



LETTER OF INTENT TO SUBMIT A PROPOSAL FOR THE THIRD FRONTIER PROGRAM

Date: September 9, 2010

Lead Applicant's Name: Greensleeves LLC
Address: 1995 Tiffin Avenue, Suite 312
Findlay, OH 45840

Phone number: 419-420-1515

Contact Person: Sharon Keeran, VP

Contact Number: 419-420-1515 x1001 (cell: 419-348-3904)

Contact Email Address: skeeran@greensleevesllc.com

Proposed Project Title: Hybrid Geothermal Loop Management System with Thermal Storage

Estimated Grant Funds to be Requested: \$500,000

Known Collaborators: LJB Inc.
3100 Research Blvd.
Dayton, OH 45420-0246

Summary of Proposal

According to DoE data U.S. buildings account for approximately 40% of U.S. energy demand as well as 39% of carbon dioxide, 18% of nitrogen oxides, and 55% of sulfur dioxide emissions. Geothermal heating and cooling systems have proven their ability to reduce energy use and costs by as much as 50%. Greensleeves is requesting funding to develop and commercialize its proprietary GeoModule™. This equipment (provisional patent filed) includes the intelligence and mechanical hardware required for a sophisticated, commercial geothermal implementation in a prepackaged, pre-integrated system. This product will reduce costs, engineering requirements and implementation risks of geothermal systems.

The GeoModule will make geothermal systems more competitive than existing systems. Distributors and potential customers have expressed interest in the GeoModule and this funding would greatly accelerate the delivery of the product.

There are major technical and market barriers to the adoption of today's geothermal technology. The major technical limitations are a very small supply of qualified geothermal design experts and relatively primitive and expensive designs used in to simplify the design and installation process. The major market barrier is the cost premium of 40% for geothermal systems compared to conventional implementations. Greensleeves will address these barriers by:

- Providing a **"35 - 50% reduction in energy use with no increase in construction costs"** - offering the commercial building owner a very powerful value proposition.
- Developing and marketing a prepackaged, integrated system that is directly analogous to Willis Carrier converting what was a custom built air conditioning (a/c) market in 1915 to standardized a/c units that rapidly made a/c affordable for the mass market.
- Building sophistication into the GeoModule that is cost prohibitive and too risky for custom designed units assembled from scratch by contractors.
- Reducing the size and resultant cost of the geothermal installation by 40% making the cost equivalent to that of a conventional HVAC system.
- Developing a third party channel of distribution made up of proven construction contractors that will purchase and install Greensleeves GeoModule's. This channel is being developed in collaboration with LJB Inc., a Dayton company that distributes tilt up construction technology through 40 U.S. contractors and a Government Division. Their current contractors are anxious to sell high performance buildings powered by Greensleeves in order to create a competitive advantage for their construction services. LJB is anxious to recruit more contractors with this compelling value proposition. Their current contractors are already engaged in selling prototype installations in their markets and will form the marketing backbone for a rapid roll out of the GeoModule.

There are currently no commercially available geothermal systems that meet the cost and performance standards of the GeoModule. Greensleeves Chief Technical Officer, Steve Hamstra has designed over 3M SF of geothermal installations and brings decades of experience to the project.

The products are being designed and will be produced in Ohio. Commercializing this concept would place Ohio in a position to provide unique products to reduce U.S. energy consumption and reduce carbon emissions with a pronounced cost and performance advantage to the Greensleeves target market (a \$2B segment of the US new construction HVAC equipment market) as well as to overseas markets.

Sincerely,

W Michael Linn

President and CEO

Letter of Intent

Wright State University, on behalf of its Wright State Research Institute is pleased to submit this letter notifying the Ohio Department of Development of our intent to submit a proposal responding to the Ohio Third Frontier Advanced Energy Program Fiscal Year 2011 Request for Proposals.

Lead Applicant: Wright State University

Administrative Contact: Ms. Jackie Frederick
Director, Pre-Award
3640 Colonel Glenn Hwy.
Dayton, OH 45435-C001
Email: Jackie.frederick@wright.edu
Phone: 937.775.2664
Fax: 937.775.3781

Technical Contact: Dr. Joseph Slater
3640 Colonel Glenn Hwy
209 Russ Engineering Center
Dayton, OH – 45435
email : joseph.slater@wright.edu
phone : 937.775.5085
fax : 937.775.5082

Project Title: Reliable Self-Health Monitoring Wind Turbines

Estimated Grant Funds: \$2M Total, \$1M AEP, \$1M WP

Collaborators: The Ashbrook Group

Project Summary

Nationally, we have started to recognize the value of wind energy as a low cost, clean source for electricity. Worldwide growth in wind generation since 2001 has been 30% or higher annually. Wind turbines that produce electricity are built in many sizes and configurations using a wide range of materials. The most important piece of the wind turbine is the rotor which consists of wing shape blades. One significant issue for the blades in the wind turbine is fatigue. The underlying cause of fatigue is complex but can be more easily envisioned as deriving from a growth of tiny cracks under repeated vibratory stresses. Procedures have been developed to estimate fatigue damage initially for metals and later extended to composites as well. These procedures traditionally estimate the fatigue life of the turbine based on i) fatigue life properties of the material ii) a model that can be used to determine the material damage and component lifetime from the loads encountered by the turbine. Any error in the estimation of the fatigue life may result in a catastrophic event.

In this effort we will place sensors in a wind turbine blade to be used during turbine operation. The sensors provide real time data on status of the materials of the turbine. This technology will help us identify the issues at a nascent stage rather than depending on theoretical models for estimating the fatigue life. The output from the sensors can potentially be used to monitor for fatigue of the materials in the turbine which results in

- reduced downtime and more operational time
- preclude catastrophic events by identifying impending failure
- predict remaining life of components, enabling timely initiation of manufacture of replacement parts with significant lead times and costs
- overall reduction in cost of wind power compared to fossil fuel source

Our goal is to manufacture, test and showcase our model wind turbines with embedded sensors in Ohio based companies. This collaboration will create a manufacturing wind farm in Ohio to sell next generation of turbine blades.



September 10, 2010

Ohio Department of Development, Technology and Innovation Division
Attention: Ohio Third Frontier Energy Program
77 South High Street, 25th Floor
Columbus, OH 43215

Subject: Letter of Intent for Ohio Third Frontier Advanced Energy Program

To Whom It May Concern:

This letter provides notice of intent for Pacific Renewable Fuels and Chemicals (PRFC) to submit a proposal to the Ohio Third Frontier Advanced Energy Program RFP.

Lead Applicant: Pacific Renewable Fuels and Chemicals

Address: 1690 Woodlands Drive, Suite 200
Maumee, Ohio 43537

Phone: 419-740-5910

Contact Person: Robert Schuetzle, CEO
rschuetzle@PRFuels.com

Project Title: Production of Renewable Specialty Chemicals from Waste Biomass

Collaborators: Red Lion Bio-Energy, University of Toledo

Requested Funds: \$2,000,000 (\$1,000,000 OTFAEP funds and \$1,000,000 cost share funds provided by the project team)



Summary of Proposed Project

Pacific Renewable Fuels and Chemicals (PRFC) has developed innovative process technologies and catalysts for the production of renewable fuels and chemicals from waste biomass.

This project will demonstrate the production of high-value specialty chemicals produced from waste biomass, including agricultural waste and forest residues. Red Lion Bio-energy and University of Toledo will be key collaborators on this project.

PRFC's Ethos™ catalyst will be used for this program to demonstrate the production of high value, renewable specialty chemicals. Using our process, greenhouse gases (GHG) are reduced by 89% when compared to traditional chemical production processes.

Specialty chemical markets are high-value and rapidly growing. The proposed project brings together industry leading technologies that have been proven at the unit process scale to deliver renewable, efficient, and economically produced specialty chemicals.

Ohio-based chemical companies have expressed an interest in the proposed technologies since the proposed system will reduce chemical production costs, enable the use of a renewable feedstock, and provide a way to economically compete with petroleum derived chemicals produced overseas.



OTFAEP 11-365

September 9, 2010

Sent by email to: OTFAEP2011@development.ohio.gov

Ohio Department of Development
Technology Division
77 South High Street, 25th Floor
Columbus, OH 43215

Re: **Letter of Intent for Putnam Power, Inc. – Project PPI**
Ohio Third Frontier Advanced Energy Program (OTFAEP)

To Whom It May Concern,

Putnam Power, Inc., in collaboration with: Putnam Power Tower, LLC; Putnam Power Smart Energy Systems, LLC; B-K Tool & Design Inc. and; Unverferth Manufacturing Co., Inc., intends to submit a proposal to the Ohio Third Frontier Advanced Energy Program (OTFAEP) for project development funds which will assist in the development and accelerated commercialization of Putnam Power, Inc., an emerging advanced energy technology company in Ohio.

Lead Applicant: Putnam Power, Inc.
2696 Lane Road
Columbus, Ohio 43220
Tel: (614) 477-0770
Fax: (614) 538-1584

Contact Person: Putnam S. Pierman, Sr.
Chairman
Tel: (614) 477-0770
Email: psp@putnampower.net

Proposed Project Title: **Project PPI**

Estimated Grant Funds Requested: \$701,420

Known Collaborators: Putnam Power Tower, LLC
Putnam Power Smart Energy Systems, LLC
B-K Tool & Design Inc.
Unverferth Manufacturing Co., Inc.

Please see the attached summary of our anticipated proposal. We are looking forward to submitting the full proposal to the Ohio Third Frontier Program by the deadline of October 7, 2010.

Sincerely,

Putnam S. Pierman, Sr.
Chairman
Putnam Power, Inc

Proposal Summary: “Project PPI”

Putnam Power, Inc., in collaboration with: Putnam Power Tower, LLC; Putnam Power Smart Energy Systems, LLC; B-K Tool & Design Inc. and; Unverferth Manufacturing Co., Inc., requests an Ohio Third Frontier Pre-seed and Entrepreneurial Success Initiative grant of \$701,420 to capitalize Putnam Power, Inc.

We believe all consumers can generate renewable energy economically. Our customers will safely, easily, and reliably harness the free fuel from wind, sun, water, and the stored temperature from our earth. Our unique products and services will improve the lives of our customers, add to the strength of our nation, and will impact positively the health of our planet. Economic value created by our venture will benefit Putnam County, Ohio as well as the State of Ohio. Our products have global application.

Putnam Power, Inc. is working for the development and growth of Ohio's advanced energy industry and supply chain. We seek support for our near-term specific commercial objectives.

Our specific objectives supporting this goal are as follows:

To support development of advanced energy technologies that will result in the opportunity for significant employment in Ohio within 3 to 5 years.

To achieve cost and performance standards that ultimate end-users of advanced energy technologies define as necessary for successful commercial applications.

To move advanced energy related products, manufacturing processes, components, and systems to a point in the commercialization process where Putnam Power, Inc. is ready to demonstrate a commercial prototype or actually enter the market with a product.

To demonstrate advanced energy technology market readiness.

Putnam Power, Inc. has proven technologies that have already achieved technical proof of concept and for which we have strong evidence of interest by potential end-users.

OTFAEP 11-366

September 10th, 2010

Re: Ohio Third Frontier – Advanced Energy Program FY 2011- Letter of Intent

Project Title: Ohio Carbon Solutions

Lead Applicant: Vena McCracken, Vice President - Ohio Project, SunCrest Energy, LLC

Address: 57037 Juliann Ct. – Washington Twp, MI 48094

Phone Number: 586-453-1759

Email Address: vena.mccracken@gmail.com

Known Collaborators: EcoSphere Energy, LLC

Grant Funds Requested: \$1,000,000

Project Summary

SunCrest Energy LLC (SunCrest) and EcoSphere Energy LLC (EcoSphere) will build and operate a renewable energy plant in northwest Ohio, using two proven, renewable and clean energy technologies to produce electricity and ethanol; with a byproduct of a regional recycling system. Specifically, the plant would utilize regional carbon reclaimed from municipal and/or regional solid waste as its feedstock. The technologies to be used have the highest environmental standards. EcoSphere has technology licenses and access agreements that permit the integrated utilization of the two technologies.

Producing cost effective electricity and ethanol from regional excess carbon sources, SunCrest will lay a foundation for regional energy independence that is a key in overall economic and environmental stability. An added by-product will be stable "Family Wage" employment – with the result of steady quality of life for working families in the region.

EcoSphere has secured a firm funding commitment for construction, conditioned on performing certain achievable elements that include completing site engineering, obtaining all necessary permits and licenses and the finalizing of required EPC contracts. International EPC contractors and engineering companies that are acceptable to the funding sources have provided written interest in the project. A similar EcoSphere project has full funding and is underway in another country.

EcoSphere has domestic agreements for 4 projects in the final stages of funding, and one is in preconstruction. SunCrest has met with Economic Dev. Office of Fulton County (OH) to discuss a possible site for an initial 2000 ton/day facility.

Each 2000 ton/day plant consists of multiple 250 ton/day modules utilizing plasma-arc gasification system and a bio-catalytic-based ethanol production system. Using this modular approach on multiple projects, EcoSphere can reduce the cost of the preliminary integration engineering and general design for all projects, which then need only minimal individual engineering. And EcoSphere has consolidated general project contracts under master technology agreements and developed streamlined project-specific agreements that spell out the specific elements for each project. *As a result, the Ohio project pre-development budget has been reduced from \$6,200,000 to \$2,500,000.*

The feedstock plan calls for SunCrest to work with several commercial enterprises to secure a supply of excess carbon from solid waste. This would occur in the vicinity of a proposed plant located in the industrial zone of an urban area, with the first plant in Fulton Co. Ohio. The regional plan includes getting 2000 tons/day of carbon feedstock from regional stores, which allows these Corporations to market their stores as "Zero Waste". Additional sources of carbon from regional and municipal solid waste are also being sought. Fulton Co. currently has no Municipal Waste landfill of its own, and ships its MSW to other adjacent counties at a significant cost. An additional benefit for a county such as Fulton is that the system also has a built in recycling system that does not require separation at the source, so that local MSW can be collected as is; and the recycling is separated out at the EcoSphere/Suncrest plant. The recycling system is a component that will be manufactured in Ohio.

SunCrest has also secured a Letter of Intent with a regional utility for the purchase of excess electricity at market rates; a key financial and functional element in the development of the project financing. The available RECs may be sold separately.

The project financing includes a firm funding commitment for the capital/construction costs, secured by EcoSphere. To close on the funding, SunCrest must complete a list of tasks that are typically expected for projects of this nature and generally include all of the associated contracts for construction and commissioning, energy sales, operations, feedstock supply, permits and land. It will require 12-16 months to complete these activities and cost \$2,500,000. Regional investment sources have been secured for over \$1 Million, which will be the match for funds sought through this RFP.

SunCrest will give contracting and purchasing preference to affiliates of local funding partners whenever possible for all aspects of normal support. This will include local construction of several system components (such as the recycling component). This approach assures that additional financial benefits can accrue to the local financial partner and supporters.

The complete project cost for the 2,000 ton/day system is approximately \$500 Million, which will be more completely delineated during the \$2.5 Million in preliminary work funded partially by \$1 Million available through this RFP submittal. With the \$1 million in investment that has been raised and further funds to be raised through Fulton Co., the \$2.5 Million requirement will have been met to perform the preliminary work, required to finalize the \$500 Million funding agreement. The system produces over 120,000 gallons of ethanol per day (42 Million gallons/year) and 75 MW of electricity per year. It provides 150 permanent jobs and 1000 construction jobs; and makes a substantial annual profit, which makes the project commercially viable.



FIBER-TECH INDUSTRIES, INC
Another Celstar Company

September 9, 2010

OTFAEP 11-367

Attn: John Griffin
Director
Ohio Department of Development, Technology Division
77 South High Street, 25th Floor
Columbus, Ohio 43215

Subject: 2011 OTFAEP LOI

Dear Mr. Griffin:

Please accept this Letter of Intent from Fiber-Tech Industries, Inc. for our Ohio Third Frontier Advanced Energy Program (OTFAEP) proposal. The relevant information about our proposal is as follows:

Lead Applicant: Fiber-Tech Industries, Inc.

Address: 2000 Kenskill Avenue, Washington Court House, Ohio 43160

Telephone: (740) 335-9400

Contact Person: Terry Keegan, President and Chief Operating Officer

Contact Email: tkeegan@fiber-tech.net

Project Title: Commercialization of Lightweight Composite Panels for Trucks and Trailers

Estimated Grant Amount Requested: \$1 million

Known Collaborators: WebCore Technologies, Ashland Performance Materials, Owens Corning, EMTEC

Summary of the Proposed Project

The growing concern over greenhouse gas emissions and environmental regulations has put significant pressure on the commercial trucking industry to deploy increasing number of low-emission hybrid and electric vehicles. As a result, there is increasing demand for lightweight and durable composite body structures. Recently, the industry has shown higher level of interest and willingness to pay the price premium for Lightweight Composite Panels to gain significant weight savings.

Fiber-Tech Industries and its collaborators are proposing to commercialize Lightweight Composite Panels for commercial trucks, delivery vans and semi-trailers. Dependent on the application, material components of the Lightweight Composite Panels can include glass,

thermoplastic, carbon and/or natural fibers; thermoplastic and/or thermoset resins; and honeycomb, foam, and/or engineered core materials such as TYCOR produced by WebCore Technologies. To date, specialized truck bodies made with Lightweight Composite Panels offer significant weight saving compared to traditional metal or conventional composite bodies. Truck and trailer bodies made of Lightweight Composite Panels have been performing well in service for several years, however the relatively high cost of the panel and a lack of familiarity and supporting data to justify the higher price has prevented broader acceptance of Lightweight Composite Panels in the commercial trucking industry.

In the proposed project, Fiber-Tech Industries and its collaborators will be working closely with leading manufacturers of trucks and semi-trailers and large fleet owners to design, build and test several composite trucks and trailers and generate technical and marketing data to support broader commercialization. Successful commercialization of composite panels will lead to improved fuel efficiency for all classes of trucks, and improve the viability of hybrid and all-electric truck fleets.

The Third Frontier Advanced Energy grant and matching fund is sufficient to fund demonstrating activities and to move the technology into market entry stage. Once market entry is realized, it is anticipated the project will result in the creation of significant jobs and technology based economic development for the State of Ohio.

Sincerely,



Terence M. Keegan
President & COO

Fiber-Tech Industries, Inc.

THE WIND TURBINE COMPANY

September 6, 2010

OTFAEP 11-368

The Ohio Department of Development
 Technology and Innovation Division
 77 South High Street, 25th Floor
 Columbus, OH 43215

RE: Letter of Intent to submit a proposal in response to Ohio Third Frontier Advanced Energy Program Fiscal Year 2011 Request for Proposals (RFP)

To whom it may concern:

This Letter of Intent is to notify you, in compliance with paragraph 1.3.3 of the above identified RFP that The Wind Turbine Company intends to submit a Proposal for your consideration.

| | |
|----------------------------------|--|
| The lead applicant is: | The Wind Turbine Company (WTC) |
| Address (current): | 14311 NE 10 th Place Bellevue, WA 98007 |
| Phone: | 425-373-9944 |
| Contact person: | Larry Miles, President |
| Email: | mileslw@windturbinecompany.com |
| Estimated grant funds requested: | \$1 million |
| Project title: | Commercialization of the WTC 750kW wind turbine |

Presently committed collaborators:

| | |
|---|---|
| TSS Technologies, Inc. 1201 Hillsmith Drive Cincinnati, OH 45215 Primary contact: Pat Sullivan, Director of Sales Phone: (859) 534-5110 Email: pat.sullivan@tssstech.com | Molded Fiber Glass Companies 2925 MFG Place Ashtabula, OH 44005-0675 Primary contact: Carl LaFrance, Wind Energy Champion Phone: (440) 994-5118 Email: clafrance@moldedfiberglass.com |
| Piasecki Aircraft Corporation 2 nd Street West Terminus Essington, PA 19029 Primary contact: Frederick W. Piasecki, Chairman Phone: (610) 521-5700x107 Email: piasecki_fw@piasecki.com | Ricardo, Inc. 40000 Ricardo Drive Van Buren Twp, MI 48111 Primary contact: Anthony Walsh, Manager Driveline & Transmission Systems Phone: (734) 394-3933 Email: Anthony.Walsh@ricardo.com |
| Cincinnati State Technical and Community College 3520 Central Parkway Cincinnati, OH 45223 Primary contact: Larry Feist, Program Chair – Renewable Energy Phone: (513) 569-1482 Email: larry.feist@cincinnatiastate.edu | |

Project Summary:

This project's objective is to develop a "pre-commercial" prototype of a revolutionary, low-cost wind turbine, based on prototypes previously developed by The Wind Turbine Company and begin sales and commercial production of this turbine. Engineering, development and testing of the proof-of-concept and a second prototype of WTC's turbine was conducted under a \$15 million contract with the US DOE's National Renewable Energy Laboratory.

The commercial version of this turbine will weigh half as much as conventional 3-blade wind turbines relative to electrical generating capability. This weight saving, attributable to WTC's proprietary design will result in a manufacturing cost advantage of 30-35% compared with 3-blade, upwind turbines of equal generating capability. This cost saving will translate into a 25-30% reduction in the cost of electricity, eliminating the need for ongoing subsidization of wind energy. This cost reduction will finally bring wind energy into the electricity generating mainstream.

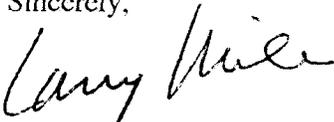
The project and subsequent commercial turbine manufacturing and assembly will take place in Cincinnati, where WTC will relocate if selected for funding. In collaboration with engineering teams Piasecki, Ricardo, and TSS, a pre-commercial prototype turbine incorporating modest design changes reflecting lessons learned from operation of WTC's previous two prototypes will be developed and assembled at TSS facilities in Cincinnati or West Chester, OH. Incorporated into this turbine will be an all new, purpose designed rotor blade, designed by Piasecki and MFG and built by MFG. This turbine will be installed at an Ohio site to be identified. This prototype will have a rated capacity of 750-to-1000kW, and will be installed within 12 months of initial funding.

After a few months of initial testing, a limited number of first generation commercial turbines will be delivered and installed for first customers. WTC has identified and is in discussions with a number of candidate customers and believes several of them will be willing to be first adopters. It is anticipated that one or more initial customers will be identified in the proposal to be delivered for this program, as will all funding sources and collaborators.

Once the turbine has demonstrated its technical and commercial viability, it will be scaled-up, initially to compete directly in the large on shore "windfarm" market, and then scaled-up again to participate in the emerging market for offshore turbines. The advantages of WTC's design increase as the turbine size increases.

WTC and its team members are looking forward to submitting a proposal and to participation in the Third Frontier Program.

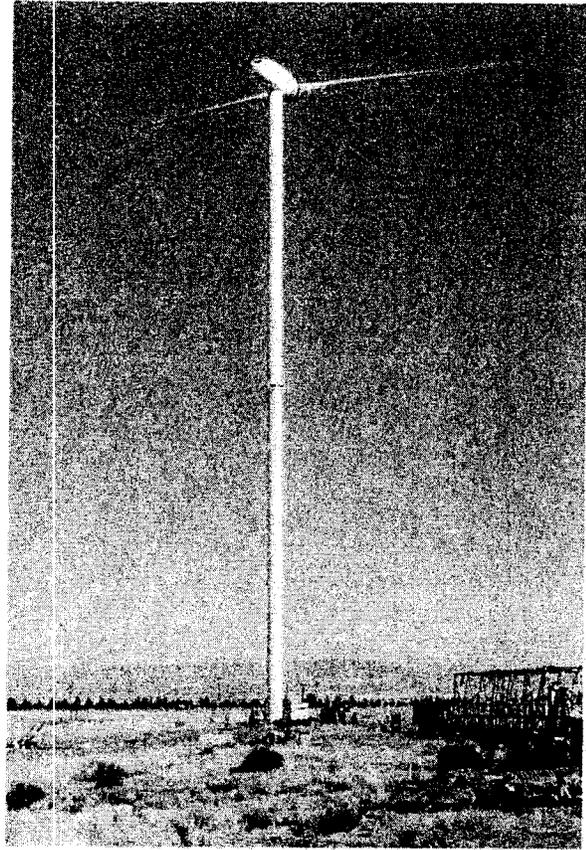
Sincerely,



Lawrence W. Miles
President

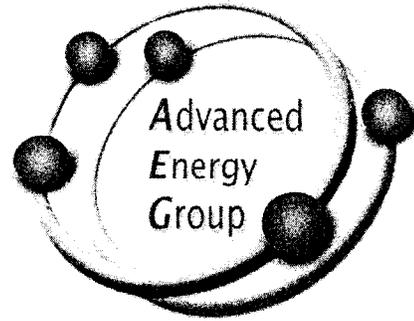


WTC 250kW Proof-of-Concept
Tower height: 38 meters
Rotor diameter: 33 meters



WTC 500kW second prototype
Tower height: 62 meters
Rotor diameter: 48 meters

September 10th, 2010



OTFAEP 11-370

Re: Ohio Third Frontier – Advanced Energy Program FY 2011- Letter of Intent

Project Title: Buckeye Aquaculture Energy Solution

Lead Applicant: Jim Moran, President – Advanced Energy Group, LLC

Address: 1003 Broadway, Ann Arbor, MI 48105

Phone Number: 734-834-4208

Email Address: jim@nfrmi.com

Known Collaborators: EcoPark Partners, LLC, SunCrest, LLC and Buckeye Farms

Grant Funds Requested: \$1,000,000

Project Summary

The Advanced Energy Group, LLC (AEG) and Eco-Park Partners, LLC (Eco-Park) will work with SunCrest Energy (SunCrest) to develop and install a cutting edge biomass-to-electricity system at Buckeye Farms (a DBA of Cheridon Enterprises, LLC) in Maumee Ohio. Buckeye is a 14 year old Live Tilapia (fish) Farm currently expanding its operations from Ft. Recovery, Ohio, to a new expanded facility (in Maumee), that filters and uses the "nutrified" water from the fish tanks to grow produce in an adjacent aquaponic greenhouse. The 20,000 lbs of fish it grows and sells each week produce over 100 pounds of fish manure per hour. In 2011, and when the expansion is complete in 2012, 60,000 lbs of fish per week, will produce 300 lbs of manure/hr. Together with the trimmings from 150,000 SF of multi-stacked greenhouses, there will be approximately 500 lbs/hr of fish manure and trimmings.

This 500 lbs/hr is precisely what is needed as the feedstock for a 120kW plasma-torch biomass-to-electricity system. This 120kWs provides about a quarter of the daily electrical needs of Buckeye's operations, (another quarter is provided by photovoltaics and solar collectors). It will also mitigate the need to process a considerable amount of fish manure, which is the only primary waste product of the aquaponic (combined aquaculture/hydroponic greenhouse) operation.

EcoPark is working with Buckeye Farms to develop a complete energy neutral system for the Aquaponic Farm, using geothermal and solarthermal (hot water) to keep the 1 million gallons of fish tank water at about 76° year round and to provide heating and cooling, and Photovoltaic and solar collector system. This energy system would compliment Buckeye's proprietary system that uses the greenhouse to filter, clean and partially oxygenate the water from the fish tanks before it is recycled to the tanks, and the tanks provide the nutrients needed for the greenhouse. The only residue is fish manure.

Buckeye was also spending \$175,000 on an electrical cogeneration system, using 2 propane generators to provide ongoing and emergency electrical power. The heat taken from the generators is also pumped into the greenhouse, fish breeding and fish tank areas to provide additional heat, especially as geothermal produces AC much less expensively than heat. That system will now be partially replaced by this biomass-to-energy generation system; running at least one of the two generators.

Buckeye is also working with the Ohio Dept. of Agriculture, within a state sponsored plan to make Ohio the #1 Aquaculture State in the US. The long term plan is to have at least 300,000 lbs of Tilapia/week grown in Ohio (and surrounding states), within 3 years in order to have enough fish to run a 60,000 lb/wk fish fillet processing plant (in the Toledo area). It takes 3 lbs of Tilapia to produce 1 lb of fillets, and as the long range plan is to have 250,000 lbs of fillets/wk processed, there will eventually need to be ~1 Million lbs/wk of Tilapia grown in the region. And that is just Tilapia. There are 12 other breeds of fish that can also lend themselves to aquaculture programs in the region, which could mean up to 8,000 lbs/hour of Tilapia manure and almost 100,000 lbs/hr based on equal development of the 12 other fish strains. For every 60,000 lb/wk farm, there could be an additional plasma-torch in operation, turning the fish manure into electricity. That would require over 200 plasma torch systems just for the fish farms planned in the Ohio area. While there is no guarantee that all fish farms will want to use the plasma torch system, it is a very good alternative. The 120kW system will save almost \$80,000/year in electrical bills, while disposing of the major fish farm waste product without any cost. The Farm will also need to spend \$100K for manure drying.

It will take \$1.2 Million to fully develop the initial system, including the manure drying system, and another \$300,000 is required for local development; for a total development budget of \$1.5 Million. The match for a \$750,000 grant from the Third Frontier Advanced energy program, includes the \$175,000 from Buckeye Farms; \$250,000 in funds that SunCrest has in place; \$250,000 that AEG will seek as an investment from Rocket Ventures, and \$75,000 AEG is committing from its sources.

The companies involved and their roles include:

AEG is the Midwest Regional Representative for Hardin Geothermal and Geo-Utilities LLC, who are developing district-wide geo-utility programs in Midwest cities. AEG also wrote a \$15 Million DOE grant for Toledo Port Authority for its Advanced Energy Utility Program. It also represents 12 other alternative energy providers. AEG will work with SunCrest and EcoPark to provide the balance of the funding and plan the future expanded use of the plasma-torch system in other aquaponics operations. It will also work with Toledo Port Authority to finance the start-up of plasma-torch system manufacturing in Ohio.

Eco-Park is a 5 year old company that is now developing Alternative Energy Parks in Ohio, Michigan, Alabama and Montana. It is working with Buckeye Farms to fully develop its energy conservation, alternative energy plans and system integration; as well as working to promote the use of the plasma-torch system throughout Ohio and the Midwest, especially for aquaculture operations. This may also include working with the state of Ohio on its stated plan to also develop fish farms in state correctional facilities. SunCrest is a 3 year old company, developing several larger scale MSW and other waste-to-energy systems to completely develop the plasma-torch program, and then to initiate manufacturing in Ohio.

September 10, 2010

OTFAEP 11-371

Ohio Third Frontier Advanced Energy Program Letter of Intent for Proposal to FY2011 OTFAEP

Prospective Applicant: Touchstone Research Laboratory

Applicant Address: Headquarters:
1142 Middle Creek Rd
Triadelphia, WV 26059

Ohio Office:
1363 Gerlaugh Dr.
Wooster, OH 44691

Contact Person: Drew Spradling

Phone Number: (304) 547-5800

Email Address: dms@trl.com

Expected Collaborators: The Ohio State University, Ohio Agricultural Research and
Development Center (OARDC)
Cedar Lane Farms
Quasar Energy Group
GZA Geoenvironmental
SRS Energy

Proposed Project Title: Re-utilization of Industrial CO₂ for Algae Production Using a
Phase Change Material

Estimated Funding Request: \$1,000,000 in OTFAEP funds
\$500,000 in Wright Capital Funds

Respectfully Submitted,



Drew Spradling
Director, Business Development
Touchstone Research Laboratory

Project Description

Touchstone Research Laboratory is the inventor and developer of an advanced energy technology in the area of algae-based industrial carbon capture and beneficial re-use. Touchstone's innovation is in the utilization of a phase change material that is integrated with low cost open-pond algae production that permits increased algae production in colder climates, reduces evaporative water losses, and minimizes foreign species contamination.

Touchstone, a nearly 30-year old small business located in Wheeling, WV has been advancing its algae technology for more than 3 years and is developing a project in Wooster, OH to demonstrate this technology. Total project investment costs are \$7.8M, and the U.S. Department of Energy has recently approved funding in the amount of approximately \$6.2M for Phase II of this project. A one-acre site is planned to be built out adjacent to a coal-fired industrial source at Cedar Lane Farms in Wooster, OH and biofuel and other products are to be produced during this 36-month demonstration phase. Other project partners include the Ohio State University's OARDC in Wooster, GZA GeoEnvironmental in Cincinnati, Quasar Energy of Cleveland, SRS Energy of Dexter, MI, and the project host site – Cedar Lane Farms in Wooster. The proposed project funding will be used to expand Touchstone's operations in Wooster in support of this project, hire additional technical personnel, and more rapidly advance the technology towards commercialization.

In the past 2 years, approximately \$1B in government and private investment has been injected into the creation of an emerging U.S. algae industry to provide renewable biofuels, electricity, and valuable co-products. The current market size is estimated at more than \$300M, and estimated to grow at an annual pace of more than 40% through 2015. The emerging algae industry has the potential to create high paying science and engineering jobs to support production and research, along with future manufacturing jobs in the areas of equipment fabrication and service, fuels refining.

September 10, 2010

OTFAEP 11-372

Ohio Third Frontier Advanced Energy Program Letter of Intent for Proposal to FY2011 OTFAEP

Prospective Applicant: Touchstone Research Laboratory

Applicant Address: Headquarters:
1142 Middle Creek Rd
Triadelphia, WV 26059

Ohio Office:
1363 Gerlaugh Dr.
Wooster, OH 44691

Contact Person: Drew Spradling

Phone Number: (304) 547-5800

Email Address: dms@trl.com

Expected Collaborators: The Ohio State University, Ohio Agricultural Research and Development Center (OARDC)
Quasar Energy Group
GZA Geoenvironmental

Proposed Project Title: Integrated Agricultural Carbon Capture (IACC) and Re-use

Estimated Funding Request: \$1,000,000 in OTFAEP funds
\$1,000,000 in Wright Capital Funds

Respectfully Submitted,



Drew Spradling
Director, Business Development
Touchstone Research Laboratory

Project Description

Touchstone Research Laboratory is proposing to partner with Quasar Energy Group to complete a pilot-scale project in the area of algae for carbon capture and beneficial re-use. Touchstone, a nearly 30-year old small business with its main office in Wheeling, WV and a new office under development in Wooster, OH has been advancing algae technology for more than 3 years. Touchstone and Quasar are currently collaborating on a recently awarded, 3-year, \$7.8M project with support from DOE, where Touchstone is developing algae capture technology for industrial flue gases and will be producing biofuels and high-value products at a 1-acre site in Wooster. Residual algae biomass from this project will be used as a feedstock for the currently operating Quasar 550,000 gallon anaerobic digester located at the OARDC campus in Wooster.

The proposed project will involve a similar algae-based carbon capture approach, but instead be designed to capture the pure CO₂ stream from the commercial-scale anaerobic digestion and electricity generation process that Quasar has developed within the State of Ohio. Two unique components to the commercial anaerobic digestion process that are well-suited to integrate with algae growth is that there is (1) a nearly pure stream of CO₂ that is generated from the biogas cleaning step, and (2) large quantities of low-grade waste heat from the electrical generation step. In the target markets of Ohio and the Midwestern states, anaerobic digestion is experiencing rapid growth as a source of renewable energy and for disposal of organic waste-streams. Algae growth requires both CO₂ and either a warm, southern climate or supplemental heat to be productive year-round. By coupling the CO₂ and waste-heat available from large commercial anaerobic digestion systems, an integrated algae production system can serve to enhance the economics from these two otherwise wasted resources, and allow for economically feasible algae production in states such as Ohio.

In the past 2 years, approximately \$1B in government and private investment has been injected into the creation of an emerging U.S. algae industry to provide renewable biofuels, electricity, and valuable co-products. The current market size is estimated at more than \$300M, and estimated to grow at an annual pace of more than 40% through 2015. The emerging algae industry has the potential to create high paying science and engineering jobs to support production and research, along with future manufacturing jobs in the areas of equipment fabrication and service, and fuels refining.



OTFAEP 11-373

WASHINGTON OFFICE • 701 Pennsylvania Avenue, NW • Suite 750 • Washington, DC 20004

LUKE M. HARMS

Senior Government Relations Specialist

**Letter of Intent
Ohio Third Frontier
Advanced Energy Program**

September 10, 2010

VIA ELECTRONIC MAIL: OTFAEP2011@development.ohio.gov

To Whom it May Concern:

Please find attached a Letter of Intent for the Ohio Third Frontier Advanced Energy Program. Whirlpool Corporation is seeking grant funding in support of research, development and commercialization of advanced energy conservation clothes washer technologies.

Sincerely,

A handwritten signature in black ink, appearing to read "Luke Harms".

Luke M. Harms
Sr. Government Relations Specialist

Letter of Intent
Ohio Third Frontier
Advanced Energy Program

| | |
|-------------------------------------|--|
| LEAD APPLICANT NAME | WHIRLPOOL CORPORATION |
| MAILING ADDRESS | 2000 N M-63 BENTON HARBOR, MI 49022 |
| TELEPHONE NUMBER | 269-923-5000 |
| CONTACT PERSON | LUKE M. HARMS, SR. GOVERNMENT RELATIONS SPECIALIST |
| CONTACT PERSON PHONE NUMBER | 202-639-9420 (OFFICE), 202-286-9308 (MOBILE) |
| CONTACT PERSON EMAIL ADDRESS | LUKE_M_HARMS@WHIRLPOOL.COM |
| PROPOSED PROJECT TITLE | ADVANCED ENERGY CONSERVATION CLOTHES WASHER TECHNOLOGIES |
| GRANT FUNDS REQUESTED | \$1,000,000 |

ADVANCED ENERGY CONSERVATION CLOTHES WASHER TECHNOLOGIES

WHIRLPOOL CORPORATION

Whirlpool Corporation seeks grant funding through the Ohio Third Frontier Advanced Energy Program for research, development and commercialization of clothes washer technologies not currently available to the U.S. market that have the potential to make significant advances in energy conservation. These technologies include demand responsiveness and design enhancements that mitigate the need for heated water to maintain desired wash performance.

Demand Responsiveness/Smart Grid

The purpose of demand-responsive appliances is to provide targeted energy efficiency during periods of peak demand when producing electricity generates the greatest amount of greenhouse gas and is disproportionately costly. For clothes washers, this technology means that during peak demand periods, clothes washers will prompt consumers to use eco-cycles or postpone power consumption to a non-peak period by delaying clothes washer cycles. Demand responsive clothes washers will be capable of communicating within a home area network and/or with the grid, with dual support for control by Smart meters or Internet-based controls.

A Smart Grid solution would provide a demand response environment in which energy reduction is systematically controlled across millions of homes at a time in a coordinated fashion, providing automatic energy reduction without any inconvenience to consumers.

Whirlpool Corporation has already been a leader in Smart appliance demonstrations with a clothes dryer demonstration project in 2006 with PNNL and the Gridwise Alliance in the Pacific Northwest. Whirlpool Corporation is also partnering with technology players and is promoting and contributing to various standards committees, trade associations and academic institutions to harmonize communication standards.

Ambient Water Wash System

Water heating is the single largest factor in a clothes washer's energy use. Development of new technologies that provide consumer-acceptable wash performance for all fabric types with ambient water would further improve upon the significant energy efficiency enhancements that have been implemented by Whirlpool Corporation for decades.

Collaborators

In addition to numerous companies, academic institutions and other organizations, Whirlpool Corporation would develop an Ohio collaboration with one or more academic institutions. The collaborators would likely include one or more of the following institution's engineering programs:

Ohio State University

Ohio University

Case Western Reserve University

Cleveland State University

Ohio Northern University

University of Toledo

September 10, 2010

Dear Sir or Madam,

LineStream Technologies Inc submits this Letter of Intent to apply for the Ohio Third Frontier Advanced Energy RFP.

Dave Neundorfer, President of LineStream Technologies, located at 2310 Superior Ave E, Suite 215, Cleveland, OH, 44114, (440) 785-1724, Email: dave@linestreamtech.com, is the Lead applicant for this proposed project. The estimated amount LineStream is requesting is \$1 million for the wind turbine project.

LineStream collaborators are Cleveland State University with Dr. Zhiqiang Gao as the Primary Researcher, graduate students will be using the Parker LineStream Lab to conduct the vital adjustments to the LineStream advanced controls to adapt it Parker's motion control platform for Next Generation Blade Pitch Control for Wind Turbines.

Program Summary:

LineStream Technologies Inc. requests Ohio Third Frontier Funding for for research and development in applying the novel Active Disturbance Rejection Control (ADRC) concept and techniques to address the pressing issues in turbine speed control and predictive fault indication. This is an initial request for this innovative control technology that could change the way wind farm operators can optimize electrical generation based on available wind combined with "health signature" monitoring that provides real time indication of the rotating equipment condition for predictive purposes. The commercial value for this innovative control for wind farm systems are better control, better energy generation, and predictive maintenance that reduces downtime caused by component failures.

Most large-scale engineered dynamic systems, such as wind turbines exhibit attributes as unmodeled dynamics, large-grained uncertainty, and incomplete knowledge of key parameter values. Conventional systems and control methodologies are usually inadequate to successfully address difficult and ill-defined situations, such as wind turbulence and wind gusts for example. Most approaches rely on intuition using Artificial intelligence techniques, added sensor data, and fuzzy logic inference that lack the mathematical rigor required to apply and validate such techniques to complex engineered systems. ADRC capitalizes on identifying and rejecting disturbances in real time with a mathematically rigorous approach that can be shown to perform according to accepted performance standards.

Unpredictable wind dynamics makes controlling, monitoring and analyzing modern wind turbines a challenge. Our proposed research, if successful will be a large step forward in



developing reliable wind power; not only for the owner operators, but also for the original equipment manufacturers as well.

The variability of data from wind turbines makes monitoring for abnormal behavior difficult for technicians and engineers. ADRC's analytic technology for monitoring and analyzing the performance and mechanical condition of wind generation systems can detect degradation well in advance of the OEM monitoring systems and help mitigate potential failures. ADRC not only helps the controls work better, it's new predictive-analytic systems in real time can focus attention on abnormal equipment conditions, resulting in improved system performance, reliability and availability.

Our research and prototype development will focus on pitch control to compensate for wind turbulence to limit forces through the gearbox and control the shaft speed and using ADRC's disturbance rejection capabilities to monitor the health of the mechanical systems in the wind turbine. ADRC health monitoring technology provides alerts by exception, as opposed to manual review of all the OEM component sensor data trends, to highlight abnormal conditions. ADRC's exception-based alerting will allow the modern wind farm operators to reduce review time by focusing only on deviations from normal system operations.

The research and prototype software development will be conducted by LineStream Technology and will focus on applied research in the above areas critical to wind turbine operation and create a prototype. The hardware platform and wind dynamics expertise will be provided by Parker.

The wind generation industry is rapidly expanding into remote and diverse areas: oceans, deserts, mountains and plains. We believe there is a global need for this technology and the commercial opportunity exists to retrofit the current installed units with the prototype units and license the technology into current OEM wind turbines as well as the installed base.

We look forward to participating in the OTF award process for this exciting technology and making Ohio the leader in advanced controls for wind turbine power generation and reliability.

Sincerely,

A handwritten signature in black ink, appearing to read "Dave Neundorfer". The signature is written in a cursive, flowing style.

Dave Neundorfer

LineStream Technologies



OTFAEP 11-375

September 9, 2010

Sent by email to:OTFAEP2011@development.ohio.gov

Ohio Department of Development
Technology Division
77 South High Street, 25th Floor
Columbus, OH 43215

Re: Letter of Intent for Putnam Power Tower, LLC – Project PPT
Ohio Third Frontier Advanced Energy Program (OTFAEP)

To Whom It May Concern,

Putnam Power Tower, LLC, in collaboration with: Putnam Power, Inc.; Putnam Power Smart Energy Systems, LLC; B-K Tool & Design Inc. and; Unverferth Manufacturing Co., Inc., intends to submit a proposal to the Ohio Third Frontier Advanced Energy Program (OTFAEP) for project development funds which will assist in the development and accelerated commercialization of Putnam Power Tower LLC, an emerging advanced energy technology company in Ohio.

Lead Applicant: Putnam Power Tower, LLC
8214 Road K-6
Ottawa, Ohio 43220
Tel: (419) 234-5781

Contact Person: Kevin Kahle
General Manager
Tel: (419) 234-5781
Email: kevin@putnampower.net

Proposed Project Title: Project PPT

Estimated Grant Funds Requested: \$428,800

Known Collaborators: Putnam Power, Inc.
Putnam Power Smart Energy Systems, LLC
B-K Tool & Design Inc.
Unverferth Manufacturing Co., Inc.

Please see the attached summary of our anticipated proposal. We are looking forward to submitting the full proposal to the Ohio Third Frontier Program by the deadline of October 7, 2010.

Sincerely,

Kevin Kahle
General Manager

Proposal Summary: “Project PPI”

Putnam Power Tower, LLC, in collaboration with: Putnam Power, Inc.; Putnam Power Smart Energy Systems, LLC; B-K Tool & Design Inc. and; Unverferth Manufacturing Co., Inc., requests an Ohio Third Frontier Advanced Energy Program (OTFAEP) grant in the amount of \$428,800.

We believe all consumers can generate renewable energy economically. Our customers will safely, easily, and reliably harness the free fuel from wind, sun, water, and the stored temperature from our earth. Our unique products and services will improve the lives of our customers, add to the strength of our nation, and will impact positively the health of our planet. Economic value created by our venture will benefit Putnam County, Ohio as well as the State of Ohio. Our products have global application.

The Putnam PowerTower is a proprietary hybrid power system which incorporates wind and solar in a single complementary system with geothermal as a built-in optional accessory.

Putnam Power Tower, LLC seeks to adapt or modify components or systems that can be produced in Ohio for use in advanced energy systems that have the potential to reduce the cost and improve the efficiency of advanced energy systems or address technical or commercialization barriers.

Buoyancy Wind Power System North America (BWPS, N.

September 10th, 2010

Re: Ohio Third Frontier – Advanced Energy Program FY 2011- Letter of Intent

Project Title: Accelerated Development of the Midrange bVAWT (Buoyant Vertical Axis Wind Turbine) System

Lead Applicant: James Kiner

Address: 24225 W. Nine Mile Rd. Southfield, MI 48033

Phone Number: 248-505-3202

Email Address: jkiner@thecpi.com

Known Collaborators: AVL, NA

Grant Funds Requested: \$1,000,000 (\$1,200,000 match) for Year 1

Project Summary

Buoyancy Wind Power System North America's (BWPS) vertical wind power technology and the company's patented continuously variable transmission (BWPS/CVT) is a proven system, with an operating model in place that solves the problems that have kept vertical wind technologies from the commercial marketplace.

Currently, nearly all commercial systems of any size are horizontal systems, with the system's blades positioned horizontal to the ground (into the wind). The typical problems addressed in horizontal system technology are:

- 1) High initial and life cycle operating costs, difficulty of maintenance, low system efficiency.
- 2) Current vertical turbine technology has drawbacks that keep the systems from being commercially viable- current designs puts too much weight on the central turning shaft, and far too much weight at the base, requiring large costly bearings and gears that take too much wind power to turn efficiently.

BWPS has solved these problems by building a system of lightweight "sails" supported by a central shaft. The BWPS sails and the rotating shaft use the laws of physics to offset the weight and float in a tank of water, relieving the weight of the shaft completely. The bearings and gears below the water tank are much smaller and more easily moved with far less wind. Also, the weight is not at the top of the shaft, eliminating the much of the vibration.

Further, the central shaft is supported and balanced by 4 vertical structures that direct wind into the sails from an area wider than the sails cover, creating a "Venturi Effect" that enhances the wind velocity. The result is a vertical wind system that begins producing power at a wind speed of 1.5 meters/second, as opposed to a standard horizontal wind turbine which starts at about 8 meters/sec. Further, there is no upper speed at which the turbine is slowed down by "governors" as is the case with horizontal systems, and because of the unique Continuously Variable Transmission (CVT). So, as when a horizontal turbine is slowed down and even stopped under very high wind speeds due to safety reasons, the BWPS system keeps producing power at an increasing rate, even under typhoon wind conditions.

The current 100kW model was built in coastal S. Korea, where it was placed to prove it can withstand and actually generate significant power from typhoon winds. In operation for a full year, it has generated significant data that prove its capacities and reliability. The patent-holder has formed a partnership with BWPS North America to bring that technology to the US and plans to begin production in Ohio, with parts manufactured in Ohio and Michigan and largely assembled on site.

BWPS has additional benefits over horizontal systems, that have been well known, but that were only theoretically attainable, due to the problems of weight and vibration. These include:

- 1) The gears (transmission) and generator are located at ground level (or below) and are much easier and less costly to replace, maintain or service than transmissions and generators 200 feet in the air.
- 2) By "collecting wind" and not relying on "wind foil", the system theoretically escapes the Betz curve limit of 60% efficiency. In other words, where a 1MW horizontal unit may be 35% efficient (operate 35% of the time); the same 1MW BWPS/CVT unit, has already been shown to operate 50% of the time, and can expect to operate at greater efficiency in the future.
- 3) So a BWPS/CVT unit can achieve almost twice as much power as the same size horizontal unit, at a similar cost.
- 4) The BWPS/CVT system uses mostly off the shelf parts, and is assembled on site, so no huge blades or tower sections need to be shipped and trucked hundreds of miles one piece at a time.

The BWPS/CVT system also creates jobs for US workers, manufacturers and supply chain vendors, and takes an essential step toward a goal of national energy independence in that the proposed system is replicable, economical in its use of off-the-shelf materials made by US suppliers, and straightforward enough in construction for experienced but non-specialist construction workers to build. Workers will also enjoy safer, ground-based conditions than on 200 ft tall units.

The Continuously Variable-speed Transmission enables the BWPS system to capture vastly greater energy from very high speed winds, up to typhoon velocity. The CVT is a new addition, not part of the Korean unit, and has only been demonstrated in a 1kw unit. The design of the 100kw CVT has recently been completed; the first prototype model will begin in early 2011.

This proposal adds to existing financial resources by working with: a) AVL (the worlds largest independent R&D and testing company (specializing in power train and turbine technologies) to refine and test the CVT and independently test and verify the Korean model's results; while BWPS works with local manufacturers to (3) assemble initial 10kW, 50kW and 100kW models, which b) Toledo Port Authority has agreed to purchase and install. Further work will focus on commercial development, emphasizing durability, production optimization, and determining optimal sizes, and scalable design – which will depend on new market research. Dana Corp in Toledo may help develop the CVT. Cost of the project for Year 1: \$1.2 Million.

OTFAEP 11-377

September 10, 2010

The Ohio Department of Development
Technology and Innovation Division
77 South High St., 25th Floor
Columbus, OH 43215

RE: Third Frontier Advanced Energy Program Letter of Intent

To Whom It May Concern:

This document is submitted as a Letter of Intent to apply to the Third Frontier Advanced Energy Program for Fiscal Year 2011. The preliminary proposal submission details are as follows:

Lead Applicant Organization: Centurion Technologies
Lead Applicant Address: 1308 Trenton Ave,
Findlay, Ohio 45840
Contact Person: Kraig Kutschbach
Owner, Centurion Technologies
Phone Number: (419) 425-0324
E-mail Address: kkutch@centuriontechnologies.com

Project Title: Wind-Sail, Next: Generation Wind Power

Estimated Grant Funds: \$1,000,000

Known Collaborators: Ohio Northern University, National Composite Center

A one-page abstract that describes the proposed project is attached. If you have any questions regarding this LOI submission, please do not hesitate to contact me at your earliest convenience.

Sincerely,

Kraig Kutschbach
Centurion Technologies

Wind-Sail, Next Generation Wind Power

Abstract

The Wind-Sail Vertical Axis Wind Turbine (VAWT) air foil design is optimized not just for aerodynamic performance, but in particular for low cost mass-manufacturing by utilizing constant cross section blade profile. This simpler shape is less expensive to manufacture than airfoils with complex curvilinear shapes and profiles. The turbine has additional attributes that are attractive in the marketplace including: Self starting, omni-directional, silent operation, low maintenance, cost effective in class 2 and above, no bird kills.

The proposed effort seeks to optimize the manufacturing process, in order to address existing demand for the 3 KW turbine, currently in pilot production, while also seeking to scale this production process to larger air foils for turbines ranging from 5 to 500 KW capacity. Since there is a ready market, with an identified customer, for a 30 KW turbine, we propose this size as the first scaling target.

Wind-sail's success is contingent upon a continuous market trend for wind energy, environmental protection and upon management maintaining the company's technological edge over its competition. Energy pricing is in the midst of long term increases that threaten the way of life of individuals, businesses, and governmental institutions around the world. Non-renewable sources of electrical power are rapidly increasing in cost. In addition, the recognition of global warming as a significant threat will continue to present regulatory frustration in the non-renewable energy sector.

Centurion Technologies, LLC will serve as the lead applicant on this project. Centurion Technologies will rely on its experience with renewable energy including wind energy. The project team will also include The National Composite Center (NCC) as a collaborator. NCC is the industry leader in promoting, developing and applying advanced composite technology to the aerospace, defense, ground transportation, commercial and infrastructure markets. NCC will assist in identifying and testing the optimum material to compose the patented airfoil. Ohio Northern University (ONU) will also be a collaborator to the project. ONU ranked No. 3 among baccalaureate colleges and universities in the Midwest by U.S. News & World Report in America's Best Colleges 2011. ONU's T.J. Small College of Engineering will assist in tooling, machining and other aspects of manufacturing the airfoil.

Empire Magnetics Inc, holder of the patent license from UC Berkeley/Lawrence Berkeley National Labs, will undertake marketing and sales activities, to obtain initial contracts for air foils that will be produced.



OTFAEP 11-378

September 10, 2010

To Whom It May Concern:

This letter is to state the intent of Intwine Energy Networks to submit a proposal to Ohio Third Frontier's Advanced Energy Program.

Lead Applicant and contact person:

Intwine Energy Networks, LLC
Mr. David Martin, CEO
8401 Chagrin Road, Suite 10A
Chagrin Falls, OH 44023
phone: (440)773-7144
e-mail: dmartin@intwineenergy.com

Proposed Project title: Integrated, Smart Home Energy Management System

Estimated Grant Funds to be requested: \$1,000,000

Known Collaborators:

Case Western Reserve University
FirstEnergy Services Company
FirstEnergy Solutions Corp.
Arzel Zoning Technology, Inc.
Aclara RF Systems, Inc.
Osmisys, LLC
Delta Systems, Inc.
Cincinnati Technologies, Ltd.
Alternative Energy/Electrical Storage partner to be named

Summary of the Proposed Project:

This collaborative project is to develop an intelligent, easy-to-use adaptive energy management system that will provide energy management decision support to homeowners and small businesses while delivering comfort, conservation, and peace of mind and simultaneously fulfilling the future smart grid needs of utilities and the energy market. The proposed system will be built upon Intwine Energy's hosted cloud-based system architecture consisting of 3 primary components: (1) in-home WiFi enabled end-point energy sensing and management devices; (2) a scalable, relational middleware platform; and (3) customized, secure intuitive user interfaces integrated with a unique model-based planning and decision support system that will aid users and utilities in the development and implementation of energy management strategies. The system will leverage and extend Intwine Energy's proven hardware, firmware and software solution, integrated with unprecedented intelligence at the server level, allowing the system to deliver real-time energy management solutions through sensing and adaptive model-based

control systems that will increase the ability of users to more efficiently and effectively manage their energy use while maintaining comfort and peace of mind. The data-rich, extensible system will also bring value to utilities in numerous ways by: (1) enabling smart grid programs (demand response and dynamic pricing) to deeply extend into the home and small business environment; (2) reducing end-user operating costs; (3) increasing customer education, enhancing customer relations; and (4) adhering to government policy and regulations with easily accessible metrics & reporting. Additionally the system has the ability to interface with various advanced metering infrastructures without compromising secure, proprietary communication links back to utilities. By bringing added value and control to both the end-user and energy providers, the proposed system will increase the adoption and success of smart grid programs while raising end-user awareness of the advantages of energy efficiency.

Sincerely,

Dave Martin
President, Intwine Energy Networks



THE GREAT LAKES CONSTRUCTION CO.

OTFAEP 11-379

September 10, 2010

Dear Ohio Department of Development,

Please accept this Letter of Intent (LOI) from The Great Lakes Construction Co. (TGLCC) for our 2011 Advanced Energy Program proposal.

| | |
|---|---|
| Lead Applicant's Name: | The Great Lakes Construction Co. |
| Address: | 2608 Great Lakes Way Hinckley, OH 44233 |
| Telephone: | (330) 220-3900 |
| Contact Person: | Paul Stanard (330-220-3988) |
| Contact Email: | pstanard@tgllcc.com |
| Proposed Project Title: | Development of Systems for Offshore Wind Turbine Foundations |
| Estimated Grant Funds to be Requested: | \$2 million (\$1M AEP R&D / \$1M WCF) |
| Known Collaborators: | Case Western Reserve University, Great Lakes Energy Institute (GLEI at CWRU), and others to be determined |

Project Summary

Offshore wind power presents one of Ohio's greatest opportunities for leadership in the alternative energy sector. The hub of this opportunity is Lake Erie: its shallow depth and excellent wind quality provide a safe and reliable test bed for offshore elements of the national wind energy goal: 20% energy from wind power by 2030 (U.S. Department of Energy). Current efforts intend to develop a pilot project of 20 MW (5 turbines) in Lake Erie by 2012. Follow-on development targets 1000MW by 2030 (potentially hundreds of turbines). Both projects bring with them significant regional economic growth and job creation. Recently, this economic impact has been estimated at up to 8000 jobs and \$7.8 billion in wages over the next 20 years.

To accelerate Ohio's claim on this opportunity, this project, with Ohio Third Frontier support, will develop the critical engineering, design, and deployment capabilities for one of the most expensive components affecting offshore siting: turbine foundations. Lake Erie presents unique challenges to foundation design, manufacturing, and installation. Example challenges include untested soil composition and floating ice conditions, which can be more challenging to marine structures than in any of the other Great Lakes.

Specifically, this proposal team will develop, fabricate, and install a scaled commercial prototype offshore turbine foundation and tower base. Numerous testing and measurement equipment will be installed with the test foundation, which will be located very near the proposed site of initial wind turbine development near Cleveland. This offshore foundation will be the first of its kind in Lake Erie, the Great Lakes, and the U.S.

2608 Great Lakes Way • Hinckley, OH 44233-9590 • www.tgllcc.com
Office (330) 220-3900 • Fax (330) 220-7670 • Eng./Est. Fax (330) 220-3998

An Equal Opportunity Employer

In addition to developing specialized expertise and test facilities, this offshore platform will enable valuable data to be obtained. This data includes soil characteristics of the lake floor, forces on the tower and foundation from water and ice, meteorological and environmental data, impact on freshwater wildlife near the proposed commercial demonstration site, and the prototype foundation performance. Such information will be essential for ensuring the safety and economy of the foundation designs of future turbines, allowing them to become economically competitive and to encourage a local industry to begin manufacturing and deploying them. Practical experience with constructing and installing the first Great Lakes offshore wind foundation will also be gained by the project team, positioning them well to serve not only the first 20MW project, but also all subsequent projects within the Great Lakes.

The partners in this team include The Great Lakes Construction Company (TGLCC) of Hinckley, Ohio and Cleveland-based Case Western Reserve University (CWRU). The Great Lakes Construction Company is a 100% employee-owned civil construction company of 62 years, which concentrates its projects in the Great Lakes region, with a predominate focus in Northeast Ohio. Case Western Reserve is one of the nation's leading independent research universities, ranking in the top 50 of all national colleges and earning \$345 million in annual sponsored research.

TGLCC has adapted its wide range of services, including marine substructure construction, for the growing Ohio wind market. Likewise, Case Western Reserve currently pursues multiple research & development projects intended to enable the transition to sustainable energy, including multiple wind power projects. Among these are specific commercially-focused endeavors intended to help Ohio businesses claim major portions of the local wind energy supply chain.

Together, along with its other partners, this proposal team has the expertise, infrastructure, and access to fabricate, install, test, and validate the design and performance of offshore wind turbine foundations in Lake Erie. Within this same team is the capability to transition these pieces into the commercial products and services, captured investment, and quality green collar jobs needed to develop the industry for Great Lakes wind in Ohio.

Sincerely,

The Great Lakes Construction Co.

A handwritten signature in black ink that reads "Paul J. Stanard". The signature is written in a cursive, slightly slanted style.

Paul J. Stanard
Project Development Manager

PJS/lg

Smart Energy Storage Systems Ltd.

September 9, 2010

The Ohio Department of Development
Technology and Innovation Department
77 South High Street, 25th Floor
Columbus, OH 43215

RE: Letter of Intent to Submit Ohio Third Frontier Advanced Energy Program Proposal

Dear Sirs:

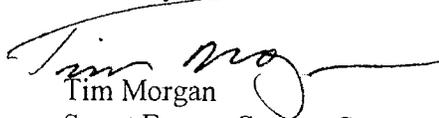
Smart Energy Storage Systems Ltd., located at 1771 East 30th Street in Cleveland, OH, intends to submit an Ohio Third Frontier Advanced Energy Program Proposal entitled *Smart Energy Storage*. Tim Morgan will be the contact for the proposal. Mr. Morgan can be reached at (216) 292-8772 or tim@intlsg.com

The proposal will request approximately \$1 million to develop, test and commercialize a scalable distributed energy storage platform technology. The first application will be in the residential electric utility sector. An initial system has been proto prototyped which will begin expanded testing during the second quarter of 2011. The residential electric system will be launched for commercial sale during the first quarter of 2012. Additional applications, including electric vehicle applications and scalable portable power generation, will be developed based on, and integrated into, the same platform technology as part of the proposal.

Smart Energy Storage Systems will be the Lead Applicant. Energizer is expected to be the commercial collaborator for the project. The University of Akron is expected to be the research collaborator for the project.

We appreciate your consideration of our proposal for funding from this exciting and important program.

Sincerely,


Tim Morgan
Smart Energy Storage Systems Ltd.



PutnamPower[™]
Transforming Energy. Naturally.

OTFAEP 11-381

September 9, 2010

Sent by email to:OTFAEP2011@development.ohio.gov

Ohio Department of Development
Technology Division
77 South High Street, 25th Floor
Columbus, OH 43215

Re: **Letter of Intent for Putnam Power Smart Energy Systems – Project PP SES**
Ohio Third Frontier Advanced Energy Program (OTFAEP)

To Whom It May Concern,

Putnam Power Smart Energy Systems, LLC, in collaboration with: Putnam Power, Inc.; Putnam Power Tower, LLC; B-K Tool & Design Inc. and; Unverferth Manufacturing Co., Inc., intends to submit a proposal to the Ohio Third Frontier Advanced Energy Program (OTFAEP) for project development funds which will assist in the development and accelerated commercialization of Putnam Power Smart Energy Systems, LLC, an emerging advanced energy technology company in Ohio.

Lead Applicant: Putnam Power Smart Energy Systems, LLC
18143 Road L-18
Cloverdale, Ohio 45827 Ohio 43220
Tel: (419) 979-9460

Contact Person: Jim Klausing
Managing Director
Tel: (419) 979-9460
Email: Jim@putnampower.net

Proposed Project Title: Project PP SES

Estimated Grant Funds Requested: \$368,700

Known Collaborators: Putnam Power, Inc.
Putnam Power Tower, LLC
B-K Tool & Design Inc.
Unverferth Manufacturing Co., Inc.

Please see the attached summary of our anticipated proposal. We are looking forward to submitting the full proposal to the Ohio Third Frontier Program by the deadline of October 7, 2010.

Sincerely,

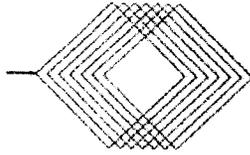
Jim Klausing
Managing Director

Proposal Summary: “Project PPI”

Putnam Power Smart Energy Systems, in collaboration with: Putnam Power, Inc.; Putnam Power Tower, LLC; B-K Tool & Design Inc. and; Unverferth Manufacturing Co., Inc., requests an Ohio Third Frontier Advanced Energy Program (OTFAEP) grant in the amount of \$368,700.

We believe all consumers can generate renewable energy economically. Our customers will safely, easily, and reliably harness the free fuel from wind, sun, water, and the stored temperature from our earth. Our unique products and services will improve the lives of our customers, add to the strength of our nation, and will impact positively the health of our planet. Economic value created by our venture will benefit Putnam County, Ohio as well as the State of Ohio. Our products have global application.

Putnam Power Smart Energy System, LLC is focused on developing and commercializing new products, manufacturing processes, and technologies that have the potential to reduce the cost and improve the efficiency of advanced energy technologies and systems as well as address technical commercialization barriers to advanced energy technologies.



Energy Technologies, Inc.
Rugged Power ◊ Global Solutions

September 10, 2010

The Ohio Department of Development Technology Division
 77 South High Street, 25th Floor
 Columbus, OH 43215

Subject: 2011 OTFAEP LOI

Dear Sir or Madam,

We are very pleased to have this opportunity to submit this Letter of Intent in response to the Third Frontier Advanced Energy Program Request for Proposals.

Energy Technologies, Inc. (ETI) of Mansfield, OH, develops, manufactures, and sells products that are the standard in rugged, high-reliability power generation, power conditioning and computer peripherals for military, industrial, medical and telecommunications sectors.

We are collaborating with R.W Beckett located in North Ridgeville, OH on the development of leading edge Lithium-Ion battery modules for the defense industry. One of the outstanding issues is the interface, voltage requirements and packaging of storage modules for the Tactical Micro Grid package.

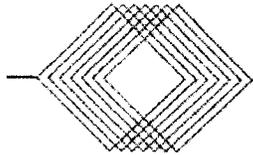
The key information requested in the RFP is provided below:

Applicant Name: Energy Technologies, Inc.
 Address: 219 Park Avenue East, Mansfield, OH 44902
 Phone Number: 419.522.4444 Contact
 Person: P. D. Madden, PE
 E-mail Address: pdmadden@ruggedsystems.com

Proposed Project Title: Tactical Hybrid Intelligent Micro-Grid
 Controller System
 Project Type: Research, Development, and
 Commercialization
 Estimated Amount of Funding Requested: \$1M

Sincerely,

P. D. Madden, PE
 CEO/General Manager



Energy Technologies, Inc.

Rugged Power ♦ Global Solutions

Project Summary

This project is to configure a system from proof of concept bench scaled demonstrated hardware into a Tactical deliverable system capable of accepting power from any source of electrical input (generators operating on either fossil fuel or renewable hydrogen fuel cell and available local grid power) and supplying the necessary load with a focus on reducing the dependence on fossil fueled power systems. The proposed project system contains four main elements:

- Plug and play
- Capability of sources and loads
- State of the art energy storage modules
- Intelligent source management and intelligent load management.

The demonstration system to be delivered as part of this phase of the program is based on a modular design and is scalable to address operational power requirements over the range of 15 kW to 500 kW.

The system architecture is capable of accepting in excess of 15kW input at a range of 20 to 32 VDC to facilitate renewable energy sources. The intelligent energy storage device contained in the system allows for transient management during generator start up and shut down, as well as supports efficient and reliable grid operation during sudden power source or unplanned load transients.

The system's modular configuration allows for an autonomous operation of the Micro-Grid with central control and monitoring. The system has a master fall back configuration (battle short mode) that not only allows for manual selection of load and source operation, but can be hard switch configured for automatic overriding of automatic control functions based on priority power loads.

Based on the modular tactical design approach, the system can be employed without Material Handling Equipment (MHE) assistance, and is designed using IAW accepted design criteria for Human Factors Engineering. The proposed system is designed to operate in harsh environments (-45°C to +60°C with a storage range of -55°C to +75°C), with each module meeting Mil Specifications for 901D, 461F, 167, and 810D.

The system is designed to meet a MTBF greater than 125,000 hours and offers a MTTR of less than 30 minutes. The ability to load shed along with load walk-in based on a selectable four tier level allows for an increase in the overall reliability of the configured Micro-Grid.



846 North Cleveland-Massillon Road
Akron, Ohio 44333
Phone: 888.666.8577
Fax: 866.586.6824

September 8, 2010

OTFAEP 11-383

Dear Ohio Department of Development,

Please accept this Letter of Intent from Green Energy Technologies for our FY 2011 Third Frontier Advanced Energy Program proposal.

Lead Applicant Name: Green Energy Technologies
Address: 846 North Cleveland-Massillon Road
Akron, Ohio 44333
Telephone: 1-888-666-8577

Contact Person: Mark Cironi
Contact Email Address: mark.cironi@getsmartenergy.com
Project Title: On-Site Wind Power Generation.

Estimated Grant Funds Requested: \$1,000,000.00

Collaborators: Nottingham-Spirk Design Associates and other to be determined.

Summary of Proposed Project

Green Energy Technologies, LLC of Akron, Ohio, has developed a product named the Wind Cube for industrial and commercial on-site wind power generation. The overall motivation since the inception of the concept is to further develop a product that enables clean, renewable, cost effective, on-site power generation. It is currently difficult to use traditional wind turbines in industrial and commercial on-site environments. Currently there is a void in the marketplace in the availability of wind turbines that produce significant power with a low cut in speed and in a small footprint. The wind cube solves that issue.



Respectfully Yours,

A handwritten signature in black ink that reads "Mark L. Cironi". The signature is written in a cursive, flowing style.

Mark L. Cironi
President
Green Energy Technologies



444 East 2nd St.
Dayton, Ohio 45402

Direct Voice: 937-768-2084
IHMSI Voice: 937-285-4820
Fax: 937-285-4855

September 10, 2010
Ohio Department of Development, Technology and Innovation Division
Attention: Ohio Third Frontier Sensor Program
77 South High Street, 25th Floor
Columbus, Ohio 43215

OTFAEP 11-384

Dear Sirs:

International Health Monitoring Systems Inc. (IHMSI) is pleased to submit this Letter of Intent to submit a proposal in response to the Ohio Third Frontier Advanced Energy Program Fiscal Year 2011 Request for Proposals.

Lead Applicant: International Health Monitoring Systems Inc.

444 East 2nd Street
Dayton, Ohio 45402

Administrative Contact: William K. McCroskey
President IHMSI
Direct Voice: 937-768-2084 Voice: 937-285-4820
William.mccroskey@ihmsi.com

Technical Contacts: William K. McCroskey - President
Direct Voice: 937-768-2084 Voice: 937-285-4820
William.mccroskey@ihmsi.com

Project Title: "Wind Rotor Blade X-ray CT for in Line Process Monitoring and Control for Wind Rotor Blade Manufacturing for Global Markets"

Estimated Grant Funds to be Requested: \$1,000,000.00

Known Collaborators:

1. **Molded Fiber Glass Companies**, 2925 MFG Place, P.O. Box 675, Ashtabula, Ohio 44005-0675
2. **GE Energy, Global Research & GE Energy Blade Design**, Bldg KWD 216A, One Research Circle, Niskayuna, NY 12309
3. **Sandia Labs – Wind Turbine Blade Design**, P.O. Box 5800 MS 1124 Albuquerque, New Mexico 87185-1124
4. **Fraunhofer Institute IZFP Dresden**, Germany, **Fraunhofer Institute IIS – Furthe**, Germany.
5. **Ladar & Optical Communications Institute (LOCI)**, 300 College Park, Dayton, Ohio 45460



6. **E3-Design** – Wind Turbine Controls and Composite Design for Wind Energy
7. **Institute for Development and Commercialization of Advanced Sensor Technology (IDCAST)**
444 East Second St., Dayton, Ohio 45402
8. **University of Dayton Research Institute (UDRI)** 300 College Park Dayton, Ohio 45469 Division
Multi-Scale Composites & Polymers
9. Others To Be Determined

Project Description:

Wind Turbines are designed to harness the Wind's Energy as a green renewable energy source. The Wind energy market is growing at 20% in the US with an US initiative to achieve 20% wind power by 2030. Wind turbines are constructed from major components including wind turbine rotor blades, gear boxes, towers, generators and control systems and sensors. Approximately, 22%-23% of the wind turbines cost is in the three rotor blades. Therefore, Wind Rotor Blade Reliability is a keen issue. Major failures are due to manufacturing flaws and defects, lightening, ice, and over speed conditions.

The Wind Rotor Blade X-ray Computed Tomography (WRBCT) is being developed in a global collaboration with wind rotor blade manufacturers, wind turbine manufactures and Wind Rotor Blade Reliability Consortium. The WRBCT systems are being designed to demonstrate that the systems can detect manufacturing problems at the blade formation process and provide rapid feedback to correct process defects.

The WRBCT will provide 3D x-ray CT density information on the wind rotor blade for 100% inspection and process control feedback at completion of the blade molding process. The WRBCT is expected to provide solutions to the following manufacturing problems including: 1.) Are the Low/High Pressure shells bonded together properly over the 40 meter to 50 meter length? 2.) Are the Spar Caps and Shear Webs bonded properly? 3.) Are there "Dry Fibers"? 4.) Are there "Fiber Waves" in root sections and spar caps?

Regards,

William K. McCroskey
President
International Health Monitoring Systems, Inc.
444 East 2nd Street
Dayton, Ohio 45402
www.ihmsi.com

DET NORSKE VERITAS



DNV Columbus, Inc.

2011 OTFAEP
Ohio Department of Development

5777 Frantz Rd
Dublin, OH
Tel: (614) 761 1214
Fax: (614) 761 1633
<http://www.dnv.com>

Dear Ohio Third Frontier Review Committee,

DNV Columbus, Inc., in partnership with Global Thermostat, LLC and Sempa Power Systems Ltd, is pleased to propose “**Conversion of Carbon Dioxide with Load Balancing for Ohio’s Growing Wind Energy Network**”. The project will achieve the following goals for Ohio’s Advanced Energy systems:

- Integrate Ohio renewable wind energy into industry value chains
- Improve efficiency of existing Ohio energy infrastructure
- Reduce atmospheric CO₂ by utilizing CO₂ to produce value added products
- Commercialize technology that can be produced in Ohio and exported anywhere

The proposed project will commercialize carbon dioxide conversion into useful products such as formic acid and other organics. The process uses pure carbon dioxide captured from the atmosphere (via technology provided by Global Thermostat), recycles this CO₂ via an electrochemical process (provided by DNV Columbus), and produces formic acid or other fuels which can be used as a chemical feedstock in multiple processes. A unique piece of this project will be the inclusion of demand-response technology (provided by Sempa Power) that will enable this process to be variably controlled in order to balance electrical loads. This is particularly relevant to the growth of wind power in Ohio as wind energy is often intermittent.

By using demand response technology in sync with intermittent wind generation, the CO₂ recycling process will be renewably powered (and therefore carbon negative) and will also smooth the adoption of wind energy into the Ohio grid. The end-products of the CO₂ conversion process will be value added chemicals, and the ancillary services to the grid are a potential added revenue stream. This project can be built in Ohio with product support from Ohio suppliers. More importantly, the upcoming Buckeye Wind Power project and other wind projects in the coming years will new energy management challenges to the grid. The partners in this project intend to work with the energy generated from Ohio wind farms and aid in “wind firming”, either directly with the farm or with the local independent system operator. This is particularly relevant to the Ohio Renewable Portfolio Standard (RPS) which targets 12.5% renewable energy in Ohio by 2024 and 25% alternative power sources by 2025. Much of this energy will come from reliable but intermittent wind resources, so technologies of this type are needed to help the Public Utilities Commission of Ohio (PUCO) reach these goals.

This project will move carbon dioxide conversion technology to commercialization by integrating existing technologies into a new and unique package. Each of the team members possesses a unique technology that is part of the greater system. By the end of the project duration, the project team expects

to have demonstrated this technology, verified its performance, transferred intellectual property to commercial ventures, and planted the seeds for growing Ohio companies.

DNV will lead this effort and requests \$1,000,000 US. The team will acquire an additional \$1M US in matching in-kind funds. Dr. Davion Hill (Davion.M.Hill@dnv.com, [614] 761 6932 direct) will be the principle investigator for this program and can be contacted at the DNV Columbus office.

Sincerely, for DET NORSKE VERITAS AS
Davion M. Hill, Ph.D.

A handwritten signature in black ink, appearing to read 'D M Hill', written in a cursive style.

Group Leader
DNV Research and Innovation USA Corporate
DNV Columbus, Inc.

McKay, Michael J.

From: Dan Oberle [d.oberle@gbtholding.com]
Sent: Friday, September 10, 2010 2:52 PM
To: OTFAEP2011
Subject: 2011 OTFAEP LOI

Ohio Third Frontier Advanced Energy Program

This memo is to inform the Ohio Department of Development that we, GBT USA, Inc. intend to submit a proposal for grant within the context of the 2011 Advanced Energy Program.

GBT (Global Blade Technology) is a relatively new company (August 2009) with a deep and rich history of experience in the wind energy business, specifically focused on the design, development and manufacturing of rotor blades. It is our intent to offer a proposal to the ODOD as the lead applicant for this grant.

Lead Applicant: GBT USA
865 Southmeadow Circle
Cincinnati OH 45231
(513) 312-3776
Dan Oberle

Project title: Optimized Blade Mold Technology

Estimated grant funds: \$1,000,000

Known collaborators:

End user: Minster Machine Company, Minster Ohio
Input materials: WebCore, Miamisburg Ohio
Input technology: University of Dayton Research Institute

The project is to build a mold for an advanced technology rotor blade. Our Ohio customer has a developmental program for a new wind turbine. They have the option of sourcing a blade for this turbine from an "off the shelf" blade producer, or building a dedicated mold to produce this blade. The key differences between the two options are the capital cost of the mold and the improved performance of the blade.

The option of sourcing an existing design requires no capital, therefore relatively little risk. They can source this blade (from offshore) with minimal commitment to volumes. The custom blade, on the other hand, will require "risk" capital of about \$2.5MM to build the mold. That sounds expensive until you consider a few very important points:

1. The (Ohio) customer will own the intellectual property, no royalties or licenses
2. They will avoid all of the incremental shipping costs associated with bringing blades from offshore
3. And most important, the performance of the turbine will be optimized for maximum energy output, which translates directly to lower cost of energy

GBT USA is an Ohio company, however we have the option to locate our US operation anywhere at this point in time. We have ties to the State of Ohio, we like the infrastructure and supply base, and we like the composites expertise that lies within the Universities and surrounding industries. Much of our business activity continues to point us toward Ohio as the place to establish our business.

This program will allow us to accelerate the establishment of GBT USA, locating us in Ohio, while working with other Ohio organizations in collaboration. This program will also allow our end user to avoid sourcing a major component of their new turbine offshore.

Thank you for your consideration.

Best regards--



Dan Oberle

Global Blade Technology

4 Dogwood Place

Mt Vernon IN 47620

USA

(O) +1 (812) 307-4366

(M) +1 (513) 312-3776

d.oberle@GBTHolding.com

www.GBTHolding.com

EAST EXCHANGE STREET, 7th Floor
AKRON, OH 44308

TELEPHONE 330.375-
FAX 330.794-

OTFAEP 11-389

September 9, 2010

Ohio Third Frontier Program 2011 (OTFWPP)
Ohio Department of Development
Technology and Innovation Division
South High Street, 25th Floor
Columbus, Ohio 43215-6130

Letter of Intent to Submit an OTFAEP Proposal to ODOD

Dear Sir or Madam:

Hydrogen Energy Systems, LLC and our manufacturing collaborators hereby submit a Letter of Intent in respect to the Ohio Department of Development Third Frontier Advanced Energy Program 2011 Request for Proposal.

Respective Lead Applicant's Name: Hydrogen Energy Systems, LLC.

Respective Lead Applicant's Address: 12 East Exchange Street, 7th Floor
Akron, Ohio 44308

Contact Name: Jeffrey E. Wilhite
Contact Phone Number: (330) 807-8291
Contact E-Mail: jjwilhite@neo.rr.com

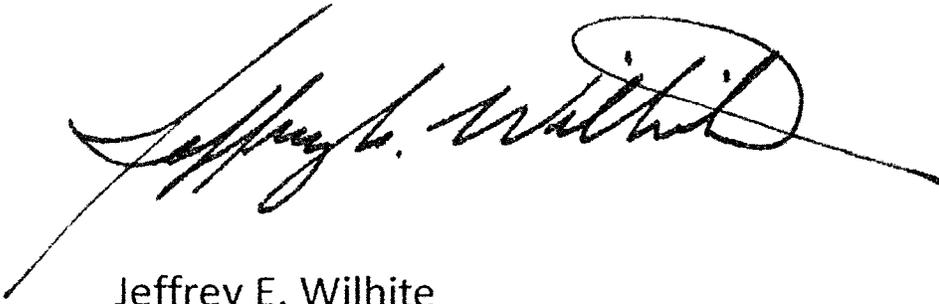
Collaborator's Name: MTD Products Inc.
Collaborator's Address: Corporate Office
P.O. Box 368022
Cleveland, Ohio 44136-9722

Contact Name: Rory Bringhurst
Contact Phone Number: (330) 558-3060
Contact E-Mail: rory.bringhurst@mtdproducts.com

Project Title: Small Engine Advanced Energy System

Estimated Funds Requested: \$1,250,000

Sincerely,

A handwritten signature in black ink, appearing to read "Jeffrey E. Wilhite". The signature is fluid and cursive, with a large loop at the end of the last name.

Jeffrey E. Wilhite
President
Hydrogen Energy Systems, LLC

Cc: Rory Bringhurst
Executive Vice President, Product Engineering
MTD Products, Inc.

**Letter of Intent for:
Ohio Third Frontier Advanced Energy Program - Fiscal Year 2011**

Project title: "A residential-based point-of-use Energy Appliance to manage energy demand, improve power quality, and provide grid energy storage"

Lead Applicant:

Distributed Storage Systems
13676 North Station Rd
Columbia Station, OH 44028
Contact person: David Rubin
dssenergy@gmail.com, 216/403-2289

Estimated Grant Funds requested: \$850,000

Known Collaborators: Dr. Ken Loparo, Department of Electrical Engineering and Dr. Jesse Wainwright, Department of Chemical Engineering; Case Western Reserve University/Great Lakes Energy Institute

Project Summary:

Over the past several decades, the greatly expanded use of central air conditioning, florescent lighting and electronic equipment with switching power supplies has significantly increased electrical power demand while compromising power quality. In addition, new renewable sources of power (specifically wind and solar) are intermittent and unpredictable.

The DSS system is an advanced battery-based distributed energy storage device that stores and regenerates power while operating either autonomously or by remote control. Uses include point-of-use demand management transparent to the customer, storing generated power not matched to demand, and being available to improve power quality as needed. A network of DSS systems will provide utilities with a very flexible grid storage and load management tool.

Power quality problems include frequency variation and changing power factor based on the quantity and type of power demand. The increased use of air conditioning in particular significantly degrades power factor while raising real power demand and stressing generation and transmission resources. The DSS system can react quickly and locally to power quality issues whether due to power factor, frequency changes or voltage sag.

Demand management includes peak shaving and more efficient use of generating resources. Peak demand is typically 3-5 times non-peak demand meaning generation and grid capacity must be overbuilt. By storing power during off-peak times and regenerating it during peak demand the DSS system can smooth the demand curve reducing peak power demand and countering power factor issues. This not only lowers stress on the grid during peak times but also can allow generation resources to operate at higher and more efficient baseline levels for longer periods. This demand management is transparent to the customer - unlike current options that require turning off various loads.

New renewable generation resources like solar and wind are both intermittent and unpredictable. A network of DSS systems can be used to both absorb energy surges, and store energy generated at inopportune times (such as during off peak periods when demand is low) for later use as needed.



David Rubin: CEO of DSS

9/8/10

OTFAEP 11-391

September 6, 2010

Subject: 2011 OTFFCP LOI

Dear Sir/Madam,

Millennium Reign Energy LLC. is very pleased to submit this Letter of Intent (LOI) in preparation for submittal of our proposal in response to the FY2011 Ohio Third Frontier Fuel Cell Program RFP.

Lead Applicant Information:

Chris McWhinney, CEO

Millennium Reign Energy LLC

125 West Wenger Road, Suite C

Englewood, Ohio 45322

(937)832-9840 – Phone

(937)832-7779 – Fax

www.mreh2.com – website

Chris@mreh2.com - email

Project Title: *Small Hydrogen Fueling Appliance (SHFA)*

Estimated Grant Funds requested \$ 1,000,000

Known Collaborators:

University of Dayton Research Institute (UDRI)

Mound Technical Solutions, Inc. (MTS)

Summary of Project:

Millennium Reign Energy's technology provides a solution to the hydrogen fuel needs of the fuel cell industry and helps provide needed infrastructure. Millennium Reign Energy currently assembles the *AutoARK*® and Small Hydrogen Fueling Appliance (SHFA) at our Englewood, Ohio facility. The *AutoARK*® separates hydrogen from water, then sends it to the SHFA which then compresses, stores and dispenses the hydrogen fuel. The ***AutoARK*® SHFA** moves beyond the competitive technology with benefits that exceed current capacity limits by incorporating the ability to compress hydrogen at 5000 psi for all in one unit. It includes on board hydrogen storage cylinders, easy-to-use hose, and nozzle hookup apparatus with many safety features built in for use by non-technical workforce end-users.

Millennium Reign Energy's *AutoARK*® SHFA is poised for the Market Entry Phase as defined by the Technology Commercialization Framework. The *AutoARK*® offers significant advantages over other electrolyzers. It exceeds the current industry's efficiency average regarding hydrogen production per watt consumed. At the same time, the *AutoArk*® has a significant price advantage that benefits the market and sustains our growing business. The *AutoARK*® SHFA unit offers superior quality and design, and is 100% assembled in Ohio with parts and manufacturing currently provided by as many as 17 Ohio based vendors. There is already significant interest in this packaged product by end-users such as Plug Power, CAT, Crown, Lift One, Battelle, the U.S. Air Force and the Department of Energy. An investment by Ohio Third Frontier will offer the opportunity to solidify Millennium Reign Energy's *AutoARK*® SHFA in core areas related to product sustainability and commercialization, specifically for demonstration, evaluation, design improvements, certification and job creation in Ohio over the grant allocation period and beyond. When brought to market at multiple entry points, support will develop through creating jobs related to product installation and sales in the power lift truck and automobile market segments. An educational unit is already being manufactured and sold in the educational arena that also contributes to creating additional sales and jobs.



catacel

William A. Whittenberger
President
waw@catacel.com

B: 330-527-0731 x108
C: 330-219-7250
F: 330-527-0761

September 10, 2010

OTFAEP 11-392

The Ohio Department of Development
Technology Division
77 South High Street, 25th Floor
Columbus, Ohio 43215

Dear Sir or Madam,

This letter is to advise the Ohio Department of Development of our intent to submit a proposal towards the FY2011 Third Frontier Fuel Cell Program RFP, as follows:

Applicant Organization: Catacel Corp., 7998 Gotham Road, Garrettsville, OH 44231
Contact: William A. Whittenberger, President – 330-527-0731x108, waw@catacel.com

Project Title: Novel Catalyst to Reduce Cost of On-Site Hydrogen Generators
Known Collaborators: Nuvera Fuel Cells

Estimated Dollars Requested: \$500,000

A one-page summary of the project follows.

Very truly yours,

William A. Whittenberger
President, Catacel Corp.

LOI.doc



Novel Catalyst to Reduce Cost of On-Site Hydrogen Generators

Catacel designs and manufactures engineered coated foil materials that are both catalytic and heat exchanging. This material combination delivers considerable performance and cost advantages to fuel cell, hydrogen, and other advanced energy applications that use catalytic reactions that also require heat transfer. In particular, Catacel has been active in developing catalytic solutions for large hydrogen plants, and has had SSR® materials running in a pilot plant since July 2008.

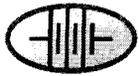
Nuvera Fuel Cells is developing and implementing PEM fuel cell solutions that are currently being commercialized in fork truck applications. Nuvera technology is also slated for eventual use in automotive applications. Nuvera is also commercializing a PowerTap™ hydrogen generator that will provide the necessary hydrogen fuel for these applications.

Inside the current PowerTap system is a reformer that uses conventional ceramic catalytic pellets in pipes, essentially a miniature version of the scheme that has been used for many years in large hydrogen plants. Nuvera is currently evaluating an adapted version of Catacel's SSR catalyst technology for use in PowerTap. Preliminary indications suggest that SSR could allow the PowerTap reformer to be reduced in size up to 50%. This would bring considerable cost savings to Nuvera, facilitating commercial implementation and market penetration.

In this project, Catacel and Nuvera will collaborate to:

- Iterate the design of SSR to find the configuration most appropriate to PowerTap
- Evaluate a cost-reduced PowerTap design that takes advantage of SSR
- Develop and implement a manufacturing system at Catacel that will support Nuvera needs for several years

The strong technology team of Catacel Corp. and Nuvera Fuel Cells provides all of the elements needed to deliver a commercially attractive solution to small-scale hydrogen generation. Such a solution will deliver the necessary hydrogen for supporting large fleets of fuel cells to be implemented in fork truck, automotive, and other applications. Development of the solution as an Ohio project will ensure that jobs associated with catalyst manufacturing for this application are brought to Ohio. The project will also increase visibility of the Ohio supply chain and resources to Nuvera, increasing chances that they will use Ohio content in their overall fuel cell solution.



September 10, 2010

The Ohio Department of Development
Technology and Innovation Division
77 South High Street, 25th Floor
Columbus, OH 43215

OTFAEP 11-393

RE: 2011 OTFAEP LOI

To whom it may concern:

We are pleased to announce our intent to participate in the 2011 Ohio Third Frontier Advanced Energy Program. Here are the details of the proposed collaboration:

| | |
|---------------------|---|
| Lead Applicant | Advanced Battery Concepts, LLC |
| Address | 5225 W. Lakeshore Dr., Port Clinton, OH 43452 |
| Phone | 1-817-602-5461 |
| Contact | Dr. Edward O. Shaffer II |
| Contact e-mail | Edshaffer2@advancedbatteryconcepts.com |
| Title of Proposal | Rapid Commercialization of GreenSeal™ Advanced High Energy Batteries |
| Grant Request | \$1,000,000.00 |
| Known Collaborators | Crown Battery Manufacturing Co. Contact: Mr. Patrick O'Brien 1445 Majestic Drive, Fremont, Ohio 43420 Advanced Battery Concepts, LLC University of Toledo Contact: Professor Thomas Stuart EECS Department Mail Stop 308 University of Toledo, Toledo, OH 43606 |

Attached is a summary of the project scope. We look forward to the support from the Ohio Third Frontier Program to help launch this vital endeavor.

Sincerely,

Ed Shaffer
CEO, Advanced Battery Concepts, LLC

Cc: Dr. Thomas Stuart, University of Toledo
Mr. Patrick O'Brien, Crown Battery Manufacturing Company



Rapid Commercialization of GreenSeal™ Advanced High Energy Batteries

Advanced Battery Concepts, LLC (ABC), has invented GreenSeal™ technology, an electrode that revolutionizes battery design. GreenSeal™ technology dramatically improves the performance and functionality of large-format, rechargeable batteries. We have achieved proof of technical concept with test data demonstrating that lead-acid batteries built with GreenSeal™ products store more energy, have more power, and are anticipated to last longer than conventional lead-acid batteries. We have filed global patents and recently filed additional provisional patent applications.

The most exciting features of GreenSeal™ batteries are the lower material cost and reduced amount of lead metal (reduced by 75%). These features greatly reduce the environmental impact of lead-acid batteries while maintaining compatibility with existing recycling stream. We believe the combination of GreenSeal™'s lower cost, improved energy, and smaller environment foot-print will help accelerate market adoption in both existing and much needed new markets such as wind, solar, grid-scale power management and electric vehicles.

Recently, Crown Battery and Advanced Battery Concepts announced that pilot-production for GreenSeal™ batteries will be located at the Crown Battery Renewable Energy Center (CBREC) in Port Clinton, OH. We have already started working with suppliers in the region equip the facility. As we mentioned, GreenSeal™ batteries have tremendous potential for high growth in both existing and new “green” energy applications. To accelerate this commercialization trajectory we are proposing to use OTFAEP funds for the following:

- 1) Finalize manufacturing process and demonstrate high reliability
- 2) Accelerate commercial supply of GreenSeal™ batteries
 - a) Hasten capital installations from equipment vendors in Ohio
 - b) Increase engineering staff
- 3) Demonstrate utility/advantage in new “green” applications
 - a) Off-grid solar applications
 - b) Solar to grid peak power management and efficiency
- 4) Market into existing applications
 - a) Field trials in key motive applications

Upon successful completion of this project we expect sales into existing markets and demonstration of utility in new “green” applications. This will attract large capital investments to build world-scale manufacturing in Ohio resulting in significant employment and other economic benefits.