Utility Scale Solar Installations

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GERONIMO® ENERGY

Agenda

- Introduction to Geronimo Energy
- Utility Scale Solar
  - How it works
  - Development process
- Aurora Example
  - Key findings

Company Backgrounds

Geronimo Energy & Enel Green Power

- Utility-scale renewable energy developer headquartered in Minneapolis, MN
- Geronimo has successfully developed and built three projects in Minnesota
- Awarded 992 megawatts of Power Purchase Agreement's for delivery in 2014 & 2015
- Ranked 4th in U.S. by Bloomberg New Energy Finance in awarded contracts - 2013
- 3,500 megawatt pipeline of wind and solar farm development assets
- Recently awarded 100 MW AC distributed solar proposal (Aurora) with Xcel Energy
- Fully staffed team with competencies in marketing, development, real estate, permitting, finance, accounting, sales, etc.

- The 2nd leading generator of renewable energy in the world.
- Over 600 plants in operation around the world with over 8,900 MW of capacity
- 2013 revenue of ~€2.8 billion
- 2013 EBIDTA of ~ €1.8 billion
- Market capitalization of ~ €9.8 billion
- A majority owned subsidiary of Enel SpA
  - Second largest utility in Europe
  - Investment grade credit rating

Geronimo's strategic partnership with EGP provides vast experience and financial capabilities

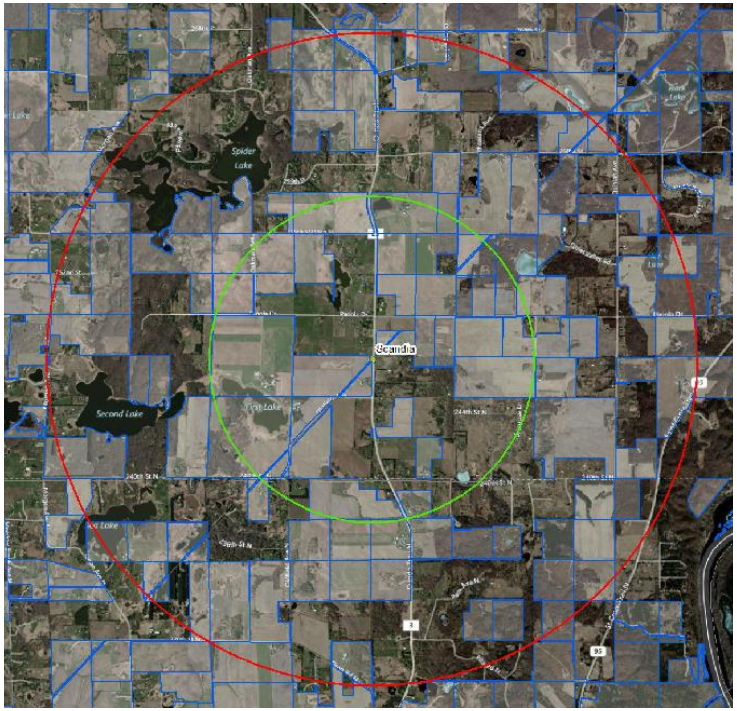
Utility Scale Solar

- **Can be any size, but typically considered larger than 2 MW**
- **Ground-mounted**
- **Laid out in straight arrays on level surface**
- **Permitting is typically done at the local level**
  - **Large installations (>50 MW) and "connected actions" can be permitted at the state level**
- **Interconnection Options:**
  - **Distribution level – allows facility to be connected directly to distribution facilities or substations and energy is absorbed by local load**
  - **Transmission level – allows facility to be connected to the high-voltage transmission system and transported to other parts of the grid**
- **Construction takes 4-12 months**

Site Identification

Map Substation/ Feeders

- Close to interconnection point
- 5-10 acres per MW
- < 5% slopes
- No wetlands
- Easement (Pipelines & Transmission)
- Square or rectangle in shape
- Compatible land use
- Limited environmental impacts



Solar Development

Technology Selection: Tracker vs. Fixed

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Tracker

Fixed

Solar Development

Module: Thin Film vs. Polycrystalline

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Thin Film

Polycrystalline

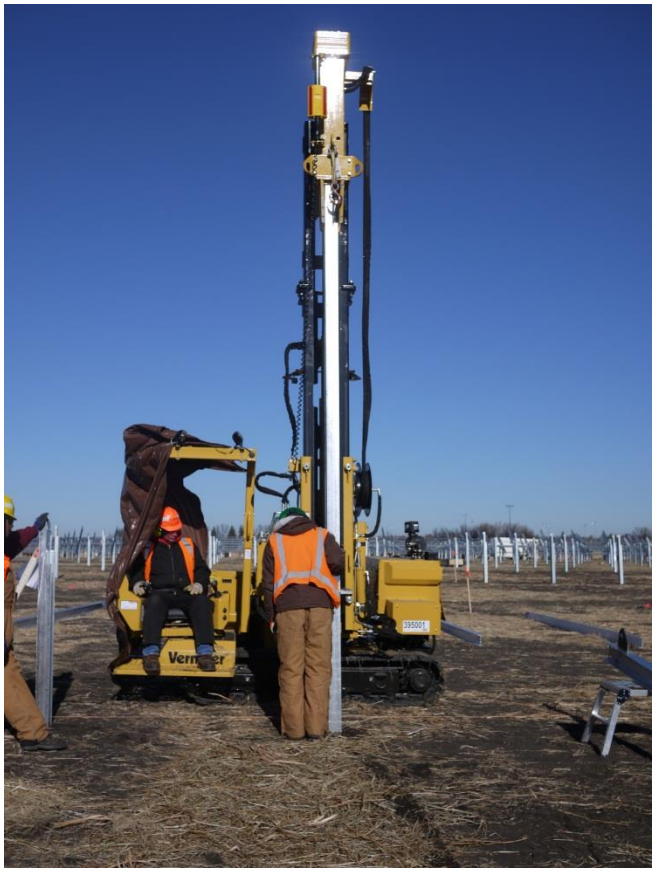
Solar Development

Engineering & Surveys

Similar to Wind:

- Field Work
  - Phase I
  - Fatal Flaw Analysis
  - Wetland Delineation
  - Alta Survey

- Engineering
  - Preliminary Site Plan
  - Grading Analysis (minimal)
  - Geotech
    - *Borings or Pull Test*



Solar Development

Construction & Operation

- **Components**
  - Linear arrays of panels
  - Access roads
  - Electrical collection system
  - Generation tie line

- **Construction**
  - Minimal site grading
  - Pile driving
  - Laying underground cable

- **Operation**
  - Equipment and electrical maintenance or replacement
  - Re-vegetated with a low growth type grass
  - Ground maintenance includes minimal mowing and snow removal by the local economy

Aurora Overview

Distributed Solar Generation

How does it work?

- Distributed solar generation (DG) refers to strategically locating solar facilities near load
- Sites are distributed amongst several locations throughout service territory utilizing easy to execute distribution level interconnections
- Each location is carefully selected based on:
  - Proximity to utility-owned distribution substations with sufficient connected load to absorb project energy
  - Land availability
  - Site quality
- Primary system components include:
  - Photovoltaic modules mounted on tracking or fixed system
    - Decision point for customer
  - Balance of Plant components include:
    - Electrical cables
    - Conduit
    - Step up transformers
    - Metering equipment
  - Facility will be fenced and seeded with low growth see mix
    - Reduces run-off from existing conditions and improves water quality

Distributed Solar allows the advantages of interconnecting smaller, separate generators while providing the economies of scale that help drive down capital costs

Distributed Solar Generation

Aurora Solar Example – Geronimo Experience

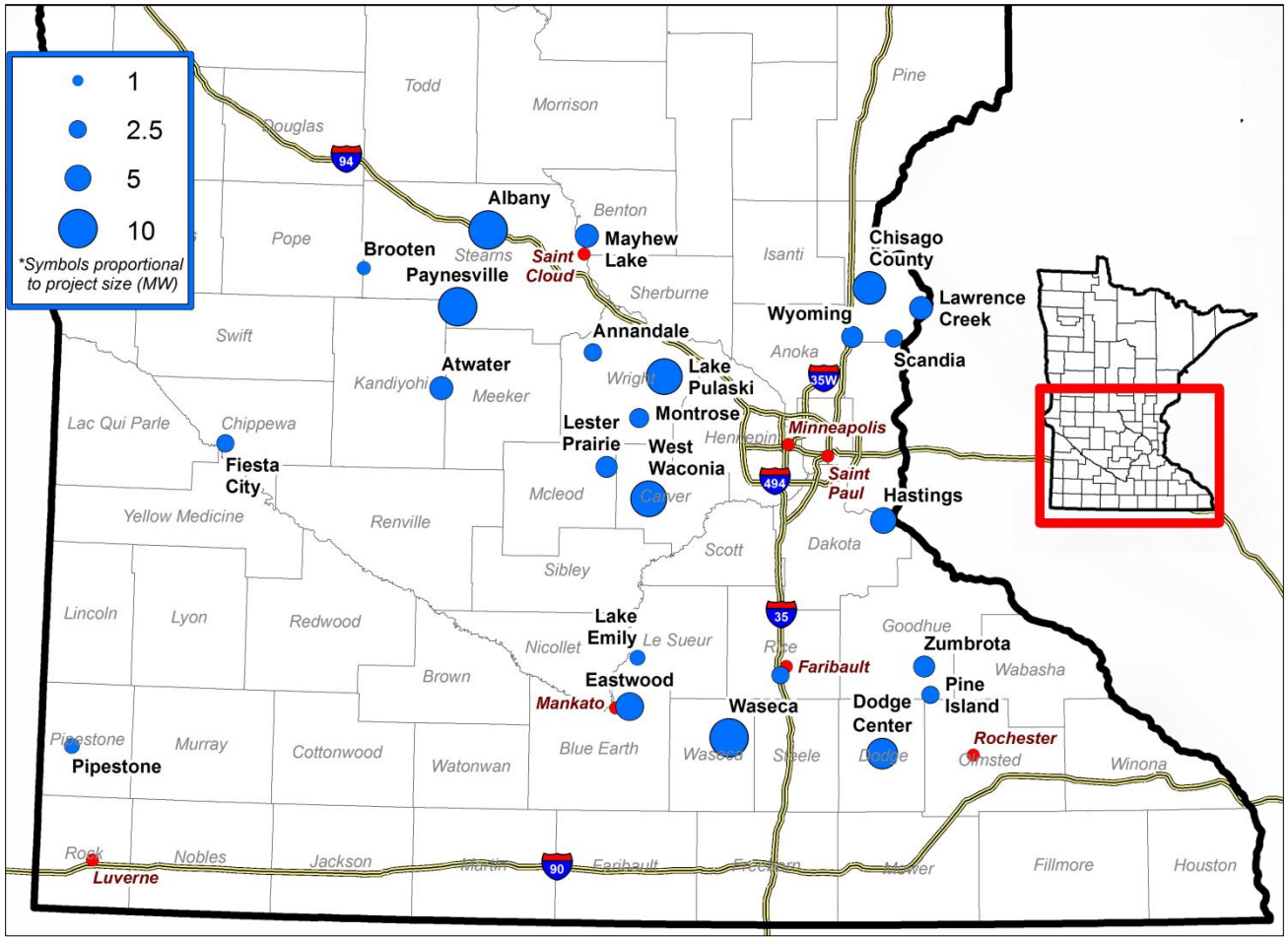
- Geronimo's Aurora Solar project was selected in the recent 2013 Xcel Energy Competitive Acquisition RFP
- Administrative Law Judge - Eric L. Lipman ruled Aurora was the most economically viable option for Xcel Energy
  - Over and above several proposed natural gas plants
- Subsequently, the Minnesota Public Utilities Commission ruled in favor of solar as a **cost-competitive** energy source for Minnesota-based Xcel Energy
- Aurora Project Details:
  - 100 MW AC distributed solar generation project
  - Solar arrays ranging in size from 2 MW to 10 MW across Xcel's service territory
  - Up to 25 site locations throughout 16 Minnesota counties
  - Utilizes nominal 300 watt photovoltaic module mounted on a liner axis tracking system
  - Interconnecting into multiple Xcel Energy substations across Minnesota
  - Will provide energy and capacity for the local distribution network

"The greatest value to Minnesota and Xcel's ratepayers is drawn from selecting Geronimo's solar energy proposal."

- Eric L. Lipman
Administrative Law Judge

Distributed Solar Generation

Aurora Solar Distributed Sites Map



Aurora Solar Quick Fact:

Total Development Period – 15 months

Distributed Solar Generation

Aurora Solar Benefits

Decision Criteria	Geronimo's Proposal	Findings	Conclusions
Capacity Resource	✓	240-245	5
Least Cost	✓	251-267	6-9
Environmental Benefits	✓	268-279	10
Minnesota Law	✓	282-289	12-16

Capacity Resource

- ✓ "includes features that…ensure that the project reliability delivers energy capacity" – *Finding No. 241*

Least Cost

- ✓ "is the lowest cost resource proposed." – *Conclusion No. 6*

Environmental Benefits

- ✓ "will not generate carbon dioxide (CO2) or "criteria pollutants." – *Finding No. 296*
- ✓ "will have minimal impacts on the environment" – *Finding No. 275*

Minnesota Law

- ✓ "furthers the public interest." – *Conclusion No. 16*
- ✓ "is in accord with Minnesota's preferences for low-emission, renewable and distributed generation." – *Conclusion No. 12*
- ✓ "represents the lowest risks of non-compliance with state and federal policies, rules and regulation." – *Conclusion No. 13*

Information cited from Docket No. E002/CN-12-1240 – In the Matter of the Petition of Northern States Power to Initiate a Competitive Resource Acquisition Process

Distributed Solar Generation

Economic Benefits & Considerations

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Reduction in Line Loss:

- System line loss can be approximately 10% from generator to load
- With DG Solar, approximately half the losses associated with a typical delivery are eliminated

Distribution Interconnect Value:

- No transmission system line loss (4-5%)
- Deferral of new or upgraded transmission capacity (system benefit)

Distribution Capacity:

- Strategic placement of distribution generation can reduce or defer distribution capacity investments
  - Example: A transformer that is at capacity could be alleviated by introducing the distributed facility on the feeder line - essentially acting as a negative load.

Geographic Diversification of Generation Assets:

- Lowers risk of system failures and helps smooth generation delivery across the system vs. centralized plant

Solar Renewable Energy Credits (SREC's):

- Rights to environmental, social, and other non-power qualities pass to customer
- SREC's can be utilized (sold or required) for sustainability goals and statute requirements

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