



Solar Farm Electrical Control Buildings & Substation Build Project

PROJECT PROFILE



The Team

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Brock's Panel
Services

Brock's Services

Canadian Solar Inc.

Recognized as a leading global solar manufacturer, Canadian Solar Inc. delivers high-efficiency solar cells, solar modules, solar power systems, and off-grid solar power application solutions.



ABB's Solar Group

Known for innovative solutions that transform the sun's energy into reliable power, ABB's Solar Group is a global leader for the delivery of products and solutions such as solar inverters, low-voltage and grid connection products, and photovoltaic (PV) power plants.



Brock Solutions

Brock Solutions is a leading automation engineering/systems integrator with full manufacturing operations that support solar projects including:

- Multiple solar projects covering high volume control panel and combiner box fabrication
- Manufacturing of prefabricated E-Houses, I-Houses and Substations with complete assembly and wiring of power and communication systems
- Multiple Solar Manufacturing Execution Systems (MES)



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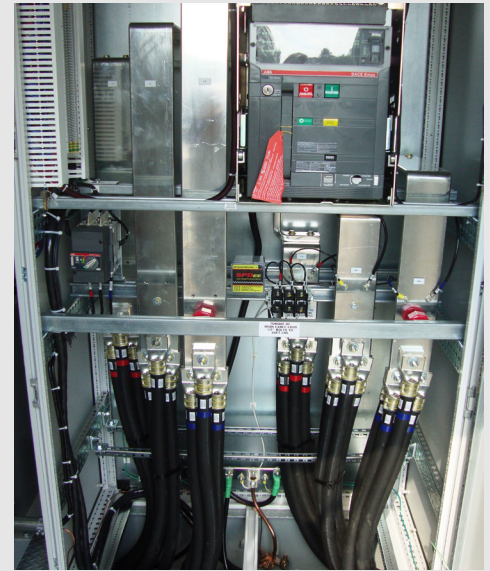
Integrated Solar Farm

Canadian Solar sought to construct three 10 megawatt solar farms on three separate properties near the community of New Liskeard, in the City of Temiskaming Shores, Ontario, Canada. The farms needed to be electronically linked to create a 30 megawatt integrated solar farm.

The business case for the integrated solar farms was based on three separate contracts that Canadian Solar received from the Ontario Power Authority (OPA) for the sale of electricity generated by this renewable energy source.

For the design and construction of the solar farms, Canadian Solar contracted ABB's Solar Group. ABB faced a unique challenge because of the requirement for 36 (1) megawatt 31' long x 14' wide x 11' high I-Houses to be assembled and delivered to the three solar farms within a four-month timeframe. To address this challenge, ABB sub-contracted Brock Solutions.

"Canadian Solar looked to construct three 10 megawatt farms on three separate properties"



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Brock Solutions Takes on the Challenge

Brock's panel manufacturing team accepted the challenge of delivering 36 I-Houses within a tight project timeline and executed the project on schedule. The Project Manager oversaw a team of manufacturing specialists who made this challenging and complex job a success. Due to the immense size and technical nature of the project, custom tools were developed to guide the fabrication process and to track progress. The project was broken down into 110 key tasks per I-House and arranged by the following sub-categories:

- Equipment mounting/installation
- Conduit installation/fastening
- Re-combiner/inverter bus bar installation
- Inverter/MV transformer power cabling
- Control/power wiring
- Ground bonding
- Testing
- Shipping



Preping for the Build

In preparation for the build, the Brock Solutions team of engineers and specialists:

- Reviewed and provided comments on the electrical design and worked with the Electrical Safety Authority (ESA) to finalize and approve the design before manufacturing started
- Reviewed the I-House design with the Control Room manufacturer and addressed issues related to obstructions, component mounting/supports, cable routing and required clearances
- Provided and implemented options to reduce labour and material costs through layout design modifications and material substitutions

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Forty-Four Thousand Pounds

Brock manufactured 36 I-Houses that each weighed 44,000 pounds. The I-Houses were comprised of:

- 1 MW inverters
- 3,600 Amp, 1000VDC re-combiner panels
- 1 MVA medium voltage transformers
- Supervisory Control and Data Acquisition (SCADA) cabinets
- Low-voltage switchboards that were designed, manufactured, and installed by Brock
- 17,000 feet of heavy gauge power cable
- 10,000+ pounds of copper busbar
- 20,000+ feet of conduit
- 30km (18 miles) of control cabling



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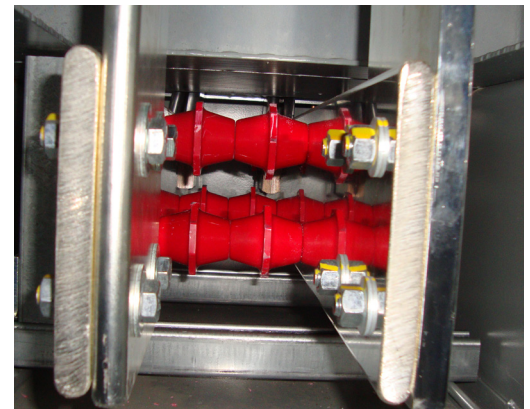
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Fully-Loaded and Tested

For 16 straight weeks, fully-loaded and tested I-Houses were shipped on-time, from Brock's panel shop in Kitchener, Ontario, direct to the new integrated solar farms in northern Ontario. The solar farms play an important part in supporting the Ontario Power Authority's focus on transforming Ontario's electricity system by harnessing clean electricity resources. The I-Houses are vital to the overall project effort, as they provide the technical infrastructure to ensure that energy conversion takes place at optimized levels for the long term.



Brock's Panel Services

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Panel Services Overview



As part of our core systems integration services, Brock Solutions operates one of the largest CSA-Certified & UL-Listed panel fabrication operations in North America. Highlights include:

- Two panel manufacturing facilities - one in Kitchener, Ontario, Canada, and one in Irving, Texas, US
- Combined capacity of 50,000 square feet
- Track record of financial stability and profitability for over 15 years
- Capabilities to design, assemble, wire, and functionally test complete industrial controls ranging from junction boxes and multi-panel systems, to complete self-contained power-control rooms
- Flexible manufacturing, panel fabrication from either location, or both
- Capability to handle high-volume/rapid-delivery projects as well as projects where high levels of customization are required
- Contract manufacturer for high volume programs with globally recognized OEMs and Automation companies
- Full-scale manufacturing of "Engineered-to-Order" pre-wired and pre-tested Prefabricated Control Rooms (PCRs)

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What Brock Does

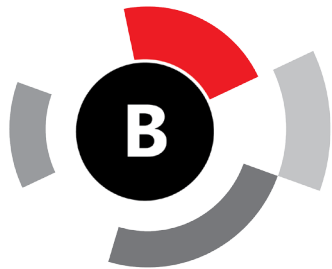
Brock Solutions is an engineering solutions and professional services company specializing in the design, build and implementation of real-time solutions for broad based industrial/manufacturing and transportation/logistics organizations globally. With more than 300 employees in Canada and the U.S., Brock Solutions is a privately held, employee owned organization with over 25 years in the real-time solutions space.

From panel fabrication to the controls layer and Manufacturing Execution System (MES) layer with seamless integration into Enterprise Resource Planning (ERP) systems, our teams deliver from the "shop-floor-to-the-top-floor". Our services include:

- Consulting
- Controls Automation
- Project Management
- Manufacturing Execution Systems (MES)
- Panel Fabrication
- Sustainment & Support
- Software Automation
- Electrical/Hardware Design

Brock's teams deploy technology, industry know-how and a proven methodology for reducing risk and solve challenging problems on-schedule and on-budget.





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