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Mirus Solution resolves Solar Connection Stand-off with Utility



The changing grid connection requirements of solar installations puts the pressure on

In 2013, Sean Hammond, VP of Operations at Barrie, Ontario-based EthoSolar found himself in a bit of a tight spot when a 500 kW solar installation in Southern Ontario was not allowed by the utility to connect to the grid. The non-MIRUS supplied transformer was deemed insufficient because of the utility's interpretation of Hydro One Network Inc.'s Transformer Interconnection Requirements (HONI TIR). Without the ability to connect to the grid, the project remained incomplete, putting a strain on EthoSolar's construction financing.

Fortunately for Sean, MIRUS International began working in this sector. MIRUS president Tony Hoevenaars was already engaged in educating members of the Utility Advisory Council and the Electrical Safety Authority on harmonics. Tony was able to step forward and offer consulting advice to EthoSolar. After some initial discussion, it became apparent that the only solution to save the existing transformer was to install a zigzag autotransformer and neutral grounding inductor (NGI) designed to meet the HONI TIR requirements. The team at MIRUS came to the rescue with a very quick turn-around, shipping these devices to site two weeks later.

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What were the benefits of MIRUS' solution?

The zigzag autotransformer (an adaptation of MIRUS' NCE™) and NGI were added to the existing transformer to address the utility's requirement for effective grounding during islanded operation, without introducing a low impedance path for circulating common-mode currents. Another option was to replace the existing transformer with one from MIRUS' new line of ULLTRA™ Solar Transformers that have the HONI TIR requirements built-in.

The new solar transformer was designed to deliver a number of benefits including additional solar revenue as the transformer's extremely high efficiency passes more energy to the grid. MIRUS' transformer is a better solution than other transformers with designs that have high efficiencies only at light loads. MIRUS' ULLTRA™ transformer was designed to deliver high efficiency at all load levels, increasing revenues at any time during the solar cycle, whether at full load during a bright sunny day, zero load at night or any other load level throughout the day. Other transformers are not designed for this range.

To meet utility interconnection requirements, this low loss transformer can be designed with a zigzag winding connection and built-in neutral grounding inductor. This combination will be acceptable for connection to any utility in Ontario regardless of whether they enforce all aspects of HONI TIR requirements or not. Simpler transformer configurations are also available from MIRUS when allowed by a specific utility.

Transformer Interconnection Requirements for solar applications include:

- Need to have a ground fault path, whether grid tied or islanded
- Limiting temporary over voltages during a fault condition
- Prevention of common mode circulating currents
- Ability of the Inverter to detect loss of phase and shut down
- Delivering high efficiencies to minimize losses
- Addressing harmonic voltages and metering requirements

Designing a transformer to meet Ontario's Electric Utility interconnection requirements is challenging, as many conflicts and compromises must be addressed. MIRUS has developed the best transformer to meet these requirements while delivering greater efficiency. The solar specific transformer application uses the NEMA Premium ULLTRA™ – low loss transformer in combination with a neutral grounding inductor.

More about EthoSolar

EthoSolar began in 2009, when a local farmer installed solar on his property. He started the company because he wanted to bring this income opportunity to other farmers across the province. EthoSolar focuses on agricultural solar installations. Since 2009, the company has installed 550 systems for a total of 8 megawatts of solar energy. Initially they focused on installing smaller 10-12 kW systems that typically did not require a transformer. Recently the design for all larger systems, up to 500 kW such as roof tops on farm and commercial buildings use a series of small inverters and step up transformers.

About Mirus International

Mirus designs and develops world class power quality improvement products for mission critical operations. Their uniquely specialized product line includes highly efficient harmonic filters, transformers, autotransformers and Data Center power distribution equipment. Comprised of a leading team of power quality experts, Mirus' solutions minimize disruption to the power supply, improve reliability and adhere to the strictest of regulatory requirements while also saving energy. Proven to perform, Mirus products are available globally and are real-world tested in its own Harmonics & Energy (H&E) Lab.

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