

# HIGHLAND VALLEY FARM

## SOLAR PV

Living in an age of global warming, reduction of carbon emissions through pursuing renewable energy is a challenge many are considering. So many that it seems we are at the cusp of a “solar revolution.” Advances in technology, consumer demand for components, and “net-metering” available from energy providers make establishment and use of private solar systems affordable and efficient. At Highland Valley Farm, going solar was a decision which satisfied our commitment to protecting the environment. But importantly, it is also a business investment toward stabilizing and ultimately eliminating energy expense from the farm’s budget. This project was not without some technical challenges. But we could not be more pleased with the guidance and support we’ve received along the way from Cheq Bay Renewables, Next Energy Solution and Bayfield Electric Co-op.

Jon Dale, Co-owner and General Manager



### System overview

- Ready-to-install (RTI) system provided by Next Energy Solution, Shell Lake
- Installed by Jon Dale with electrical by Jolma Electric
- 2 south-facing wooden ground mounts with anodized aluminum racking
- Grid-tied to Bayfield Electric Cooperative with net metering

### Technical specs

- 21.6 kW dc consists of 80, 270-watt solar modules manufactured by Peimar
- Inverted from DC to AC by 2 Fronius Primo inverters
- Estimated generation is 27,690 kWh per year
- Will cover 112% of farm electrical use

### Incentives

- 30% Federal Investment Tax Credit for renewable energy
- 22% MARCS accelerated depreciation for business

- USDA Rural Energy for America Program (REAP) Grant – covered 25% of total costs
- *Note: Xcel Energy customers qualify for additional Focus on Energy incentives*

### Costs

- Total cost including solar system, ground mounts, electrical: \$46,313
- Estimated payback of 3 years
- See below for full cost breakdown

### Installation

- Approximate time to complete
  - 63 hours: research and planning, calculations, meetings, USDA REAP grant application
  - 132 hours: project organization, coordinate and manage contractors, ground mount construction, panel installation, PV wire connections
- Lessons learned
  - The USDA REAP grant application process was time consuming and with no guarantee of acceptance. However, going through the process does provide applicant with a thorough and organized analysis of all technical aspects of project and an accurate and detailed cost projection.
- Recommendations
  - Building a ground mount and installing an RTI is fairly rudimentary, but it still requires some basic skills and tools. Therefore, an RTI is not for everyone.

### Cost breakdown

- \$38,450 RTI System (Next Energy Solution)
  - \$1.78/watt
  - Includes modules, inverters, racking, PV wiring, drawings and install instructions
- \$2963 Electrical (Jolma)
  - Includes trenching and 400 ft buried conduit and run of pv wire from inverters to arrays, AC wire connections, combiner box and breakers from meter to inverters
- \$2200 Wooden ground mounts and supplies
  - pressure treated lumber (Menards)
  - fasteners (Amazon.com)
  - #6 bare copper wire and ground rods with wire clamps (Omer Nelson Electric)
  - 6"x6" electrical boxes, conduit couplings and cable ducts (Omer Nelson Electric)
- \$2200 Site Prep (Lake Effect Builders)
  - stump removal
  - auger post holes
- \$500 System inspection, reversible meter installation, system hook up (Bayfield Electric Co-op)
- \$46,313 Total cost