Florida Energy Systems Consortium

April 2015 Issue

FESC Highlights

Florida Energy News

U.S. Energy News

Funding Opportunities

Upcoming Events

Space Symposium | April 13 - April 16, 2015 | Colorado Springs, CO
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Turbo Expo 2015 | June 15 - 19 | Montreal, Quebec, CA
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Bioenergy 2015: Opportunities in a Changing Energy Landscape | June 23 - 24 | Washington, DC
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Registration **Abstract Instructions** **Agenda** **Speakers** **Poster Guidelines**

The 2015 Florida Energy Systems Consortium (FESC) Workshop is scheduled for May 20-21, 2015, at the Orlando Airport Marriott Lakeside, Florida. The FESC Workshop showcases pioneering research, education and outreach programs that focus on Florida's sustainable energy future. The program features internationally renowned speakers, as well as presentations and posters highlighting innovative work leading to alternative energy strategies, improved energy efficiencies, workforce development, and expanded economic development for Florida.

Updates will also be posted on our Face Book and Twitter Pages!

Second International Conference on "Energy, Sustainability and Climate Change" ESCC 2015 | June 21 - 27 | Crete, Greece
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Waste Conversion Technology Conference & Trade Show | August 17 - 19 | San Diego, CA
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CZEBS-iiSBE Net Zero Built Environment 2015 Symposium | August 19 - 21 | Montreal, CA
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Battery Show and Critical Power Expo | September 15 - 17 | Novi, MI
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WORLD NEWS

European Wind Energy Installations Outperform Gas and Coal in 2014

The European wind energy industry installed more new capacity than gas and coal combined in 2014. Across the 28 Member States, the wind industry connected a total of 11,791 MW to the grid with coal and gas adding 3,305 MW and 2,338 MW respectively.

Moreover, the coal and gas industries in Europe both retired more capacity than they commissioned in 2014. In comparison, wind energy capacity in Europe increased 5.3% year on year from 2013, with cumulative installations now standing at 128.8 GW in the EU.

Thomas Becker, chief executive officer of the European Wind Energy Association, said: "Europe is at a turning point for investment in renewables and particularly wind. Ploughing financial capital into the industries of old in Europe is beginning to look unwise. By contrast, renewables are pushing ahead and investments in wind remain attractive."

Renewable power plants accounted for 79.1% of new installations during 2014; 21.3GW of a total 26.9GW. Today, grid-connected wind power is enough to cover 10% of the EU's electricity consumption, up from 8% the year before.

Becker said: "These numbers very much show Europe's continued commitment to renewable and wind energy. But this is no time for complacency. The uncertainty over the regulatory framework for the energy sector is a threat to the continued drive toward sustainable and homegrown energy that will guarantee Europe's energy security and competitiveness for the long-term."

He added: "It's time for Europe's political leaders to create a truly European Energy Union and send a clear signal of their support for the shift to a secure and sustainable energy system. Political will on their part is an essential piece of the puzzle."

On a country-by-country breakdown, Germany and the United Kingdom accounted for 59.5% of total EU wind energy installations in 2014, installing 5,279MW and 1,736MW respectively.

"What we've seen in 2014 is a concentration of the industry in key countries," Becker said, adding "while markets in eastern and southern Europe continue to struggle in the face of erratic and harsh changes in the policy arena. We expect this concentration to continue into 2015."

The First International Symposium on Sustainable Human-Building Ecosystems | October 5 - 7 | Pittsburgh, PA Click **here** for more.
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Power Up Energy Expo | Fall 2015 | South Walton, FL Click **here** for more.
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View FESC Calendar

This Solar-Powered Plane is Currently Circumnavigating the World

@Solar Impulse / Rezo.ch

With 17,000 solar cells in its wing and tail, the aircraft relies solely on sunshine to keep its motors running

If ever there were a reason to sleep on a seat that converts to a toilet, circumnavigating the world in a solar-powered plane might be it. The revolutionary solo aircraft-imagined by the psychiatrist and round-the-world balloonist Bertrand Piccard, and designed by an engineer named André Borschberg-will, Borschberg predicts, "change the way we think about energy."

Solar Impulse 2 weighs as little as an SUV but boasts a wingspan greater than a Boeing 747. It's built of carbon fiber, with 17,000 solar cells in the wing and tail; during the day the cells on the wing supply the motors with energy and charge lithium batteries, which power the plane at night. Top speed is a poky 87 miles per hour, but the maximum altitude is a heady 28,000 feet.

After taking off in early March from Abu Dhabi, the plane is currently flying east over Asia and the Pacific, and will cross the United States this month before returning to the United Arab Emirates this summer. The itinerary depends on the weather—sunshine, after all, is a must. Borschberg and Piccard are taking turns piloting, and each is prepared to spend five or six days and nights in the air at a time. The Swiss pilots are eating food akin to astronaut fare, listening to Leonard Cohen recordings and using self-hypnosis to "regenerate" and sleep less.

"People believe they have to reduce their lifestyles to protect the environment," says Piccard. "We want to demonstrate that clean technology can achieve the impossible: protecting the environment, creating jobs and making profit for industry."

First Turbine Installed at Amrumbank West Offshore Wind Farm

After a one-year period of construction, E.ON's Amrumbank West offshore project in Germany is taking form. The installation of the first of 80 turbines has been done successfully at the construction site, 35 km to the north of the island of Helgoland.

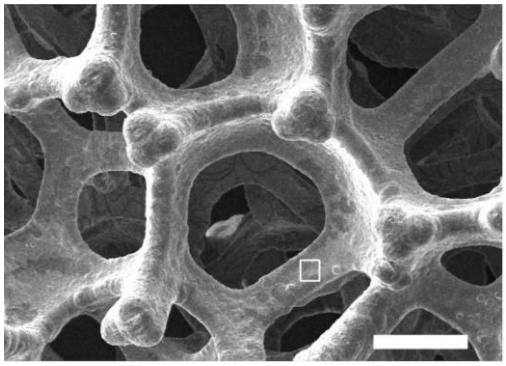
The height of the hub of 3.6 MW turbine produced by Siemens is 90 m above water level; the rotor diameter is 120 meters. The rotor tip is almost as

high as the Cathedral of Cologne, having a height of 150 meters. Carrier vessels convey the constituents of seven turbines from the Port of Esbjerg in Denmark to the deep-sea construction location Amrumbank West.

Right after the installation of the modules, the turbines are set for operation. Meanwhile, commissioning work is being achieved on the transformer substation of the Amrumbank West wind farm. E.ON has constructed a base for operations and maintenance on the island, since the operation and maintenance of the wind farm will be managed from Helgoland.

Amrumbank West should be accomplished and launched in autumn 2015. With a total capacity of 288 megawatts, the wind farm can provide power to approximately 300,000 households. This will aid reduce more than 740,000 tonnes of carbon emissions yearly. Total capital expenditures on the project will attain around €1 billion.

Clean Energy Future: New Cheap and Efficient Electrode for Splitting Water



A scanning electron microscope image shows the porous structure of the nickel foam used to make UNSW Australia's inexpensive and efficient oxygen-producing electrode.

UNSW Australia scientists have developed a highly efficient oxygen-producing electrode for splitting water that has the potential to be scaled up for industrial production of the clean energy fuel, hydrogen. The new technology is based on an inexpensive, specially coated foam material that lets the bubbles of oxygen escape quickly.

"Our electrode is the most efficient oxygen-producing electrode in alkaline electrolytes reported to date, to the best of our knowledge," says Associate Professor Chuan Zhao, of the UNSW School of Chemistry.

"It is inexpensive, sturdy and simple to make, and can potentially be scaled up for industrial application of water splitting."

The research, by Associate Professor Zhao and Dr Xunyu Lu, is published in the journal *Nature Communications*.

Inefficient and costly oxygen-producing electrodes are one of the major barriers to the widespread commercial production of hydrogen by electrolysis, where the water is split into hydrogen and oxygen using an electrical current.

Unlike other water electrolysers that use precious metals as catalysts, the new UNSW electrode is made entirely from two non-precious and abundant metals -- nickel and iron.

Commercially available nickel foam, which has holes in it about 200 micrometres across, or

twice the diameter of a human hair, is electroplated with a highly active nickel-iron catalyst, which reduces the amount of costly electricity needed for the water-splitting to occur.

This ultra-thin layer of a nickel-iron composite also has tiny pores in it, about 50 nanometres across.

"The three-dimensional architecture of the electrode means it has an enormous surface area on which the oxygen evolution reaction can occur," says Associate Professor Zhao.

"The larger bubbles of oxygen can escape easily through the big holes in the foam. As well, the smaller holes make the electrode surface 'wetter', so the bubbles do not stick to it, which is a common problem that makes electrodes less efficient."

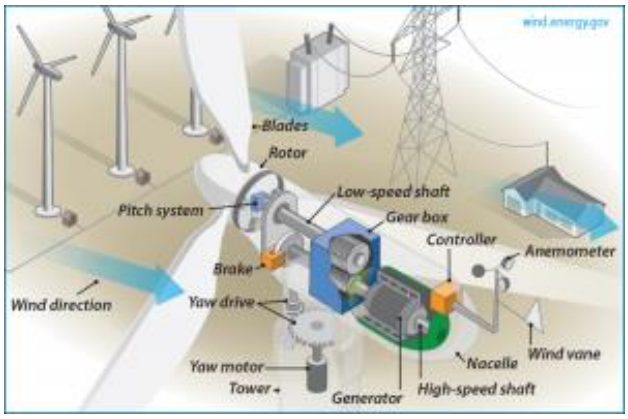
Hydrogen production is a rapidly growing industry, but the majority of hydrogen is still produced using fossils fuels such as natural gas, oil and coal, because this approach is still cheaper than electrolysis of water.

Hydrogen is a great fuel for powering mobile devices or vehicles, and storing electricity generated from renewable energy, such as solar.

"I think this electrode has great potential for the industrial-scale production of hydrogen. Our next goal is to understand the science behind it and to further improve its performance. Cleaner sources of fuel like hydrogen will be particularly important for reducing carbon dioxide emissions and solving the air pollution problems from the burning of fossil fuels such as coal," says Associate Professor Zhao.

FESC HIGHLIGHTS

New Wind Energy Fact Sheet Added to the FESC Website



As part of our outreach effort, directed by Dr. Pierce Jones, FESC is continually expanding Energy Fact Sheet development.

The latest added is the Wind Energy Fact Sheet which can be viewed at this **location**.

Many more Energy Fact Sheets can be found at the **FESC website** as well.

U.S. Department of Energy Solar Decathlon 2015

The University of Florida, partnering with Santa Fe College, Alachua Habitat for Humanity and the National University for Singapore, has been selected as one of 20 teams to participate in the 2015 Solar Decathlon. The competition challenges collegiate teams to design, build, and operate solar-powered houses that are cost-effective, energy-efficient and attractive. The winner of the competition is the team that best blends affordability, consumer appeal, and design excellence with optimal energy production and maximum efficiency.

University of Central Florida's First Electric Vehicle Fast Charger Opens in Cocoa - Grand Opening and Ride and Drive Announced

UCF's first DC fast charger at FSEC in Cocoa will re-charge the all-electric Nissan LEAF to 80% capacity within 30 minutes.

Electric Vehicle drivers now have a place to charge up on the Space Coast in Cocoa. Located just two miles off State Road 528, otherwise known as the "Beachline,"-a main artery connecting Orlando to the Space Coast -the University of Central Florida's Florida Solar Energy Center (FSEC) is now home to a Direct Current (DC) Fast Charger and a dual Level 2 charger.

The grand opening of UCF's re-charging facility at FSEC is scheduled for Friday, March 20 at 11 a.m. Nissan will be offering a Ride & Drive for the all-electric Nissan LEAF® from 11:30 a.m. until 1:00 p.m. A variety of electric and plug-in hybrid vehicles will also be on display. The public is invited to attend and participate in this special event.

Donated by Nissan North America, and provided by NovaCharge, a leading provider and integrator of EV charging solutions nationwide, the DC Fast Charger is a first for UCF, as well as the City of Cocoa.

“We’re excited to have such a valuable resource for the electric vehicle community right in our backyard,” said City of Cocoa Mayor Henry Parrish III.

The fast charger—using a CHAdeMO connector—will charge a Nissan LEAF to 80 percent capacity in 30 minutes. It is expected that the station will also offer charging for electric vehicles that use the SAE Combo connector in the future. This valuable resource will help expand the EV community by offering services to a variety of vehicles using different charging standards.

“Nissan is promoting EVs by making LEAF an affordable and fun-to-drive car, while helping to build public charging infrastructure in the communities where people live, work and play,” said Brendan Jones, Nissan’s director of EV Sales and Infrastructure Strategy. “We’re happy to see leading institutions like the University of Central Florida joining the charge to encourage people to drive electric.”

UCF’s re-charging facility at FSEC also includes a 240-volt dual Level 2 charger, which can charge electric vehicles using the SAE standard J1772 connector in three to four hours. Customers will pay 15 cents per kilowatt hour or $1.00 minimum for a charge using the dual Level 2 charger, and 15 cents per kilowatt hour or $1.50 minimum for a charge using the DC Fast Charger. Both of these units are available 24 hours a day to the general public and can be used through free smartphone applications, or with any RFID enabled credit card. Easy to follow instructions are on each station.

Both of these new chargers are networked, and will provide a source of research data for UCF’s Electric Vehicle Transportation Center at FSEC. The data collected will be analyzed to determine the effects of EV charges on electrical grid integration, as well as their impact on building electrical demands.

In addition to promoting workplace charging—FSEC has at least five EV drivers now—the new charging stations also provide a means for faster adoption of electric vehicles, which is better for the community.

“Most people drive less than 40 miles per day, well within the range of an all-electric vehicle,” said FSEC Director James Fenton. “Most days, I drive 50 miles, and when I plug into the standard electrical outlet in my garage at night, I go from 50 percent to a full battery charge in the morning.”

UCF’s FSEC is located at 1679 Clearlake Road, Cocoa, FL 32922.

Why Startups Are Moving into Research Park at FAU

Andrew Duffell, president and CEO of the Research Park at FAU in Boca Raton

It's gotten a little more crowded at Research Park at Florida Atlantic University.

More than twice as many people work on the park's Boca Raton and Deerfield Beach campuses now compared to three years ago, said President and CEO Andrew Duffell.

Research Park is independent from FAU, but helps link its educational and research efforts with the private sector. It hosts 20 high-tech companies who employ more than 1,700 people as of December, up from 750 people in 2011, Duffell said.

"They range industry and revenue as well [as size]," he said. "It's a big, diverse population."

This week, 10-person LED lighting manufacturer Green Lumens moved to Research Park from its previous headquarters at Plumtree Centre in Boca Raton.

"The Park's high-tech focus puts us right in the middle of a hotbed of talented companies and resources not available anywhere else in the area," Green Lumens founder and chairman Neil Glachman said.

Nineteen of those 20 companies are in Boca Raton, with People's Trust Insurance Company on the Deerfield Beach campus.

The firms range from a three-person startup to the rapidly growing electronic medical records firm Modernizing Medicine, which has more than 250 employees.

Other occupants include MobileHelp, an emergency response tech firm that is one of the 200 fastest-growing companies in the country, according to the Inc. 5000.

"We've got a company that does compliance testing for electronics equipment," Duffell said. "We've got an aerospace company. We've got a pretty good concentration of healthcare IT, a lot of healthcare imaging and a publishing company."

Companies tend to move to the park to be near talented FAU students, he said. For instance, Green Lumens is establishing a formal internship program designed to help the firm hire FAU students.

"One of the top reasons is always proximity and access to students — getting to know them, hiring them as interns, getting the cream of the crop before they even graduate," Duffell said.

Research Park also encourages companies to work with FAU faculty researchers.

"The most important thing is an ability and a willingness to develop a very substantial relationship with the university," he said. "They need to have that desire to continuously innovate and develop new products, not only with students but also for the faculty."

Duffell hopes the park will continue to grow as its 15-year-old Technology Business Incubator creates a pipeline of growing startups who need more space.

Research Park is about 90 percent occupied, Duffell said. But there's space available for lease and land to build on, both in Boca Raton and Deerfield Beach — so the park certainly isn't done adding companies.

"We're always looking for new ones," he said.

FAMU Joins U.S. Department of Energy's Better Buildings Challenge

Florida Agricultural and Mechanical University (FAMU) has committed to making its entire portfolio of buildings 20 percent more energy efficient within 10 years by joining the Better Buildings Challenge by the U.S. Department of Energy. FAMU will work with the DOE to share its successful efficiency models and help pave the way for other organizations to follow.

"The Better Buildings Challenge partners are demonstrating leadership in a variety of industries, bringing greater energy efficiency to American restaurants, data centers, multifamily housing developments, and cities across the country," said Energy Secretary Ernest Moniz. "Joining hundreds of other organizations, these new partners are taking action to save money by saving energy and cutting carbon pollution, while also creating jobs."

FAMU will soon complete an expansive energy performance contract that is slated to yield millions of dollars in energy-cost savings. In addition, FAMU will undergo an assessment and planning process in the next six months to identify strategic opportunities to achieve energy efficiency goals. The Sustainability Institute, working directly with the University's Office of Facilities Planning & Construction, will steward this commitment and develop a plan. Faculty and students will also be involved in creating new learning experiences designed around this commitment.

"FAMU's participation in the Better Buildings Challenge is a perfect example of our commitment to embed a culture of sustainability into our campus," said Chief Sustainability Officer Abena Ojetayo. "Pursuing this goal not only improves our building performance, it opens the door for innovation in our facility services, frees up real dollars to advance other mission-critical work, and causes us to practice what we teach and research."

FAMU joins a diverse set of more than 20 other new partners, including six multifamily developments announced by the White House. These new partners bring with them fresh perspectives and leadership in newly represented sectors totaling more than 70 million square feet of fast-food, restaurant, manufacturing, university, and government facilities.

"FAMU is proud to join the esteemed institutions across the nation that understand the importance of sustainability and its role in ensuring the highest level of effectiveness and efficiency in our respective sectors," said President Elmira Mangum, Ph.D., a signatory of the American College and University President's Climate Commitment.

The Better Buildings Challenge supports the goal of doubling American energy productivity by 2030 while motivating corporate and public-sector leaders across the country to save energy through commitments and investments. More than 250 organizations are partnering with the Department of Energy to achieve 20 percent portfolio-wide energy savings and share successful strategies that maximize efficiency over the next decade. Across the country, Better Buildings Challenge partners are deploying energy efficiency projects at more than 9,000 facilities, with more than 2,100 buildings expected to improve efficiency by at least 20 percent, and another 4,500 by at least 10 percent, compared with their baseline years.

FLORIDA ENERGY NEWS

Google to Use NextEra Wind Farm to Power HQ

Google will partner with Juno Beach-based NextEra Energy Resources to power buildings at its California headquarters, the company announced Wednesday.
The subsidiary of NextEra Energy (NYSE: NEE) will repower a wind farm in the Bay Area that will provide 43 megawatts of electricity starting in 2016. That energy will feed into Google buildings in Mountain View, California.

"Once the installation is complete, and the 370 legacy turbines are replaced, it will take just 24 new ones to generate as much power as our campus uses in a year," wrote David Radcliffe, Google's vice president of real estate and workplace services.


1 NextEra Energy Resources focuses on renewable energy, with wind and solar projects across the U.S. and Canada.

The cost of the project was not announced, and a NextEra Energy Resources representative did not immediately respond to a request for comment.

NextEra Energy Resources focuses on renewable energy, with wind and solar projects across the U.S. and Canada. The company signed contracts for about 1,400 megawatts of new renewables projects in 2014, CFO Moray Dewhurst said in a fourth-quarter earnings call.

NextEra Energy is also Florida Power & Light's parent company and recently agreed to acquire Honolulu-based Hawaiian Electric Industries (NYSE: HE) for $4.3 billion.

NextEra Energy is South Florida's fourth-largest public company, according to *Business Journal* research. The company reported $17 billion in 2014 revenue, compared to $15.1 billion in 2013.

FPL Proposes To Almost Double Florida's Solar Power By End of 2016

Florida's largest investor owned utility announced plans Monday to build three new solar farms that would nearly double the state's solar capacity.

In its announcement, Florida Power & Light said it had found a "cost-effective" way to expand solar power in Florida and proposed to install the systems at three sites in its service area. The utility proposes to add 225 megawatts of solar to the state's current 229 megawatts by the end of next year in Manatee, DeSoto and Charlotte counties.

Associated Press (2009) President Barack Obama, with DeSoto construction manager Greg Bove, center, and then-Florida Power and Light CEO Lewis Hay, tours the DeSoto Next Generation Solar Energy Center in Arcadia in 2009. FPL plans to build three solar farms that would nearly double the state's capacity.

FPL is still refining the details of the project so the utility did not provide cost estimates. But the company said there would be no significant impact on customer rates.

"Over the past decade, we have continuously focused on advancing reliable, affordable, clean energy for our customers," said Eric Silagy, president and CEO of FPL. "In particular, we have been working especially hard to find ways to advance solar energy in Florida without increasing electricity costs, and we have developed what we believe will be a cost-effective plan.

But FPL utility noted in a news release that "solar power — even the most economical large-scale installation — is generally not yet cost effective in FPL's service area."

That refrain has been part of Duke Energy Florida's argument against any immediate deployment of solar power in its service area, though the utility also has been exploring possible sites in Pinellas County for a solar farm.

Tampa Electric is exploring solar with a project that is just 1 percent the size of FPL's project. Tampa Electric plans to build and operate its solar facility at Tampa International Airport.

The announcement comes as pressure mounts on Florida's utilities and on Tallahassee from grass roots organizations that are calling on the Sunshine State to live up to its name by tapping the sun for more of its electricity needs.

Floridians for Solar Choice — a coalition of tea party and Christian Coalition conservatives as well as liberals, environmentalists and retailers — has launched a petition drive to add an initiative to the 2016 ballot that would allow those who generate electricity from the sun to sell the power directly to other consumers.

That would create competition for the investor owned utilities such as FPL, Duke Energy Florida, Tampa Electric and Gulf Power.

Environmentalists on Monday applauded FPL's efforts after long, heated battles with the utility before state regulators. But they questioned the utility's continued argument that solar is generally not economical.

"The Southern Alliance for Clean Energy disagrees with FPL's assessment that large-scale installations are 'generally not yet cost effective in FPL's service area,' particularly as utility-scale solar has proven to be cost effective in other states and utility territories," said Stephen Smith, the organization's executive director.

"Unfortunately, FPL has not made any of its competitive bids for solar projects public, so it is impossible to know why FPL is making this claim," Smith said. "We welcome more transparency in this round of solar projects and believe competitive bids would bring the most cost-effective solar to Florida ratepayers."

FPL, the nation's third largest electric utility with 4.7 million customers, currently operates 110 megawatts of solar power that it built in 2009 and 2010. At the time they came online, those solar farms made Florida the second largest solar power-producing state in the country.

But Florida has since fallen in rank, now standing at 13th nationwide, according to the Solar Energy Industries Association. The Sunshine State ranks below such states as New Jersey and North Carolina in solar installations. California is by far the nation's leader when it comes to solar power.

A nationwide solar boom has in part been fueled by a 30 percent federal tax credit that will decrease to 10 percent at the end of 2016. By that time, FPL expects to have its new solar farms up and running.

Because of the size and "cost-effectiveness" of the project, FPL does not need approval from state regulators in advance of building the solar power plants, said utility spokesman Mark Bubriski. But the Public Service Commission will review any costs passed onto customers.

Florida's investor owned utilities have argued that solar is too costly and that there are too many clouds for solar to be effective in Florida without a way to store power for times of low radiance or at night.

But in the last week, the utilities have proposed bigger solar projects than the state has ever produced.

Gulf Power, a subsidiary of Georgia-based Southern Co., plans to add 120 megawatts of solar power at military bases on the Florida Panhandle.

"At first blush, it's like, 'Wow! This is great news,' " said Ken Johnson, spokesman for the Solar Energy Industries Association in Washington, D.C. "But as a state, (Florida) is just scratching the surface of its potential in regard to solar."

AIF Promotes Energy Probe in New Florida Mineral Rights Working Group

The Associated Industries of Florida (AIF) launched the "Florida Mineral Rights Working Group" as they look to further energy exploration across the Sunshine State.

"AIF has been engaged in Florida's energy industry for decades, including running the successful Florida Energy Coalition (FEC)," said former U.S. Rep. Tom Feeney, R-Fla., the

president and CEO of AIF. "While AIF has a long history of advocating for increased, responsible oil and gas exploration and production in the Sunshine State, we are re-energizing our efforts on this front because of the renewed focus on Florida's onshore oil and gas resources. As such, we are proud to announce the formation of the Florida Mineral Rights Working Group, which will operate under the FEC.

“The goal of this newly-formed working group will be to help secure a fair and consistent regulatory framework in the state for operators and mineral owners, while also ensuring standards are in place to protect Florida’s environment, our natural resources and our water supply,” Feeney added. “This will undoubtedly allow companies and landowners currently in this industry space to grow, while encouraging new companies to enter the state -- the end result of which will be more jobs for Floridians, more revenue for the state, and greater oversight of oil and gas exploration and production activities.”

Shell Buys 30,000 Tons of Brazilian Ethanol for Import to Florida

In Florida, Royal Dutch Shell has booked 30,000 metric tons of ethanol from Raizen and Louis Dreyfus Commodities' Biosev for shipment with end of March delivery. Brazil imported nearly the same amount in December. The trade is a result of the weakening real mixed with need to sell old crop ethanol as the new crush gets underway early. On a dollar basis, Brazilian ethanol is at its lowest in a year, but in real terms is only down 30%.

U.S. ENERGY NEWS

Protecting Utilities from the Risk of Data Breach

Cybersecurity, Allocation of Risk, and the Need for Prevent Energy Breach and Liability Agreements *by Jeremy L. Susac and Steven D. Weber*

Energy is the lifeblood of the economy. It powers our homes and businesses, and supports critical government services that ensure our public safety. According to the United States Energy Information Administration (EIA), our electricity is generated by 6,997 operational power plants with a nameplate generation capacity of at least one megawatt. The generated electricity is transmitted over 2.7 million miles of electrical wires into our homes, businesses, and government buildings. Those 2.7 million miles are coordinated by interconnected computers belonging to the electric industry, reliability councils and various state and federal regulators. Those regulators oversee 3,200 utilities in the United States, which are interconnected by even more computers spread across the 50 states.

Standardizing the Smart Grid

Many of those utilities are just beginning to use the "smart grid." Under the Energy Independence and Security Act of 2007 (EISA), the National Institute of Standards and Technology (NIST) is tasked as the "primary responsibility to coordinate development of a

framework that includes protocols and model standards for information management to achieve interoperability of smart grid devices and systems…" [EISA Title XIII, Section 1305]. Congress and NIST both recognize the urgent need to establish rigorous protocols and standards for a 21st Century Grid (i.e. "smart grid"). Over the last decade, there has been a tremendous deployment of various smart grid elements to increase efficiency and reliability of the U.S. electrical grid. These elements include smart sensors on distribution lines, smart meters in homes, and wi-fi enabled home thermostats, many of which are developed by third party vendors.


Steven D. Weber

The smart grid will ultimately require hundreds of standards and specifications, but some standards are more urgently needed than others. To prioritize NIST's deployment of standards, NIST chose to focus, in large part, on eight priority areas identified in the Federal Energy Regulatory Commission (FERC) Policy Statement.

Priority: cybersecurity

One of those eight priority areas is cybersecurity, because the grid's reliance on so many wires creates the opportunity for cyber-vulnerability. Without rigorous interoperability standards between utilities and third party vendors (like thermostat manufacturers) with respect to the smart grid, the entire grid – and our entire economy – could be shut down using a mouse and keyboard because even if utilities employ the most rigorous defenses, their 2.7 million miles of interconnected electrical wires are only as strong as its weakest link – which could be a third party vendor. As a result, integration of third party vendors (and the cybersecurity risks they bring) into the smart grid raises questions like, do utilities need insurance to combat these risks? Should third party vendors indemnify utilities for losses sustained when hackers bring down all or a portion of the grid through a third party entry point?

"Prevention of power loss from cybersecurity attacks is a compelling national security necessity," according to Jacob Worenklein, chairman and CEO of U.S. Grid Company. "The head of the U.S. National Security Agency reported to Congress that the loss of 10 major electric substations in the United States from a cybersecurity attack could plunge the entire country into a blackout that would last at least four months and would kill millions of people. Prevention of these attacks requires attention on many fronts relating to training, software and hardware, including such basic actions as verification of authorized personnel through monitoring of patterns of conduct in their computer usage, identification and isolation of malicious activities in the computer network, identification of IP-addressable malware in hardware installed by enemies that can be remotely activated, training of personnel against sloppy but innocent behavior such as clicking on links and opening attachments from email senders who often appear to be plausibly appropriate, and placing USB flash drives into their computers."

Worenklein predicted that many Federal and state agencies with jurisdiction over the rates of the nation's utility companies will over the next several years mandate utility companies to take certain actions and make certain investments which will be designed to significantly reduce the risks of cybersecurity attacks that take down their systems.

"Many utility companies today are reluctant to invest the massive amounts of capital needed

to fully protect their systems on the basis that these investments are not required by law and may not be recoverable through their rates. This disincentive needs to and will be eliminated," according to Worenklein.

Mitigating data breach risk

One way for utilities to mitigate the risk of a data breach is to enter into a Prevent Energy Breach and Liability agreement (PEBAL). A PEBAL is an agreement by which a utility agrees with all or certain third party vendors to cooperate in defending their networks and to allocate the risk of a data breach. Numerous factors must be considered when entering into a PEBAL, some of which will be addressed here.

One way for utilities to mitigate the risk of a data breach is to enter into a Prevent Energy Breach and Liability agreement.

In negotiating a PEBAL, the parties must first determine the relevant level of computer security to maintain. On February 12, 2014, NIST released the Framework for Improving Critical Infrastructure Cybersecurity (the "Framework"). The Framework "uses a common language to address and manage cybersecurity risk in a cost-effective way based on business needs without placing additional regulatory requirements on businesses." The Framework is voluntary and is meant to assist the critical infrastructure community: entities that have a role in securing "systems and assets, whether physical or virtual, so vital to the United States that the incapacity or destruction of such systems and assets would have a debilitating impact on security, national economic security, national public health or safety, or any combination of those matters."

Utilities are part of that community and, even though the Framework is voluntary, their failure to abide by it may result in liability. Parties to a PEBAL may establish the relevant level of security to maintain based on the Framework and requirements imposed by applicable law. The vast majority of states have enacted data beach laws and other cybersecurity regulations, which may apply to utilities. International laws and regulations may also apply. Some of those laws and regulations may impose security standards that differ based on where the parties to the agreement reside and operate. The parties should clearly agree to maintain a standard of security that meets all applicable obligations.

The parties to a PEBAL must decide who should pay the fees and costs involved in maintaining the level of security imposed by a PEBAL. It is unlikely that the level of security maintained by utilities and third party vendors is uniform prior to entering into a PEBAL. As a result, the parties may need to substantially upgrade their computer hardware, software, training, and other practices, and the parties may decide to consult with a dedicated security vendor -- each of which may carry significant costs. Any PEBAL should take into account the cost of ensuring that the parties to the PEBAL are able to meet the relevant security standard and who pays for those costs.

Parties to a PEBAL should determine whether third party vendors will indemnify a utility in the event of a data breach. Many third party vendors could not operate without access provided by a utility – their products might depend on such access. By giving third party vendors access to their networks and the grid, utilities are necessarily exposing themselves to vulnerabilities in the event that one of those third party vendors experiences a data breach. The parties should negotiate in advance who bears the cost of the breach and the extent to which they will respond to a breach so that all rights and liabilities are determined in advance. In exchange for providing the third party vendors with access to the grid, the utilities may require third party

vendors to indemnify them for any and all damages they incur as a result of a data breach due to the third party vendor. The parties might tie such an indemnification provision to a third party vendor's compliance with cybersecurity standards imposed by the utility.

Parties to a PEBAL should also consider obtaining cyber insurance, and the PEBAL should state which party or parties will bear the cost of it. According to the Department of Homeland Security (DOHS), cybersecurity insurance is designed to mitigate losses from a variety of cyber incidents, including data breaches, theft, business interruption, and network damage. The key characterization is "mitigate," because there is no guaranteed prevention. Further, the DOHS' National Protection Program Directorate (NPPD) found that the first-party cybersecurity insurance market is a nascent market, especially related to coverage for cyber-related critical infrastructure loss, like power plants and the electrical grid. In the wake of a data breach, there may be many costs associated with the data breach that are not immediately foreseeable to the utility or a third party vendor. A utility may be required to pay for attorneys, pay for security experts, pay for public relations specialists, and prepare reports to government organizations on the severity and scope of the data breach.

Utilities as cyber captives

One cyber insurance strategy that may be incorporated into the PEBAL is a captive insurance program that includes the state's electric utilities and third party vendors. State legislatures may enact captive insurance laws that form insurance companies for the specific purpose of insuring data breach risks ("Cyber Captives").

As applied to utilities, Cyber Captives would enable a state's utilities to be self-insured, and protect them and their customers against losses related to data breaches. Each utility in the state would be required to be a member of a state's Cyber Captive. The Cyber Captive would hold a pool of funds from the utilities to offset losses due to data breaches. The utilities could recover their contribution to the pool through a surcharge to their customers that is proportionate to their customer base and potential liability. A PEBAL, in conjunction with a Cyber Captive, may additionally mitigate the risks posed by third party vendors by requiring those third party vendors to charge their customers an amount at the time those customers purchase the product, which would be contributed to the Cyber Captive's pool of funds. Obtaining and implementing cyber insurance through an insurance policy, captive insurance law, or other method will crystalize the utilities' response in the event of a data breach and help mitigate the costs associated with any breach.

The PEBAL cannot absolutely prevent data breaches but it will mitigate the risk of them. Before entering into any such agreement, a utility should assess the extent to which a data breach by a third party vendor will impact them. Accurately and completely understanding the extent to which utilities are vulnerable to data breaches through third party vendors will lead to better results in drafting the PEBAL. Utilities would be well served to determine whether a PEBAL is right for them and, if so, who they should enter into it with and under what terms.

World's Largest Solar Plant Opens in California Desert

The Southern California desert is now home to the world's largest solar power plant.

U.S. Interior Secretary Sally Jewell joined state officials on Monday to open the 550-megawatt Desert Sunlight solar project in the town of Desert Center, Calif., near Joshua Tree National Park. Built by First Solar, the project generates enough electricity to power 160,000 average California homes.

Desert Sunlight received a federal loan of nearly $1.5 billion, and Jewell called its completion an example of the loan guarantee program's tremendous importance.

"When you are stepping out with new technology, when you are trying something that has been untested before, a loan guarantee program from an organization like the Department of Energy is what provides you, as a lender, that certainty that you can step up and support the project," Jewell told *The Desert Sun.*

Conservative lawmakers have derided the loan guarantee program, arguing that it's wasted billions of taxpayer dollars. Critics have pointed to the program's $535 million loan guarantee for Solyndra, a Fremont-based solar panel manufacturer that filed for bankruptcy in 2011.

But the Department of Energy reported last year that it expects to make a profit of $5 billion to $6 billion from the program. The department funded five traditional, large-scale solar farms, and Desert Sunlight marks the last of those projects to go online.

"They're all rock-solid, money is good, living up to every kind of condition we put in the loan documents in terms of performance, in terms of commercial operation," Peter Davidson, executive director of the Department of Energy's loan programs office, said in an interview last week.

The loan guarantee program did more than fund five solar photovoltaic projects, Davidson added: It helped launch the large-scale solar industry. In 2009, there were no traditional solar farms in the United States larger than 100 megawatts. Now, 17 such projects have been financed, according to a Department of Energy report released Monday.

Solar panels "existed before as a technology, but that technology hadn't been deployed at a large scale," Davidson said. "Once we've done that, the government steps aside to let the private markets take over."

Desert Sunlight employed an average of 440 people during more than three years of construction, and it now has about 15 full-time employees. Money provided by the project's owners — as part of an agreement negotiated with Riverside County — is also being used to fund $400,000 in improvements to the community center in nearby Desert Center.

"The debate's over — we're going to be moving to more renewable energy," Riverside County Supervisor John Benoit said.

Power from the plant will go to Southern California Edison and Pacific Gas & Electric Co.

CALIFORNIA BEAMIN'

Desert Sunlight is the world's largest solar power plant, although only by a hair.

The Topaz solar project in San Luis Obispo County, Calif. — which, like Desert Sunlight, was built by Arizona-based First Solar — also has a capacity of 550 megawatts. But the desert has more abundant sunlight than San Luis Obispo County, so Desert Sunlight will actually generate more electricity than Topaz, said Georges Antoun, First Solar's chief operating officer.

"It's a beautiful sun here, year-round," he said.

California as a whole has installed more renewable energy than any other state, noted David Hochschild, a member of the California Energy Commission.

"There were a lot of skeptics who actually didn't believe that renewables could scale, that this cost reduction could happen, that we could introduce it to the grid," Hochschild said. "They've been proven wrong."

There's little doubt that California will get more electricity from clean energy in the coming years. The state's three major utilities are on track to meet or exceed a 33% renewable energy mandate by 2020, and Gov. Jerry Brown is calling for policymakers to increase that target to 50% by 2030.

It's an open question, though, whether future solar projects will be anywhere near as big as Desert Sunlight.

Developers have been gravitating toward smaller solar farms, which are easier to build and usually have a smaller impact on species and ecosystems in California's deserts. Desert Sunlight spans 3,800 acres near Joshua Tree National Park, and it faced vehement opposition from environmental activists during its permitting process.

If legislators adopt a 50% renewable energy mandate, it could incentivize massive projects like Desert Sunlight. But Antoun said he'd be surprised to see many more projects 550 megawatts or larger, in California or elsewhere.

"Can we create a bigger project? Of course," he said. "But it all has to do with how much appetite (states) have for how much land to utilize, and to be committed for 20-25 years."

Utilities faced with renewable energy mandates, Antoun said, will more likely turn to projects in the 100-megawatt range, located closer to energy consumers. Projects built near cities require far less transmission infrastructure, which is expensive to build and poses a host of environmental concerns.

Apple's Massive Solar Farm Could Power Its Entire California Operations

Apple is investing in a vast solar plant in Northern California that will generate as much electricity as the company uses to power all its operations in the state. Apple will invest $850 million in the plant through a partnership with First Solar, CEO Tim Cook said Tuesday. It will cover 1,300 acres -- equal to about 1,000 football fields -- in Monterey County, about an

hour south of Apples Silicon Valley headquarters.

The plant will generate enough energy that it could power Apples entire operations in California, including its data center, retail stores and offices. That's also enough energy to power 15,000 California homes, Cook said.

It doesn't mean Apple's stores and offices will consume power directly from the plant. But the investment allows Apple to lock in a low, fixed rate for renewable energy, and probably also obtain renewable energy certificates to offset its carbon foot print.

Apple will receive energy from 130 megawatts of the solar project under a 25-year purchase agreement, in the largest agreement of its kind to a commercial end user, First Solar said.

It's Apple's latest effort to improve its green credentials by investing in renewable energy; it already operates two solar farms on the east coast and one in Nevada. Google and other tech firms have made similar investments in renewables, though perhaps not on this scale.

"We're doing this because it's the right thing to do, but you may also be interested to know it's financially good to do it," Cook said at the Goldman Sachs Technology and Internet Conference. "We expect very significant savings."

Thats because the investment allows Apple to lock in a price for the renewable energy that will compare favorably to "brown energy," Cook said, meaning non-renewable sources like coal.

Construction is expected to begin in mid-2015 and be completed by the end of next year, First Solar said.

Google Invests $300 Million in SolarCity Green Energy Project

Google is putting up $300 million as part of a $750 million SolarCity fund meant to encourage solar energy in homes in the United States.The fund, which was announced on Thursday, covers the cost of solar panel creation and installation so homeowners will have no upfront costs to dissuade them from going green. SolarCity, America's largest solar power provider, claims it ultimately costs less than paying a typical utility company. But solar energy is still just finding its footing as a residential energy option.

CU-Boulder Technology Could Make Treatment and Reuse of Oil and Gas Wastewater Simpler, Cheaper

Oil and gas operations in the United States produce about 21 billion barrels of wastewater per year. The saltiness of the water and the organic contaminants it contains have traditionally

made treatment difficult and expensive.

Engineers at the University of Colorado Boulder have invented a simpler process that can simultaneously remove both salts and organic contaminants from the wastewater, all while producing additional energy. The new technique, which relies on a microbe-powered battery, was recently published in the journal Environmental Science Water Research & Technology as the cover story.

“The beauty of the technology is that it tackles two different problems in one single system,” said Zhiyong Jason Ren, a CU-Boulder associate professor of environmental and sustainability engineering and senior author of the paper. “The problems become mutually beneficial in our system—they complement each other—and the process produces energy rather than just consumes it.”

The new treatment technology, called microbial capacitive desalination, is like a battery in its basic form, said Casey Forrestal, a CU-Boulder postdoctoral researcher who is the lead author of the paper and working to commercialize the technology. “Instead of the traditional battery, which uses chemicals to generate the electrical current, we use microbes to generate an electrical current that can then be used for desalination.”

This microbial electrochemical approach takes advantage of the fact that the contaminants found in the wastewater contain energy-rich hydrocarbons, the same compounds that make up oil and natural gas. The microbes used in the treatment process eat the hydrocarbons and release their embedded energy. The energy is then used to create a positively charged electrode on one side of the cell and a negatively charged electrode on the other, essentially setting up a battery.

Because salt dissolves into positively and negatively charged ions in water, the cell is then able to remove the salt in the wastewater by attracting the charged ions onto the high-surface-area electrodes, where they adhere.

Not only does the system allow the salt to be removed from the wastewater, but it also creates additional energy that could be used on site to run equipment, the researchers said.

“Right now oil and gas companies have to spend energy to treat the wastewater,” Ren said. “We are able to treat it without energy consumption; rather we extract energy out of it.”

Some oil and gas wastewater is currently being treated and reused in the field, but that treatment process typically requires multiple steps—sometimes up to a dozen—and an input of energy that may come from diesel generators.

Because of the difficulty and expense, wastewater is often disposed of by injecting it deep underground. The need to dispose of wastewater has increased in recent years as the practice of hydraulic fracturing, or “fracking,” has boomed. Fracking refers to the process of injecting a slurry of water, sand and chemicals into wells to increase the amount of oil and natural gas produced by the well.

Injection wells that handle wastewater from fracking operations can cause earthquakes in the region, according to past research by CU-Boulder scientists and others.

The demand for water for fracking operations also has caused concern among people worried

about scarce water resources, especially in arid regions of the country. Finding water to buy for fracking operations in the West, for example, has become increasingly challenging and expensive for oil and gas companies.

Ren and Forrestal's microbial capacitive desalination cell offers the possibility that water could be more economically treated on site and reused for fracking.

To try to turn the technology into a commercial reality, Ren and Forrestal have co-founded a startup company called BioElectric Inc. In order to determine if the technology offers a viable solution for oil and gas companies, the pair first has to show they can scale up the work they've been doing in the lab to a size that would be useful in the field.

The cost to scale up the technology also needs to be competitive with what oil and gas companies are paying now to buy water to use for fracking, Forrestal said. There also is some movement in state legislatures to require oil and gas companies to reuse wastewater, which could make BioElectric's product more appealing even at a higher price, the researchers said.

Ren and Forrestal have received funds from the National Science Foundation to work on scaling up the water treatment cell. The grant came after the pair participated in NSF's Innovation Corps Program—aimed at pushing NSF-funded research beyond the lab—and took first place in their class.

Ren and Forrestal also worked with researchers Zachary Stoll and Pei Xu at New Mexico State University. Stoll and Xu are also co-authors of the article.

FUNDING OPPORTUNITIES

FESC office tracks the energy related funding opportunities, shares them with faculty and industry partners, facilitates the submission of multi-faculty, multi-SUS university competitive proposals in response to solicitations for major research programs. The most recent funding opportunities are listed below. For a complete list please visit the funding opportunities page on the FESC website.

DEPARTMENT OF ENERGY

DE-FOA-0001225 - Sunshot Technology to Market (Incubator Round 10, Solarmat Round 2, Sunpath Round 2)
Application Due Date: 4/22/2015

Summer 2015 U.S. Department of Energy Clean Cities University Workforce Development Program (CCWUDP)
Application Due Date: 4/25/2015

DE-FOA-0001241 - Solar Powering America by Recognizing Communities (SPARC)
Concept Paper Submission Deadline: 3/5/2015
Application Due Date: 4/27/2015

DE-FOA-0001269 - Topical Collaborations in Nuclear Theory

Application Due Date: 5/4/2015

DE-FOA-0001285 - U.S.-China Clean Energy Research Center: Energy and Water
Application Due Date: 5/4/15

DE-FOA-0001219 - Resilient Electricity Delivery Infrastructure Initiative
Application Due Date: 5/4/2015, 11:59PM ET

DE-FOA-0001239 - Technology Development and Assessment for Supercritical Carbon Dioxide (SCO2) Based Power Cycles
Application Due Date: 5/12/2015

DE-FOA-0001252 - Academic Collaboration for Cybersecurity of Energy Delivery Systems (CEDS)
Application Due Date: 5/12/15

DE-FOA-0001240 - Intelligent Monitoring Systems and Advanced Well Integrity and Mitigation
Application Due Date: 5/25/2015

DE-FOA-0001208 - Next Generation Electric Machines: Megawatt Class Motors
Application Due Date: 6/3/2015

DE-FOA-0001204 - FY 2015 Continuation of Solicitation for the Office of Science Financial Assistance Program
Application Due Date: 09/15/2015 (or until replaced by a successor FOA)

DE-FOA-0001002 - Innovative Development in Energy-Applied Science (IDEAS)
Concept Paper Submission Deadline: 9/28/2015
Full Application Deadline: 9/28/2015

H2 Refuel H-Prize Competition
Deadline: 10/31/2016

DE-FOA-0001203 - **Assisting Federal Facilities with Energy Conservation Technologies, Fiscal Year 2015 (RFI)**
Application Due Date: TBD

NATIONAL SCIENCE FOUNDATION

NSF PD 13-7607- Energy, Power, Control and Networks (EPCN)
Full Proposal Window: October 1, 2015 - November 3, 2015
October 1 - November 1, Annually Thereafter

NSF 15-562 - Big Data Regional Innovation Hubs (BD Hubs)
Application Due Date: 6/24/2015

DEPARTMENT OF AGRICULTURE

USDA-NIFA-OP-004976 - Supplemental and Alternative Crops

Competitive Grants Program
Application Due Date: 4/17/2015

USDA-NIFA-SRGP-004996- Special Research Grants Program Potato Breeding Research
Application Due Date: 4/22/2015

USDA-NIFA-AFRI-004797 - Food, Agriculture, Natural Resources and Human Sciences Education and Literacy Initiative 2015 Request for Applications (RFA)
Application Due Date: Doctoral Fellowship- 2/11/2015
Undergraduate: 5/6/2015

USDA-NIFA-9008-004957- Biomass Research and Development Initiative
Application Due Date: 5/27/2015

USDA-NIFA-9008-004957 - Biomass Research and Development Initiative
Application Due Date: 7/27/2015

OTHER

BAA-RQKM-2015-0014 - Flexible Hybrid Electronics Manufacturing Innovation Institute
Application Due Date: 5/29/2015

Florida Space Research Program (FSRP)
Proposal Due Date: 5/29/2015

Oak Ridge Associated Universities - ORAU Faculty Travel Grants Program
Application Deadline: 9/1/2015

N00167-15-BAA-01 - Energy Conservation Applications for the US Navy
Response Date: 11/30/2016

Read more at our website>>

UPCOMING EVENTS

Space Symposium

April 13 - April 16, 2015
Colorado Springs, CO

The Space Symposium, held at The Broadmoor in Colorado Springs, Colo., USA, has brought together space leaders from around the world to discuss, address and plan for the future of space since the inaugural event in 1984. Attendees at that original event numbered barely 250 space enthusiasts, while participants in recent

years have surpassed 11,000. The Space Symposium has become widely known as the premier U.S. space policy and program forum and as the "must attend" opportunity for information on and interaction among all sectors of space.

Called the National Space Symposium for the first 29 years, the event was renamed in 2014 to Space Symposium to reflect the event's truly global profile.

Click **here** for more information. BACK TO TOP

Hannover Messe 2015

April 13 - 17, 2015
Exhibition Grounds Hannover, Germany

The Group Exhibit is part of HANNOVER MESSE

*World's leading trade fair for industrial technology
*200.000 visitors and 5.000 exhibitors

*10 trade fairs at one venue covering all major industrial technologies on 200.000 m²

*Synergy with numerous energy topics: Wind, solar, hydro and geothermal power, energy storage, power plant

efficiency and many more!

Click **here** for more information.

Greentech Media Solar Summit 2015

April 14 - April 16, 2015
Phoenix, AZ

Now in its eighth year, Solar Summit is Greentech Media's flagship annual solar conference that attracts leaders from across the solar value chain. Join us in Phoenix for over two days of unrivaled networking opportunities and innovative, engaging panel sessions that will provide a unique mix of market intelligence and coordination among industry players.

Click **here** for more information. BACK TO TOP

International Biomass Conference & Expo

April 20 - April 22, 2015

Minneapolis, MN

International Biomass Conference & Expo is where future and existing producers of biobased power, fuels and thermal energy products go to network with waste generators and other industry suppliers and technology providers. It's where project developers converse with utility executives; where researchers and technology developers rub elbows with venture capitalists; and where Fortune 500 executives and influential policy makers sit side-by-side with American farmers and foresters

Click **here** for more information. BACK TO TOP

EnerTech Chile 2015

April 28 - April 29, 2015

CasaPiedra, Chile

The conference will focus on hydro, solar, wind and geothermal energies and will cover new projects deployment, investment, regulatory issues and technology updates.

In the networking area we have prepared 30 table-top exhibition spaces for the leading renewable energy technology companies to showcase their market offer.

Click **here** for more information.

Solar Power Southeast

May 7 - May 8, 2015

Atlanta Marriott Marquis
Atlanta, GA

Solar Energy Industries Association (SEIA) and Solar Electric Power Association (SEPA) are proud to present a new, regional event to their lineup: Solar Power Southeast. This program is designed specifically for those in the growing Southeastern solar market. Registration will open soon!

Click **here** for more information.

AWEA WINDPOWER Conference and Exhibition

May 18 - 21, 2015
Orlando, Florida

2015 U.S. Department of Energy WINDExchange Summit

May 17 - 18, 2015

Orlando, Florida

The Summit will be held before the annual **AWEA WINDPOWER Conference and Exhibition**. The Summit provides our network of local, state, and regional partners, representatives from U.S. Department of Energy (DOE) and national laboratories, and industry professionals an opportunity to review wind energy successes, opportunities, and challenges across the United States.

Click **here** for more information.

The Florida Colleges Energy Education Forum

May 22, 2015
9am - 4pm
Hillsborough Community college
10414 E. Columbus Drive

Tampa, FL

Join with educators and industry people from all over Florida to learn and share ideas and knowledge about energy education and energy industry workforce needs.

Click **here** for more information

ESA 25th Annual Conference

May 27 - 29, 2015
Dallas, TX

The Symposium will be held 7-11 June 2015 in downtown Kansas City at the Kansas City Marriott Hotel.
The most powerful event in the energy storage industry, our 25th Annual conference sits at the nexus of markets, policy and the companies and individuals that are charting the path forward.

For three days in Dallas, TX, the most influential leaders and decisions makers will gather with global experts to shape the future of the energy storage industry.This year's conference will bring even greater awareness of the successes of the energy storage to federal policy makers and regulators, and include an in depth look at the state activities.

Click **here** for more information. BACK TO TOP

2015 Power Industry Division Symposium

June 7 - June 12, 2015

Kansas City, MO

The Symposium will be held 7-11 June 2015 in downtown Kansas City at the Kansas City Marriott Hotel.

This event will provide power generation industry leaders with information on the latest innovations in controls, instrumentation, cyber security, SmartGrid, regulatory issues and variable energy technologies, which impact the power generation delivery systems.

Click **here** for more information. BACK TO TOP

Turbo Expo 2015

June 15 - June 19, 2015

Montreal, Quebec, Canada

Now in its 60th year, ASME Turbo Expo is recognized as the must-attend event for

turbomachinery professionals. The technical conference has a well-earned reputation for bringing together the best and brightest experts from around the world to share the latest in turbine technology, research, development, and application in the following topic areas: gas turbines, steam turbines, wind turbines, fans & blowers, Rankine cycle, and supercritical CO2. Turbo Expo offers unrivalled networking opportunities with a dedicated and diverse trade show floor. The 3-day exhibition attracts the industry's leading professionals and key decision makers, whose innovation and expertise are helping to shape the future of the turbomachinery industry and will feature a Student Poster Session.

Click **here** for more information. BACK TO TOP

2015 EIA Energy Conference

June 15 - June 16, 2015

Renaissance Downtown Hotel
Washington, DC

The U.S. Energy Information Administration (EIA) will hold its 2015 EIA Energy Conference on June 15 and 16 at the Renaissance Downtown Hotel in Washington, DC. The EIA Energy Conference has become a premier forum for addressing energy issues in the United States and worldwide. This event provides a unique opportunity to meet and network with fellow energy experts and decision makers.

Click **here** for more information.

Bioenergy 2015: Opportunities in a Changing Energy Landscape

June 23 - June 24, 2015

Walter E. Washington Convention Center
801 Mt. Vernon Place, NW
Washington, DC 20001

Bioenergy 2015, an event of the U.S. Department of Energy's Bioenergy Technologies Office, will take place at the Walter E. Washington Convention Center, Washington, D.C. on June 23-24, 2015. The co-host is the Clean Energy Research & Education Foundation (CEREF) which is creating the Exhibition, Sponsorship and evening Reception.

Click **here** for more information. BACK TO TOP

Second International Conference on "Energy, Sustainability and Climate

Change" ESCC 2015

June 21 - June 27, 2015
Orthodox Academy of Crete (OAC)
Chania, Greece

This international conference aims on bringing together leading experts in the fields of optimization and computational methods to discuss recent advancements and trending topics.

Click **here** for more information

Waste Conversion Technology Conference & Trade Show

August 17 - 19, 2015
San Diego, CA

The Waste Conversion Technology Conference & Trade Show (WCTC) provides a forum for informing the public and private sectors of the economic and environmental significance of converting waste materials to alternative fuels such as biodiesel and ethanol as well as renewable electric energy.

Click **here** for more information.

CZEBS-iiSBE Net Zero Built Environment 2015 Symposium

August 19 - 21, 2015
Montreal, Canada

We would like to invite you to attend the CZEBS-iiSBE Net Zero Built Environment 2015
Symposium on Smart Net Zero Resilient Buildings and Communities being held at Concordia University, Montreal, August 19-21, 2015.

This international workshop will bring together Canadian and international experts to discuss the challenges and opportunities for the design of Smart Resilient Net-Zero Energy Buildings and Communities of the future. Net zero energy strategies are rapidly becoming the cornerstone of future building and community performance targets and are being extended to carbon and other emissions.

Click **here** for more information.

The Battery Show and Critical Power Expo

September 15 - 17, 2015
Novi, Michigan

THE BATTERY SHOW
The Expo for Advanced Batteries

Critical Power Expo is dedicated to connecting the buyers, operators and specifiers of critical power equipment and technology with a wide range of suppliers along with the whole supply chain - from manufacturers of batteries, power systems and products to UPS equipment and monitoring systems.
Taking place September 15-17, 2015, in Novi, Detroit, Michigan, the exhibition hall offers attending facilities managers, data center managers, IT managers and engineers a one-stop-shop for informing key stationary power technology decisions.

Click **here** for more information. BACK TO TOP

The First International Symposium on Sustainable Human-Building Ecosystems

October 5 - 7, 2015
Pittsburgh, PA

The Steering Committee of the NSF funded Research Coordination Network (RCN) on Sustainable Human-Building Ecosystems (SHBE), in partnership with the Carnegie Mellon University, cordially invites you to participate in the First International Symposium on Sustainable Human-Building Ecosystems (ISSHBE).

The symposium provides an opportunity to share cutting edge findings in the integration of human behavioral science, social and economic sciences with building design, engineering and metrology for better understanding of building energy performance, environmental impacts and occupant comfort.

Click **here** for more information. BACK TO TOP

Power Up Energy Expo

Fall, 2015
South Walton, FL

The Premier Energy Conference along the Gulf Coast,Power Up offers a great opportunity to network with peers and develop qualified leads for your business.

Click **here** for more information.

Note from the Editor

Thank you for reading Florida Energy Systems Consortium Newsletter and sharing this newsletter with your colleagues. We try to highlight developments in renewable energy technology and research all across Florida and the world. If you have any news you would like to see featured in the Newsletter, or events you would like to announce, feel free to e-mail floridaenergysystems@gmail.com for posting in the next newsletter and on the **FESC website**: www.floridaenergy.ufl.edu