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Wind Turbines



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Business Overview

- *Inventors previous success in the turbine industry,*
- *Retained IP for use above water and on land.*
- *The unique design of the wind turbines have numerous proprietary, advantages over their 3-Blade competitors, including:*
 - *Low cost design and improved ROI and Payback .*
 - *Direct drive high speed generator provides maximum power at wide range of wind speeds*
 - *Low cut-in and cut-out speeds.*
 - *Less moving parts, fewer things can go wrong! No gear box or braking system.*
 - *The worldwide exclusive IP on the design, rim drive, and generator technologies that distinguish the turbine in the marketplace covering multiple U.S. and International patents issued and filed.*
 - *Fully built-out management team with significant engineering, business development, operations, finance and R&D experience.*



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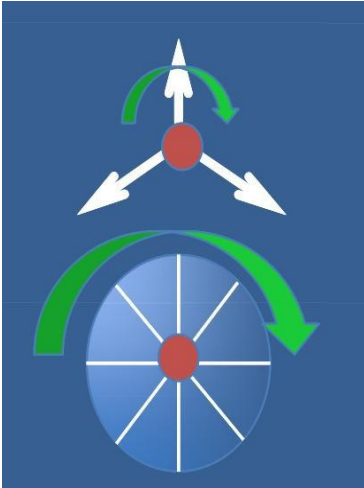
Turbines are lower cost and has advanced performance superiority over 3-Blade

Design and Technology – “A Better Way”

Turbine technology employs a unique, low-cost design that utilizes a proprietary “Rim Drive TM pending” process which enables power to be derived from outside the blade span (positive inertia effects collected around the ring – drag-based turbine).

The results are higher RPMs, resulting a lighter smaller generator (lower cost), no gearbox, no braking system - fewer mechanisms (fewer things to go wrong).

Drag-based system versus lift-base of three blade turbines, thus allowing us to capture wind at lower speeds.





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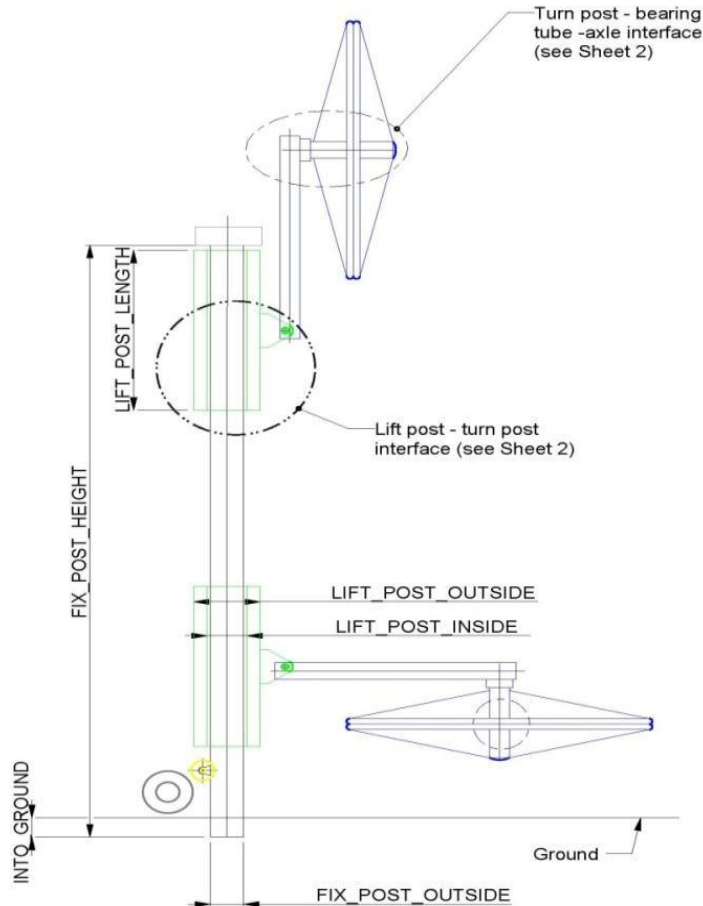


- High speed, direct drive generator can operate at a large range of wind speeds (880 rpm's to 8,800), allowing us to extract maximum energy from low and high wind speeds.
- Operates in Class 2 and 3 environments, as well as Class 5, 6 & 7.
- Simplicity and lower costs for installation, repairs and maintenance.
- Low cut-in and high cut-out speeds and Lower tower height.
- VSDD Wind Turbine Controller with pitch control turns turbine out of wind , opposed to turning the turbine off; no breaking system. Can be slowed down to safe operational RPM of 40 to 45 rpm's even at high wind speeds as high as 75 mph
- Noise levels extremely low and Migration of bats and birds not an issue due to design
- Low radar and cell tower inference



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Installation and Maintenance

➤ *Lever action allows for the lift post to fold down for ease of installation and maintenance*

➤ *In the event of dangerous winds, the structure can be folded down to prevent damage.*

➤ *Tower height requirement much lower than 3-Blade (60 -75 ft)*



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Turbines provide further advantages via a Resonant Field Modulation Direct Drive High Speed Variable generator.

- *Direct drive eliminates the need for a gear box.*
- *High speed variability allows operations at a wide range of wind speeds, enabling to extract max energy from low and high wind speeds .*
- *High speeds allows for a reduction in generator size, producing a smaller and lighter generator .*
- *Resonant Field Modulation allows for power control output with fewer power electronics; making a more cost effective approach to active front end power electronics*
- *Turbine, generator and inverter – all modular, one-stop solution for all turbine models.*



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Continued Validation

RD40 (50 kW) Validation

• All testing on our Proprietary Generator has been completed at the Center for Advanced Power Systems (CAPS) utilizing the Navy generator test bed that is on-site. Test bed is loaded with all data compiled over an eight month period at the test site located at Texas Tech (REESE).

• VSDD controller, generator controller, and inverter controller communications tested; as well as grid connectivity.

• Full Scale production of RD40 implemented at Co-Line.

• Validation is starting on our 100kW unit.

• In addition, production will begin the first quarter of 2012 on our 250kW and 500kW turbines.





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Business Relationship: Manufacturing (Co-Line) **Reliable Electricity Source**



Finalized manufacturing agreement with Co-Line Manufacturing in Sully, Iowa.

- *Family-owned business with over 180,000 sq. ft. of manufacturing space.*

- *Facilities house metal stamping, tool & die, metal fabrication, laser cutting, and robotic and manual welding.*

- *Fortune 500 customers include Daimler Chrysler, Ford Motor Company, General Motors, Kawasaki, Vermeer Manufacturing, and Pella Manufacturing.*

- *In addition, Co-Line produces 20-round and 30-round gun clips for the M16 rifle for the Department of Defense.*

- *ISU 9001-2008 Certified.*





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Gexpro Overview

- *Largest electrical distributor in the world - \$20B*
- *1,000 plus dedicated sales force*
- *Dedicated “Green Specialists” -- Assists with Rebates, Grants, Permitting*
- *Utilization of GE Project Management Software*
- *Proposed to Kit all electrical supplies – JIT Inventory and cost plus agreement for supply, sales, training*

Gexpro Responsibilities:

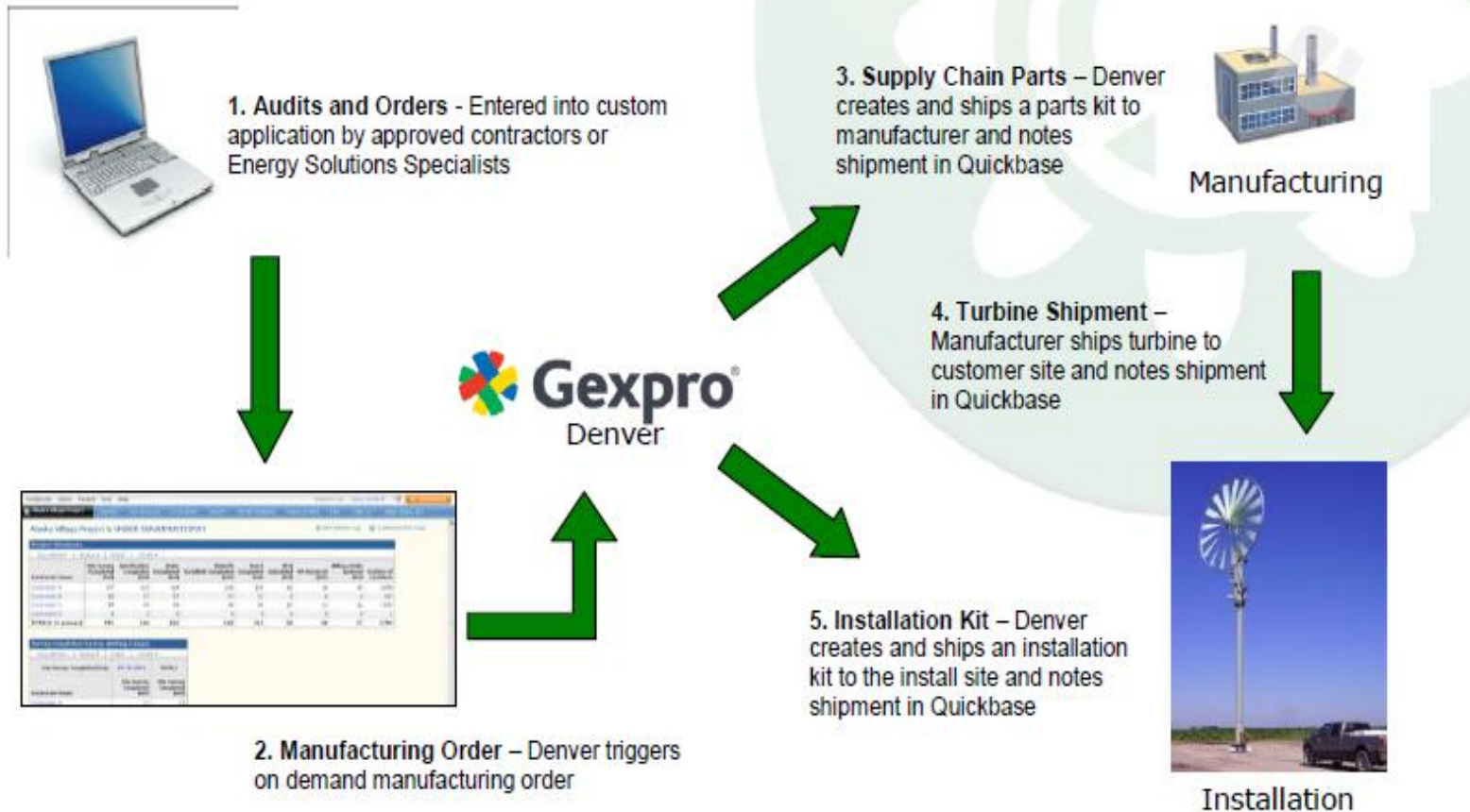
- *Single POC for Product Selection & Support*
- *Site Audit Capabilities*
- *Manufacturing Kit – Supply materials including nuts and bolts, gear, wiring harnesses, PLC components, motors, batteries, etc.*
- *Installation Kit – Site specific installation materials (AC side wire, disconnects, panels, etc).*
- *Training*



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Gexpro Denver will serve as the single POC for all aspects of the Gexpro/Keuka relationship including (but not limited to): support, product selection and ordering, shipping and logistics, and training.





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Who is Gexpro?

Our History

- *Established in 1904 as part of the General Electric Company*
- *\$2.5 billion in Sales*
- *2400 employees globally*
- *150 +/- branch locations*
- *100,000 SKUs in stock from 200+ suppliers*
- *4.5 million square feet of warehouse space*
- *Distribution, Services and Parts Super Center*



Today

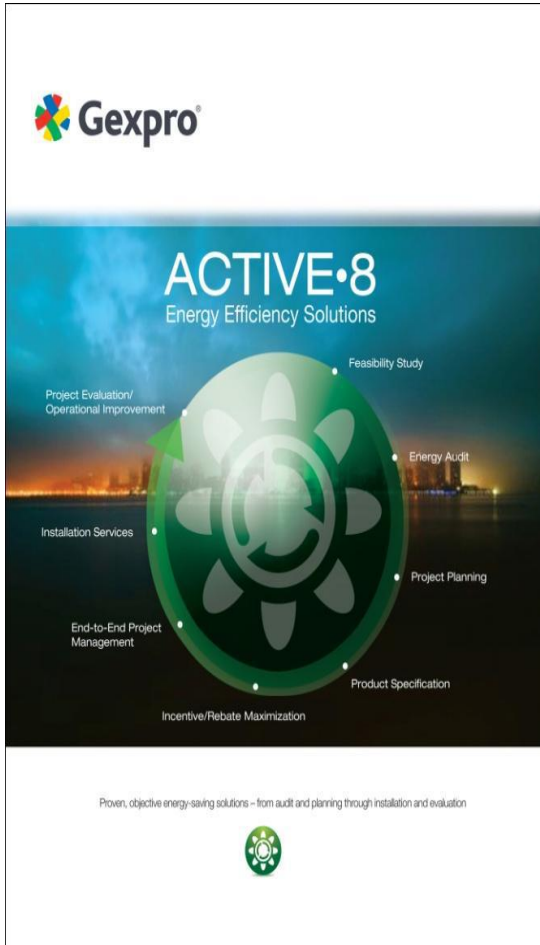
- *\$22.5 billion in Sales*
- *24,000 employees globally*
- *2400 +/- branch locations worldwide*
- *#1 Global Market Share Position*
- *Multi-platform Global Distributor*





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Energy Solutions

1. Feasibility Study

2. Energy Audit

3. Project Planning

4. Product Specification

5. Incentive/Rebate Maximization

6. End-to-End Project Management

7. Installation Management

8. Project Evaluation/Operational Improvement



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Market Overview

Why the small to medium wind size market?

- *We can solve the problem of low yields and high cost that has hindered the small turbine market.*
- *A substantial amount of land based wind energy is available with Class 3 wind speed (5.1m/s -5.6m/s). However, modern aerofoil blade wind turbines of medium capacity require wind speeds in excess of 7m/s.*
- *There are no generators in this space, when combined with the turbine, that can extract power at the low and high wind speeds similar to Keuka.*
- *Class 4, 5, 6 and 7 wind area's are becoming saturated in the U.S. market.*

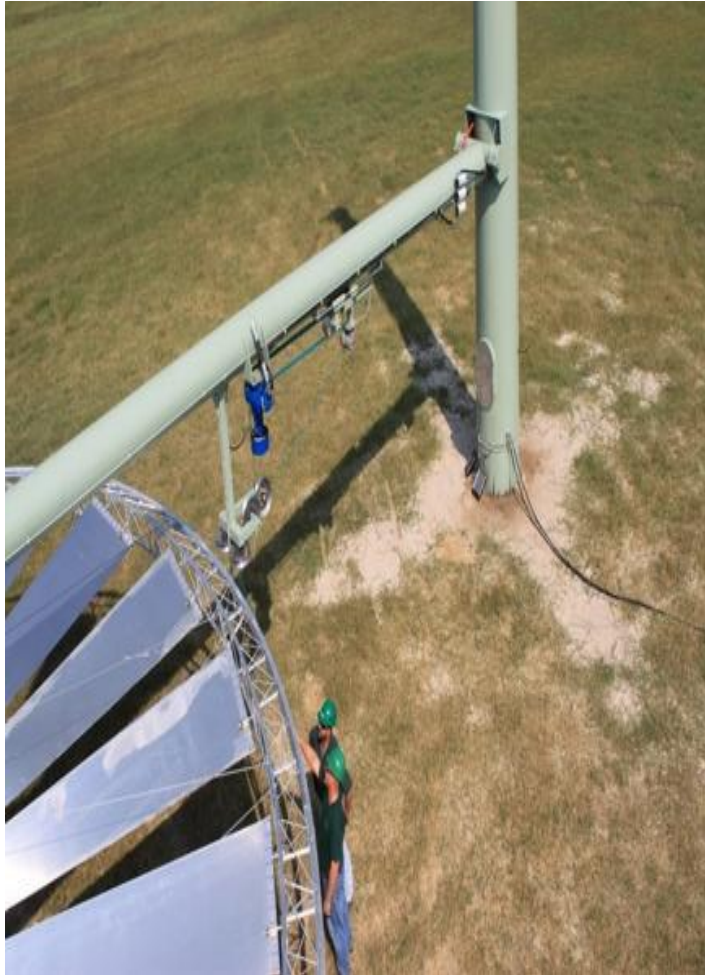


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Solutions

- *A turbine that extracts power from the rim opposed to the rotor*
- *Lower cut-in and Higher cut-out speeds.*
- *Produces High, early torque and more stable power at lower elevation due to inertia*
- *A generator that can extract maximum power at low wind speeds and high speeds.*
- *Operating range from 880 rpm's to 8,800 rpm.*
- *First to demonstrate the ability to control variable speed and variable power.*





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Turbines create huge markets that include small wind, wind farms and off-shore opportunities. Market Overview

- *The 2009 Small Wind Turbine market was \$189MM (21,000 units) with CAGR of 26.4% since 2001.*
- *Medium wind is typically classified with projections for large wind. This market is a \$20B plus market. Annual global wind market is projecting 16.50% CAGR.*
- *Low cost design (lower KW installed in comparison to small wind competitors). We believes they can be price competitive with solar, thus opening significant opportunities.*
- *Large opportunity, low cost solution for the production of compressed air.*
- *Revenue model is to manufacture, sell, install and service the units. Additionally, the company is open to licensing the technology to wind farms and off-shore opportunities, not to build/ own/ operate.*





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Market Overview - Other Opportunities (Compressed Air)

- *Recent DOE report states that 15% of all industrial power is utilized to create compressed air.*
- *Report further states that it takes between 5 to 6 KW to produce 1 HP of compressed air*
- *The turbine produces high, early torque.*
- *Low cut-in speed produces compressed air in most conditions.*
- *Will utilize internally designed controller system to maximize compressed air output.*
- *Production of compressed air and storage has taken place in Florida for the better part of 2011. We will perform further validation in Iowa during the first quarter of 2012.*



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Market Overview - Other Opportunities (Water Desalination and Roof Top Turbine)

➤ *Water Desalination. CAPS has partnered with MIT over the past 6 months testing the validity of using our VSDD controller and turbine for water desalination. CAPS and MIT are focused on testing VSDD controller with the controllers of designated pumps and R.O. systems. With the controller communication validated, validation of the efficiencies is now the directive.*

➤ *Roof Top Design. Gexpro, after seeing testing platforms that have been operating for a number of years has suggested we consider a roof top turbine. This platform will be examined, but we will a phase gate approach to the implementation of testing of this platform.*



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Market Overview - Offshore Wind

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Market Overview - Offshore Wind

➤ *The benefits of this offshore platform:*

➤ *Cost. When all offshore platform are seeing a multiples of 4X plus to enter this arena, offshore platform is less than their land-based platform.*

➤ *Installation, Repairs and Maintenance. Offshore platforms demand new equipment to install and repair the turbines. Existing equipment can be utilized to install and maintain the offshore platform. Safety concerns that are garnering attention in the offshore market are minimized with our platform.*

➤ *Class 3 Winds and below. With the ability to operate in Class 4 winds and above, the Keuka offshore platform can operate in Class 3 and below wind speeds. The Gulf Coast has significant Class 3 and below winds surrounding a huge portion of their shoreline.*

➤ *Designs have been completed for 5MW through 30MW platforms.*



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Summary of Competitive Advantages



- *Simplicity of the turbine; as well as the maintenance and repair.*
- *Lower cost to maintain and repair.*
- *Can be erected with a lull or small truck mounted crane.*
- *No gearbox, no braking system – fewer things to go wrong.*
- *Higher Return on Investment (shorter payback period).*
- *Low cut-in and high cut-out speeds.*
- *Operates in Class 2 and Class 3 (as well higher classes) unlike standard 3-blade.*
- *Installation cost and time are considerably lower.*
- *After footings poured, can be installed in a few days.*
- *Lower transportation costs and Lower tower height.*
- *Migration of birds and bats no impacted like standard 3-blade.*
- *High speed, direct drive generator.*
- *Allows to convert power at a wider range of speeds, allowing us to extract max energy from low and high wind speeds.*
- *High speed, high torque allows us to reduce the generator size—lighter and smaller.*
- *Resonant Field Modulation and Ability to control variable wind and variable power*



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Summary of IP

Our patent is based on our ability to suspend the blades on the turbine. The blades are suspended from the rim and the hub. Although our focus market is the small to medium size wind, we believe the above patent provides the ability to build the world's largest turbine, if desired. If elected to direct efforts towards a larger turbine, this will be in strategically planned steps, scaling the size, i.e. 1 MW, 2 MW, etc. Finally, a final decision has not been made on whether we will apply for IP protection for our control system that allows us to manage variable speed and variable power.





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Summary of the RDWT Advantages:

➤ *A new innovative design of wind turbine that is able to extract energy from wind speeds as low as class 3.*

➤ *It has multiple blades connecting the central hub to an outer ring as shown in the attached picture. Unlike the conventional wind turbines where the power is extracted from the central hub, RDWT extracts power directly from the outer rim.*

➤ *This modification considerably reduces the cost of the turbine-generator system. RDWT has been proven to extract energy as low as 4kW from class 2 wind speed conditions (~5.6m/s), whereas commercial wind turbines usually require the minimum wind speed of 7m/s.*





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