EiP Technologies Backgrounder for the City of Yachats

Brad Burkle, CEO

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EiP Technologies Inc. Overview

EiP Technologies, a startup headquartered in Yachats OR, provides clean, reliable power to local communities. There are two key problems we address. First, we enable energy from the wind to be harnessed safely right on urban roofscapes where power is consumed. This is possible through our patented EiP (Electronic Inertial Power) technology. Urban roofscapes are an untapped new market for wind energy. Previous wind power technologies have either served very small applications like sailboats, or very large applications like multi-MW wind farms with their associated high side-car power plant, installation, and transmission costs.

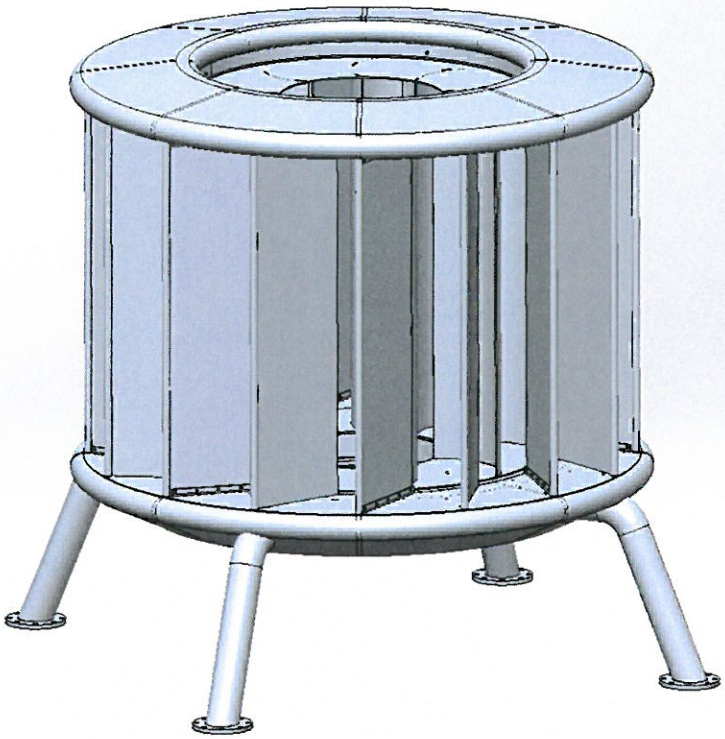
The second problem we address is storage. EiP machines rapidly absorb energy from wind and solar as increased wind rotor (heavy flywheel) inertia. Two or more EiP machines become a storage device, with one shedding excess inertia while feeding the other, as storage time increases as more EiP machines join in. Total storage capacity is indicated by changes in rotor speed data shared around the network. As a result, EiP machines can be used in combination with solar panels to provide a much wider range of renewable coverage (wind + sun), plus storage through the electronic flywheel effect. Designers can now place solar panels in combination with EiP machines to service all loads at all times of the day. Battery storage can be significantly reduced or eliminated. A grid intertie exists only for use during peak loads.

Ideal applications include high rise office buildings, business campuses, data centers, and high density residential projects.

Our Technology

EiP Technologies has created a breakthrough invention for direct generation of urban rooftop wind power. Our unique wind turbine is a stationary cylindrical structure 8 feet wide and 6 feet tall that sits on four legs about three feet above the roof, with fixed vertical blades that concentrate wind of any speed and direction, including gusts and turbulence, toward internal wind blades rotating around a vertical axis. The center of the machine is hollow, which allows turbulence from wind power conversion to exit top and bottom while intensifying straight-line wind that drives rotor blades on inflow and outflow. The rotor is bird safe and quiet, since it never moves faster than the wind. The rotor is a single moving part that converts wind energy directly to electricity. Developed right in the middle of one of

the windiest places in the world, our machine is self-regulating in high winds, which allows continued power production during conditions where all other wind machines fail. EiP technology combines permanent magnets, generator coils, and electronics in a modular patented way to extract full power from a heavy low speed rotor. EiP wind machines also provide power regulation and storage, replacing the need for batteries when used in a microgrid with solar panels and other renewables. Our rotor provides a flywheel storage effect from high inertia to provide steady power output without batteries. EiP technology defines a way to network many wind machines and solar roofs to create urban energy farms that satisfy the needs of the local power grid. See www.eiptechonologies.com for more details.

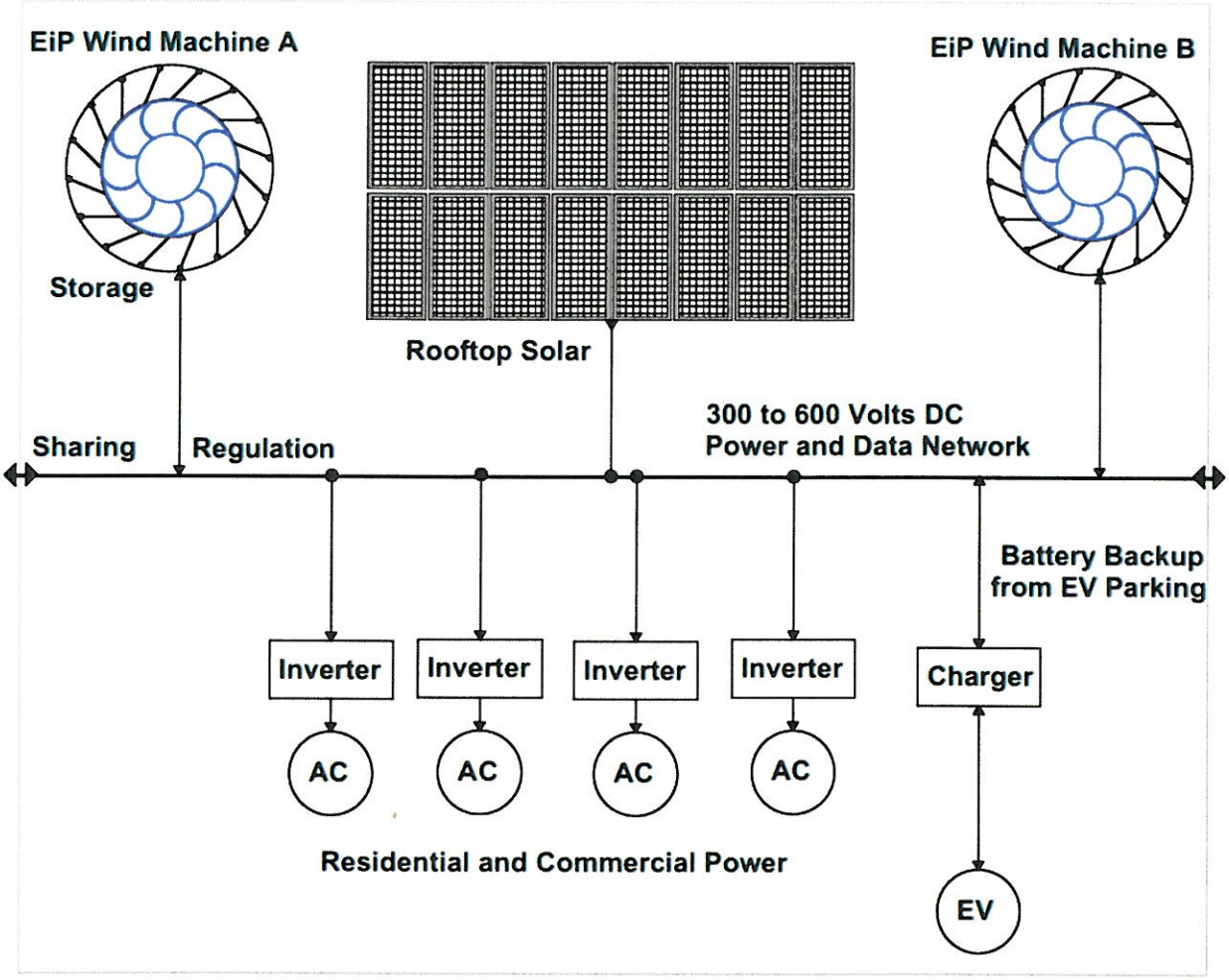


Power Generation from the Wind: Our vertical-axis wind turbine (VAWT) design is ideal for high power production on urban roofscapes. Historically VAWT designs have not been able to spin fast enough to draw enough power to be economically viable. We have solved this problem with our super-efficient industrial motoring technology that allows magnetic flux to do the work rather than a driveshaft. We have 60 patent claims in our filing through our patent firm Perkins Coie. Our machines have been tested in wind speeds up to 90 mph with no breaking or furling required. Our wind curve (representing available energy across a range of wind speeds) starts at 8 kW continuous idling power when no wind is present. Any gust will be instantaneously converted into additional power, and sustained winds above

20 mph increase power exponentially. All of these features are unheard of in wind machine design. We have yet to discover an upper power limit in high winds. Unlike large turbines, EiP wind machines produce power in turbulent and gusty winds that are the norm in cities. EiP machines are very reliable with only one moving part. No tower is required when placed on rooftops. Output per machine is 50-100 KW. Since we are powering local loads, all of the power is consumed with no transmission loss. Each machine weighs about 2000 lbs., which most commercial rooftops will support.

Storage: In addition to producing power from the wind, EiP wind machines also regulate and store power extremely efficiently. We have added a large mass to the one internal rotating part, to create an electronic-mechanical flywheel storage device. Our patented electronics use a small trickle of power to build up a large amount of kinetic energy in the flywheel, which provides an added source of energy to create the EiP oscillation, which maintains rotor speed regardless of wind and load. This is the heart of 'Electronic Inertial Power' technology. Machines can be powered up from the wind, solar panels, or a trickle from the grid to reach EiP oscillation. Once oscillating, machines will maintain the flywheel rotation indefinitely, powered by all of the energies present in the system, from wind, inertia, and load changes. As a disaster recovery measure a 2-hp motor drive would power the oscillation during any major catastrophe. Any power added to the system, say from wind or solar, serves to increase total storage capacity. EiP machines used in clusters will replace the need for battery arrays currently being considered to back up solar and other renewables, with no toxic waste, fire hazard, or maintenance requirements. Radically different from batteries, our storage capacity increases instantaneously as wind gusts or any other power load hits. The fact that storage capability comes 'included' in each machine solves the local storage problem and creates a great partnership between EiP wind machines and solar panel technologies.

Microgrid Design: EiP wind machines can be networked together in microgrids for increased performance. In a network of 4 or more machines, placed on urban roofscapes, power and storage can be shared between different buildings. Solar panels can be built into the design to optimize power regulation, generation, and storage for the given local wind/solar characteristics. For instance, a different mix of solar panels and EiP wind machines would be optimal for Arizona versus Oregon. In Arizona, EiP wind machines would be primarily storing power from solar panels during peak generation times, while in Oregon a larger percentage of EiP wind machines would be used for generation in combination with storage. All excess energy produced during peak times can be stored to drive local loads at a later time. Since our machines provide energy production, storage, and disaster recovery, a true microgrid is created where all base loads can be serviced without reliance on an outside power company. Using EiP technology, customers can truly operate under a '21st Century Grid' model, un-reliant on sidecar power plants provided by large power companies. Individual microgrids can connect with the larger grid as needed only for servicing peak loads. Note that the local power company benefits from this as well, as they will have a more predictable service model and ultimately be able to avoid building sidecar power plants necessary to back up typical renewable projects like today's large windfarms. This is truly the way to reduce our planet's carbon power footprint. For those interested in a deeper study on this we have produced a white paper titled "The 21st Century Power Grid".



Installation & Maintenance

Installation can be easily performed by a 3rd party contractor using a crane to mount a preconfigured EiP machine on the roofscape. Tremendous cost savings are realized when installing EiP wind machines in comparison with other types of wind machines. There is no tower, since the roof provides the same height benefits. There is no land purchase required. There are no long power lines to carry energy with loss from the wind site to the loads. And there are no sidecar power plants required (for large wind farms) or toxic batteries (for solar arrays).

Maintenance costs will be low, as there is only one moving part, the internal rotor, supported by bearings and magnets. Machines are fabricated from stainless steel plus aluminum and powder coated, to survive marine conditions on the Oregon coast. Each EiP machine uses many bearings instead of one central bearing. Bearings are field replaceable. In two years of marine conditions no bearing failures have occurred in our prototype. The weight of the machine is about 2000 lbs, which virtually all commercial rooftops structurally support. There is minimal vibration. UL compliance or grid intertie is achieved using a standard off the shelf inverter.

Business Focus and Vision

Target markets include 'urban community wind power' and high-power users such as office towers, condo complexes, datacenters, and office campuses. Our hope is to enable local community leaders to manage their own power needs with renewable resources. Our part is as an equipment provider to this new economy. Our customers will be the System Integrators, local utilities, and developers who service these markets.

To date we have remained self-funded. Our initial manufacturing partner facility is within the greater Portland OR metro. All custom electronics and materials are developed/sourced in the Portland metro as well. Final assembly is currently in Yachats. Our process is transportable, so that we can set up future manufacturing in other geographies as demand grows, such as Hawaii or New York, to help create local jobs and reduce our carbon transportation footprint. Our executive team is committed to the long term benefits of reducing carbon and investing at the local level.

Our Team

Steve Burkle is inventor and CTO of EiP Technologies. Steve is a scientist who has lived off grid for many years in Yachats OR. Steve's brother Brad is CEO. Brad has a long career in executive management within high-technology start-ups. Both of their bios are available on our website; http://eiptechnologies.com/about/.

Company History

EiP Technologies is a self-funded start-up based in Yachats OR. We formed the company in 2009, at which time we began R&D and prototyping. In 2014 we filed our provisional patents through Perkins Coie. We have 60 patent claims in our filings.

We conducted a launch event in Newport OR during the summer of 2014 which was well represented by local business leaders, government leaders, and reporters. See http://www.newportnewstimes.com/v2_news_articles.php?heading=0&story_id=45071&page=86.

In the fall of 2015, we participated in VERGE, and won the start-up accelerate competition; http://www.greenbiz.com/article/startups-vie-win-verge-accelerate.

In 2016, we sold our first production machine to the Yachats Brewing Company, which has been extensively tested in our lab and will be installed on their rooftop in early 2017. We have virtually no debt, and we broke even on our first production customer machine. We expect to make money on subsequent EiP wind machine sales.

City of Yachats Microgrid Project

EiP Technologies is interested in collaborating with the City of Yachats to set up the one of the world's first (or THE first depending on timing) microgrid demonstration projects. This involves interconnecting 4 EiP machines in a microgrid. The first unit has already been financed and is ready for placement upon

the Yachats Brewing Company rooftop when street construction has been completed. This unit will service power requirements for the Yachats Brewing Company. A second unit will be placed at the sewer plant, and a third at either the sewer plant or Commons building. These 2nd and 3rd units will service power requirements for the City of Yachats. A fourth unit will be placed at EiP's headquarters building. This unit will provide enhanced performance for the City of Yachats and Yachats Brewing Company units, plus act as a test bed to optimize the network software architecture.

We are currently exploring financing options for the 2nd, 3rd, and 4th machines, to help minimize cost to the City of Yachats. We will commit to build each 50kW machine at a cost of $75k per machine, for arrangements made up until June 30, 2017. This price is near our manufacturing cost; normal retail pricing will start at $125k.

EiP machines will be delivered fully assembled to the City of Yachats. Additional costs to the city would include placement of power lines between City facilities where a machine is placed, and across the highway to the Yachats Brewing Company. Additional costs will include transportation from Northwest Technologies (our manufacturing partner) in Portland, placement of each unit on the roofscape via crane, and architectural review if required, and simple connection of each EiP machine to building power panel and via inverter to the grid. In early 2016, PECI, headed by local resident Jesse Reeder, prepared a document to the City of Yachats which covered the financial investment of the entire project.

We will train Nathan's crew at the Farm Store who will be available to arrange with the City to provide maintenance support.

In addition to the benefits of power self-sufficiency and disaster preparedness, the City of Yachats will find itself in a world-spotlight for green energy and microgrids. Depending on how quickly this project begins, you may be the first demonstration of a true microgrid, with integrated power generation, clean storage, and disaster recovery. EiP will feature this project on our website and at industry events, with live web feeds and performance data. We literally have large companies, system integrators, and developers around the world cued up to study results. The City of Yachats project may become a center of study for the most novel developments in microgrid and green energy design going on today!