PATHION

PATHION AXIS WIND TURBINE SOLUTIONS

COMPACT, EFFICIENT WIND ENERGY THAT SCALES THE VALUE OF SOLAR & STORAGE

Commercial and community developments, remote industrial, and other sites seek local energy generation that's efficient day and night and is adaptable to a wide variety of physical locations. Urban developments want to leverage their rooftops and building edges for wind energy generation, while remote industrial sites seek local generation in a larger array, connected to energy storage system containers.

PATHION Axis wind turbine solutions provide a compact, lightweight, powerful wind turbine that is modular by design, adaptable to a variety of configurations, stand-alone or in hybrid solutions with solar. Our turbines work effectively in virtually any physical location, in both low and high wind speeds, with superior wind power capture across wind conditions compared to large horizontal axis turbines.

INNOVATIVE ENERGY GENERATION AT 8X THE PRODUCTION PER SQUARE FOOT OF SOLAR

PATHION Axis Wind Turbines are a compact, scalable solution that provides new energy generation options in smart grid and microgrid environments. The turbines provide up to eight times greater power production per square foot than a solar installation of the same footprint. They produce energy in areas where space is limited in cities and urban environments or where microgrids operate solely on solar and gensets, such as on islands and remote facilities. The technology provides real solutions in off-grid and grid-connected applications using closely grouped turbines that increase annual power output by up to 25%. Unlike horizontal axis turbines that must be spread apart by a distance at least 2.5 times their diameter to work efficiently, the turbine operates safely and silently in low turbulent flows, making it more suitable for use in urban environments.

Wind, like solar, is considered an intermittent resource. Solar energy is limited to daylight hours, while a micro wind turbine makes it possible to generate power during a 24-hour cycle in optimal locations. With on-grid applications, there is often a mismatch between the timing of energy consumption and energy production; a percentage of renewable resources devoted to wind power allows the microgrid to collect any time of the day or night.

Our small wind turbines operate alone or in hybrid micro-grids. We use the PATHION DiectCore™

	Savonius	*Darrieus Egg-Beater*	*Darrieus H-Rotor*	*Gorlov*	*HAWT*	*Axis Tri-blade*
Performance	Low (<20%)	Average (20-35%)	Average (20-35%)	Average (20-35%)	High (>40%)	High (>45%)
Efficiency in turbulent flows	✓	✓	✓	✓	✗	✓
All wind directions	✓	✓	✓	✓	✗	✓
Self-starting	✓	✗	✗	✓	✓	✓
Low vibration levels	✓	✗	✗	✓	✗	✓
Low noise levels	✓	✓	✓	✓	✗	✓
Robustness	✓	✗	✗	✗	✓	✓
Pleasing aesthetics	✓	✓	✓	✓	✗	✓
Modularity	✗	✗	✗	✗	✗	✓

PATHION Axis Wind Turbines comparison to other wind-based generation solutions

Energy Management System that seamlessly interchanges between wind, solar, diesel, bio fuels and the grid to provide uninterrupted, reliable, and low-cost electricity. The system is monitored in real- time and was designed to respond to very stringent requirements such as a near- instantaneous (<250 milliseconds) switch to local power supply in case of a grid outage.

BENEFITS OF PATHION AXIS TURBINES IN A MICROGRID

PATHION Axis wind turbines combine with PATHION DirectCore™ Energy Management System to provide an always-on microgrid solution to ensure 24/7/365 power at any commercial, industrial or community site. Hybrid microgrids based on PATHION DirectCore™ seamlessly interchange between Axis wind turbines, solar, diesel, and the grid to provide uninterrupted, reliable, low-cost electricity. The system is continuously monitored in real-time and switches to PATHION's on-site energy storage in under 250 milliseconds when grid power is shut down.

ONLY PATHION SOLUTIONS CAN DO THIS:

- **Provide a complete, always-on energy generation, storage and management solution that delivers up to 8 times more power than a solar installation of the same footprint**
- **Highest efficiency in class in low and high velocity as well as turbulent wind conditions**
- **More power and lower cost than solar per kWh over 20+year lifespan**
- **Scalable to commercial-volume energy for both urban and remote environments.**
- **Highest efficiency in class in low and high velocity as well as turbulent wind conditions**
- **Seamless interchange between Axis wind turbines, solar, diesel, and the grid - controlled by with the PATHION DirectCore™ energy management system - to provide uninterrupted, reliable, low-cost electricity.**
- **Optimized for any space footprint; turbine modules can be stacked vertically or horizontally**
- **Safe and silent operation that can withstand category-4 hurricanes**
- **Modular design allows uninterrupted power production even if an individual component fails.**
- **Interchangeable components facilitate minimal low-cost routine maintenance.**
- **Flexible solutions that can be implemented in fixed or relocatable installations.**

PATHION Axis Wind Turbines can pair with solar panels and PATHION DirectCore™ for a remote energy generation and storage solution

How can we help you?

PATHION works closely with our customers to define their critical problems and find the best solutions, including offering insight on operations and processes both before or as part of a critical water and/or energy system upgrade. We then continue to support our customers throughout the life of the facility. Visit https://pathion.com/contact/ to schedule an evaluation.