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Transitioning Your Business in an Economic Turndown

Inside this issue:

<i>Message From The President</i>	<i>Cover</i>
<i>EMTEC Member Transitions to Advanced Energy Products.</i>	2
<i>A Salute to Percy Gros</i>	<i>Insert</i>
<i>EMTEC Leads U.S. DOE Ohio Collaborations for Solar Products</i>	3
<i>Upcoming Events</i>	4

Message From The President



The global economic recession has affected every one of us in some manner this past year. Stock exchanges around the world have lost half of their valuations since their high point in 2008; retirement portfolios have shrunk; CD and money market interest rates have fallen substantially; jobs have been lost; companies shuttered.

in 2009 until credit frees up slowing down expansion plans for all but companies with cash to invest. However, we do see growth opportunities in new product development for alternative energy products. EMTEC can help manufacturers allocate their resources as efficiently as possible between current production and new product development to conserve cash. During your production slow down our collaborative product development expertise can assist in solving new product technological issues so that you are ready for entry into the new and growing alternative energy markets. Furthermore, we are working with companies on stimulus funding proposals of interest to the State and Federal government that focus on new job creation.

In summary, EMTEC continues to work with medium and small companies in Ohio who are the "supply chain" and backbone to the automotive, aerospace and other markets. We can assess your company

capabilities and help you transition a portion of your business to become a supplier or OEM to the growing alternative and advanced energy markets through collaborative products, process, or business development projects. This issue of Solutions highlights a few of our current projects.

Despite all of this gloom and doom there is still business in the energy sector. The U.S. economy, despite the downturn, still has considerable influence on the world economy. President Obama's Economic Recovery and Reinvestment Act intends to double the production of alternative energy in the next 3 years in solar panels, wind turbines, energy efficiency equipment, advanced fuel efficiency vehicles, energy storage, smart grid and grid infrastructure improvements.

According to Clean Edge Research, the global market for several energy market sectors is expected to grow dramatically in the 10 year period from 2006 to 2016; Bio-fuels is expected to grow from \$20.6B to \$80.9B; Solar photovoltaic's from \$15.6B to \$69.3B; fuel cells and distributed hydrogen from \$1.4B to \$15.6B; Wind turbines from \$17.9B to \$60.8B; These are double-digit growth rates from 13% to over 27% over the 10 year period and do not factor in the additional government funding stimulus driver effect. Is your present market growing at thie rate? If not, you might consider entering the alternative and advanced energy market.

With the current credit crunch, there will be a slowdown

Percy Gros, Director of Core Technology Programs, announced his retirement in February 2009 after 22 years at EMTEC. Percy has made an enormous impact to our members. See our insert for a Salute to Percy.

EMTEC Member Transitions to Advanced Energy Products



WebCore Technologies was founded in 1991 with a mission to be a leading supplier of fiber-reinforced core materials for the composites industry. The company founders, Dan Hutcheson and Steve Day, had experience in developing composite panels used in both residential and commercial construction for everything from vacation homes to refrigerated enclosures. The composite panels were typically comprised of a foam core surrounded by a skin of wood or metal. Over the years, WebCore has developed a unique method to reinforce the foam core with glass fiber, significantly improving its performance and increasing design flexibility. These efforts resulted in a patented fiber-reinforced core polymer composite core material named TYCOR®. The commercialization efforts continued and TYCOR was incorporated into numerous composite applications and products including:

- Doors & hatches for the marine market
- Railcar decking used to carry automobiles
- Military enclosures
- Truck trailer enclosures

- Fan housings for gas turbines
- Bridge decking, and
- Mats to support heavy military equipment in loose soils

Like many markets for composite materials commercial sales has been slow to develop often due to material cost issues. However, the generally higher cost for composite materials can often be economically justified by their superior performance in selected applications and markets.

In 2006, through EMTEC encouragement and a WebCore association with an existing customer, WebCore recognized an opportunity for their TYCOR material in the wind energy industry. The specific application is a support component of the composite turbine blades. Today's utility-scale wind turbine can have a blade length approaching 50m long and weighing 20 tons. Composite materials are used extensively in these blades to provide the necessary strength, to reduce deflection, and at the lowest weight possible.

Historically, the primary core material used in wind turbine blades as been balsa wood and PVC foam. The availability of balsa wood, however, is limited due to the limited regions where the balsa trees grow. PVC, a petrochemical product, is subject to volatile price fluctuations with the price of oil. The wind turbine industry needed a supply of core material that was reliable and stable in price. In addition, the wind energy market has been growing at about 30% annually over the last few years. This combination of technology and market factors has created a perfect opportunity for WebCore's TYCOR.

WebCore began working with several wind turbine and blade manufacturers to develop appropriate TYCOR configurations and demonstrate its

superior performance and compelling value proposition. A rigorous qualification process, both with an international standards organization and the individual manufacturers, is now completed. The result of nearly two years of development activity reached a culmination recently when WebCore received its first major



Photo's Courtesy of WebCore

commercial order for TYCOR material from a leading wind turbine blade manufacturer. Since that time, WebCore is actively working with several other turbine blade manufacturers to qualify TYCOR material for their individual applications.

WebCore Technologies is just one of many Ohio firms that have been able to capitalize on the rapid development and growth rate of the alternative energy industry in Ohio. To learn how your company may be able to participate in the new Green Economy contact EMTEC today.

EMTEC Leads U.S. Dept. of Energy Ohio Collaboration for Solar Products

The U.S. Department of Energy Solar Energy Grid Integration System (SEGIS) project is part of the Solar America Initiative (SAI). The goal of SAI is to reduce the cost of solar photovoltaic (PV) energy to grid parity, or equivalent cost to produce as current competing systems, by 2015. The SEGIS project has been developed to investigate ways to make the utility grid more efficient; more agile to respond to high demand conditions; more resilient to high security risk or environmental risk conditions.

The EMTEC/SEGIS team project builds on previous work done by Emerson Electric, EMTEC, and K&H Energy, on a Five Tier grid control project by adding a smart inverter/controller that provides dispatchable power from intermittent distributed generation sources such as PV. The five tiers represent five levels of power priority which can be set by monitoring energy pricing signals and grid status over the OASIS (Open Access Same-Time Information System) communication network and then varying the load and distributed generation online to keep the grid stable. This, in effect, provides closed loop control to the entire electric grid system to make it more cost effective and stable.

With proper adaptation of smart grid technology and careful algorithm development, it is possible to shed loads, adjust thermostats, bring internal combustion generators or PV panels on line, etc. to improve the efficiency of the electricity grid. Grid efficiency is best measured by the ratio of total energy required to produce electricity at the point of use divided by the amount of electricity at the point of use. Generating electricity by coal, natural gas, hydropower, nuclear, petroleum, and renewable energy combined is currently about 34.6% efficient. The transmis-

sion and distribution of electricity is approximately 90% efficient. This means for every 1.0 kWh of electricity generated at the power plant, 0.9 kWh of energy reach the point of use. However, it took 2.89 kWh of raw energy going into the power plant to begin with to create this 0.9kWh end use point. The SEGIS project focuses on grid efficiency from the power plant to the consumer using closed loop control and the conversion losses from the PV

tween the inverter and the control source, and 3) Grid controller software architecture that provides the control umbrella to close the loop between energy production, transmission, distribution, and consumption.

The maximum benefit from any distributed generation (DG) system would be to totally eliminate transmission and distribution losses. Realistically, the DG capacity is available if technology is adapted to access it. The SEGIS

project will first build a prototype system that contains an upgraded Five Tier Grid Optimization Manager capable of controlling 10,000 customer loads along with the needed generation. The objective is to then build a prototype smart 2 MVA inverter that is about half the foot print of current inverters. This is twice the MVA of current designs with an overall efficiency of 96% which is a 2.5% increase in efficiency. The 2 MVA size matches most switch gear sizes providing economy of scale for large portions of any PV installation. By using new communication protocols, DSP controls, and advanced cooling

the new design will be more reliable and compact while enabling the PV energy to be fully dispatchable in continuous increments up to 2 MW.

The integrated system design of a dispatchable inverter along with a Grid Optimization Manager capable of dispatching the inverter on a smart basis provides grid stability and efficiency not currently available in other designs. By allowing the PV energy to be independently dispatched with regard to the load, the new system provides PV owners more payback on their investment thereby making deep penetration of PV into the grid more financially appealing. The current phase of the SEGIS project will be completed by mid-2009 and an additional scale-up phase is expected to be funded later this year.

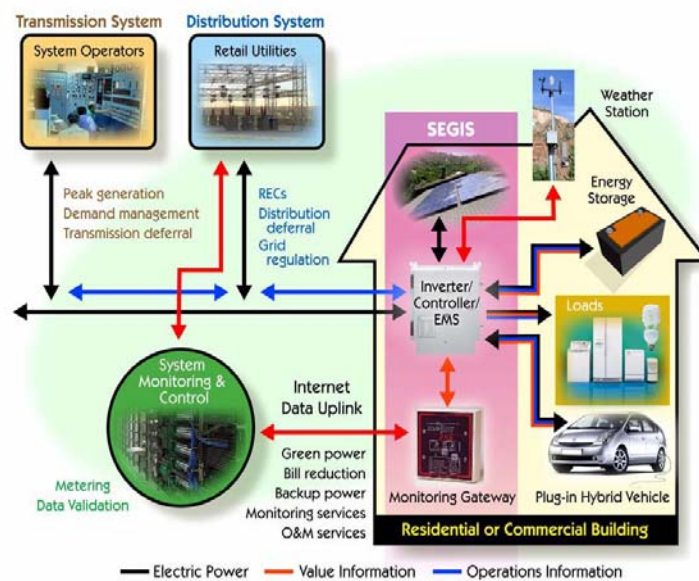


Diagram Courtesy of U.S. Dept. of Energy

panel to the grid by improving the AC inverter efficiency to 96%.

Currently large scale electric generation plants have their own closed loop control system. This is connected to a closed loop Supervisory Control and Data Acquisition (SCADA) system for controlling the generation, transmission and large distribution switching for an individual utility's control area. Levels of control above and below this are controlled on an open loop basis which does not provide the most efficient and cost effective way of producing and consuming energy on a macro or micro scale. PV plants, and other small distributed generation sources, are generally outside of the closed loop control systems. Three things are required to bring them under closed loop control: 1) A dispatchable inverter, 2) Near real time communications be-

EMTEC's Upcoming Events

INTRODUCTION TO STORAGE TECHNOLOGIES FOR ALTERNATIVE ENERGY

Wednesday, April 29, 2009

This half-day Short Course will be presented by Dr. Jack Brouwer of the National Fuel Cell Research Center, University of California, Irvine, and will include presentations from Ohio companies specializing in these technologies.

Jack will cover the fundamentals of energy storage, conversion, and provide an introduction to the science of how storage applies to various alternative energy technologies. Bring your questions; Jack is excellent at addressing questions!

Register online at www.emtec.org/ae

TRANSITION OHIO MANUFACTURERS TO MEDICAL DEVICE PRODUCTION

Friday, May 29, 2009

EMTEC is working together with BioOhio and TechSolve to help educate Ohio manufacturers transition into medical device production. This event will be at the Savannah Center in West Chester, Ohio.

Register online at www.emtec.org

OHIO ADVANCED & GREEN ENERGY MARKET'S SUMMIT -

Wednesday, November 4, 2009

Green Jobs

Crowne Plaza North, Columbus Ohio

Watch for online registration this summer on www.emtec.org



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Of Development

Please advise EMTEC of any change in your mailing address

The Edison Materials Technology Center (EMTEC) in Dayton, OH, is a non-profit, member-based organization serving Ohio. As an organization that develops business and technology strategies, sponsors, coordinates and manages collaborative projects and programs leading to commercialization or new business formation EMTEC is committed to the mission of accelerating materials technology to the market. With over 20 years experience in applied research management, commercial successes, and startups EMTEC focuses on assistance for potentially high growth materials technologies. EMTEC provides technical coordination and commercialization assistance to Ohio's industry, universities, and government labs to strengthen Ohio's industrial competitiveness in automotive, metal casting, nanomaterials, polymers, composites, biomaterials, and alternative energy markets.



A Salute To Percy Gros from EMTEC Members



“What is the value of making one referral and introduction - a request for help?. Back in 1992 Percy took a request from the Air Force asking for someone that could make a wire drawing bench for superconductors, and he gave them my name and made the introduction. That contact has resulted in the formation of two companies: Plastronic Inc. and Hyper Tech Research. It has resulted in over \$20 million of Federal and State Research grants and contracts and a company with over 20 employees. There is now the potential building a company with over \$100 million dollars of revenue and making a dramatic impact on the cost of MRI systems to the public. Thank you Percy for taking the time to help people like me during your career at EMTEC.”

*Mike Tomsic
President*



“The assistance, guidance, and gentle reminders Percy provided during all phases of our research was invaluable in assuring our success and we appreciated Percy's calm and steady demeanor... Our best wishes to Percy in whatever he chooses to do next.”

*Rob Mayer, President
Queen City Forging Co.*



"We have had the opportunity to work with Percy Gros for several years on several different IQ Technology IntensiQuench® projects. Percy is one of those rare individuals that is very modest but also very accomplished in many areas of life.... He is so modest about the many things he has done, and so quiet and efficient at how he gets them done, that you can know him for years and be completely surprised to learn there is yet another layer.... He understands the new technologies (thermodynamics, mechanical engineering and metallurgy), and the accounting practices, and, most importantly, the politics of how things get done in the real world. He is a good listener, and when he does speak people listen! At his core is an unwavering ethical nature, a good heart and soul; he cares deeply about his family, his associates, and his country. God bless you, Percy. We will miss working with you, and wish you a very happy and healthy retirement!"



*Joe Powell
Michael Aronov
Nik Kobasko
IQ Technologies, Inc.*



"Percy Gros has been involved in helping Nex-Tech grow and prosper for over ten years... Percy was always highly interested in what we were doing and went out of his way to make sure we had the resources we needed to be successful. I always think of Percy as the perfect gentleman, always thoughtful and always willing to lend a hand... he will be missed."

*Bill Dawson
NecTech Materials*