



## Grand Renewable Wind | Haldimand County, Ontario



SAMSUNG RENEWABLE ENERGY INC.



# Overview

|                      |                           |
|----------------------|---------------------------|
| Location             | Haldimand County, Ontario |
| Power Purchaser      | IESO                      |
| Turbine Model        | Siemens SWT-2.3-101       |
| Number of Turbines   | 67                        |
| Power Capacity       | 149 MW                    |
| Construction Start   | September 2013            |
| Commercial Operation | December 2014             |
| Construction Jobs    | 500 at peak               |
| Permanent Jobs       | 12                        |



Grand Renewable Wind is a joint venture between Pattern Energy, Samsung Renewable Energy, and Six Nations of the Grand River. Project construction began in September 2013 and the facility commenced commercial operations in December 2014. Construction was performed by Samsung C&T Canada (SENC).

Ontario workers have been involved in every aspect of Grand Renewable Wind – from manufacture and assembly of the wind turbine components to site construction, component installation, and facility operations. Approximately 500 workers were on-site during peak construction activity, with 98% of the workforce from Ontario. Twelve full-time employees currently operate and maintain the facility, which uses 67 Siemens 2.3 MW wind turbines with Ontario made blades and towers.

The 149MW facility is expected to produce clean, renewable electricity equal to the needs of 50,000 Ontario homes each year. The project sells 100% of its electrical output under a 20-year power purchase agreement with the Independent Electricity System Operator (IESO).

Grand Renewable Wind will continue generating significant local benefits, including an estimated \$23 million in property taxes and contributions to a Community Vibrancy Fund over 20 years. Haldimand County will administer the Community Vibrancy Fund to support local initiatives including land stewardship; development and construction of County recreational facilities; improvements of community and protective services; and infrastructure improvements.

## Grand Renewable Wind Annual Benefits

**50,000**



Generates enough clean energy to power 50,000 Ontario homes.

**4,000,000**



Injects more than \$4M of direct spending into the local economy.

**83,000**



Avoids 423,000 tonnes of CO<sub>2</sub> equal to taking 83,000 cars off the roads.

**12,000**



Conserves enough water to meet the needs of about 12,000 Ontarians.

↳ When compared to coal-fired generation. ◀

# Harvesting the Wind for Ontario

## Harnessing the Wind

Wind can be harnessed to transform kinetic energy into electrical energy. Wind turbines do this with blades mounted on towers, which are turned by the wind, causing them to turn a shaft that is attached to a generator. This creates an electrical current that is carried by cables to the power grid, which transmits electricity to the electric grid that connects to your home.

**Turbine model:** SWT-2.3-101

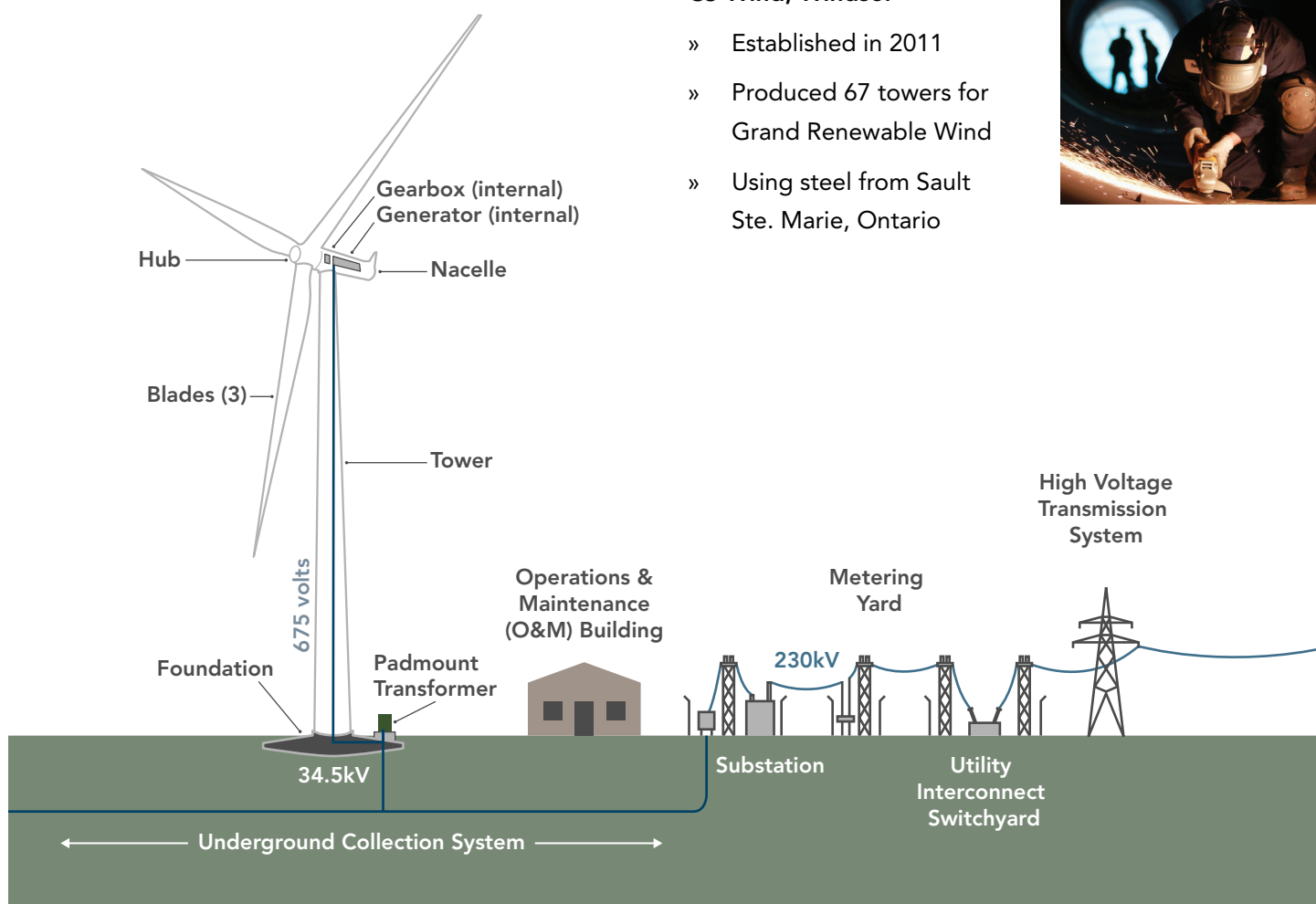
**Rotor speed:** 6 – 16 RPM

**Hub height:** 99.5 m

**Blade length:** 49 m

**Rotor diameter:** 101 m

**Tower base diameter:** 4.5 m

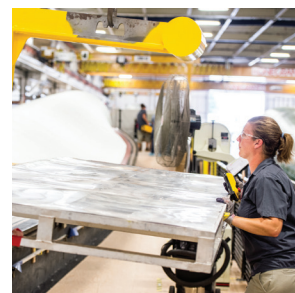


## Ontario-Made Wind Turbines

Siemens and CS Wind invested \$100 million in Ontario, creating approximately 600 manufacturing-sector jobs to meet the demand from Grand Renewable Wind and other Samsung-Pattern Energy wind projects.

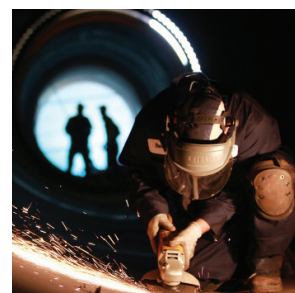
### Siemens, Tillsonburg

- » 23,505 square metre facility
- » Produced 201 blades for Grand Renewable Wind
- » Siemens' first turbine manufacturing plant in Canada
- » First blade manufacturing facility in Ontario



### CS Wind, Windsor

- » Established in 2011
- » Produced 67 towers for Grand Renewable Wind
- » Using steel from Sault Ste. Marie, Ontario



## Six Nations of the Grand River

Six Nations of the Grand River community is located 20km upstream on the Grand River from the Grand Renewable Wind facility. With over 26,000 community stakeholders, the Six Nations of the Grand River Development Corporation (SN Dev Corp) seeks economic opportunities that align with community cultural values to assist in meeting the needs of the community.

Six Nations of the Grand River Development Corporation invests in and manages several Nation Enterprises and has readily participated in several renewable energy projects. These actions include a strong commitment to the renewable energy sector largely due to the positive impact on the environment. To date Six Nations has directly or indirectly invested in over 790 MW of renewable energy.

## Samsung

Founded in 1938, Samsung C&T is involved in a broad and growing portfolio of businesses, delivering creative, integrated solutions to customers worldwide through a network of over 100 offices in 44 countries. Samsung C&T, together with our partners, is making an unprecedented \$5 billion private-sector investment in Ontario to create clean, renewable energy for generations to come. Samsung signed a Commercial Agreement with the Government of Ontario that will result in 1,369 MW of installed renewable energy capacity in Ontario.

Our investments are establishing four new manufacturing facilities to produce renewable energy components for Ontario and for export to markets around the world, along with 900 direct manufacturing jobs and 9,000 high-skilled jobs in Ontario. Working together with the Province of Ontario, Samsung looks forward to a long-term partnership to place Ontario at the forefront of the global shift to clean energy.

## Pattern Energy

Pattern Energy Group Inc. (Pattern Energy) is an independent power company listed on the NASDAQ ("PEGI") and Toronto Stock Exchange ("PEG"). We have a portfolio of renewable energy facilities in the United States, Puerto Rico, Canada, and Chile that use proven, best-in-class technology. Headquartered in San Francisco, we have offices in Toronto, Houston, San Diego, New York, Mexico City, Santiago, and Tokyo.

We intend to create long-term value for our shareholders in an environmentally responsible manner and with respect for the communities where we operate. We have a strong commitment to promoting environmental stewardship, which drives our dedication to operate high-quality renewable energy facilities. Pattern Energy plans to grow our business through third-party acquisitions, including from Pattern Energy Group LP (Pattern Development), our shareholder and a leading developer of renewable energy assets.