy flexibility to increase or decrease the generation capabilities as market conditions warrant.

Nominal generation characteristics are summarized below by Distributed Energy Generation Zone:

**Table 1 Nominal generation Characteristics by Site**

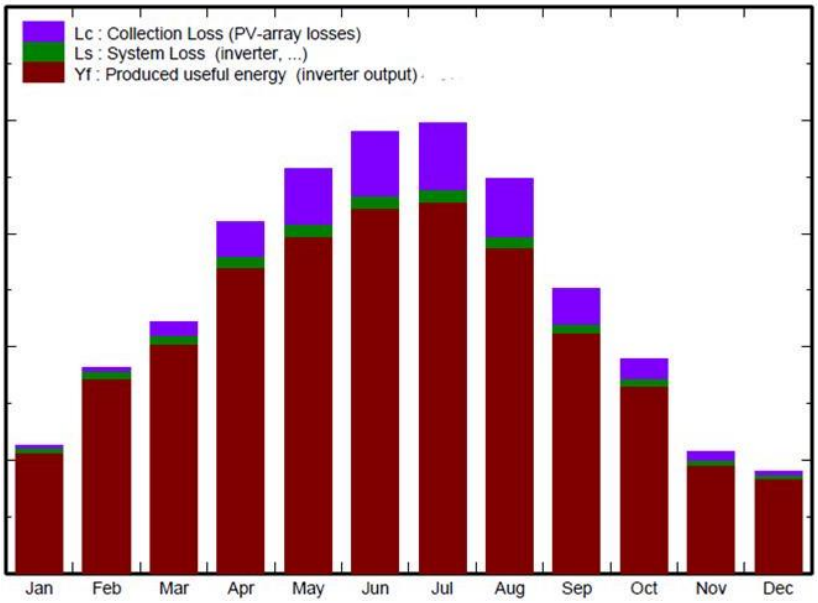
| DEGZ #[8] | Interconnection | MW - AC[9] | MW - DC | MWh/year |
|---|---|---|---|---|
| 1. | 69kV | 10 | 13 | 19,785 |
| 2. | Distribution | 2 | 2.6 | 3,930 |
| 3. | Distribution | 2 | 2.6 | 3,929 |
| 4. | Distribution | 2 | 2.6 | 3,935 |
| 5. | Distribution | 2.5 | 3.25 | 4,833 |
| 6. | 69kV | 10 | 13 | 19,676 |
| 7. | 115kV | 10 | 13 | 19,441 |
| 8. | Distribution | 2 | 2.6 | 3,856 |
| 9. | Distribution | 2 | 2.6 | 3,855 |
| 10. | Distribution | 4 | 5.2 | 7,697 |
| 11. | Distribution | 2.5 | 3.25 | 6,127 |
| 12. | 69kV | 10 | 13 | 19,372 |
| 13. | Distribution | 2 | 2.6 | 3,859 |
| 14. | Distribution | 2 | 2.6 | 3,917 |
| 15. | Distribution | 5.5 | 7.15 | 10,663 |
| 16. | Distribution | 7.5 | 9.75 | 14,461 |
| 17. | Distribution | 2 | 2.6 | 3,960 |
| 18. | Distribution | 3 | 3.9 | 5,939 |
| 19. | Distribution | 2 | 2.6 | 4,101 |
| 20. | Distribution | 2 | 2.6 | 3,862 |
| 21. | 69kV | 10 | 13 | 19,222 |
| 22. | Distribution | 2.5 | 3.25 | 4,894 |
| 23. | Distribution | 3 | 3.9 | 7,124 |
| 24. | Distribution | 4 | 5.2 | 7,716 |
| 25. | Distribution | 2 | 2.6 | 3,865 |
| 26. | Distribution | 8.5 | 11.05 | 16,434 |
| 27. | Distribution | 3 | 3.9 | 5,777 |
| 28. | Distribution | 2.5 | 3.25 | 4,815 |
| 29. | Distribution | 6 | 7.8 | 11,578 |
| 30. | Distribution | 3 | 3.9 | 5,798 |
| 31. | Distribution | 3 | 3.9 | 5,778 |
| | **Totals** | **133** | **172** | **260,099** |

[8] In order to protect the Trade Secret locations of the Distributed Energy Generation Zones through this filing, each individual facility has been numbered 1-31. Trade Secret Appendix D provides a table correlated each number to its geographic location.

[9] The aggregate nameplate capacity of the Distributed Energy Generation Zones shown on this table exceeds the proposed 100 MW (AC) size of the Project because the table lists all primary and alternate sites. The final size of the Project will be consistent with the 100 MW (AC) proposed size unless modified by the Commission.

Figure 4 below illustrates the expected generation pattern by month for a 2 MW facility.

**Figure 4 Normalized productions (per installed kWp): Nominal power 2592 kWp**




### 5.4 ECONOMICS OF SCALE

Generally, economies of scale (system size) do not affect the generation characteristics of the proposed facilities due to the fact that the efficiency of a photovoltaic system depends primarily on the characteristics of the individual modules and the inverter. This allows excellent flexibility to adjust system size for site specific constraints without impacting the facilities' overall efficiencies.

Economies of scale do affect the capital cost of the Project. Should a smaller Project be more advantageous to Xcel Energy, Geronimo reserves the right to adjust its capital costs per MW to reflect the revised project size.

### 5.5 ANNUAL CAPACITY ACCREDITATION

MISO bases the accredited capacity for non-wind variable generation on the historical net output for the hours 1500 to 1700 Eastern Standard Time during June, July, and August over the most recent three consecutive years. This time corresponds to the hours ending 2 p.m., 3 p.m., and 4 p.m. Central Standard Time.[10] Xcel Energy's forecasted demands reported under the MISO Resource Adequacy Requirements are on an hourly basis.

[10] Comments of the Minnesota Department of Commerce, Division of Energy Resources, Docket No E002/GR-10-971 dated December 3, 2013, at 6.

Based on an analysis using MISO's accreditation method, the proposed photovoltaic power plants have an accredited capacity of 72 percent of their AC rating. The accredited capacity value for the Project was determined using a TMY3 (typical meteorological-year, version 3) data set produced by the National Renewable Energy Laboratory ("NREL") and three years of production data from the Saint John's Solar Farm 400kW linear axis tracker in Collegeville, Minnesota.

The TMY3 data is an hourly time series spanning one calendar year produced from a combination of satellite and surface radiance measurements from a variety of platforms and is intended to represent the typical conditions at a given location. System topology – panels, inverters, string counts and lengths, and loss assumptions – and the TMY3 time series were entered into PVSyst, an industry-standard modeling program for the estimation of energy production by solar facilities, and used to derive the generation values presented.

The generation data was then cross referenced with data obtained from Xcel Energy's production meter the Saint John's Solar Farm in Collegeville, Minnesota. The Saint John's Solar Farm utilizes identical technology and provides an excellent proxy for generation characteristics of the proposed solar facilities.

Table 2 below summarizes the annual capacity characteristics of the solar facilities based upon the average of the TMY 3 data as modeled through the PVSyst program and the data from the Saint John's Solar Farm. Trade Secret Appendix E provides the PVSyst model results for each Distributed Energy Generation Zone.

**Table 2 Summary of Comparison of Annual Capacity Characteristics**

| Data Source | AC Capacity |
|---|---|
| Saint John's Solar Farm | 71.20% |
| PVSyst | 72.40% |
| **Average** | **71.80%** |

Due to the geographical disbursement of the proposed Project sites, the portfolio of solar facilities as a whole will have a smaller standard deviation on its energy output than that of one single solar project. For example, on a cloudy day, when a cloud may temporarily cover a single project site and lower its energy output, another solar facility in a different part of the state may not be experiencing cloudiness and will be at full output. Whereas, with one single solar facility, that single site may have larger changes in output than that of a 30-facility portfolio. This dispersion of plants across a broad geographical range around Xcel Energy's Upper Midwest service territory gives a diversified generation output, with a lower standard deviation of total portfolio output during peak hours than that of one single large solar facility.

Similarly, from an operations perspective, having multiple locations increases the reliability of the system as opposed to one single unit. For example, when comparing a 100 MW natural gas peaking unit against 20 different solar facilities, if that one 100 MW natural gas peaking unit fails, all 100 MW are unavailable; whereas, with 20 different solar facilities, if one solar facility fails, then only approximately 5 percent of the total energy output potential is unavailable.

Utilizing the methodology described above. The accredited capacity value for each respective Distributed Energy Generation Zone is detailed in Table 3 below.

**Table 3 Distributed Energy Generation Zone Accredited Capacity Values**

| DEGZ # | MW - AC[11] | Capacity Rating |
|---|---|---|
| 1. | 10 | 7.2 |
| 2. | 2 | 1.44 |
| 3. | 2 | 1.44 |
| 4. | 2 | 1.44 |
| 5. | 2.5 | 1.8 |
| 6. | 10 | 7.2 |
| 7. | 10 | 7.2 |
| 8. | 2 | 1.44 |
| 9. | 2 | 1.44 |
| 10. | 4 | 2.88 |
| 11. | 2.5 | 1.8 |
| 12. | 10 | 7.2 |
| 13. | 2 | 1.44 |
| 14. | 2 | 1.44 |
| 15. | 5.5 | 3.96 |
| 16. | 7.5 | 5.4 |
| 17. | 2 | 1.44 |
| 18. | 3 | 2.16 |
| 19. | 2 | 1.44 |
| 20. | 2 | 1.44 |
| 21. | 10 | 7.2 |
| 22. | 2.5 | 1.8 |
| 23. | 3 | 2.16 |
| 24. | 4 | 2.88 |
| 25. | 2 | 1.44 |
| 26. | 8.5 | 6.12 |
| 27. | 3 | 2.16 |
| 28. | 2.5 | 1.8 |
| 29. | 6 | 4.32 |
| 30. | 3 | 2.16 |
| 31. | 3 | 2.16 |
| **TOTAL** | **133** | **95** |

[11] The aggregate nameplate capacity of the Distributed Energy Generation Zones shown on this table exceeds the proposed 100 MW (AC) size of the Project because the table lists all primary and alternate sites. The final size of the Project will be consistent with the 100 MW (AC) proposed size unless modified by the Commission.

Geronimo will follow MISO Module E's guidelines for Generation Verification Test Capacity to obtain the accredited capacity for all site locations.

## 5.6 OPERATIONAL AND MAINTENANCE CONSIDERATIONS

### 5.6.1 Service Life and Availability

The Project's estimated average annual availability is in excess of 97 percent. The expected service life of the proposed facilities is 25-40 years. The minimum specifications for the solar module production warranty are 90 percent of nameplate capacity at year 10 and 80 percent of nameplate capacity at year 25. Similarly, the inverters are warranted to be free from defects in material and workmanship for a period of 10 years. The components of the inverter can be replaced and repaired if maintenance is required. The tracking system and associated foundation piers are made of aluminum and galvanized steel and have a useful life in excess of 25 years.

### 5.6.2 Operations and Maintenance Plan

Geronimo's strategic partner EGP currently provides O&M services on 32 solar projects across the globe totaling over 142 MW of operating nameplate capacity. Utilizing this experience, a unique maintenance plan will be created for the Project to ensure the performance of the solar facilities. It will include a scheduled check of the main items and a predictive maintenance approach of the devices subjected to derating/degradation. The main scheduled activities are listed below:

- Housekeeping of the site: road maintenance, grass cutting, fence and gate inspection, lighting system check, and PV panel washing (if required).
- Performance monitoring: weekly or monthly download of the data acquired by the on-site met station (energy produced, alarms, faults, etc.).
- Inspection of the main equipment:
  - PV panels: visual check of the panels, tracking system and surrounding grounds to verify the integrity of the panels and tracking structure, the presence of animals and nests, etc.
  - Inverters, transformer and electrical panels:
    - Visual check of the devices including the connection cabinet and the grounding network. Check for presence of water and dust;
    - Electrical check: measurement of the insulation level and dispersion. Check of the main switches and safety devices (fuses);
    - Noise: check of abnormal sounds.
- Cabling and Wiring: visual check of the buried and aerial electrical line and connection box to verify their status.

All maintenance activities will be performed by qualified personnel. Notably, maintenance can be performed without shutting down the entire plant. As an example, if a module needed repair, that particular section of the array can be disconnected from the array by opening the combiner box circuit. The module can then be replaced and the combiner cox circuit closed. This

temporary shutdown would affect less than one percent of the array's production capability for a 10 MW plant. Additionally, the power production circuits are separated from the tracking circuits. This allows the photovoltaic modules to operate during an unscheduled outage of the tracker system.

There will be an area for the storage of the spare parts and the tools. The generation plant will be remotely operated through a real time control system. All the monitored data will be managed by EGPNA or contracted out to a qualified subcontractor.

Table 4 describes the O&M tasks and their frequency.

**Table 4 Operations and Maintenance Tasks and Frequency**

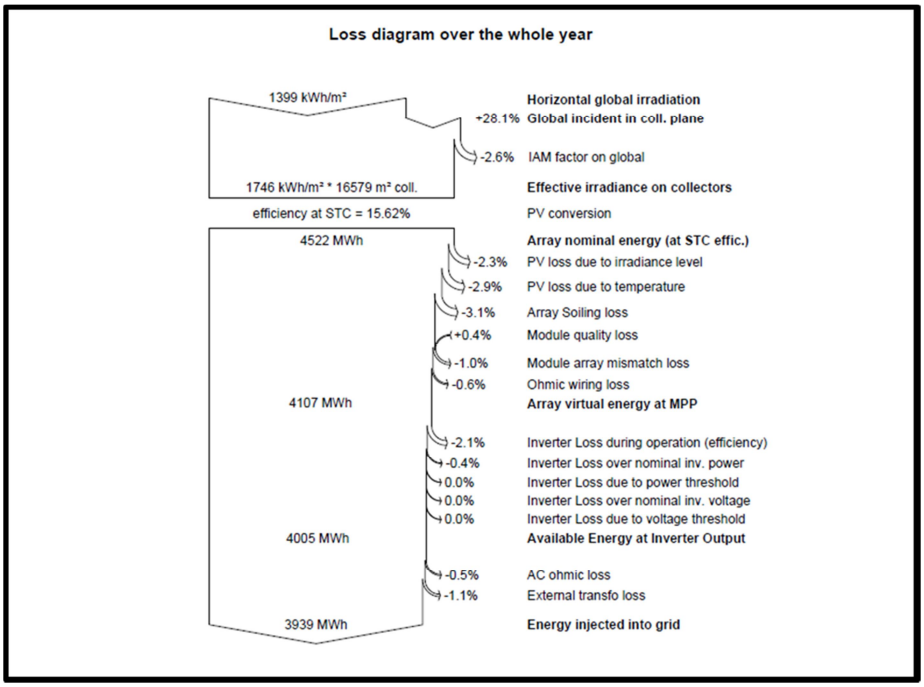
| ***Plant device and job*** | ***Frequency*** |
|---|---|
| Photovoltaic Field | |
| PV modules visual check | *Every two months* |
| Wirings and Junction boxes visual check | *Quarterly* |
| PV strings measurement of the insulation | *Quarterly* |
| PV strings and string boxes faults | *Weekly (1)* |
| PV panels washing | *Yearly (if required)* |
| Grass cutting *(if necessary at site)* | *Once in Spring, once in Summer* |
| Electric boards | |
| Case visual check | *Twice Yearly* |
| Fuses check | *Twice Yearly* |
| Surge arresters check | *Twice Yearly* |
| Torque check | *Twice Yearly* |
| DC voltage and current check | *Twice Yearly* |
| Grounding check | *Twice Yearly* |
| Inverter | |
| Case visual inspection | *Every two months* |
| Air intake and filters inspections | *Every two months* |
| Conversion stop for lack of voltage | *Twice Yearly* |
| AC voltage and current check | *Twice Yearly* |
| Conversion efficiency inspection | *Twice Yearly* |
| Datalogger memory download | *Twice Yearly* |
| Fuses check | *Twice Yearly* |
| Grounding check | *Twice Yearly* |
| Torque check | *Twice Yearly* |
| Support structures | |
| Visual check | *Twice Yearly* |
| PV modules torque check on random sample | *Twice Yearly* |

EGP's Operations & Maintenance (O&M) group in North America currently employs 195 people. Within the EGP O&M group is a global Operational Excellence Group dedicated to identifying areas where O&M staff can enhance the performance of EGP's global operating assets. This group will monitor, implement, and analyze key performance indicators of effectiveness and efficiency and will coordinate and manage all sites associated with the Project.

### 5.6.3 Efficiency

The individual facilities will have performance ratios of between 78-85 percent depending on the final design and site specific environmental conditions. Figure 5 below illustrates the items that affect production capabilities for a typical 2 MW system. The typical items include module soiling, temperature, module voltage mismatch as well as inverter and transformer losses. In addition, Geronimo has assumed a **[TRADE SECRET DATA HAS BEEN EXCISED]** percent system unavailability loss in addition to the system losses modeled below. Generally, losses stay consistent with changes in site size. Larger sites may have slightly great electrical losses, but those are accommodated for in the overall sizing of the individual sites.

**Figure 5 Representative 2 MW Solar Facility System Losses**




## 6.0 PROJECT COST AND PRICING

### 6.1 PROJECT COST

The total project cost is estimated at $**[TRADE SECRET DATA HAS BEEN EXCISED]**, or **[TRADE SECRET DATA HAS BEEN EXCISED]** /kW +/- 10 percent, depending on the current market for panels and construction services at time construction. The estimated annual operations and maintenance costs are $**[TRADE SECRET DATA HAS BEEN**

**EXCISED]**/kW/Yr or approximately $**[TRADE SECRET DATA HAS BEEN EXCISED]**/kWh.

There are no fuel costs associated with the Project. Nominal purchases of electricity will be necessary to run the Project, and that power will be acquired from local electricity utility, similarly to any other commercial or industrial business. For example, a 10,000 kW Nameplate AC Solar facility will only require approximately 12 kW of power during night hours when no energy is being generated.

### 6.2 COMPETITIVE PRICING

Geronimo is pleased to offer annual, defined pricing for this Project throughout the proposed 20 year contract. Solar energy requires no fuel, and therefore pricing is not dependent on future forecasts of natural gas or other fuels. Adding solar energy to Xcel Energy's resource mix will allow the Company to reduce its dependence on natural gas and hedge the future volatility of rates.

The energy that will be delivered from this Project is high value energy that is only produced during the daylight hours, and is mainly produced during the MISO on-peak hours when market energy prices are typically higher. To mirror pricing for accredited capacity resources, Geronimo is proposing a price for the Project's accredited capacity, energy, RECs and the environmental attributes that includes both a fixed and a variable price component. Because this resource does not incur costs in the same way as a thermal generation facility, however, Geronimo is also proposing an alternative pricing that bundles the Project's economic attributes based only on MWh generated.

Table 5 shows the prices for each proposal for each year of the 20-year term. This pricing is inclusive of all renewable energy credits and other environmental attributes. This pricing is applicable at the Point of Interconnection ("POI") and does not include any transmission or delivery costs beyond the POI. Geronimo is not proposing any additional payments for fixed or variable O&M, fuel, taxes or other costs. This pricing assumes that Xcel Energy is obligated by the power purchase agreement to take all energy produced by the Project.

**Table 5 Annual Price**

| Fixed + Variable | | | | Bundled Price |
|---|---|---|---|---|
| | $/MWh | $/kW-month* | | $/MWh) |
| Year 1 | **[TRADE SECRET DATA HAS BEEN EXCISED]** | | | |
| Year 2 | | | | |
| Year 3 | | | | |
| Year 4 | | | | |
| Year 5 | | | | |
| Year 6 | | | | |
| Year 7 | | | | |
| Year 8 | | | | |
| Year 9 | | | | |
| Year 10 | | | | |
| Year 11 | | | | |
| Year 12 | | | | |
| Year 13 | | | | |
| Year 14 | | | | |
| Year 15 | | | | |
| Year 16 | | | | |
| Year 17 | | | | |
| Year 18 | | | | |
| Year 19 | | | | |
| Year 20 | | | | |

*Note: kW based upon AC nameplate rating

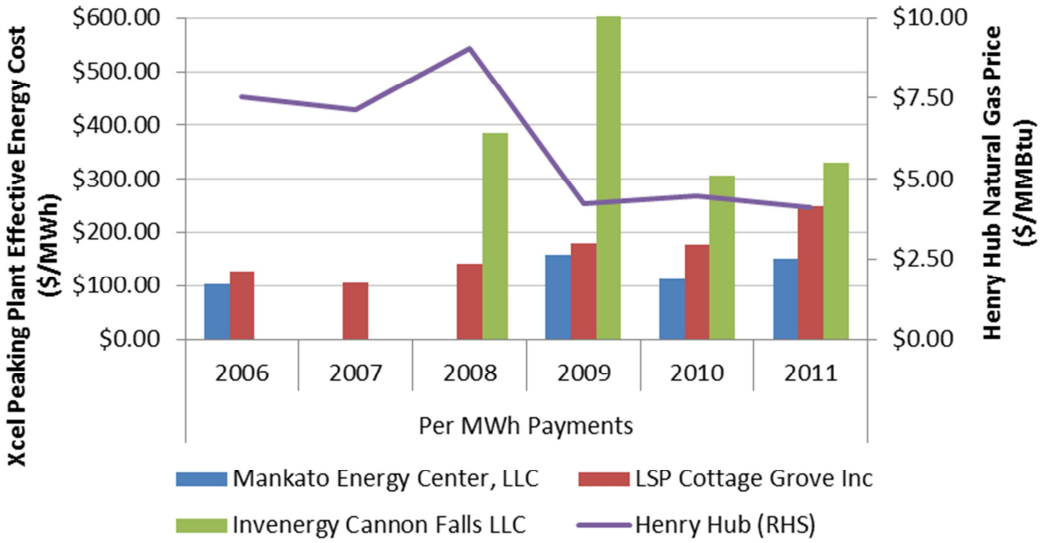
Geronimo's pricing is competitive with all-in costs of natural gas-fired facilities that Xcel Energy already has under contract, even before considering the Project's REC values and other associated environmental benefits. As shown on Table 6 and Figure 6, Xcel Energy has reported total cost of energy and capacity for various natural gas peaking facility contracts on Xcel Energy's system as ranging from approximately $135-300 MWh.

**Table 6: Per MWh Payments for Xcel Energy Natural Gas Facilities**

| | Per MWh Payments | | | | | |
|---|---|---|---|---|---|---|
| | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
| Mankato Energy Center, LLC | $104.83 | - | - | $158.30 | $113.57 | $151.31 |
| LSP Cottage Grove Inc | $128.13 | $106.30 | $140.86 | $180.06 | $177.19 | $249.87 |
| Invenergy Cannon Falls LLC | - | - | $384.96 | $954.81 | $305.79 | $329.84 |

Source: Ventyx Velocity Suite – FERC Form 1, Per MWh payment = Total Cost ÷ MWh Generated

**Figure 6 Total Energy & Capacity Costs for Xcel Energy's Natural Gas Peaking Facilities**




Source: Ventyx Velocity Suite – FERC Form 1, Per MWh payment = Total Cost ÷ MWh Generated

**Please note Calpine Corp Plant data showed zero generation in 2007 or 2008; Invenergy LLC came on line in 2008.*

### 6.3 ESTIMATE OF FACILITY'S EFFECT ON RATES

Because the cost of this Project exceeds the average cost of Xcel Energy's wholesale generation, and likely replaces generation previously provided by an aged coal-fired generating plant, Geronimo expects the proposal to slightly increase rates. The increase will likely be comparable to rate increases caused by that of other reasonable alternatives.

Geronimo believes this proposal is competitively priced, especially when all environmental costs and benefits are considered. The relative costs and rate impacts of each proposal, including the Project, will be analyzed by the Minnesota Department of Commerce and Xcel Energy as part of their evaluation of the alternative proposals in this docket. Appendix F includes the Strategist Assumptions for the Project to facilitate this review.

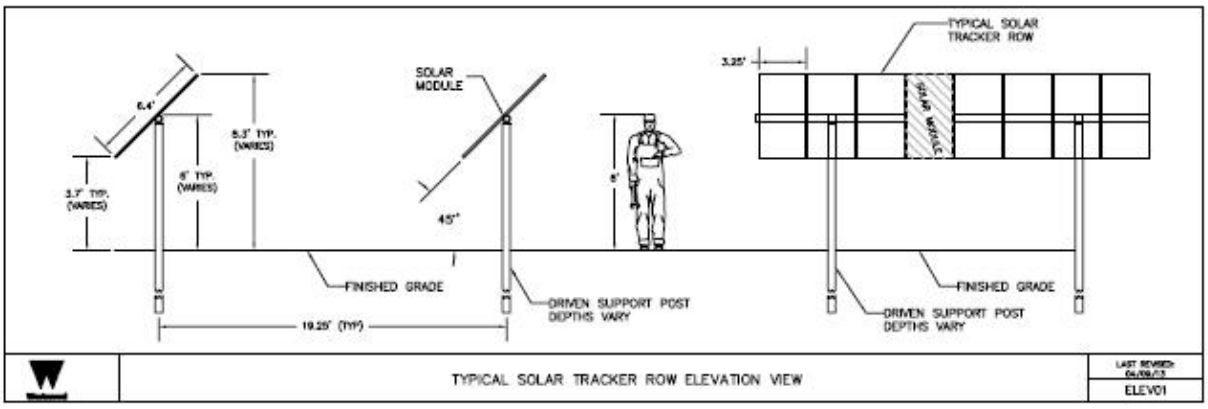
## 7.0 ENVIRONMENTAL INFORMATION

### 7.1 VISUAL IMPACTS

Geronimo's proposal would convert approximately 700 acres of agricultural or vacant land to multiple solar facilities characterized by complex geometric forms, lines, and surfaces that may be novel to and divergent from the surrounding rural landscape. Most of the developed area would be utilized with rows of solar PV panels. Solar PV employs glass panels that are designed to maximize absorption and minimize reflection to increase electricity production efficiency.

To limit reflection, solar PV panels are constructed of dark, light-absorbing materials and covered with an anti-reflective coating. Today's panels reflect as little as two percent of the incoming sunlight depending on the angle of the sun and assuming use of anti-reflective coatings. A typical solar array drawing for a 2 MW facility is provided as Figure 7. Appendix G also provides a scalable image of the proposed facilities; for solar facilities that are larger than 1 MW, the area will be expanded and the rows repeated in a similar pattern either in the east-west direction or north-south direction to scale to the size (i.e., a 2 MW facility will be double the size shown in the drawing either by duplicating the row spacing north and south or by extending the rows east and west, or some combination thereof).

**Figure 7 Drawing of Typical Solar Array**




The solar fields will occupy most of the disturbed area for the solar facilities (700 acres, or 94 percent of the total disturbed area). The electrical substations and interconnection facilities, a switchyard, an O&M building, and access roads would take up the rest of the disturbed area. Most of the facility, including the solar field, would be low-profile, and would not exceed 15 feet in height. The proposed gen-tie line leading away from the main generation facility would be typical distribution line construction approximately 35 feet tall, depending on the location and local terrain, with final heights to be determined during detailed design. Approximate dimensions of proposed facilities are provided below:

Solar Field

a. *Solar field*: Linear arrays of PV modules 6 to 10 feet above grade, at a maximum.
b. *Solar inverters*: Overhead shade would be 10 to 12 feet tall and the equipment enclosure, if used, would be up to approximately 35 feet long by 10 feet wide by 10 feet tall.
*c. Security fence*: Chain-link fence around the perimeter, 8 feet tall, with 3-strand barbed wire.
d. *Weather station*: One or more meteorological towers (aluminum lattice) up to approximately 30 feet tall.

Operations and Maintenance Area

a. *Operations and Maintenance Building*: A pre-engineered metal building approximately 17 feet high at its peak with a neutral-colored metal siding and roof.
b. *Lighting*: During construction, temporary service poles would be 18 feet tall. During operations, lighting would be affixed to O&M areas and security gates.

Interconnection facilities
*Distribution Line*: The proposed gen-tie would be typical distribution line construction similar to the existing voltage, size, and type of distribution lines in the vicinity of the interconnection point (typically distribution wires strung on wood poles approximately 35 feet high and approximately 150 feet apart.)

*Substation:* Substations, if required, will be low profile typical of distribution voltage substations and will include a fenced area, a small control house and electrical transformation and switching equipment. It will generally be of a light industrial nature.

### 7.2 LAND USE AND REQUIREMENTS

The Project in its entirety will convert 700 acres to solar energy facilities including panels, operations facilities, substations and interconnection facilities as described in Section 6.1. These facilities will be located on agricultural or industrial land or other land uses determined by the local land use and zoning authorities to be compatible with solar energy production. These determinations will be made through public processes and will not be out of the scope of normal land use changes that occur on a day-to-day basis in municipalities.

The Project would not require or cause any land use impacts for water storage, cooling systems or solid waste storage.

### 7.3 WILDLIFE

The proposed Project will have limited impacts to wildlife and will be likely only related to indirect effects associated with habitat conversion from agricultural or vacant land to the solar facility. Because any given site's acreage will be small compared to the available habitat around the site, the impacts associated with any habitat conversion will be minimal. Geronimo will coordinate with the DNR, FWS and other relevant agencies to review and ensure that all facilities have been appropriately sited to avoid any direct or indirect impacts to State and Federally listed species.

To provide an initial screening of the sites, Geronimo contracted with Westwood Professional Services to perform GIS desktop level assessments of the proposed Distributed Energy Generation Zones and identify locations of environmental sensitivity. Trade Secret Appendix H provides maps illustrating the Distributed Energy Generation Zones relative to sensitive environmental features. The initial screening identified a number of environmentally sensitive areas in or near many of the Distributed Energy Generation Zones. However, because of the small number of acres impacted by the solar facilities, Geronimo will be able to avoid these features when siting the Project.

### 7.4 TRAFFIC

For every two megawatts of installed capacity, Geronimo estimates that there will be between 27 and 35 trucks used for delivery during construction and light duty trucks on a daily basis for transportation of construction workers to and from the site during construction. Once construction is complete the individual solar facilities will see one to two trucks on site at intervals associated with the maintenance schedule in Section 5.6.2 during normal operations.

Geronimo does not anticipate that the project will generate perceivable changes to barge and rail traffic.

### 7.5 AIR EMISSIONS

The Project will have no air emissions and will avoid emissions associated with other fossil generation facilities. Geronimo undertook analysis using U.S. Environmental Protection Agency ("EPA") data for emissions and generation data for the MISO-Minnesota Zone from Ventyx avoided emissions related to the Project. Table 7 provides a summary of the estimated reduction in pollutants from the Project based on a 2012 generation profile. Appendix I provides further detail regarding the analysis and assumptions used in calculating these estimates.

**Table 7 Estimated Avoided Pollutants**

| Pollutant | Tons/Year |
|---|---|
| CO2 | (94,133.00) |
| CO | (115.98) |
| NOX | (63.26) |
| PM10 | (27.08) |
| VOC | (3.44) |
| SO2 | (10.48) |

### 7.6 WATER

The Project will not use any water for alternate cooling systems. The Project may, on occasion, and on a site-by-site basis, require water for cleaning of panels on a yearly or six-month basis. Geronimo conservatively estimates that water used for washing will be approximately 10,000 gallons per MW of installed nameplate capacity annually. Geronimo anticipates that actual water usage will be much lower based on experiences at operating facilities in Minnesota (e.g., the St. John's Solar Farm).

### 7.7 RADIOACTIVE RELEASES AND WASTE

The Project will not generate any radioactive or solid waste under normal operating procedures. No parts require greasing or oiling on a regular basis.

### 7.8 NOISE

The main source of noise will be from the transformers and from the rotation of the tracking system. The proposal will not generate noise at levels different than those already present in the in landscape of the Distributed Energy Generation Zones. All electrical equipment will be designed to National Electrical Manufacturer Association ("NEMA") Standards. Table 8 summarizes typical noise generated from different voltage transformers that will be used to step up the electricity from the proposed solar facilities.

**Table 8 Transformer Noise Levels**

| Eq. Two-Winding (kVA) | Self-Cooled/ Ventilated (dB(a)) | Self-Cooled /Sealed (dB(a)) | Eq. Two Winding (kVA) | Ventilated Cored Air Cooled (dB(a)) |
|---|---|---|---|---|
| 0-50 | 50 | 50 | - | |
| 51-150 | 55 | 55 | - | |
| 151-300 | 58 | 57 | 3-300 | 67 |
| 301-500 | 60 | 59 | 301-500 | 67 |
| 501-700 | 62 | 61 | 501-833 | 67 |
| 701-1000 | 64 | 63 | 834-1167 | 67 |
| 1001-1500 | 65 | 64 | 1168-1667 | 68 |
| 1501-2000 | 66 | 65 | 1668-2000 | 69 |
| 2001-3000 | 68 | 66 | 2001-3333 | 71 |
| 2001-4000 | 70 | 68 | 3334-5000 | 73 |
| 4001-5000 | 71 | 69 | 5001-6667 | 74 |
| 5001-6000 | 72 | 70 | 6668-8333 | 75 |
| 6001-7500 | 73 | 71 | 8334-10000 | 76 |

All transformers will be sited such that the sound generated by them will attenuate to levels below Minnesota State Noise Standards before it reaches any residences or community buildings.

### 7.9 CONSTRUCTION AND OPERATION WORK FORCE

The Project will create approximately 500 construction related jobs and 10 permanent positions to operate and maintain the facilities. Geronimo estimates that each site will require an average of six unique construction jobs, plus 3.3 jobs per installed MW (i.e., a 1 MW site will create approximately 10 construction jobs). Additional, during construction other, non-construction jobs such as engineering and surveying will be needed. Geronimo used the National Renewable Energy Laboratory's ("NREL") Jobs and Economic Development Impacts ("JEDI") PV tool[12] to calculate jobs associated with the design construction and installation of the Project and estimated a total of 793 Full Time Equivalent jobs created during the construction cycle.

### 7.10 NUMBER AND SIZE OF TRANSMISSION FACILITIES

The Project is proposing limited transmission facilities that will interconnect the solar facilities to the transmission grid. Transmission facilities will be short (approximately 0.5 to 3 miles) for each solar facility. All distribution voltage interconnection facilities will be permitted at the local level.

[12] https://jedi.nrel.gov/.

## 8.0 TRANSMISSION AND DELIVERABILITY

Each of the Distributed Energy Generation Zones is located within MISO Planning Resource Zone 1, which includes Xcel Energy's loads in Minnesota. The proposed distribution-interconnected facilities will interconnect directly to Xcel Energy distribution feeders or Xcel Energy distribution substations serving Xcel Energy load. For the proposed facilities interconnecting at Xcel Energy transmission substations, Geronimo will request MISO Network Resource Interconnection Service, which will allow Xcel Energy to designate them as network resources. In either case, Xcel Energy will incur no additional transmission cost.

In aggregate, the proposed facilities will provide a high level of reliability through geographic diversity. Individual transmission or generating equipment outages will affect only a subset of the proposed facilities. Each of the proposed facilities has been sited and sized to be less than approximately 20 percent of the peak load at the POI. This ensures that the effects of outages or output fluctuations at each site will be less than or comparable to existing load variability. The reliability of distribution or transmission service affecting the proposed facilities will be comparable to the reliability of service to loads at the POI.

## 9.0 SCHEDULING CONSIDERATIONS

### 9.1 IN-SERVICE DATE

The proposed in service date is December 1, 2016 in order to meet a portion of the 150 MW of capacity for the 2017 summer requirements. In addition, due to the modular nature of distributed generation and the technology, if needed, a portion of the facilities could be brought on-line prior to December 1, 2016 in order to meet current market conditions. This provides Xcel Energy with significant flexibility in order to efficiently meet its customers' needs for energy and capacity.

### 9.2 PLANNED MAINTENANCE

The proposed facilities do not require any planned maintenance events that would prohibit operation of the plant. All planned maintenance would take place during non-daylight hours.

### 9.3 EXPECTED MINIMUM LOAD

No minimum load is required for solar facilities.

### 9.4 RAMP RATES

As a non-wind variable resource that utilizes solar irradiance as a fuel resource, ramp rates are determined by solar irradiance. Downward ramp control can be accommodated for larger facilities that utilize a plant controller.

### 9.5 LIMITATIONS ON OPERATIONS

The facilities utilize photovoltaic technology which requires solar irradiance to produce energy and capacity. Production will be limited by the availability of solar irradiance.

### 9.6 GUARANTEED PERFORMANCE FACTORS

Geronimo and its contracting partner have never missed a commercial operation deadline. The proposed construction and procurement schedule for the Project have been vetted for fatal flaws and include flexibility in the critical path of the procurement, permitting and construction schedules. The selected technology is offered by numerous vendors in the marketplace. This provides flexibility in the procurement of the module, inverter and racking technologies protecting the project from sole source procurement risk. Similarly, as a distributed generation project, the schedule for site permitting and construction can be modified to accommodate site specific constraints without impacting the overall schedule of the project at large. Together, this allows the Project with tremendous flexibility to ensure commercial operation by December 2016.

### 9.7 PERMIT MILESTONES

The Project will require local land use permits. In many jurisdictions, there may not be existing zoning specifically for solar energy facilities. Geronimo anticipates that land use permitting will take between 60 and 120 days to complete, varying according to local processes in place for ordinance amendments and zoning approvals. Table 9 provides a summary of the timelines associated with the permits needed for the Project.

**Table 9 Permitting Timeline**

| Category | Timeline |
|---|---|
| Land Use Permitting | 60-120 days |
| Wetland Permitting | 90 days |
| Stormwater Permitting | 60-120 days |
| Right of Way Permitting | 30 days |
| Construction Permitting | 30 days |

### 9.8 FINANCING, ENGINEERING, CONSTRUCTION AND PROCUREMENT MILESTONES

The following tables provide a summary of Geronimo's milestone dates for financing, engineering and procurement. Because of the modular nature of the proposal, milestone dates will be assigned in finality in the contract document and will be based off of the contractual in-service date unique to each Distributed Energy Generation Zone.

**Table 10 Financing Timeline**

| **Item** | **Completion** |
|---|---|
| Financial Syndication | 60 days before construction |
| Financing Closed | 30 days before construction |

**Table 11 Engineering Timeline**

| **Item** | **Completion** |
|---|---|
| Geotechnical Evaluation | 20 days before completion of Civil |

| | Design |
|---|---|
| Electrical Design | 75 days before construction |
| Civil Design | 75 days before construction |
| Transportation Plan | 75 days before construction |
| Interconnection Design | 90 days before construction |

**Table 12 Procurement Timeline**

| **Item** | **Completion** | |
|---|---|---|
| Land | | |
| Option Secured | 3rd Q 2013 | |
| Lease activated/Purchase Closed | 220 days before construction | |
| Equipment | Ordered | Delivered |
| Panels | 120 days before construction | Will vary by location |
| Inverters | 150 days before construction | Will vary by location |
| Medium/High Voltage Switching | 150 days before construction | Will vary by location |
| Low Voltage Equipment | 100 days before construction | Will vary by location |
| Transformers | 200 days before construction | Will vary by location |
| Control House | 150 days before construction | Will vary by location |

The proposal is for multiple sites of varying size, Table 13 provides data on how Geronimo will schedule the construction process for each Distributed Energy Generation Zone including task duration and key predecessors.

**Table 13 Construction Timeline**

| Task | Duration | Key Predecessor |
|---|---|---|
| Site Preparation, Grubbing and Clearing | 2 days per acre | Construction begins |
| Laydown and Temporary Job Site Trailers | 7 days | Construction begins |
| Civil Construction | 10 days per acre (May vary according to terrain) | Laydown and Temporary Job Site Trailers |
| Substation | 100 days | Laydown and Temporary Job Site Trailers |
| PV Mounting Posts | 5 days/MW | Site Preparation, Grubbing and Clearing |
| Underground Collection System | 4 days/MW | Site Preparation, Grubbing and Clearing |
| Electrical Enclosure/Inverter | 15 days/unit | Laydown and Temporary |

| | | |
|---|---|---|
| | | Job Site Trailers |
| Tracker Installation | 3 days/MW | PV Mounting Posts |
| PV Module Installation | 3 days/MW | Tracker Installation |
| Interconnection Tie | 10 days/100 feet | Laydown and Temporary Job Site Trailers |
| Testing | 20 days | Interconnection Tie |

## 10.0 CERTIFICATE OF NEED CRITERIA

Minnesota Rule, part 7849.0120 sets forth the criteria the Commission uses to assess the need for a large electric generating facility. The Commission must grant a CN to an applicant upon determining that:

> A. [T]he probable result of denial would be an adverse effect upon the future adequacy, reliability, or efficiency of energy supply to the applicant, to the applicant's customers, or to the people of Minnesota and neighboring states (Part 7849.0120(A));
>
> B. [A] more reasonable and prudent alternative to the proposed facility has not been demonstrated by a preponderance of the evidence on the record (Part 7849.0120(B));
>
> C. [B]y a preponderance of the evidence on the record, the proposed facility, or a suitable modification of the facility, will provide benefits to society in a manner compatible with protecting the natural and socioeconomic environments, including human health (Part 7849.0120(C)); and
>
> D. [T]he record does not demonstrate that the design, construction, or operation of the proposed facility, or a suitable modification of the facility, will fail to comply with relevant policies, rules, and regulations of other state and federal agencies and local governments (Part 7849.0120(D)).

As discussed further below, the Project satisfies all four of the Commission's criteria for granting a certificate of need for the Project.

### 10.1 DENIAL OF THE DISTRIBUTED SOLAR ENERGY PROPOSAL WILL ADVERSELY AFFECT THE ADEQUACY, RELIABILITY AND EFFICIENCY OF XCEL ENERGY'S ENERGY SUPPLY

As noted previously in this filing, the Minnesota Public Utilities Commission has determined that Xcel Energy has demonstrated a need for 150 MW of capacity and associated energy by 2017, which will increase up to 500 MW of capacity by 2019. Not only does Xcel Energy's demand continue to grow, but some of its current generation resources are facing possible retirement, and some of its current contracts are expiring over the next decade. A notable example is the Black Dog Generating Plant coal-fired Units 3 and 4, with a summer rated capacity of 253 MW, which Xcel Energy plans to retire in the 2016 time frame.

Denial of the Distributed Solar Energy Proposal would prevent Xcel from meeting its peak capacity needs as identified by the Commission, which could potentially lead to blackouts or brownouts across its system. In addition, Xcel Energy may fail to meet its requirements as a member of MISO's Reserve Sharing Pool, which could cause the Company to incur a Capacity Deficiency Charge from MISO in an amount that could exceed $268,000/MW-year.[13]

### 10.2 THE DISTRIBUTED SOLAR ENERGY PROPOSAL IS THE MOST REASONABLE AND PRUDENT ALTERNATIVE PRESENTED

This competitive acquisition process has been established to assist the Commission in evaluating the best alternative to meet Xcel Energy's need for additional generation identified in its most recently-approved integrated resource plan. Applying the factors set forth in Minnesota Rule, Part 7849.0120(B), the Project has many advantages when compared to other alternatives that may be proposed in this alternative proposal process.

***Size, Type, Timing***: In evaluating alternatives, the Commission examines whether the Project is the appropriate size, whether it is the right type, and whether the timing is appropriate. With respect to the size of the Project, Geronimo is proposing up to 31 distributed sites for a total Project size of up to 100 MW. Geronimo recognizes that Xcel Energy will also need to acquire additional generation to meet its total 150 MW need in 2017 and up to 500 MW need in 2019. However, the Commission's Orders do not require that the entire need be satisfied from a single project. Moreover, given the limited penetration of solar facilities in Minnesota, adding 100 MW of solar to Xcel Energy's system by 2017 will represent by far the most significant solar installation in Minnesota to date. By proposing a number of locations ranging from 2 MW to 10 MW, this proposal allows Geronimo to capture the advantages of interconnecting smaller, separate generators while providing Xcel Energy and its ratepayers the economies of scale that help drive down capital costs.

Regarding the type of facility, Geronimo is proposing multiple solar photovoltaic generating facilities. Solar energy is a qualified renewable energy under Minnesota law. Solar provides approximately 70 percent of its power during MISO's on peak hourly cohort and has an expected accredited capacity rating of 72 percent of its AC nameplate.

With respect to timing, this proposal offers the Commission and Xcel Energy the flexibility to bring portions of the Project online at different times. Providing flexible in-service dates allows Xcel Energy to better monitor and adjust its operations as these new, distributed generators come online. Ultimately, however, Geronimo is proposing that up to 100 MW AC will be available and in-service by year-end 2016. The proposed in-service date will ensure delivery of the energy ahead of Xcel Energy's 2017 need established in Docket No. E002/RP-10-825. In addition to meeting Xcel Energy's identified resource plan need, this proposal will also provide 100 MW of renewable energy to satisfy Xcel Energy's obligations under the RES for 2016 and beyond.

[13] The MISO Capacity Deficiency Charge is 2.748 times the Cost of New Entry (CONE). CONE represents the cost of a new simple cycle combustion turbine. For the planning year beginning June 1, 2013, the Capacity Deficiency Charge is 2.748 x $97,650 = $268,342.20 /MW-year.

***Cost Analysis***: Geronimo believes that the cost of the Project compares favorably to the cost of new natural-gas fired generation resources when all costs and benefits are considered.

According to MISO, the Cost of New Entry ("CONE") of a new combustion turbine generation resource in the MISO Region is approximately $95,690/MW-Year,[14] or $7.97/kW-Month. The proposed capacity payment for the 100 MW AC distributed solar portfolio is $**[TRADE SECRET DATA HAS BEEN EXCISED]**kW-Month. Because the proposed solar Project is estimated to have an accredited capacity of 72 percent of its AC nameplate capacity, this equates to a cost of $**[TRADE SECRET DATA HAS BEEN EXCISED]**/kW-Month for actual accredited capacity for the solar facility, received by Xcel Energy, thus, this Distributed Solar Energy Proposal offers a capacity savings of approximately $**[TRADE SECRET DATA HAS BEEN EXCISED]**/kW-Month, when comparing against MISO's FERC filing.[15] In addition, according to Xcel Energy, the loss factor on its transmission and distribution system is 5.7 percent for a primary voltage customer.[16] The Project, as a distributed generation portfolio would interconnect primarily to the distribution system which reduces line loss by approximately four percent as compared to a nondistributed generation facility thereby increasing the value of the energy by the same value. These figures do not include the additional environmental benefits of a solar energy facility.

Additionally, the Project has no start-up costs. Start-up costs for a natural gas peaking plant depend on plant characteristics (i.e., size and technology) and the costs incurred by the off-taking utility are directly proportional to the amount of times the plant must start. This can be a significant factor to a natural gas peaking plant over cost.

Finally, the Project provides additional benefits when environmental benefits ($4.99 - $17.81/MWh) and/or S-RECs are considered. Neither of these benefits was included in the above capacity cost or energy cost figures above yet represents a significant benefit of a solar generation facility.

***Potential Environmental and Socioeconomic Impacts***: The Project will have a net benefit to local and regional economies while having limited impacts to the environment. The Project will result in the conversion of up to 700 acres from agricultural or light industrial uses to solar energy facilities. This conversion will result in limited increases of impervious surfaces and no added emissions. The Project will generate some increases in traffic during construction but will not have a noticeable impact once construction is complete. The Project will generate significant revenue in local communities associated with the increased construction activity, the payment of

[14] See David B. Patton, Ph.D., IMM for MISO, 2010 State of the Market Report, p.8 (June 2011) (available at: https://www.midwestiso.org/Library/Repository/Report/IMM/2010%20State%20of%20the%20Market%20Presentation.pdf), citing MISO 's Annual CONE Recalculation Filing at the FERC, Docket ER11-4185-000 (August 1, 2011).

[15] FERC Docket No. ER11-4185-000.

[16] Minnesota Department of Commerce Comments, In the Matter of the Application of Northern States Power Company for Authority to Increase Rates for Electric Sales in Minnesota, Docket No. E002/GR-10-971 (December 3, 2012) at 7.

taxes, and the payments to landowners participating in the Project. In addition to direct payments, there will be significant induced benefits from the Project. Using NREL's JEDI will generate approximately $22,311,760 in earnings and the operation phase will generate $442,750 in earnings.

The local economy will benefit from the procurement of balance of plant components such as steel for the racking foundations, cable, conduit and other commodities utilized for the construction of the facilities.

***Reliability***: The Project will provide a high level of reliability through geographic diversity. Outages of individual transmission elements or generating facilities will affect only a subset of the proposed facilities. Each of the proposed facilities will be available at least 97 percent of the time. The Project's estimated availability is supported by the fact that the Saint John's Solar Farm has had a 99 percent operational track record in its first three years of operation. In addition, the inverters for the Project (which covert the DC power generated by the photovoltaic models to AC power) can support power quality through voltage and frequency regulation on the respective distribution or transmission feeder, thereby increasing the reliability of the grid. As discussed in Sections 5.6.1 and 5.6.2, solar equipment has a service life of 25-40 years and maintenance can be performed without taking the entire plant offline.

### 10.3 THE PROJECT BENEFITS SOCIETY AND IS COMPATIBLE WITH THE NATURAL AND SOCIOECONOMIC ENVIRONMENTS

Minnesota Rule, part 7849.0120(C) requires an applicant for a CN to address whether the proposed Project will benefit society in a manner that is compatible with protecting natural and socioeconomic environments, including human health. Applying the factors set forth in Minnesota Rule, Part 7849.0120(C), the energy produced by the Project will provide significant and numerous societal benefits, with minimal negative impacts.

***Xcel Energy's Identified Energy Needs:*** In Xcel Energy's most recently approved integrated resource plan, the Commission found that Xcel Energy needs 150 MW of new generation by 2017 and up to 500 MW by 2019. Approving this Project, which will deliver up to 100 MW (AC) of solar energy by 2016, will fulfill a significant portion of Xcel Energy's identified need.

***Potential Environmental and Socioeconomic Impacts Compared to No-Build Alternative***: One of the greatest attributes of solar energy is its minimal impact on the environment. The Project will not release carbon dioxide, sulfur dioxide, nitrogen oxides, mercury, or particulate matter. It will not require water for power generation and will not discharge wastewater containing any heat or chemicals during operation. It will produce energy without the extraction, processing, transportation, or combustion of fossil fuels. The Project will be sited so as to minimize the impact on the environment.

The development of solar energy will diversify and strengthen the economic base of the counties where the solar facilities are located. Wages and salaries paid to contractors and workers will contribute to the total personal income of the region. At least part of the wages paid to temporary and permanent Project workers will be circulated and recirculated within the county and the state. Expenditures made by Geronimo for equipment, operating supplies, and other

products and services will benefit businesses in the host counties and the state. Landowners with solar panels or other Project facilities on their land will receive annual land payments, and these payments will diversify and strengthen the local economy.

Negative impacts to socioeconomic resources will be relatively minor. Approximately 700 acres of land will be temporarily removed from its current use in pasture or agricultural production as a result of project construction. This represents only 0.0013 percent of the State of Minnesota's land areas. In addition, due to the low impact design of the proposed facility, the land can be easily converted back to its current use at the end of the useful life of the facility.

Project construction will not negatively impact leading industries within the Project area. There is no indication that any minority or low-income population will be adversely impacted by Project. Additionally, the Project does not consume fuel and is therefore largely insulated from risks associated with the future costs, availability, and transportation of fuels.

Not building an electrical generation facility would result in no physical impact to the environment in the Distributed Energy Generation Zones. On the other hand, not building such a facility would also not provide an increase in the income stream to county residents and businesses, or an increase in the amount of low-cost, clean, reliable renewable energy available to state or Xcel Energy and its customers. The Project will have minimal impact on the physical environment, while simultaneously providing significant benefits to society.

***Promotional Practices:*** Geronimo does not serve retail customers and has not engaged in any promotional practices that gave rise to Xcel Energy's need for new generation.

***Inducing Future Development:*** The Project will not directly affect development in the host counties but will provide significant benefits to the local economy and local landowners. Landowners in the areas surrounding the Distributed Energy Generation Zones will benefit from property payments. The Project will also provide significant income opportunities for local residents through the creation of 500 temporary construction and 10 permanent operations and maintenance positions.

***Socially Beneficial Uses of Output:*** The Project will provide Xcel Energy with affordable, clean, renewable energy that will help meet energy and capacity demands and the RES. In addition, the local economy will benefit from landowner payments, income from jobs created and local spending.

### 10.4 THE PROJECT IS CONSISTENT WITH FEDERAL, STATE AND LOCAL RULES AND POLICIES

This Project has several key attributes making it a superior resource choice when considering the various state and federal energy and environmental policies that influence acquisition of new generation resource in Minnesota. The Project offers a competitively-priced, distributed, solar resource that can meet a significant portion of Xcel Energy's established need for 150 MW of new generation by 2017.

### 10.4.1 Minnesota Law and Energy Policies

As discussed below, the Project is consistent with statutory requirements promoting clean renewable resources through the state's CN and resource acquisition processes.

#### 10.4.1.1 Renewable Energy Standards

This Project will provide Xcel Energy with significant benefits beyond capacity and on-peak energy. First and foremost, the Project will provide Xcel Energy with renewable energy credits that can be used to meet its renewable energy standards in Minnesota or its other jurisdictions, or marketed to further reduce the cost of energy from the Project. These RECs are uniquely qualified as solar, or "S-RECs," which can be used to meet a solar standard. Xcel Energy is not currently subject to a solar standard in any of its jurisdictions, although at the time of this filing a proposal for such a standard is pending in the Minnesota State Legislature.[17] S-RECs typically have a higher value than general RECs and can be marketed to utilities that need to satisfy solar standards in other jurisdictions, and the proceeds used to acquire general RECs or offset other costs.

Table 14 below shows recent values for S-RECs in markets that have solar standards:

**Table 14 S-REC Spot Prices as of April 10th, 2013**

| S-REC Type | **(USD/MWh)** |
|---|---|
| **NJ S-REC 2012** | $110.00 |
| **MA S-REC 2012** | $240.00 |
| **MD S-REC 2012** | $155.00 |
| **PA S-REC 2012** | $12.50 |

Source: Bloomberg New Energy Finance; Prices as of April 10th, 2013

#### 10.4.1.2 Renewable and Distributed Energy Preference

Over and above the Renewable Energy Standard, Minnesota Statutes require that a preference be shown for renewable energy, especially when also considering the acquisition of or cost recovery for non-renewable resources. Minn. Stat. § 216B.2422, subd. 4 states:

> The commission shall not approve a new or refurbished nonrenewable energy facility in an integrated resource plan or a certificate of need, pursuant to section 216B.243, nor shall the commission allow rate recovery pursuant to section 216B.16 for such a nonrenewable energy facility, unless the utility has demonstrated that a renewable energy facility is not in the public interest.

This concept is further reinforced in the Certificate of Need statute, Minn. Stat. § 216B.243, subd. 3a, which states as follows:

[17] See, e.g., HF 956 and SF 901, which, if passed, would require Xcel Energy to obtain 4 percent of its retail electric sales from solar energy by 2025.

> The commission may not issue a certificate of need under this section for a large energy facility that generates electric power by means of a nonrenewable energy source, or that transmits electric power generated by means of a nonrenewable energy source, unless the applicant for the certificate has demonstrated to the commission's satisfaction that it has explored the possibility of generating power by means of renewable energy sources and has demonstrated that the alternative selected is less expensive (including environmental costs) than power generated by a renewable energy source. For purposes of this subdivision, "renewable energy source" includes hydro, wind, solar, and geothermal energy and the use of trees or other vegetation as fuel.

Geronimo's Distributed Solar Energy Proposal fully meets the definition of renewable in both of these statutes. This proceeding gives the Commission a full and fair opportunity to compare this Project against non-renewable resources and make findings as to their costs and the public interest, as required by the statute. In most resource proceedings, the Commission is unable to make these findings because no renewable resources are offered, or the only renewable resources put forward are hypothetical projects.

The Certificate of Need statute also discusses, in Minn. Stat. § 216B.243, subd. 3, item 6, the need to evaluate "possible alternatives for satisfying the energy demand or transmission needs including but not limited to … distributed generation." The Project, spread over a number of sites with interconnections largely at distribution substations, is a distributed generation project that will provide Xcel Energy with the benefits of lower cost interconnections, little or no transmission cost or infrastructure, reduced losses and increased system reliability.

#### 10.4.1.3 Greenhouse Gas Reduction Goals

The Project is also consistent with the state greenhouse gas reduction policy as discussed in Minn. Stat. § 216H.02, subd. 1, which establishes a goal of reducing greenhouse gas emissions to 15 percent below 2005 levels by 2015, 30 percent below by 2025, and 80 percent below by 2050. Geronimo's Project emits no greenhouse gasses, and to the extent that its energy will be used to replace that previously provided by the retiring Black Dog Generating Station coal-fired units 3 and 4, will have a positive impact on greenhouse gas reduction in Minnesota. As discussed further in Section 7.5 of this proposal, Geronimo estimates that the Project will annually displace 94,133 tons of carbon dioxide, based on an average system mix at the time the Project is expected to generate energy.

#### 10.4.1.4 Environmental Cost Planning

As part of its evaluation of any non-renewable generating plant, Minn. Stat. § 216B.243, subd. 3(12) requires the Commission to evaluate the extent to which an applicant has considered the risk of environmental costs and regulation. This criterion is important to the extent the Commission is considering approval of any nonrenewable generating facilities submitted within this competitive bid proposal. As a solar facility, the Project is emission free. Moreover, renewable or carbon credits produced by the facility may help Xcel Energy offset the costs or requirements of any future carbon or other environmental regulations.

The Commission has undertaken regular exercises in estimating both a high and a low cost associated with CO2, CO, SO2, PM10, NOx, and Pb. These estimates show an increasing price for these emissions over time. Using the current pricing the commission has for these emissions and data from the EPA and Ventyx, Geronimo estimated the displacement of each of these emissions and the relative cost savings associated. [18] Table 15 provides the results of this analysis which estimates a minimum savings of $4.99/MWh from this proposal and a maximum potential savings of up to $17.81/MWh.

**Table 15 Estimated Project Environmental Cost Savings**

| Emission | Tons | Cost/Ton | | Total Cost |
|---|---|---|---|---|
| CO2 | (94,133.00) | $ 34.00 | High | $ (3,200,522.08) |
| | | $ 21.50 | Mid | $ (2,023,859.55) |
| | | $ 9.00 | Low | $ (847,197.02) |
| CO | (115.98) | $ 1.86 | High | $ (215.71) |
| | | $ 1.46 | Mid | $ (169.32) |
| | | $ 1.06 | Low | $ (122.93) |
| NOX | (63.26) | $ 370.00 | High | $ (23,406.18) |
| | | $ 282.50 | Mid | $ (17,870.93) |
| | | $ 195.00 | Low | $ (12,335.69) |
| PM10 | (27.08) | $ 4,012.00 | High | $ (108,632.65) |
| | | $ 3,387.00 | Mid | $ (91,709.57) |
| | | $ 2,762.00 | Low | $ (74,786.48) |

| | | | |
|---|---|---|---|
| Total | | High | $ (3,332,776.62) |
| | | Mid | $ (2,133,609.37) |
| | | Low | $ (934,442.13) |

| | | | |
|---|---|---|---|
| $/MWH | | High | $ (17.81) |
| | | Mid | $ (11.40) |
| | | Low | $ (4.99) |

Appendix I provides more detail on the analysis completed in calculating these offsets and cost savings.

[18] Order Establishing 2012 and 2013 Estimate of Future Carbon Dioxide Regulation Costs, In the Matter of Establishing and Estimate of the Costs of Future Carbon Dioxide Regulation on Electricity Generation under Minnesota Statutes § 216H.06, Docket E999/CI-07-1199 (November 2, 2012); and Notice of Updated Environmental Externality Values, In the Matter of the Investigation into Environmental and Socioeconomic Costs, Docket No. E999/CI-00-1636 (June 23, 2012).

The Project has several other environmental benefits as compared with traditional fossil fuel-fired plants. It will have no air emissions, uses no water, and will generate no solid waste. It has little noise, minimal visual impacts and will not disturb birds, bats or most other wildlife. Its land impacts are minimal and decommissioning costs are very low. Finally, as a distributed project that requires no fuel, the Project will minimize environmental disturbance caused by the need to construct significant transmission or fuel delivery and handling facilities.

### 10.5 FEDERAL ENERGY AND ENVIRONMENTAL RULES AND POLICIES

While primary responsibility for regulating the composition of Minnesota's energy resources falls to the Minnesota Public Utilities Commission, federal energy and environmental policies also play a significant role in determining the energy resources offered and selected to meet the needs of Minnesota customers.

Notably, the EPA has proposed a Carbon Pollution Standard for New Power Plants.[19] Power plants represent the single largest source of industrial greenhouse gas emissions in the United States and account for approximately 40 percent of all U.S. anthropogenic $CO_2$ emissions.[20] EPA's proposed new source performance standard would set uniform national limits on the amount of carbon pollution new power plants can emit. EPA's proposed standards apply to fossil-fuel-fired boilers, integrated gasification combined cycle ("IGCC") units and stationary combined cycle turbine units that generate electricity for sale and are larger than 25 MW. The proposed standards would require covered units to achieve an emission rate of 1000 pounds of $CO_2$ per megawatt hour.

Federal energy policy also provides significant U.S. federal tax incentives to attract investment in renewable energy projects, including solar projects such as the Project. The federal business energy investment tax credit ("ITC") available under 26 USC § 48 allows taxpayers to take a tax credit equal to 30 percent of expenditures, with no maximum credit, for installation of eligible solar energy property placed in service prior to December 31, 2016. As noted in Section 9.1, while Geronimo Energy expects there will be rolling in-service dates for various tranches of the individual solar facilities, the Project plans to be in-service by year-end 2016 in order to qualify for the ITC.

In addition, the Federal Energy Regulatory Commission ("FERC") has implemented a number of policies and directives aimed at ensuring independent power producers have open and nondiscriminatory access to the transmission grid, to enable renewable generators, such as the Project, to interconnect and deliver power. Most recently, FERC issued Order 1000 further strengthening the requirements that public utilities participate in regional planning efforts and consider public policy needs in transmission planning. Recognizing the unique issues that solar projects can face interconnecting to the grid, FERC also issued Order No. 2006 (2005) that

[19] Standards of Performance for Greenhouse Gas Emissions for New Stationary Sources: Electric Utility Generating Units, 77 Fed. Reg. 22392 (April 13, 2012).

[20] Table 2-1 from "Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2009," U.S. Environmental Protection Agency, EPA 430-R-11-005, April 2011.

required transmission providers to adopt standard procedures and interconnection agreements for connecting generating facilities of less than 20 MW and created fast track procedures for projects less than 2 MW. FERC is currently considering revising its rules related to small generator interconnections to further expedite interconnection for solar electric generation through a proposed rule change in Docket No. RM13-2-000.

President Obama has also been a significant supporter of increased renewable energy as part of a larger strategy to combat climate change and create clean energy jobs. President Obama signed Executive Order 13514 on Federal Leadership in Environmental, Energy, and Economic Performance in October 2009 that directed Federal agencies to reduce greenhouse gas pollution, eliminate waste, improve energy and water performance, and leverage Federal purchasing power to support innovation and entrepreneurship in clean energy technologies and environmentally-responsible products.

By providing up to 100 MW of new solar energy, the Project is consistent with these federal policies encouraging low carbon, renewable energy resources.

### 10.5.1 The Project Complies with Federal, State and Local Environmental Regulations

The Project will meet the requirements of all applicable federal, state, and local environmental laws and regulations. Table 16 provides a list of approvals the Project may need to obtain from governmental entities to demonstrate full compliance. Geronimo Energy is committed to obtaining all necessary environmental and other approvals required under federal, state, and local requirements. Section 9.0 sets forth a schedule and major milestones for acquiring all required approvals.

**Table 16 List of Potential Permits and Approvals**

| Permit | Jurisdiction |
|---|---|
| **Federal Approvals** | |
| Section 404 Permit | U.S. Army Corp of Engineers |
| **State Approvals** | |
| Section 401 Certification | Minnesota Pollution Control Agency |
| General Permit (Construction) | Minnesota Pollution Control Agency |
| License for Very Small Quantity Generator of Hazardous Waste | Minnesota Pollution Control Agency |
| License to Cross Public Land and Water | Minnesota Department of Natural Resources |
| WCA Approval | Minnesota Board of Water and Soil |
| Access Driveway Permit | Minnesota Department of Transportation |
| Utility Permit on Trunk Highway Right-of-Way | Minnesota Department of Transportation |
| Oversize and/or Overweight Permit | Minnesota Department of Transportation |
| Water Supply Well Notification | Minnesota Department of Health |

| | |
|---|---|
| Plumbing Plan Review | Minnesota Department of Health |
| **Local Approvals** | |
| Land Use Permit | Counties |
| Right-of-way permits, road access permits, driveway permits for access roads and electrical collection system | Counties |
| WCA Approval | Counties |
| Land Use Permit | Townships |
| Right-of-way permits, road access permits, driveway permits for access roads and electrical collection system | Townships |

## 11.0 STANDARD CONTRACT AND EXCEPTIONS

Because this aggregated distributed solar proposal differs significantly from a natural gas plant or other proposal, Geronimo has provided a proposed form of Solar Power Purchase Agreement ("Solar PPA") in Appendix J. Geronimo proposes to execute the same form of the agreement for each individual facility. The form of Solar PPA sets forth customary terms and conditions for the sale and purchase of solar accreditable capacity, energy and renewable energy credits and is subject to the negotiation of final terms by the parties and regulatory approval.

The form of Solar PPA is substantially the same form that was proposed in the Request for Proposals by the Public Service Company of Colorado with the following modifications; (i) references to parties, state commission and regional transmission authority to reflect the fact that the PPA will be with Northern States Power Company within MISO for Minnesota solar projects; (ii) provisions relating to the Right of First Offer & Option Agreement were removed and (iii) the requirement to provide additional security in the form of subordinated mortgage was removed, but the financial security requirements that are required on all Xcel Energy commercial power contracts in Minnesota remain; and (iv) the obligation of buyer to compensate seller for the solar facility's accreditable capacity has been added, but the parties are free to negotiate how the Solar PPA payments are allocated among accreditable capacity, solar energy and renewable energy credits.

## 12.0 CONCLUSION

This Distributed Solar Energy Proposal offers cost-competitive and environmentally superior alternative to fossil fuel generators and can reliably deliver accredited capacity, energy, RECs and other environmental attributes to meet Xcel Energy's needs for new generation. Approval of the Project is in the public interest for the aforementioned reasons and because it meets all of Minnesota's laws supporting acquisition of clean, renewable energy and moves Xcel Energy forward on its long-term resource acquisition where a majority of its new and refurbished generation resources come from renewable energy and demand side management.

Geronimo respectfully requests that the Commission approve this Distributed Solar Energy Proposal to meet up to 100 MW (AC) of Xcel Energy's 2017 generation needs.