

# RENEWABLE ENERGY INNOVATION FOR TELECOM TOWERS

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*Windular's 10 kW wind and  
2.25 kW solar tracking systems  
in Nungesser Lake, Ontario.*

## BELL AND WINDULAR RESEARCH AND TECHNOLOGIES PARTNER WITH STATE-OF-THE-ART WIND & SOLAR HYBRID SYSTEM

Bell Canada and Windular Research and Technologies have partnered on a pilot initiative installing Windular's state-of-the-art hybrid wind and solar systems on Bell's Nungesser Lake, Ontario, tower.

Windular's innovative technology employs a 10 kW wind turbine and a 2.25 kW solar array that are mounted directly on the tower by way of a customized rail and carriage system. Through the application of proprietary power electronics, the turbine can travel 360 degrees around the tower seeking out the most efficient wind. Similarly, Windular's power electronics propel the solar array 180 degrees around the tower while it tracks the rise and fall of the sun from east to west.

The wind system has been placed at the 205' level of the 523' guy wire tower and the solar positioned at the 50' level.

Dual cycling diesel generators charging a bank of sealed lead acid batteries have historically powered Bell's Nungesser site. Windular's hybrid renewable energy system will now utilize the wind and sun as the primary power sources to charge the batteries, thereby reducing, and possibly eliminating diesel genset run-time, fuel consumption and the resulting carbon emissions. The pilot initiative provides a long-term, cost-efficient, renewable energy source for powering Bell's towers.

Windular's innovative technology allows mobile network operators to install wind and/or solar systems at any elevation on any type of telecom tower and its state-of-the-art power electronics make Windular's systems the most efficient renewable energy application available to the industry.

The Nungesser site is the first installation of Windular's technology in North America and only the second of its kind in the world. Bell Canada leads the way in employing this innovative renewable energy technology in the telecom sector.

Windular is currently looking at other sites for prospective clients.

Windular Research and Technologies Inc. is a, Ontario, Canada based company that designs, manufactures and installs hybrid renewable energy systems specifically for the global telecom industry. For additional information see: [www.windular.com](http://www.windular.com).





## THE 10 KW WIND SYSTEM HAS BEEN PLACED AT AN ELEVATION OF 205' ON THE 523' TOWER

The transfer of energy from the wind and solar systems is achieved through Windular's proprietary energy transfer platform utilizing a multiple brush and buss bar application to deliver energy down the tower where it is inverted and rectified before charging the batteries.

In order to minimize the destructive forces of extreme weather conditions, Windular's 10 kW wind system employs a number of protective mechanisms more commonly found in big wind turbines. Firstly, the system utilizes a two-piece patented blade technology that allows the blades to "pitch" when winds become too intense, thereby eliminating over-spin and the possible

destruction of the turbine. In addition, in extreme winds in excess of 25 m/s, the system's power electronics are programmed to drive the turbine into a safe position out of the wind where an electronic brake is deployed. Once the system detects acceptable operating winds, the brake is released and the turbine automatically repositions itself to optimize wind direction and speed. It is, if you will, smart wind technology!

Windular's technology also includes an on-board weather station allowing technicians to monitor wind speed, wind direction and solar irradiance and, in turn, determine the best locations for Windular's wind and solar tracking systems.

Windular's rail and carriage system has been designed to adapt to virtually any tower configuration globally. The rail can be expanded or contracted to accommodate guy wire towers, three and four-legged, self-supporting towers, and monopole towers.

One benefit of Windular's technology is the ability to install powerful renewable energy systems using the existing tower infrastructure. Windular's 10 kW wind and 2.25 kW solar systems can be installed at any elevation on the under-utilized sections of the tower. This allows the systems to maximize the wind and solar resources available on site and eliminates the requirement for, and resulting costs of, installing additional concrete foundations and ground-mount infrastructure.



## Energy Monitoring

The Nungesser site is equipped with remote monitoring capabilities allowing technicians to view wind speed, wind direction, solar irradiance and kWh of power produced, among other data. With a load of approximately 1.8 kW, preliminary data from the site has proven very promising with Windular's hybrid wind and solar system generating up to 80%-100+% of the daily power requirement with additional data to be gathered moving forward. This productivity translates into significant reductions in power operating costs and carbon emissions for the Nungesser site. With Windular's technology, Bell has taken a world-leading role in the effort to reduce the use of carbon-based power sources.



## Windular's Global Reach

Below, Windular's 10 kW wind system is deployed on a four-legged, self-supporting tower in rural Pakistan at the 26m elevation of a 37m tower.

Industry analysts estimate that by 2020 the telecom industry globally will contribute about 45 million tons of carbon dioxide annually. With a global mandate to reduce reliance on carbon-based power sources Windular's technology will play a much-needed role in reducing the industry's carbon footprint.

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