



entrepreneurs for energy efficiency

the eeeluminator

The quarterly newsletter of E-3

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Our mission: to promote successful commercialization of energy efficient technologies developed with the support of the Department of Energy's Inventions & Innovations

The 5th Annual Meeting of Entrepreneurs for Energy Efficiency, Inc.

On Wednesday, April 26, the 5th Annual Meeting of Entrepreneurs for Energy Efficiency convened at the Key Bridge Marriott in Arlington, VA. The spring meeting is the signature event on the E-3 calendar. The meeting provides an opportunity for the E-3 members to visit their Congressional representatives early in the budget cycle for the fiscal year beginning in October. On Tuesday evening, E-3 hosted a reception at the hotel, followed by an informal dinner overlooking the Potomac River with a panoramic view from Georgetown University to the Watergate Hotel.

This year, the meeting fell on the week Congress returned from their two-week Easter break. This timing played havoc with the scheduled Keynote Address by Congressman Denny Rehberg of Montana. Weather delays in the Rockies prevented his arrival in time for the opening session, so Legislative Assistant, Jason Begger spoke in his place. Congressman Rehberg is the key supporter of Inventions and Innovation on the House Energy and Water Appropriations Subcommittee.

Every year, an E-3 member makes a presentation with a commercialization success story. Larry Acker, President of ACT Inc. Metlund Systems, gave two short presentations. "Government Grants: Good News? Bad News?" outlined his company's use of California's PIER program to develop a heat trap for residential hotwater heaters. His next topic, "International Marketing: Create International Alliances to Gain Product Knowledge and Share Environmental Challenges," described his experience introducing a new product in Australia, a market with many of the same energy and water issues as California.

Dennis Gerschick, a longtime contributor to E-3 programs, spoke on "Overcoming Barriers to Entry." Contemporary examples and an energetic style engaged the audience with an extremely well-received presentation. Dennis began with defining the barriers to entry; competitor's advantages, laws and regulations, large capital requirements preventing new entrants, patents and trade-secrets, and the element of time.



Tuesday Evening Reception (L-R) Tom Briselden, Roy Hardy, John Balsam, Bill Rafferty, Larry Acker, Frank Perhats, Dennis Gerschick, David Jamison



Not to oversimplify, in the end it all comes down to knowing your customer.

Roy Hardy followed with another E-3 success story, Spinworks, LLC. Tom Briselden, a Lecturer in Engineering at the Erie campus of Penn State University, is the driving force behind Storm Development, LLC. Engaged in a variety of R&D for the process heat industry, Storm licenses technology to Spinworks who develops the product and takes it to market. A 1999 I&I grant led to the commercialization of a silicon carbide insert to improve the heat transfer in radiant tubes. Other products are following a similar path to market.



Bill Rafferty at the podium.

William S. Rafferty, Executive Vice-President of Mestek, Inc., Westfield, MA, followed after lunch with the story of Mestek. Founded in 1898, as Mesta Machine Company, Mestek is a billion dollar corporation with over thirty companies in the HVAC, metal forming and material handling industries. Bill showed how

acquisitions of small companies with the right technology can pay big dividends.

John Servo, Vice President of Dawnbreaker, Inc., presented "What strategic allies and investors want. . . . And do you have it?" John discussed commercialization strategies and the financing options dependent on the expectations of the business owner. Since 1990, Dawnbreaker has conducted the highly successful Commercialization Assistance Program (CAP) for the U.S. Department of Energy (DOE) and Department of Defense (DoD). The company has worked with over 300 small R&D firms, including over 40 companies with energy-efficient and renewable energy technologies.

The final presentation of the day was an introduction to a new technology by Whaste Technologies, Inc., Washington, D.C. Created by Caius Egbufoama, Whaste Technologies has developed a process to convert an organic waste stream into a renewable fuel. Doug Shackelford presented a commercialization business model and received many comments and recommendations from those in attendance.

New Member Introductions



Alfred Brizzolara Wilmington, DE

Al Brizzolara is a chemist with a B.S. from Fordham University and a Ph.D. in Organic Chemistry from Columbia University. Al worked for the DuPont Company for 42 years, starting in the Nylon Research Division,

at Carothers Research Laboratory. Al worked on synthesis of new high-performance polyamides and evaluation of fibrous material. Al followed a typical DuPont personal development path, moving with the Qiana* project to an End-Use Development Laboratory at Chestnut Run Laboratories.

As Manager of Technology Forecasting Group, Al applied technology forecasting techniques to develop future scenarios for a number of DuPont businesses. Al returned to the Experimental Station at the Fibers Pioneering Research Laboratory as a Research Manager in the New Product/New Business group for 10 years. Research in his section included development of a fundamental understanding of the Kevlar* process and product, research on new rigid-rod polymers, carbon fibers, organic composite materials, inorganic fibers, metal matrix composites, fibers from polypeptides synthesized via recombinant DNA processes, and molecular composites. From this work emerged a new, high-modulus Kevlar* fiber, and DuPont's composites new business venture.

Al's responsibilities during the last 10 years of his tenure with DuPont involved Strategic Technology Planning, first with the Fibers Businesses, and then in DuPont's Central Research and Development Department. This work ranged from efforts to select the most promising areas for research within the core competencies of the organization, to processes for reviewing and evaluating proposals for specific research programs, to processes for monitoring the progress of these programs against objectives and milestones.



Don Burg Miami, FL

Don Burg, President of Hydro-Air Drives, Inc., has a number of energy saving inventions. His SeaCoaster Surface Effect CATamaran (SECAT) boat has received a grant and is noted as a favored energy saving invention by DOE. It has also received funding from ONR (Office of Naval Research), SECOR Marine, Caterpillar, private investors and others. See: www.seacoaster.com

Another marine related invention of his is the SWEEP (Ship with Wave Energy Engulfing Propulsors) that has been the subject of presentations at ASNE (American Society of Naval Engineers) Day 2005, FERRIES 2005, and is the subject of articles in Naval Engineers Journal and other trade publications. The SWEEP invention promises to improve the efficiency of large high speed displacement hulls such as destroyers and larger military combatants, high speed freighters, and the like. It is the subject of a proposal for government funding by the Military SeaLift Command (MSC) and the Naval Surface Warfare Center (NSWC).

Don's Hydro-Air Drive (HAD) invention combines the best features ventilated propellers and waterjets and has been very successfully tested as 350 HP unit in a 40 foot boat. The HAD has potential to replace marine propulsors ranging from small outdrives and waterjets to propulsors used in very large ships.

More recent developments include his Fluid Rotor with Energy Enhancements (FREE) Power Generation System. This invention offers the potential for vertical axis wind or water turbines with efficiencies comparable to state-of-the-art horizontal axis wind turbines. The FREE concept has its generator mounted at its base

and is physically and environmentally attractive. Present day horizontal axis commercial wind turbines are over 400 feet high with 250 foot diameter three bladed propeller type rotors and a generator nacelle that is as big as a school bus and weighs over 50 tons. In summary, present day wind turbines are very obtrusive, noisy, and costly. Due to the FREE Power Generation System's modular pre-fabricated construction concept it is very low cost and easy to transport and assemble. This concept is receiving interest from venture capitalists and is the subject of a pending DOE grant.

David Seitz Microtherm Inc. Houston, TX www.seisco.com



Seisco "Tankless" Heater

Gone may be the days of the cold shower punishment, usually reserved for the last person up in the morning. The new, compact SEISCO "tankless" water heater from Microtherm promises an unlimited supply of heated water at the turn of a faucet.

The SEISCO heater does have a tank, but it holds only a gallon. Yet this tiny heater manages to out-do the conventional big water tank. SEISCO is a modularly constructed, wall-mounted square made up of high-performance engineering plastics developed by DuPont Engineering Polymers. The plastics represent a big advance. Previously made on-demand water heaters used corrosive metal parts and had problems with overheating and reliability. Zytel Nylon resists thermal and mechanical stress, mineral build up, hydrolysis and corrosion. The heating chamber assembly consists of seven of these fixed, non-corrosive parts and is housed within a compact 15"x15" cabinet. The unit has several safety and shut-off features, including a mechanism to prevent scalding.

For residential use, a single heater can supply an entire (moderately sized) household as a single system or in



a series as a booster to existing gas or electric water heaters to extend the volume of available useful hot water. The residential model can also be used with passive solar water heaters.

Commercial applications include beauty and barber shops, food handling areas such as fast food and other small restaurants, meat markets, bakeries and convenience stores. The heater can also be an alternative to dual—pipe recirculating boiler systems found in apartments, condominiums, hotels and hospitals. Industrial applications include office warehouses, food processing and other processes.

E-3 Member News



PATH Concept Home and SEISCO

The Partnership for Advancing Technology in Housing (PATH) has awarded Seisco its Certificate of Commendation. PATH is dedicated to accelerating the development and use of technologies that radically improve the quality, durability, energy efficiency, environmental performance, and affordability of America's housing.

PATH is a voluntary partnership between leaders of the homebuilding, product manufacturing, insurance, and financial industries and representatives of Federal agencies concerned with housing. Working together, PATH partners improve new and existing homes and strengthen the technology infrastructure of the United States.



Texas Technology Showcase 2006

You are invited to submit a one-page abstract on a topic for presentation at the Texas Technology Showcase 2006, to be held December 6 and 7, 2006 at the Galveston Island Convention Center at the San Luis Resort in Galveston, Texas. Submit your abstract by May 31, 2006 to Kathey Ferland at kferland@mail.utexas.edu. The topic for the Showcase is "The Engineer's Energy Toolbox: Practices, Technologies and Management". Session topics will address issues of interest to engineers in the chemical manufacturing and petroleum refining industries that are facing high energy prices, while continuing to meet stricter NOx emission standards on their combustion units. In addition to the sessions on energy management topics and Showcase companies, as well as an Exhibit Hall, a special series of sessions will highlight NOx reduction technology implementation case studies. For a complete description of the program, go to www.ShowcaseTexas.org.

TECHNOLOGY FOLLOW UP ON THE 2005 FORUM. You heard about the **Flooding Predictor™** at the 2005 Forum. 2ndpoint is seeking a limited number of industrial-scale applications for the Flooding Predictor™ to complete the final stage of development as this technology moves out of successful research and into the field. This breakthrough control technology provides 6%-plus debottlenecking capability for many separation processes. The patented pattern-recognition application can be incorporated into virtually any Multivariable Predictive Control (MPC) product, or it can be commissioned as a stand-alone advanced control strategy. The benefits are derived by shifting the control objective from delta-pressure, to the column's incipient flood point; allowing the column to be safely operated at its hydraulic limit. Favorable licensing agreements will be made available to participants. Interested companies may download the Industrial-scale Demonstration Work Plan by clicking on "Demo" at www.2ndpoint.com.



Energy Concepts Co. announces the commencement of a full-scale demonstration of a new energy-conserving water-heating and chilling technology. A "ThermoSorber" has been installed at a poultry processing plant in central California. This technology provides hot water and chilled water at roughly double the energy efficiency and half the cost of any conventional technology. The \$180K installation provides approximately \$100K per year savings in natural gas and electric utilities.

The sequence of preparing poultry for market is regulated by the U.S. Department of Agriculture, and includes a scalding step using 140°F hot water, followed in short order by chilling with 33°F chilled water. The plant which is hosting this demonstration processes 50,000 birds per hour for 15 hours each day. This requires a continuous flow of at least 190 gallons per minute (gpm) hot water and 190 gpm chilled water. The hot water is produced from 80-psig steam from natural gas-fired boilers, and the chilled water is produced from an ammonia vapor compression refrigeration plant powered by electricity. At current utility rates (\$10 gas and 9¢ electric), the plant spends \$420K per year on natural gas to make the hot water, and \$100K per year on electricity for the refrigeration to make the chilled water.

The ThermoSorber produces both chilled water and heat pumped hot water from a single heat source. It is powered by the same steam which otherwise would make the hot water, but with two important differences. First, instead of the 98% efficiency of a steam hot water heater, the ThermoSorber achieves 156% efficiency in converting steam to hot water, due to the heat pumping action. Second, the chilled water produced by the ThermoSorber is energy-free.

A ThermoSorber sized to produce the full 190 gpm of hot and chilled water for this host plant would save \$158K per year in natural gas and \$88K per year in electric, or a combined savings of \$246K per year, relative to current practice.

Figure one is a photograph of this installation. This ThermoSorber weighs 5100 lbs. and has a 5ft. x 5ft. footprint. The ThermoSorber can be powered by any heat source above about 270°F. Other possible heat sources besides steam are: stack exhaust from boilers and furnaces; engine exhaust; and direct firing from natural gas, LPG, fuel oil, or biogas. Note that the

ThermoSorber is more than twice as efficient as a boiler exhaust economizer in making use of the exhaust.

The ThermoSorber is a heat-activated heat pump which is based upon an absorption refrigeration cycle which uses ammonia-water as the working fluid. It was originally developed through the laboratory prototype stage with cost share support from the U.S. Department of Energy. The first field demonstration, at 10-ton scale, was financed by the California Energy Commission (CEC). Pacific Gas and Electric Company has committed to paying an incentive for this full-scale demonstration proportional to the actually realized savings in natural gas. The CEC plans to conduct a program of data collection and analysis in order to document the extended performance of this installation.

The ThermoSorber applies to any facility which needs both hot water and chilling. The heat output can also be applied to space heating or to drying. Food industry applications include poultry, meat, and fish processing; dairy processing; beverages; and greenhouses. Other applications are found at hotels, hospitals, laundries, and sports complexes.

For more information, contact Ellen E. Makar at Energy Concepts Co.

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Fig 1 - ThermoSorber installation



EERE and I&I News

DOE Names EERE Assistant Secretary, Alexander "Andy" Karsner

Over the last 15 years, Mr. Karsner has participated, led, and financially closed private infrastructure projects cumulatively worth more than half a billion USD. He has worked with Tondy Energy Systems of Texas, Wartsila Power Development of Finland, and independently contracted his project development & finance skills for prominent multinational energy firms and developers. Based at various times in Houston, Hong Kong, London, Casablanca, and Washington DC, many of his project successes were achieved in diverse and challenging regulatory and financial environments.

Mr. Karsner's energy experience has encompassed a wide range of technologies including heavy fuel oil, distillates, natural gas, coal, wood waste/biomass, wind energy and distributed generation based upon renewable technologies. He has been responsible for innovative financial structuring in emerging markets, and has arranged equity, debt, and returns to meet the requirements of investors, lenders, and the respective government authorities.

Mr. Karsner has been National Vice Chairman and a member of the Chairman's Council of the National Federation of Independent Business (NFIB) Leadership and is a strong advocate of the US small business community. He is multilingual and has graduated with Honors with a BA from Rice University, and an MA from Hong Kong University.

Inventions & Innovation (I&I) FY 2006 Awards

A total of 10 new projects will receive \$1,775,000 in grant funding from Inventions & Innovation (I&I). At the close of the pre-application phase, I&I had received 219 pre-applications, 44 of which were selected for submission of full-applications after initial screening.

FY 2006 I&I Category 1 Grantees

Project Title	Organization	Planned Funding
Wind Fins: Novel Lower-Cost Wind Power System	DCM Studios	\$50,000
A Bio-Based Fuel Cell for Distributed Energy Generation	Antek, Inc.	\$50,000
A Low-Cost, High-Efficiency Periodic Flow Gas Turbine for Distributed Energy Generation	Ventions, LLC	\$49,896

FY 2006 I&I Category 2 Grantees

Project Title	Organization	Planned Funding
Energy Saving Glass Lamination via Selective Radio Frequency Heating	Ceralink, Inc.	\$249,287
An Innovative Back Surface Reflector for High Efficiency Infrared Paper Drying	Creare Incorporated	\$249,957
Hi-Q Rotor	Hi-Q Products, Inc.	\$250,000
Innovative Combustion Pressure Sensors	Orbital Research, Inc.	\$202,160
New Regenerative Cycle for Vapor Compression Refrigeration	Magnetic Development	\$250,000
Maximus Sonic Stop-Fill Instrument for LP Gas Tanks	Adept Science & Tech	\$173,700
Eco Oil - A Superior-Performance, Bio-Based Motor Oil	Peaks & Prairies, LLC	\$250,000



Guest Author Series

E-3 presents the latest in a series of articles by Dennis Gerschick, CFA, Attorney, CPA, Gerschick Business & Investment Counsel, LLC

Evaluating Your Company's Culture©

I study both publicly traded corporations and privately held companies. I consider what factors led to the success, or failure, of a particular company. Usually many factors are involved and they are interrelated. However, if I had to pick a single factor it would be the company's "culture." This is a nebulous and elusive concept. What exactly is a company's culture? How do you define company culture? I have not read a good definition. I would argue that it is many things that are combined to create an implicit code of conduct, or atmosphere, within the company. It includes a company's policies and procedures, which indicate to employees what exactly is expected of them. It is an attitude that is reflected within the company and the set of values reflected in that company's actions. An excellent book that addresses the concept of corporate culture is Built to Last, by James C. Collins and Jerry I. Porras.

I believe several important points should be made, including:

- ☞ Every company has a culture, whether they like it or not.
- ☞ The company's culture sets the stage for its future success or failure.
- ☞ A company's founder and management team should consciously think about what culture they want to develop for that company, and then take specific steps in that direction.
- ☞ There is no right culture that works best for every company. The desired culture depends upon the goals and values of those involved. What is really important to them?

Every company should focus on its values and principles. What are they? How are the company's values and principles communicated to the employees? A company could have a written mission statement and/or code of conduct, which encapsulates the company's values. However, written documents are

not absolutely necessary - a company will have a culture with or without them. The old adage – "Actions speak louder than words" is applicable. It is **not** what a company says its values are, it is what the company does that will really reflect the company's culture. Virtually, every action a company takes will be a reflection of its culture. For example:

- ☞ Where the company's offices are located and how they look.
 - Are the offices plush, moderate, or sparse?
- ☞ The company's hiring, retention, promotion, and firing policies.
 - Is the company selective in who it hires? Will they hire anyone with a pulse?
 - Does the company treat its employees fairly and consistently?
- ☞ The training the company offers to its employees.
 - Does the company invest in its employee's education and training?
 - Does the company really want its employees to be better?
 - How are the company's employees evaluated?
- ☞ What the company's compensation policies are.
 - How are the employee's raises and bonuses determined? Are they based upon an individual's performance, the company's performance, or is it based upon the combination of the two?
- ☞ The company's marketing program.
 - Does the company follow traditional practices or does it use cutting-edge practices?
 - What brand is the company trying to create? Is the image consistent with the substance or is it just fluff?
- ☞ The pricing policies of the company.
 - What are the company's prices? Are they at the high-end, moderate, or low-end?
- ☞ The policies of the company regarding its customers.
 - Does the company really treat customers in the manner it would like to be treated?



Is the company responsive to its customer's needs and concerns?

A company's traditions and folklore contribute, and they become part of its culture. In short, what does the company value and reward? It has been said many times, that a company gets what it rewards. People will usually adapt their behavior and do whatever it takes to maximize their own personal income, regardless of how their behavior impacts the company.

I started my own law firm years ago. I remember talking with my partner about the number of billable hours we should expect from our associates and what the normal work day would be. I recall him saying, "Dennis, remember the pack only runs as fast as the lead dog." His comment has stayed with me for many years because it was so simple and yet it said so much. People often emulate their leaders. In a business context, employees watch their bosses, and often imitate their behavior. If the boss works hard, the employees will work hard. Conversely, if the boss goofs off it is hard to expect the employees to work hard. The tone is set at the top, and the leaders of any organization should carefully review their own behavior and attitudes.

How a company handles problems may say more about its culture than how it handles success. Does the company ignore the problems or does it address them head on? Are employees encouraged to speak up and identify problems, or are they encouraged to be "yes men?"

Lou Gerstner, the former CEO of IBM, wrote a book entitled, Who Says Elephants Can't Dance? In his book, Mr. Gerstner talks about changing the corporate culture at IBM. Mr. Gerstner wrote, "Culture isn't just one aspect of the game – it is the game." He also wrote, "Changing the attitude and behavior of hundreds of thousands of people is very, very hard to accomplish. You can't mandate it, can't engineer it. What you can do is create the conditions for transformation. You can provide incentives, in fact, in the end, management doesn't change culture, it invites the workforce itself to change the culture."

Mr. Gerstner also wrote, "Cultures in which it is easier to ask forgiveness, than permission, disintegrate over

time. Leaders who don't demand uniform and fair adherence to good principles and policies lose their effectiveness." In short, rules and policies that are not enforced consistently are not really rules and policies. Instead, you get a situation where everyone is doing their own thing and hoping they don't get caught.

A company's culture influences if not establishes, how a company does business. Is your company's culture producing the desired results? If not, consider what changes should be made. As Albert Einstein once said, "Insanity is doing the same thing and expecting a different result." If you really want different results, you have to do things differently.

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Minnesota Inventors Congress Invention EXPOsure™ 2006 Inventing Success Seminars™

Friday, June 9 and Saturday, June 10, 2006
Redwood Falls, MN

James Echols. Commercialization of Energy Related Technologies. Commercialization of a new, energy-efficient or renewable energy technology – sounds like a daunting task, but there's never a better time to get started than today. Echols, President of Entrepreneurs for Energy Efficiency (E-3, www.e3energy.org) will speak on his experience with the Department of Energy's Invention and Innovation, a direct grant for individuals and small businesses commercializing new, energy efficient and renewable energy technologies. In addition, you will receive an overview of other grant programs available to inventors and hear lessons-learned from his 20 years as an entrepreneur. **(Fri. only)**

Ann Rydalch. US Department of Energy Inventions and Innovations Grant Program. Learn information about grants for energy related inventions and how to get involved in the program. Information will also be presented about the technologies at Federal labs that may be available for licensing by individuals. **(Fri. only)**