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Auto parts makers transform into green machines

Linamar joins pack of companies retooling to build the gear that drives wind and solar energy

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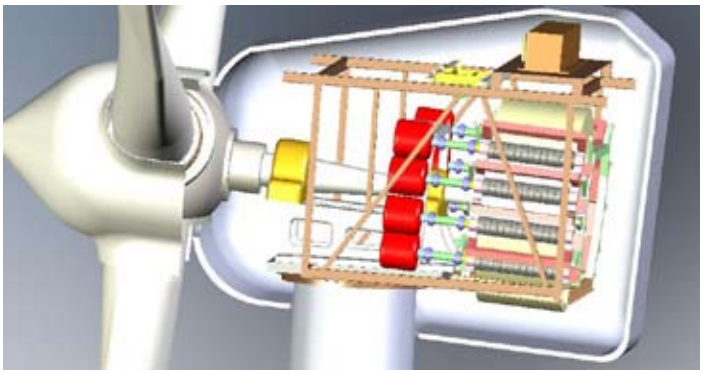
The fourth of November was a big day for Jeff Andrews. It also signalled a bold new direction for one of Canada's largest auto parts makers.

The president of Pro-Power and Energy Ltd. of Port Hope spent a good part of that day driving to Detroit, where he got together with Ken Rossman, an American who manages new business deals for Ontario auto parts manufacturer Linamar Corp.

It was there, ironically on U.S. soil, that the two men signed a 10-year supply agreement that committed Linamar to manufacturing a new – and the first – made-in-Ontario wind turbine at the company's headquarters in Guelph.

Specifically, Linamar will be making a 2-megawatt "nacelle," the heart and brains of a wind turbine that houses all the mechanical gear used to generate electricity.

CWind Inc. of Owen Sound designed the device, and in partnership with Pro-Power has set up separate companies – WindPro and WindBlade – to manufacture the towers that will hold the massive Linamar-made machines, as well as the blades that connect to them.



Computer drawing shows prototype wind turbine, in development by Ontario partners CWind and Linamar, that eliminates the maintenance.

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Solar engine was made by Ontario's Linamar and is tested at a research site in New Mexico.

"It's all signed, sealed and delivered," says Andrews, adding that the agreement is a big one for Linamar. "We're talking about $3.6 billion in orders for them over 10 years."

Not bad for a company that reported $2.3 billion in revenues in 2008. Linamar, like other companies that have depended heavily on the auto industry, is diversifying its customer base. And the energy sector – the greener the better – is what's capturing their attention.

Aurora-based auto parts giant Magna International is producing electric bicycles, for example, and in October signed an agreement to manufacture, through subsidiary Cosma International, solar equipment for California start-up SkyLine Solar.

Two other auto parts entities – Meikle Automation Inc. of Kitchener and Markham-based Woodbine Tool & Die – have picked up business in the solar PV market as well.

Linamar, in many ways, is leading the pack. It expects its energy-related business will grow to about $1 billion annually within the next 10 years, up substantially from roughly $50 million in 2008.

Chief executive officer Linda Hasenfratz says the company's revenue stream has already grown by 50 per cent this year, much of it through making wind-turbine parts and production equipment for the European market.

The company also makes engines that generate power from solar heat, part of a deal with Scottsdale, Ariz.-based Stirling Energy Systems.

But the deal with CWind and Pro-Power potentially puts Linamar on a different plane.

If the new wind turbine is successful, it stands to become a lucrative chunk of the company's multibillion-dollar manufacturing operation.

"When we came upon CWind, we saw a much bigger opportunity, that of producing the entire nacelle. This is a much larger contribution to the wind turbine than we've done in the past," says Hasenfratz.

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The stars, in a way, are aligning for the 43-year-old company. As the wind industry grows, so, too, are the wind turbines being developed. The bigger the turbine, the more efficient it is at converting wind energy into electricity.

The largest to date stands nearly 200 metres tall and has a blade-to-blade diameter of 126 metres. Nacelle, blades and tower together can weigh more than 300 tonnes.

These massive sizes, however, create huge challenges for turbine manufacturers based in Europe and parts of Asia that are looking to serve the North American market.

"When you look at products of this significant size, the logistics and cost of shipping are really prohibitive, so you're almost forced to go local," says Hazenfratz.

"If oil prices go up, fuel prices go up, and then it becomes less cost-effective to ship product thousands of kilometres."

Linamar also plans to capitalize on new rules in Ontario that require wind and solar equipment to have a certain amount of local content. Add to that generous incentives in the province for developing green-energy projects and the timing for introducing the CWind turbine couldn't be better.

Already, CWind has its first two years of production pre-sold to Ontario-based wind developers, with strong interest also coming from British Columbia, Saskatchewan and as far as Ireland. "The phone is ringing off the hook," says Andrews, adding that Linamar's involvement has brought credibility to CWind's design.

This is no ordinary wind turbine, part of the reason Linamar has been so attracted to the project.

"It's unique in the industry," says Paula Mayor, manager of business development for New World Generation Inc., parent company of CWind. Her father, Paul Merswolke, is co-inventor of the CWind design.

Most utility-scale wind turbines are designed to turn a drive shaft that is connected to a gearbox. The gearbox speeds up the rotation of a second shaft that connects to an electrical generator.

The problem is that gearboxes are heavy and prone to failure under mechanical stress. This leads to higher maintenance costs over the life of the turbine, as well as increased noise as the gearbox wears out.

The CWind turbine eliminates the gearbox altogether. Instead, the drive shaft is connected to a big wheel, similar in shape to a can of tuna. Hugging the wheel are eight tire-lined shafts, each connected to its own electrical generator. As the big wheel turns, it spins the smaller shafts.

If the wind is light, some of the shafts can be moved away from the wheel to reduce friction. As the wind picks up, more shafts hug the wheel to capture the additional friction energy.

It's a simpler, more efficient design that has been validated by two independent engineering firms. It has also been demonstrated on a small 65-kilowatt prototype.

"Linamar's engineers were impressed as they poured over the data and the drawings," Mayor recalls.

Between now and March 2011, the companies will work together to develop a 2-megawatt prototype and two pre-commercial turbines, which must be tested for six to eight months before being certified. After that, commercial production will begin.

Linamar's merger in 2003 with the engineering firm McLaren Performance Technologies, of Formula 1 auto racing fame, will come in handy. The Michigan-based engineering group hopes to do with CWind what it did for the solar engine it developed for Arizona's Stirling Energy.

Charles Andraka, a project engineer at Sandia National Laboratories, a U.S. Department of Energy research centre in New Mexico, says Linamar took the early solar engine design and improved it dramatically. Both old and new models have been tested at Sandia's solar research facility.

"They took a lot of weight out of the system and simplified it quite a bit," says Andraka. "The engine was completely redesigned."

Linamar's important role in re-engineering these technologies explains, in part at least, why it increasingly wants to put its own stamp on the final product.

In the case of CWind's nacelle, the supply contract stipulates that the machine be clearly marked "Powered by Linamar." It follows the same marketing logic as the "Intel Inside" logo on computers that made chipmaker Intel Corp. a household name.

That's just fine with Mayor, who is more than happy to have Linamar use the CWind design as a springboard for new business, particularly at a time when European wind-turbine makers are eyeing the North American market.

"They're our main supplier of the nacelle. They bring capability to the table, and they bring reputation to the table," Mayor says. "They are moving into this industry and they want to be recognized."