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The following companies have chosen to support the TXSES educational mission by joining at the business level:

Axiom Solar, New Path Consulting, Go Bright Leaf, Emerald Natural Resources, Nihil Ultra, Ontility, Randall Electric, Hill Country Eco Power, Texas Responsible Energy & Efficiency, Alternative Energy Institute, Ross Tedter-Architect, Imperial Electric, Austin Solar Air Conditioning, Reeves Exploration & Technology, Gary Gene Olp-Architect, South Texas Renewable, Techsun Solar, John Hirschi, GNS Electric, E3 Properties, Diez Energy Solutions, Solar Insure, Venti Energy, Solar Energy Applications of Texas, Premier Siding and Roofing, Mike Doherty Homes, Solar Fanatics, Images Of..., Solarplex of Texas, ImagineSolar, Maxcom Solar, Tesla Electric, Tom Norrell Master Electrician, Carroll H. Payne-Architect, Jim Rush-Green Builder, Sunergy Texas, The Warner Company.

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ANNOUNCEMENT – THIS IS THE LAST PRINT EDITION OF THE SOLAR REFLECTOR

This will be our last print version of the Solar Reflector; we are going online. Starting with our Winter 2010 edition, you will be notified by email that our quarterly newsletter is available on the TXSES website, www.txses.org.

If you are a TXSES member and don't have access to a computer or a public library, please call Lucy Stolzenburg at 512-751-1873. We will print and send you a hard copy.

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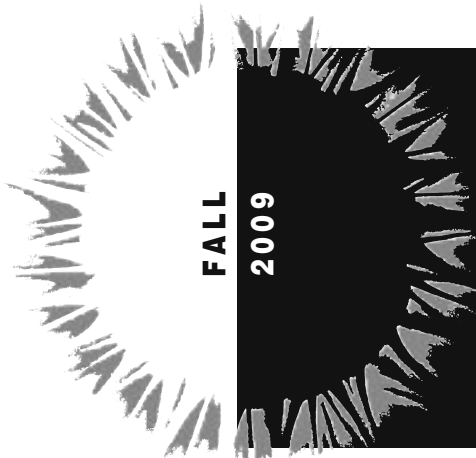
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The Texas Solar Energy Society (TXSES) was founded in 1976 and is a non-profit educational organization formed to increase the awareness of the potential of solar and other renewable energy applications and to promote the wise use of these sustainable and non-polluting resources.

The SOLAR REFLECTOR



REFLECTOR

promoting the wise use of sustainable and non-polluting resources

BRINGING THE SMART GRID TO LIFE

Bringing the Smart Grid to Life at The October 2009 Clean Energy Venture Summit

In concept the Smart Grid is relatively simple. Overlay the Internet onto the utility grid, or, as Thomas Friedman states in *Hot, Flat, and Crowded*, the Smart Grid is “the Energy Internet.” The U.S. Department of Energy calls it the “clean energy superhighway.”

The concept may be simple, but creating the reality is complex and enormous. Whatever the analogy, energy and usage information will no longer follow a one-way path from generator to customer. The challenge and the potentially lucrative opportunity (Cisco estimates networking alone as a \$100 million dollar business) involves merging into one communication system the country’s electric utilities, telecommunications, and IT sectors with homes, buildings, and distributed energy sources.

As with merging all highly complex technologies, the devil is in the details. Toward that end, “Bringing the Smart Grid to Life,” the third annual Clean Energy Venture Summit was held in Austin, Texas, October 14 & 15, 2009. Sponsored by UT-Austin’s Clean Energy Incubator (CEI), the event drew hundreds of venture capitalists, technology innovators, electric utility officials, and policy makers to the new AT&T Executive Education and Conference Center at UT Austin.

The summit featured a wide array of industry and government speakers, including a power panel of utility professionals, and a first for the event, 20 startup companies participated in a conference competition for prize money and support services.

Austin Energy General Manager Roger Duncan began the day with his now famous view of the Smart Grid business model: “I have a vision and a nightmare. The vision is that I see buildings that will generate as much energy as they consume. The nightmare is that I see buildings that will generate as much energy as they consume.”

Transforming the current utility business model was a hot topic for the panel. Utilities face the dilemma of encouraging energy efficiency, which will in turn undermine their profits. The answer may be in state and local level regulatory innovations. In some cases these policies would “decouple” or “unbundle” utility rates, separating profits from electricity sales. Revenue and profits would then be realigned with utility energy efficiency successes and distributed energy sales from the utility. In other scenarios, utilities would be required to offer home energy management services. States would then essentially reimburse utilities for revenue lost through efficiency gains. Some services could even be farmed out to third party players, with the utility offering access to their grid.

According to IBM, a major player in Smart Grid rollout, profits may best be realized by offering value-added products to customers based on their specific usage patterns.

The Power Panel

John Baker, Chief Strategy Officer for Austin Energy, provided a useful method for reviewing the conference. Smart Grid 1.0, Baker stated, can be considered the utility side of the meter; Smart Grid 2.0 is the customer side. The power panel, comprised of utility officials, industry stakeholders, and a government spokesman, focused their discussion primarily on Smart Grid 1.0.

Baker emphasized that efficiency and conservation are as important as new technologies, pointing out that Austin Energy’s demand savings programs have offset the construction of one major power plant. He’s enthusiastic about AE’s Smart Grid initiative and it’s real world laboratory, The Pecan Street Project. Baker emphasized that customer acceptance of the Smart Grid will be a strong determi-

nant of its direction and success, and it behooves governments and utilities to ensure the customer is informed and that feedback is obtained from them.

Don Cortez, Vice President at Centerpoint Energy in Houston, highlighted his company’s goal of deploying 2.2 million smart meters, or “energy portals,” in the coming years. Centerpoint, which recently received a \$200 million stimulus grant for smart meter installation, will use the two-way meters for customer data acquisition to build a “common data repository.” Information gleaned from customer usage will be used, Cortez said, to design and accelerate the fast adoption of consumer energy management products.

CPS Energy Executive Vice President Chris Eugster told the audience that the company will initiate a feed-in tariff in the near future. According to Eugster, the tariff is designed to create a marketplace for renewable energy generation and exchange between customers and the utility. The CPS goal is 1200MW of installed renewable generation by 2020, including solar on area rooftops. Echoing Baker at Austin Energy, Eugster stressed efficiency and conservation as cornerstones of Smart Grid success.

When consumers participate in monitoring their own energy usage, studies have shown their usage behaviors change, according to TXU VP for Governmental Affairs Carl Richie. The consumer uses less energy and uses it more strategically throughout the day depending on rates and area demand. TXU offers the iThermostat and Power Monitor to enable customers to achieve those home energy management goals.

Mark Rose, GM and CEO of Bluebonnet Electric Cooperative, urged the audience to see beyond the implementation of Smart Grid, asking, “What do we do once we deploy AMI/smart meters?” Rose argued that it’s not enough to simply install smart equipment on the grid. Utilities should adopt a business model that promotes national energy sustainability by involving the customer in strategically reducing usage.

The Competition

Twenty startup companies participated in the conference competition. Most of the Smart Grid 2.0 innovations targeted the homeowner and commercial business side of the meter. At stake was a role in Austin’s Pecan Street Project, three months of free public relations guidance, and free legal consultation services. Innovations included three-axis rooftop solar panels, solar roofing tiles, solar power inverters, mobile solar generators, passive solar water heaters, wind generators, microgrid power protection systems, LED light bulbs, and office energy monitoring software systems.

As the lavishly fed audience of hundreds looked on from seemingly endless rows of tables in the massive conference hall, entrepreneurs took the stage under a large video screen and delivered their presentations to a

group of judges in strict business attire seated in the front row.

Each presentation followed a similar, somewhat frenetic, trajectory. Constrained to five minutes, contestants described the product, business model, initial funding source, and management structure; they quantified the amount of capital sought, expected profit margin, and return on investment.

The presentations ranged from fledgling one-man garage operations to veteran startup professionals. Except for the occasional Power Point failure, most presentations went smoothly. Judges asked competitors to differentiate their product from others. Entrepreneurs claimed variously that they were closer to market, more reliable, less expensive, or hit a “sweet spot” in the market overlooked by competitors.

First place was awarded to a company that promises to reduce America’s voracious energy consumption by replacing the 32 million street lightbulbs that illuminate the country’s roads and highways on any given night. EcoFit Lighting, a solid-state LED street light manufacturer, states that its product will offset a huge number of kWh. The Lenexa, Kansas-based company tempted potential investors with projections of high revenues and large profit margins. Texas-based companies came in strong as runners up: IceCycle of Flower Mound produces thermal air conditioning storage units; Ideal Power Converters of Austin manufactures a lightweight, transformer-less photovoltaic inverter; and Graphene Energy of Austin creates an advanced ultracapacitor for fast energy storage and retrieval.

If technology innovations were the theme of this summit, a “massive social awareness campaign” was viewed by many as critical to Smart Grid success. Perhaps that will be a focus of next year’s Clean Energy Summit.

Google “2009 Clean Energy Summit” for further conference information and wrap up.

Mike Albrecht is a TXSES Board member with an interest in education and renewable energy policy.

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Chairman's Corner

with John Gardner



After such a hot summer, it is nice to have cooler temperatures. With the clear skies and cooler temperatures, the last few weeks have been a dream come true for solar PV and solar water heater owners.

I want to thank everyone who attended this year's RoundUp in Fredericksburg. It

was a great year with a lot of enthusiasm for all things organic and renewable. The speaker tents were full and the exhibitors talked with a steady stream of interested folks. Thank you to all the TXSES and TREIA staff and volunteers who worked so hard to make it such an amazing event. It

10th Annual Renewable Energy RoundUp a Success!

Some of you might remember when the RoundUp began in 1999; it had a life expectancy of five years. If we had stopped at that five year success point, we would not have known that truly the best was yet to come. 2009 was evidence of this and many things led us to this conclusion. Instead of our audience of attendees coming predominantly from Austin and San Antonio, as in years past, our speakers reported to us that the crowds were from ALL over Texas. This got us thinking about "early adopters and the mainstream." It seems that the ideas of

This year, we tried a few new things. We hosted a 40-hour North American Board of Certified Energy Practitioners (NABCEP) approved installer's class the week prior to the Round Up in Fredericksburg. Then we had a panel discussion on Friday on the importance of supporting local farmers and urban farming. That was followed by the nationally renowned author Toby Hemenway, and Karl Rábago, Vice President of Distributed Energy Services from Austin Energy, who gave us a sobering but hopeful message on our need to keep energy efficiency and conservation at

the forefront of our tools against climate change. On Sunday we had the mayor of Greensburg, Kansas, Bob Dixon, speak to us about how his town was devastated by a tornado and that they saw the opportunity to rebuild it "however they chose," and what they chose was GREEN, GREEN, GREEN.

Our event was not only well attended, but included folks who really are the change they want to see in the world. I think we all left a little wiser, inspired, and committed to making small changes and big, starting in our own homes, towns, and communities. For us at TXSES, whose mission is

outreach and education, I think we can agree: Mission Accomplished!

Happy 10th Anniversary to the RoundUp, and we are looking forward to starting our new tradition of its "sister" act in our Spring 2010 Salado Stampede, April 17 and 18th. Stay tuned for more on that exciting event on our website and as we take this Solar Reflector from its print version to a more environmentally friendly web-based endeavor.

Natalie Marquis is Executive Director of TXSES and General Manager of Habitat Suites Hotel



Art (beauty) and renewable energy (use) meet at the SolarPump. Beth Ferguson's MFA project is a classy charging station for electric scooters, laptops, cell phones...anything that uses an electric plug.

renewable energy, conservation, and food security are issues that we all can agree upon. Despite any politics or views on healthcare reform, as humans, we all seem to want a healthy, safe world for ourselves, and to pass it on to our children and grandchildren.

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just gets better every year. It is so important to the sponsors, exhibitors, and the event staff to see an ever increasing ground swell of interest in the fair each year.

The Mission Statement for the Texas Solar Energy Society is "To increase awareness of the potential of solar energy and other renewable energy applications and to promote the wise use of sustainable and non-polluting resources." The Cool House Tour and the Renewable Energy RoundUp are the most obvious examples of our success each and every year. However, the board works tirelessly to bring our mission to as many Texas citizens as possible every day. They work very hard and deserve the support of all our increasing membership.

The Houston Solar Tour was another rousing success this year. Thanks go out to

HREG (Houston chapter of TXSES) and all the sponsors, homeowners, installation companies and volunteers and staff that brought so many energy efficiency and solar projects to the citizens of Houston.

Finally, we will be having an open membership meeting on December 13. More information will be sent out to the membership before the end of November—so mark your calendars now. The meeting is open to all TXSES members and guests, and it will give you a chance to meet the board that works so much to make TXSES such an important player in the awareness of renewable energy in Texas.

John Gardner is an energy-efficiency professional who's home is outfitted with a hybrid solar-PV and wind system.

Member Profile - Garland Scott

Garland Scott, Solar San Antonio's representative to the TXSES Board of Directors, drives a Honda Insight. At 44 mpg, he can use the fuel savings. As energy manager for the Air Force Air Education and Training Command, he coordinates energy and utility cost-reduction efforts for 12 installations. That Insight travels from Phoenix in the west to the eastern Florida Panhandle, as far north as northern Oklahoma, and south to five installations across Texas. In the next year he will hit the road almost 20 times to visit one or more of these bases.

Scott took his first solar PV class in the late 1970s while studying for a degree in engineering. It was interesting, but the political climate for renewable energy changed in the 1980s and it was not until the early part of this century that federal government mandates propelled Scott into the renewable energy spotlight. The US military is required to lower energy use by 3% yearly, lower water use by 2%, install metering devices on all buildings and insure that 5% of all electricity used is from renewable sources. Existing



buildings must meet high performance and sustainable building criteria while new buildings must be designed to a minimum LEED silver standard. Though many of the requirements are daunting and tough to achieve (think of an Air Force installation

as a small city with added personnel commuting to "town"), Scott's efforts have won him a slew of awards, including the prestigious DOE's Presidential Energy Award; and at home he was honored as Texas Renewable Energy Industries Association's 2007 Member of the Year. Besides TXSES, he sits on numerous renewable energy boards and is active in San Antonio's efforts to surpass Austin as the top dog in municipal renewable energy use.

How does a shopping list for conservation and renewable energy for 12 Air Force installations read?

Here's a sample:

Over the last 4 years, Scott purchased over 900 GWhr of Renewable Energy Certificates (RECs) to help meet federal goals for his territory. He managed over 20 Energy Savings Performance Contracts in his region that saved \$5.5 M in future years' utility dollars, money that was then diverted to energy-saving infrastructure upgrades. Scott's Texas bases purchased 8 MW of wind capacity from a Corpus Christi area wind farm and about 2 MW capacity from a Ft. Worth area landfill-gas site, with several other sources in development. With all our southern sun power, he is currently working on several on-base solar PV projects including a 17 MW system in the Phoenix area and several smaller MW scale systems in Texas and Oklahoma.

In the future, Scott looks to add another Texas base to his territory, bring more solar power to his current lineup in the form of power purchase agreements, and in August next year promote Texas renewable energy businesses at the annual GovEnergy 2010 meeting in Dallas. His goal in Big D? Get Texas bragging rights in the federal sector.

Lucy Stolzenburg is on the staff of TXSES.

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Business Profile - Meridian Solar at 10 Years

Back in 1999, there wasn't a strong demand for solar technology. But that's exactly when Andrew McCalla founded the company then known as Meridian Energy Systems. It certainly wasn't a get-rich-quick scheme. But Andrew knew that clean energy was our future, because it had to be. He developed a passion for solar energy and started Meridian Energy Systems to help make it a viable option for everyone.

Fast forward to 2009 and Meridian Energy Systems, now known as Meridian Solar, just celebrated their tenth anniversary, truly a milestone for a solar company. As the leading provider of solar electric energy solutions in Texas, they specialize in the design and implementation of commercial, government and residential solar projects and have installed more kilowatts than any other Texas company. Meridian Solar is responsible for the design and system integration of two of the largest operational solar projects in Texas: the 180 kW Fort Sam Houston system completed in 2006 and the 200 kW Pearl Brewery system completed in San Antonio earlier this year.

Meridian Solar's decade of experience combined with their thorough and thoughtful approach and relentless dedication to quality make them exceptional in the world of solar installers. Their expert solar team includes more NABCEP®-certified installers than any other Texas company.

Meridian Solar is a Texas-based company with offices in Austin, Dallas-Ft. Worth and San Antonio.

Two recently completed projects of interest include a 23.3 kW array on the roof of H-E-B's Brodie Lane store and a unique 23.4 kW cylindrical module installation on Strictly Pediatrics, a pediatric medical and surgical subspecialty center in the new Mueller development.

The H-E-B project represents Austin's first grocery store and largest retailer to use solar power. In addition to the array design and installation, Meridian Solar also installed a monitoring system that displays on a large LCD



The 23.4 kW cylindrical module installation on the roof of Strictly Pediatrics, a pediatric medical and surgical subspecialty center in the Mueller development.

screen within the store. H-E-B shoppers can monitor how much energy is being produced, how much greenhouse gases are being avoided as well as other interesting green statistics.

The Strictly Pediatrics installation uses innovative cylindrical solar modules, the first of their kind to be installed in Texas. The modules, manufactured by California-based Solyndra, are designed to generate more electricity on an annual basis from typical low-slope commercial



Meridian Solar CEO, Andrew McCalla, introduces the 23.3 kW solar array atop H-E-B's Brodie Lane store in Austin. With him is H-E-B's Leslie Lockett.

rooftops, while providing lower installation costs than conventional flat panel photovoltaic technologies.

Meridian Solar also completed solar electric projects for IBM, Duke University, REI, Austin Energy, Applied Materials, U.S. Army Corps of Engineers, the State of Texas, the University of Texas, Texas Parks and Wildlife, Stratus Properties, Willie Nelson, and numerous other esteemed clients.

Here's to ten more years of bringing solar to many more!

Linda Haas is the Director of Marketing for Meridian Solar

A note from the Reflector designer:

As this is the last print version of the Reflector I just wanted to say it has been a pleasure working with TXSES over the past 10 years. In that time many great people have come and gone but they have always been replaced by other dynamic, talented and passionate individuals. TXSES wouldn't be what it is without their dedication and vision. Thanks TXSES I look forward to the new E-format and the adventures that lie ahead.

Judy Pearson-Wright



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GEEK SPEAK

with Chuck Wright



Not Just a Good Idea, It's the Law

A few years ago, I staffed the TXSES booth at a home show. During a slow period, I spoke with the guy in the adjacent booth. He expressed an interest in solar energy, but I was taken aback when he said something like "well, I am going to wait until they get powerful enough that you can get one that's just about a square foot and can power your whole house." I tried to nicely explain to him that because a square foot of sunlight contains only a small amount of energy, his goal was not realistic. He was undeterred, justifying his expectation with analogy to the rapid progress in computers. If they can increase performance and decrease size so much, so rapidly, technology could certainly do the same for PV panels!

I put that aside until recently, when an old friend asked me what I thought about these new schemes that use magnets to produce energy out of nothing. He was looking at it as an investment opportunity, and seemed offended when I immediately dismissed it as a scam, apparently preferring to believe that some guy tinkering in his garage would find a source of free and unlimited energy. All I could do was suggest that before he puts money into this, he should insist on performance validation by a reputable third party testing laboratory.

This is a highly intelligent person, having a medical degree with a specialty in radiology. Certainly this man of science must be familiar with the laws of thermodynamics and their amazing record of success. Doesn't everyone understand that there are certain very fundamental principles, laws if you will, that we just cannot seem to get around?

Apparently, not only do these most fundamental of principles not get taught to most school children, they don't even make it into the science curriculum of one studying high-energy particle physics for medical use.

What are these "laws" of thermodynamics of which I speak? There are two, and they were formulated (or "discovered") in the early days of steam power, when scientists were developing the math to explain how steam engines work, and have been used for centuries.

I have heard the first law stated humorously as "You can't win." It is a statement of the principle of conservation of energy. You can't get more energy out of a closed system than you put into it:

- The home show guy's solar panel cannot be made because a square foot of sunlight only contains roughly 100 watts, so there is no way that a panel could ever produce more than that.
- My friend seems willing to bet on a classical perpetual motion machine, which of course produces more energy than goes into it. It won't work. I've heard that the U.S. Patent Office

requires working models of all perpetual motion machines, and I hope that this is true.

- In a fossil fuel, the energy came from the sun, and is stored in chemical bonds. No more energy can be obtained from burning the fossil fuel than was in the sunlight that created it.

You just cannot get more out of a system than was put into it. Actually, that's where the Second Law comes in. It's humorous formulation is "You can't break even." What this means is that every energy conversion loses some energy. The losses are generally as heat.

- A coal-fired power plant burns 3 kWh worth of coal for every kWh of electricity it produces.
- The square-foot PV panel of the guy at the home show really produces about 15 watts of electricity for the 100 watts of sun that falls on it.
- My friend's magnet machine will gradually just run down, once started, and require energy to keep it going. Likewise with the wind turbine mounted on top of your car that generates electricity from your car's motion to power the car. A bad idea. Or, try it if you like, and learn for yourself!

Why should we believe these "laws"? Aren't they just an invention of closed-minded engineers, and a tool of the establishment to keep us from having the free energy that we so richly deserve? Can't technology and the human mind, if unleashed, accomplish anything?

No.

The simple fact is that these principles have been shown to be correct by real scientific experiments, literally over a span of centuries.

They stand at the very core of the science that we use to design and build real, useful things. Things that work.

Everything. The laws work, but not only in a general sense. They are expressed in the language of mathematics, and can be used to precisely predict how new designs will function. Working inventions are simply not built except in compliance with them.

Sorry, that's the way it is. If you decide to violate the laws, we can analyze your invention and let you know not only that it will fail, but how badly.

The Laws of Thermodynamics may be poorly understood, but they are very real. They govern our lives and will limit our options as we search for ways out of our energy dilemma. This is serious stuff that seriously affects the future of humanity.

If you want to be part of the energy future, you should know the rules.

And if you are still inclined to believe in magic, please at least don't "invest" any money you aren't prepared to lose!

Chuck Wright is a principle of Powderdash, LLC.

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