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If there is one thing for certain, it is that our future supply of electrical energy is not certain. The use of fossil fuels to power America’s electrical generation has a definite end to it. Although the absolute date is up for argument and debate, there is, for certain, an end to the available supply.

Renewable energy is more than a new business pursuit for Cummings Electrical, it is a passion. From our Renewable Energy Laboratory at our Fort Worth office, to the wind farms we have helped design and construct from Texas all the way to Wyoming, we are committed to helping solve our country’s future sustainable energy needs. You may have guessed by now that this issue of the Electrical Connection is devoted to renewable energy—I’ve dropped a hint or two!

I hope you will enjoy hearing from our panel of industry experts and governors of wind producing states, and I personally thank them all for sharing their views on where the industry and country need to head in our change to sustainable energy-producing sources.

Rick Perry, Governor of Texas
Mike Rounds, Governor of South Dakota
Denise Bode, CEO of American Wind Energy Association (AWEA)
Rhone Resch, President and CEO of the Solar Energy Industries Association (SEIA)

I would also like to thank Greg Wortham, Executive Director of the Texas Wind Energy Clearinghouse, for his insightful article on the synergies being developed between renewable energy and traditional fossil fuels.

I hope you find this issue interesting and informative. And, may the wind blow and the sun shine on our nation’s energy supply for the future!

Best Regards,

Tim Cummings

Texas Energy Innovation
Synergies for oil and gas companies in wind and solar sectors

Wind Tower Descent and Rescue
System selection

Renewable Energy in the United States
A forum with industry and political leaders

Cummings’ Renewable Energy Lab
Is a small wind turbine a good investment for you?
Texas Energy Innovation

Synergies for oil and gas companies in wind and solar sectors

By Greg Wortham

Texas continues its leadership in energy innovation—based in the Lone Star State’s oil and natural gas heritage—with our state’s global role in new energy fields such as wind and solar.

Texas leads the Western Hemisphere in wind energy operations, and is, in fact, one of the three most intensive wind energy development areas in the world. Texas companies also play a world-class role in the largest solar projects on the globe. As with oil and gas, the Lone Star State’s leadership arises from a combination of attributes: abundant energy resource, amenable energy-savvy landowners, favorable local and state government energy business climate, robust infrastructure and proactive entrepreneurs with technical talent.

State of the Wind

Texas currently ranks as the sixth largest “nation” for installed wind energy capacity, trailing the USA, Germany, Spain, China and India. Only China and India are outpacing Texas in wind energy development. While Europe’s wind energy installations are fairly mature, China and India have an unmatched intensity of development in wind, as in so many other energy and industrial sectors. In the Western Hemisphere, Texas has no rival. Since passing California in 2006, the Lone Star State has not looked back. Individual Texas counties outrank most other states.

In North America, Texas has more than 9,000 megawatts (MW) of installed wind energy capacity. The USA as a whole has roughly 25,000 MW installed, giving the Lone Star State more than 35 percent of USA wind energy capacity as of mid-2009. Canada has about 2,500 MW installed—equivalent to Nolan County (Sweetwater). Mexico has 87 MW installed—equivalent to a small Texas wind project.

Elsewhere in the Western Hemisphere, all of South America features less than 400 MW of wind energy installed—less than various individual Texas counties, such as Scurry (Snyder), Taylor (Abilene), Shackelford (Albany), Sterling and others.

Like Texas, USA wind energy leadership has
emerged in the past five years. As Texas seemed woefully behind California in installed wind energy capacity, the USA trailed European heavyweights Germany and Spain until just recently. The USA surpassed Spain at roughly the same moment in 2006 when Texas passed California; the milestones could be tracked with construction of the same Horse Hollow wind turbines in Nolan County. The USA passed Germany in early 2009, first in megawatt-hours generated and, soon thereafter, in total installed wind energy capacity.

The most important regulatory spur to USA wind energy intensification has been the federal Production Tax Credit (PTC), while Texas state policies most responsible for wind energy growth in the 21st century have been a Renewable Portfolio Standard (RPS), local economic development efforts and commitment to transmission expansion. Texas wind energy development is primarily concentrated in West Texas, although significant projects are now operational onshore along the South Texas coast. The General Land Office continues to explore opportunities for wind energy generation in the Gulf of Mexico. Within West Texas, there are significant centers of activity—Sweetwater-Abilene-Snyder, Fort Stockton-McCamey, Sterling City-Big Spring, for example—but turbine deployment stretches from Jacksboro and Stephenville in the east to west of Odessa and to the top of the Texas Panhandle.

The wind energy industry in Texas is now comprehensive, producing enough electricity for millions of homes and involving multiple industrial sectors. Texas deepwater ports handle billions of dollars of imported turbine components annually, as do the state’s railroads and trucking companies. Huge steel components are manufactured from Nacogdoches to El Paso, and in communities like Abilene, Brownwood, Coleman, Longview, Fort Worth, Houston, San Angelo and more. Carbon fiber for blades is manufactured in Abilene, and composite blades are manufactured in Gainesville and El Paso-Juarez. Turbine generators are assembled in Round Rock, and an Argentine manufacturer of major transmission substation components is locating a Sweetwater manufacturing facility to complement the home operation in Buenos Aires.

Texans will be investing roughly $5 billion beginning in 2010 in new electricity transmission infrastructure to double the amount of wind energy that can move from West Texas wind regions to metropolitan Texas markets by 2013. Additional investments will enable Texas wind energy to be exported to West Coast and Midwest urban markets over the same time frame. Enhanced transmission capacity means millions of more dollars annually to Texas ranchers and farmers in wind energy royalties, as well as substantial new business opportunities for wind energy prospecting, development, operations and servicing.

Beyond Texas, the USA-Canada Wind Corridor heads straight north in a massive “V” that stretches from Alberta to Ontario, from the Rockies to the Ohio River Valley. With the strong roots in the industry that have evolved here, Texas companies will have significant business expansion opportunities for decades to come.

Lone Star Shining Bright
Texas has substantial opportunities in concentrated solar power plant development, especially in the Permian Basin, Trans-Pecos and western Panhandle. But beyond those regions with substantial potential, Texas is already playing a leading role. City-owned Austin Energy has already begun development for its 30 MW project 20 miles northeast of downtown Austin; the project would be the largest in the USA and among the 10 largest in the world when it comes on line in 2010.
Texas companies based in Abilene and Brownwood, for example, are playing central roles in engineering, construction and fabrication at world-class solar project sites in Nevada and Florida, including the 64 MW Nevada Solar One project at Nellis Air Force Base and the 75 MW Florida Power & Light hybrid gas-solar project at FPL’s existing natural gas-fired Indiantown, Fla. power generation facility. The Nevada project was the second largest concentrated solar energy project in the world when completed in 2007. The Florida project will become the world’s second largest solar thermal project and the first commercial solar-gas hybrid energy center.

Critical Path
Texas lends many models to further expansion of wind and solar energy opportunities across the USA. Texas has a unique regulatory position, as most of the Texas electricity grid is exempt from USA federal jurisdiction and is regulated solely by the Public Utility Commission of Texas (PUC). The Texas grid is intrastate and is operated by the Electric Reliability Council of Texas (ERCOT). Because there are only extremely limited connections between ERCOT Texas and the rest of the USA, the Federal Energy Regulatory Commission (FERC) does not have regulatory authority over most of Texas.

The state’s independence from FERC means that Texas can act relatively quickly for dramatic effects within the state. However, it also means that Texas actions can have only limited impacts outside of Texas. FERC regulation stretches over the remainder of the contiguous 48 states but also requires what is essentially a consensus across those states before actions can take place.

This split in jurisdiction plays itself out most visibly in crucial transmission infrastructure expansion. While Texas is poised to begin construction on $5 billion of critical transmission infrastructure, other multi-state initiatives face broader regulatory challenges in the federally regulated states. High-voltage transmission infrastructure is virtually nonexistent in the most intensive wind energy regions of the Great Plains and the solar energy regions of the Southwest. In order to maximize new energy business opportunities, a national commitment has to be made to move forward on a major backbone grid system throughout the Great Plains Wind Corridor and in the Southwest Solar Corridor.

Energy Future
Texas is the heart of the Western Hemisphere’s wind energy and solar energy opportunities. Emergence of these industries continues the Lone Star State’s legacy of world energy leadership and energy innovation. There are tremendous openings for proactive Texas energy and infrastructure industrial participants to become involved profitably in multiple aspects of these new energy sectors, as wind and solar continue to grow from Texas northward into Canada over the next decades.

Greg Wortham is Executive Director of the Sweetwater-based Texas Wind Energy Clearinghouse (www.texaswindclearinghouse.us). Wortham is a graduate of Rice University magna cum laude, has a Master of Public Affairs degree from the Lyndon B. Johnson School of Public Affairs at The University of Texas and earned his law degree, with honors, at The University of Texas. Wortham was elected mayor of Sweetwater, Texas in 2007. He has practiced energy law in Washington, DC, Austin, and Sweetwater, and is licensed to practice in front of the Supreme Court of the United States. Wortham was chief operating officer of a multi-fuel energy company in New York City before returning to Sweetwater in 2004. Contact Wortham at info@texaswindclearinghouse.us or 325-236-9499.

WindPower 2010 Show
Don’t forget to mark your calendars for the WindPower 2010 Show. This year it will be held right here in our own backyard at the Dallas Convention Center. The show will run from Sunday, May 23 to Wednesday, May 26. The 2009 show in Chicago had more than 22,000 attendees. The 2010 show is expected to draw even more—making it the largest wind power trade show in the world.

Please plan on coming by the Cummings Electrical, Inc. Booth 8537 for a visit and some good old-fashioned Texas hospitality.

For more information, please contact Jim Thompson by phone at 817-355-5337 or via e-mail at jthompson@cummingselec.com. We look forward to seeing you then.
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A single rescue system cannot efficiently handle every scenario an authorized rescuer may encounter in the wind energy industry. One system can perform well for one application, but not another. Some rescue systems are easy to use, but only for one application, while others require more skill, but can be adapted for use in multiple situations. Wind turbines in North America simply come in too many different styles and designs to have a one-unit-fixes-all rescue solution. In this way, rescue systems are analogous to vehicles; the basic function is similar, but depending on the road, some outperform others.

Regardless of the turbine “road” you must travel, all turbines require technicians to climb them to perform maintenance. In the event of a fall, OSHA (1926.502 (d)(20) of Subpart M) mandates a “prompt” rescue of the victim. Choosing a suitable rescue system for different types of turbines can be a daunting task for employers. Instead of asking, “What is the best rescue system for the wind industry?” consumers should ask, “What is the best rescue system for my turbine?” Regardless of your choice, the system you choose should have the ability to raise, lower, drag and evacuate. It should also be operational by one person because many turbine rescues will involve the rescuer and the rescue subject only.

It is important for wind power consumers to understand and evaluate the best rescue systems available on the market prior to purchasing. Regardless of the manufacturer, type, operation, color or construction method, the vast majority of these systems can be divided into two categories: automatic descent control devices and manual descent control devices. Specific functions and capabilities of the systems, along with anchor point recommendations, are delineated below. The complexities of training personnel necessary for rescue systems is outlined as well.
Automatic Descent Control Devices

This family of automatic descent control devices are also known as rescue wheels. Tractel’s Derope Up E, SKYLOTEC’s MILAN, DBI-Sala’s Rollgliss® R500 Descender and ResQ’s REDPro™ all fall into this category. These devices usually have a fixed mechanical advantage with a 4:1 lifting ratio. They are typically operated by turning a wheel toward the direction of travel intended, indicated by “Auf” and “Ab” stamps on the wheel, which simply mean “up” and “down,” respectively.

Automatic descent control devices excel in scenarios where the evacuation and rescue is linear so that there is always a line of sight to the anchor point. Simple to use and operate, the pre-loaded ⅜-inch rescue rope is strong enough to support one- or two-person descents from 300 feet to 1,300 feet. Automatic descent control devices allow an automatic descent rate between 2.8 feet and 5 feet per second, depending on the manufacturer. If overhead anchor points are available, automatic descent control devices are typically the quickest, most effective and simplest devices on the market for emergency evacuation and rescue. The cost of these automatic descent control devices generally ranges from $1,300 to $3,200.

Manual Descent Control Devices

Manual descent control devices make up the second family of rescue systems. They usually include rope, pulleys and progress capturing devices. Some also have short haul systems used for lifting heavier loads. Manual descent control devices require a higher level of user participation from the rescuer. Unlike the automatic descent control devices used during self- or assisted-lowering where the user can rely on the automatic braking mechanism for descent control, the manual devices require an authorized rescuer to continually control the rate of descent.

Manually operated rescue systems for the wind energy industry fall into one of two categories: block and tackle systems or pre-rigged rope systems. Products such as Miller’s Series 70 Universal Rescue System, MSA’s Suretyman Rescue Utility System and DBI-Sala’s Rollgliss® Top R350 are block and tackle systems. They generally operate in either a 2:1, 3:1, 4:1 or 5:1 configuration and are only practical for distances under 100 feet. The higher lifting ratio allows for easier lifting compared to automatic descent control devices, however, they can require up to five times the length of rope. They also require an overhead anchor point and do not work well over edges. The advantage of block and tackle rescue systems is that lifting and lowering are accomplished without an add-on pulley kit, reducing the possibility for user error when lifting and making it the likely choice when performing suspended pick-offs. The cost for block and tackle systems ranges from $600 to $2,000 and is usually determined by the working length of the system and the lifting ratio.

Pre-rigged rope systems are distinctly different from block and tackle systems. They typically consist of a single rope used for lowering and a compatible lowering device. Most systems of this variety have an additional short haul (pulley) add-on for an increased mechanical advantage when lifting. Unlike block and tackle systems, pre-rigged rope systems can navigate corners more easily. The single line also prevents rope entanglement and length requirements are less than those for a block and tackle system.

Gravitec’s G4 Wind Turbine Rescue & Evacuation System is one of a handful of systems that use pre-rigged rope. These systems are an assemblage of components.
from a number of different manufacturers. They may come equipped with edge rollers or protectors for navigating rope over sharp edges. They may also include descent devices with anti-panic features, industrial quality anchorage connectors and a host of other accessories. This category of rescue systems generally is the most versatile, lowest in price ($800 to $1,800) and best equipped for more technical rescues. They do, however, require a higher level of training.

Rescue System Training
Wind turbine technicians typically do not have the same caliber of training as an emergency rescue response team, therefore the duration and complexity of rescue system training needs to be considered. Because a rescue event creates a high level of anxiety and apprehension, the rescue techniques should be effective, yet easy to remember. A rescue system is useless if the rescuer is unable to operate it.

There is no magical equation to determine the appropriate length of rescue system training. Competent rescuers can begin to make this determination during the initial rescue assessment when they identify all the possible locations where a worker might require rescue or evacuation. Identifying these locations will also help competent rescuers determine the necessary functions of their rescue system. Rescue system training should instruct the user on the system’s components and capabilities and include scenarios which closely simulate the real-life rescue event. Training should always include an observation of performance. On an average, most rescue training lasts between two and five days. The ANSI/ASSE Z359.2 (American National Standards Institute and American Society of Safety Engineers) standard provides direction on the content of Authorized and Competent Rescuer training.

A Proactive Approach to Rescue
Unlike emergency responders who must react to the situation at hand, employers in the wind energy industry have the opportunity to be proactive if they engage in pre-planning for rescue and evacuation. During the work planning phase, competent rescuers should perform detailed hazard surveys and write rescue procedures for those areas where hazards exist in an effort to address and abate all fall hazards. This will give them the upper hand in a rescue event.

The nature of the work, the anchor location, the working load and limit and the ease of use should all be factors in determining the appropriate rescue system. Relying on an internal competent rescuer to make an informed choice based on these factors is a much more effective way to protect workers than basing the decision on the purchasing habits of other consumers. There is simply no such thing as the “best” rescue system for the wind energy industry. Individual companies should always select rescue systems that best address their specific needs.

William Wright is the Training Coordinator and Chief Instructor for Gravitec Systems, Inc., where he is responsible for managing a full-time staff of professional fall protection and high angle rescue instructors. Wright has traveled all over the United States, South Korea and Canada to teach workers at some of the world’s leading businesses how to better protect themselves while working at height, how to safely and effectively use their fall protection equipment and how to rescue themselves or others at height.

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Model</th>
<th>Weight of Device (300’ of Working Length)</th>
<th>Distance (1 Person/2 People)</th>
<th>Maximum User Weight</th>
<th>Lifting Ability</th>
<th>Descent Speed (Feet/Second)</th>
<th>Approx. Cost 300’ of Rope</th>
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<tr>
<td>DBI-Sala</td>
<td>Rollgliss® R500 Descender</td>
<td>30 lbs</td>
<td>305 m/100 m</td>
<td>550 lbs</td>
<td>Optional</td>
<td>3’</td>
<td>$2,100</td>
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<tr>
<td>Elk River, Inc.</td>
<td>EZE-Man® Auto Descent Device</td>
<td>33 lbs</td>
<td>500 m/250 m</td>
<td>550 lbs</td>
<td>Optional</td>
<td>3’</td>
<td>$2,400</td>
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<tr>
<td>Miller Fall Protection</td>
<td>SafEscape ControlledDescent/ Self-Rescue System</td>
<td>28 lbs</td>
<td>400 m/100 m</td>
<td>660 lbs</td>
<td>No</td>
<td>4.5’</td>
<td>$1,500</td>
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<tr>
<td>ResQ</td>
<td>REDPro™</td>
<td>15 lbs</td>
<td>160 m/Max 2 People</td>
<td>440 lbs</td>
<td>Optional</td>
<td>2.6’</td>
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<td>SKYLOTEC</td>
<td>MILAN</td>
<td>33 lbs</td>
<td>500 m/250 m</td>
<td>550 lbs</td>
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<td>2.9’</td>
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<tr>
<td>Söll</td>
<td>AG 10 Hub B</td>
<td>25 lbs</td>
<td>400 m/150 m</td>
<td>500 lbs</td>
<td>Optional</td>
<td>2’</td>
<td>$1,500</td>
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<td>Tractel Group</td>
<td>derope UP E</td>
<td>33 lbs</td>
<td>400 m/125 m</td>
<td>500 lbs</td>
<td>Optional</td>
<td>2’</td>
<td>$3,200</td>
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</table>
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Renewable Energy in the United States
What is its future?

We decided to ask industry and political leaders who should know . . .

Denise Bode
CEO of the American Wind Energy Association (AWEA)

Rick Perry
Governor of the state of Texas

Rhone Resch
President and CEO of the Solar Energy Industries Association (SEIA)

Mike Rounds
Governor of the state of South Dakota and President of the Council of State Governments
TEC: If predictions hold true, we will see a rebound in the construction of wind and solar farms starting in early 2010. How long do you think that this recovery and growth will last?

Denise Bode: A recovery in the wind industry depends on several factors. The second half of 2009 was strong because incentives that were part of the American Recovery and Reinvestment Act enabled wind farm developers to put in service a record amount of new capacity. But that is not a long-term solution. Manufacturing investments are decreasing, production levels at current facilities are down and as a result, we are not creating new jobs. Our industry has been subject to more than a decade of on-again, off-again tax policies. Without stable policies, investors are not getting the right signals about the U.S. commitment to renewable energy, and are not committing to new manufacturing. Due to unstable policies, it is difficult to tell how long a recovery will last in the wind industry, and what kind of recovery it will be.

Gov. Rick Perry: Here in Texas, the future continues to look bright for renewable energy. Texas currently has more than 9,300 megawatts of wind capacity, and has led the nation in new wind capacity every year since 2005, a category that we’re a global leader but for four other countries. We are in the process of expanding our state’s transmission grid to accommodate as much as 18,000 megawatts of wind generation in West Texas, in addition to the wind capacity along the Texas Gulf Coast. More than 45,000 megawatts of potential wind projects are undergoing study for interconnection at our grid operator, which is promising news for future construction of wind power in Texas.

We are also seeing interest in large-scale solar projects in Texas, with three utility-scale sized projects under active development and several more undergoing study. The transmission build-out under way in West Texas will help make our state one of the most attractive places for solar developers to build and invest.

Gov. Mike Rounds: In South Dakota, the recovery for wind power has already begun. As a matter of fact, construction has started on more than 300 megawatts of new wind power generation, which will more than double our state’s wind power capacity. I believe that the industry will have strong growth in the next year, and then level off to a steady growth rate. In South Dakota, as in much of the wind-rich central corridor of the United States, future wind development will be stymied by lack of available transmission capacity. Regional and multi-regional transmission improvements are essential for renewable energy development in this country.

Rhone Resch: With forward-looking policies at the federal and state level, the U.S. will expand our solar energy manufacturing installation and electricity production for the foreseeable future.

The speed of solar’s growth and development is, however, contingent on our government’s commitment to leveling the playing field with fossil fuel companies, which have received more than $100 billion in federal subsidies over the past decade.

Just as coal and oil have received substantial government assistance to provide “cheap” electricity in the 20th century, the solar industry is working for the same treatment to meet the public’s demand for cheap, reliable and clean electricity in the 21st century.

If we invest in solar in the same way we invested in coal and oil, I believe we will see an era of unprecedented growth and prosperity, in utility-scale solar projects, commercial and residential photovoltaic installations and solar water heaters. In promoting this, SEIA has unveiled the Solar Bill of Rights (www.solarbillofrights.com). These eight rights will give the solar industry the freedom to compete with other energy sources and the liberty for consumers to choose solar—the clean energy choice favored by 92 percent of the American public (SCHOTT Solar Barometer). After the initial “green conversion,” the field will be open to developing more innovative ways to harness our natural resources without irreparably harming the environment we depend on for basic sustenance.

Since solar relies on unlimited sunshine, it is guaranteed that it will never run out, providing jobs and clean energy well into the future.

TEC: What action could the government take or possibly fail to take that would have either the most positive and/or negative impact on the construction of future renewable energy projects?

Denise Bode: For our industry to deliver the promise of abundant clean energy over a longer period than just a few years, we need a strong renewable electricity standard (RES), which will signal to businesses that the U.S. is committed to wind and other renewables. While new project construction signals an active wind energy market, the domestic manufacturing of wind turbine components is just as important to our industry. The investment needed to establish wind manufacturing as a new manufacturing...
sector in America can only occur with a long-term and stable market. We also need new transmission lines to carry wind energy from the wind farms to the demand centers and reforms in the way transmission lines are planned, paid for and permitted. Without new transmission, wind will not reach its potential. Finally, we would like Congress to extend the incentives that it adopted last year for renewables. These incentives have made it possible to finance new wind installation despite the poor economy and frozen credit markets.

**Gov. Rick Perry:** I believe the federal government needs to abandon plans to create new burdensome federal mandates and instead look at what we’ve done here in Texas, the nation’s leader in renewable energy. We’ve shown that the best thing government can do to ensure a fair and competitive marketplace is to establish limited, reasonable and stable regulations, and then get out of the way of private industry. We are committed to ensuring that the state’s electricity infrastructure can meet the demands of a growing population of 1,000 people every day and keeps up with the needs of an economy that has outperformed the rest of the nation over the last decade.

When you look at how the federal government and many other states have approached this issue, their proposals continue to stifle all energy projects, including renewable ones, with bureaucratic red tape, multiple levels of regulatory approval and unnecessary environmental restrictions. These restrictions make it costly, time consuming and in some cases, impossible to build renewable energy projects in an optimal location because of federal stipulations.

**Gov. Mike Rounds:** Government must support development of renewable energy projects through a diversified approach in renewable energy technologies and resources. We need investment in infrastructure (transmission), continued investment in advanced energy research and storage, and consistent incentives for new renewable energy projects. I believe long-term incentives are more effective in establishing developments that take more than 18 months to properly engineer and build.

**Rhone Resch:** The most immediate action Congress can take is to pass a jobs bill that recognizes solar as a job-creating engine. First and foremost, a strong jobs bill would include a temporary expansion of the 30 percent solar investment tax credit to 50 percent of the cost of solar systems that are installed in 2010. Additionally, a jobs bill should include a two-year extension, to December 31, 2012, of the Treasury Department’s grant program for utility-scale projects, as well as the establishment of national net metering and interconnection standards that allow the solar industry to compete on a fair playing field. These policies would immediately create jobs across the country while removing market barriers.

In addition, expanding the solar investment tax credit to include equipment used to manufacture solar energy generating property is one of the key priorities to promote solar manufacturing. This would be achieved through the Solar Manufacturing Jobs Creation Act (S. 2755/H.R. 4085) that is making its way through Congress. Another priority for the industry would be the creation of a Clean Energy Development Authority that assists with project financing at all levels.

Finally, Congress must introduce a price on the pollution that causes global warming, sending a signal to the markets that the era of energy from fossil fuels is ending and the era of clean energy technologies like solar has arrived.

**TEC:** While some turbine and solar panel manufacturers are starting to develop factories in the U.S. to produce wind turbine generators and solar panels, they are still largely produced in foreign countries. In light of our immediate and future needs to create jobs here in America, what should be done to encourage these manufacturers to invest in the U.S. economy?

**Denise Bode:** U.S. wind manufacturing has increased from less than 25 percent of turbine value a few years ago to nearly 50 percent today. Since 2004, domestic wind manufacturing capabilities have increased 12 times over. In 2008 alone, the U.S. brought online, announced or expanded over 55 manufacturing
facilities. The wind industry believes that the policy changes outlined here, such as a renewable electricity standard and new procedures for approving transmission, will stimulate demand so that more wind manufacturing facilities are located in the United States and an even greater percentage of the components are made here. Already, almost every turbine manufacturer that has installed turbines in the U.S has manufacturing facilities currently online in the U.S. or has a facility planned here. We have two U.S.-based manufacturers and seven foreign-based manufacturers with existing U.S. facilities, and at least six foreign and domestic manufacturers with announced U.S. facilities. Manufacturing investments take five to 10 or more years to pay off, so the key is for the U.S. to make a long-term commitment to wind and other renewables to signal to the manufacturers to add more facilities and build out their supply chain for subcomponents in the U.S. A strong RES is one of the only policies that would provide the long-term and stable market needed to attract more manufacturing investments.

Gov. Rick Perry: Wind turbine and solar manufacturers are inherently energy intensive businesses, and Washington’s commitment to policies that will make energy more expensive sends the wrong signal to businesses ready to invest and risk their own capital.

In Texas, we are using our Texas Enterprise and Emerging Technology Funds to attract renewable energy manufacturers in the solar, wind power and non-food-based biofuels industries, and also coordinate with our local communities. Just last year, we invested $945,000 from the Texas Enterprise Fund (TEF) in Martifer Energy Systems LLC for 225 new jobs in the San Angelo area and a projected $40 million in capital investment. This Portuguese-owned company located its wind energy tower manufacturing plant in Texas as a result of the TEF investment. We also collaborate closely with industry and higher education institutions to ensure we can provide emerging technology companies with an educated workforce, research and development facilities and commercialization opportunities.

Rhone Resch: The U.S. is losing the global race for solar manufacturing jobs. As recently as a decade ago, the U.S. accounted for more than 40 percent of global solar photovoltaic (PV) cell production. In 2008, the U.S. produced only five percent of the world’s solar cells, with Europe and Asia leading global production. It’s clear that we need to do something now.

The American Recovery and Reinvestment Act included a competitive tax credit for advanced energy manufacturing projects. It’s a good start, but we need to enact the Solar Manufacturing Jobs Creation Act to improve this tax credit and create long-term growth opportunities that incentivize job creation in U.S. factories.

Since making an investment is based largely on confidence of a predictable return, trust can be gained by offering reliable financing options to growing companies, long-term tax relief and assurances from government leaders for future assistance, if it is needed.

Creating a hospitable environment that encourages a predictable demand and return on solar and other renewable technologies is key in attracting and keeping the attention of investors.

TEC: As an entrepreneurial country, where do you see the biggest opportunities for small business growth in the renewable energy sector of our economy?

Denise Bode: We see opportunities all along the wind energy value chain. A wind turbine has 8,000 components, and each has to be manufactured. We are working hard to match the opportunities with potential manufacturers, many of them small businesses, all over the United States. In addition to manufacturing, there are thousands of U.S. job opportunities in wind farm design, construction, transportation, operations and maintenance. The
transportation and logistics of the many large components is a critical and significant part of our industry and can account for 20 percent of the cost of wind turbine. After wind projects are constructed, there are many skilled job opportunities for operations and maintenance of the turbine fleet, ensuring component reliability and maximum performance. Already, the wind industry has produced more than 85,000 American jobs. With the right policies in place, the U.S. Department of Energy estimates the industry will support hundreds of thousands of new American jobs.

**Gov. Rick Perry:** Small businesses have always played a vital role in maintaining Texas’ status as an energy leader, with hundreds of thousands of Texans working in the energy industry that fuels our nation. We’re already seeing some of these businesses meeting growing demand in areas such as wind turbine installation and maintenance, solar panel installation and remodeling efforts to maximize energy efficiency. The federal government would be remiss if they didn’t take a page from Texas’ playbook and create a business friendly environment in this country that encourages innovation, creates jobs, improves the quality of living for its citizens and propels our economy forward in an increasingly competitive global marketplace.

**Gov. Mike Rounds:** Renewable energy offers an enormous opportunity for innovation, which is what this country thrives on. There are more than 8,000 parts in a wind turbine, meaning 8,000 parts that can be improved, produced faster and at lower cost, assembled more efficiently, and better maintained. The U.S. became a global leader in business and commerce through innovation, and that is how it can maintain its position in the world. At the federal level, Congress has to once again focus on allowing private businesses to not only survive but flourish. Constant government intervention costs this country jobs that we should be keeping here for the next generation.

**Rhone Resch:** There are tremendous growth opportunities for entrepreneurs in solar energy. These aren’t just the jobs you typically think of with solar, like the installers you see putting panels on rooftops. They are across the supply chain. From manufacturing and installing to electricians and plumbers, there are growing opportunities in the solar industry. These are good jobs with good benefits. And, they are bringing a sense of pride back to the American worker.

The solar industry has also seen the emergence of innovative new business models that have contributed to the robust growth of the industry. For instance, residential and commercial power purchase agreements have allowed home and business owners the opportunity to enjoy the benefits of solar without having to put down the upfront cost. Also, the Property Assessed Clean Energy (PACE) financing model allows homeowners to take a loan from their locality for the cost of a new solar system, which is then paid back by the owner through an addition to their property tax bill over 15 to 20 years. Combined with effective state and federal policies, it is innovative new business models like these that will allow more and more Americans to go solar.
Challenges Resolved
Casper Wind Project
Cummings Electrical was awarded the contract for the electrical construction of the Casper Wind Project for Chevron in Casper, Wyo. The project began in August 2009 and was completed December 1, 2009. The scope of work covered by the initial contract was the underground collection system, medium voltage terminations and VLF (Very Low Frequency) testing of the 35kV cables. The installation of .7 miles of OH distribution line and the substations for both the Casper Wind Farm and the local utility were subsequently added.

During the initial safety orientation and project kick-off meeting conducted at the site, it was clear that Cummings’ normal open trenching methods for cable installation for the underground collection system was not the best option for this project. The soil was 100 percent sand and therefore not safe for traditional methods of trenching or the use of a backhoe. The solution was to use cable plow technology that allows for a safer movement through unusual soil conditions. Cummings Electrical was able to install the underground collection system on schedule, accident-free and with minimal disturbance of the natural habitat.

The land on which the wind farm was to be built had once been the location of an oil refinery. As a result, much of the area was classified as “Hazwop (Hazardous Waste Operations),” which presented a challenge during the installation of the OH Distribution line. Working in this type of classification requires special safety training and precautions per OSHA (Occupational Safety and Health Administration) Standard 1910.120, “Hazardous Waste Operations and Emergency Response.” Personnel certified in the appropriate training resolved the issue.

The construction of the substations presented several challenges as well. Approximately 80 percent into the scheduled work, a flaw in one of the steel structures was discovered. The structure had been damaged and repaired at the factory. However, when the flaw was discovered, it was decided that the structure should be replaced. Unfortunately, the structure supported part of the incoming 115kV OH distribution line. Working in conjunction with MSE Power, a new structure was installed without removing the existing OH Distribution lines.

Cummings Electrical encountered another challenge when a leak was discovered in one of the CT/VTs (Current Transformer/Voltage Transformer) during installation. Immediate precautions were taken to contain the spill. The unit was shipped back to the manufacturer for inspection. It was decided that an independent consultant would be used to inspect the welds to determine the cause of the leak. The consultant subsequently determined that the welds were faulty. While all the tests were being conducted, replacement equipment was shipped to the site and installed. This additional work was completed in order to ensure the substations could be energized on time.

Because of the hard work of our renewable energy group, we were able to deliver a quality project to Chevron, accident-free, on time and on budget.
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Cummings’ Renewable Energy Lab

Is a small wind turbine a good investment for you?
One area in renewable energy that seems to have the most confusion associated with it is the small wind turbine (SWT). Most everyone wants to go “green.” One of the ways that seems to be the most obvious is the small wind turbine. However, as we have found out in our research, that isn’t necessarily so.

Many inquiries for a SWT start with the question, “Do you know what your average wind speed is for your specific turbine location?” More often than not, the response is, “No, but I know it is good because the wind blows here all the time.” That statement can be the beginning of a very expensive lesson in wind energy.

What most people do not realize is the cut-in speed on an SWT usually ranges between 6 and 10 mph. At these speeds the turbine’s output is minimal—often less than 100 watts. The name plate output is not obtained until the conditions approach the rated wind speed. This is often between 20 and 30 mph. A very small portion of the county has average wind speeds in this range.

This does not mean installing an SWT to offset one’s power requirements on their home or business is a bad idea. But it does mean they need to have a very realistic idea of what they are buying and the return on investment it will yield.

Cummings Electrical recently completed Phase I of its Renewable Energy Lab. It consists of three SWTs—different manufacturers, different configurations and different sizes. The Lab also has a wind vane and an anemometer. The outputs of the SWTs and monitoring equipment are tracked and recorded in graph form so the effects of the various wind speeds, gusts and changes in wind direction can be monitored.

The Lab currently has a SWEA 1 KW traditional, 3-bladed Horizontal Axis Wind Turbine (HAWT), a Mariah Power Windspire 1.2 KW Vertical Axis Wind Turbine (VAWT) Giromill and a Hi-Energy Technology 3 KW VAWT “Eggbeater.” Research is under way on other new designs. The ones with the most potential will be added to the Lab as they become commercially available.

Potential customers of an SWT are encouraged to visit the Lab and see, firsthand, what they look and sound like in operation. They can also compare performance at their specific location using average wind speeds from various Internet sites and power curve information from the manufacturers.

Said Tim Cummings, President of Cummings Electrical, “The purchase of a small wind turbine is an excellent investment for many parts of the state, but the customer needs to have a realistic idea of the ROI and power it will generate to avoid unreasonably high expectations.”

To arrange for a tour of the Cummings Electrical Renewable Energy Lab call Jim Thompson, Sales and Marketing Manager Renewable Energy Division. The direct phone number is 817-355-5337.
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