



Florida Energy Systems Consortium

September 2016 Issue

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Florida Energy News

U.S. Energy News

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WORLD NEWS

Siemens Will Put \$1.1 Billion Into New Startups Unit

Among the areas it wants to grow: decentralized electrification and AI.

German industrial group Siemens plans to invest \$1.1 billion over the next five years in a new startups unit to help it develop businesses in areas such as artificial intelligence and decentralized electrification.



The funds will be available to employees, external startups, and established companies if they want to pursue business ideas in fields that are strategic to Siemens' future, the trains-to-turbines group said Tuesday.

Siemens, which was founded in 1847 on the then-new telegraph technology, is expanding its core strengths in automation and

electrification in new directions to stay at the cutting edge of the digitization of industry.

It said the first project of its new unit, named "next47" after the year of the group's founding, would be the previously announced joint development with Airbus of electrically powered planes.

Other important fields will include autonomous machines, networked mobility, and blockchain applications for the secure transfer of data in industry and energy trading, the technology on which cryptocurrencies such as bitcoin are based, it said.

The new unit will come into being on Oct. 1 and will initially be headed by Siegfried Russwurm, Siemens' chief technology officer. It will have offices in Shanghai, Munich and Berkeley, Calif.

Solar Panel Recycler Leads Australia in Emerging Industry

Australia's only [solar panel recycling](#) company is looking to scale up production as the number of broken and end of life systems mounts.

Adelaide-based Reclaim PV has teamed up with major solar panel manufacturers who distribute in Australia and is refining its processes as well as lobbying for panels to be included in recycling regulations.

The company was started by Clive Fleming and David Galloway in 2014 and was spun out of Solar Maintenance and Renewable Technologies (SMART), which they launched in South Australia in 2011.

"We saw the need for the maintenance of solar. We saw a lot of sales happening but not a lot of after sales stuff, there was a vacant space," Fleming said. "From there we saw a demand for recycling — we were removing a lot of modules from roofs and we were left with a big pile of about 600 panels."

Recycled panels are not recirculated, they are dismantled using a pyrolysis process developed to remove glues and recover glass, aluminium, solar cells and contacts.

"We're trying to value add to the cells so they can be reused — not as [solar panels](#)— but in new self-powered products," Fleming said.

Solar panels generally have a 20- or 25-year warranty, but a small percentage of the 23 million solar panels installed in Australia are damaged due to installation or transport handling faults, or develop new faults each year.

Galloway and Fleming are working with the a leading Australian research facility to get more value out of the recycled solar cells and streamline the dismantling process. They conservatively estimate 100,000 to 150,000 panels a year need replacing in Australia.

"It's not as simple as finding solar panels that are broken and recycling them, there are undiagnosed systems out there and all these solar installation companies are now turning to servicing and that's bringing in more diagnoses," Fleming said. "It's going to be steady for the next 15 years and then it's going to ramp up into the millions every year needing to come off the roofs. I think because it's PV, people want to recycle anyway — people who buy solar panels are generally concerned about the environment."

The [Waste Electrical and Electronic Equipment](#) (WEEE) directive regulates the treatment of electrical and electronic waste at the end of its life cycle in Europe. Solar panels were added to the directive in 2012.

"PV Recycling in Europe have been recycling for seven or eight years, so they've brought that awareness to these manufacturers who are operating in Australia as well as Europe," Fleming said.

Australian CleanTech Managing Director John O'Brien said official protocols around the

recycling of PV solar panels would become increasingly important in the coming years as millions of panels came to the end of their useful life.

"There's a great business opportunity there if government signals that in good time," he said. "The big providers will need a local smart company to go and pick them up, process them and do good things with them, so certainly it's going to be huge."

A report released in June predicts solar panel waste could total 78 million tons globally by 2050.

The Australian Government's National Television and Computer Recycling Scheme was established in 2011 to provide householders and small businesses with access to industry-funded collection and recycling services for televisions and computers. The regulations require importers and manufacturers of televisions, computers and computer products to fund and implement recycling of their products.

Galloway said including solar panels in the regulations would be a great benefit. "We are looking for industry and government support at this point to reach a critical mass so the feedstock is enough to offset the costs," he said. "It's a new industry in Australia; the manufacturers see it as a cost, which it is, so we've got to work in with that. We've got to give them a value added service, which is why SMART is associated with it."

Galloway said that Reclaim PV is also working with each state government to try and get infrastructure in each state so they can change the e-waste legislation to make it illegal to send PV panels to landfill.

Reclaim PV is refining its processes and hopes to establish collection and dismantling centres across Australia before the end of the year.

The company will also continue to work with Tier One panel suppliers, such as SunPower, Canadian Solar, Suntech, ReneSola and Yingli, with more manufacturers partnering soon.

"It's industry-led at the moment; they know the problems and they know where it's headed. It's just a matter of getting it to the point where it can be facilitated on all fronts," Galloway said. "We are setting up an industry stewardship, which will then hopefully lead in to a program that's run by the government and also the legislative changes need to be made in each state as well."

Galloway said that the company is trying to set it up now so there's an easy gradient into it, so that when it becomes a "big problem" the infrastructure is there.

"If we don't and it escalates, we have to look to catch up to a waste problem, which came out of a good green carbon offsetting initiative," he said.

South Australia leads the nation in the uptake of [wind energy](#) and [rooftop solar](#), with renewable sources accounting for more than 30 percent of the electricity generated in the state.

Global Grid-Connected Energy Storage Capacity to Double in 2016, IHS Markit Says

The global energy storage market is expected to double, from 1.4 gigawatt hour (GWh) added in 2015 to 2.9 GWh this year, offering unique growth prospects for many energy

companies as global energy markets continue to cool. Global grid-connected energy storage capacity will surge to 21 GWh by 2025, according to IHS Markit (Nasdaq: INFO), a world leader in critical information, analytics and solutions. Over the next decade, Lithium-ion (Li-ion) batteries will become the mainstream energy-storage technology, and more than 80 percent of global energy storage installations will include the technology by 2025.

“Energy storage is set to grow as fast as solar photovoltaic energy has in recent years, sparking strong interest from a wide range of players and underscored by recent mergers and acquisitions among car manufacturers, major oil and gas companies, and conventional power suppliers,” said Marianne Boust, principal analyst, IHS Markit. “The United States and Japan are leading the way, but we’re also seeing activity in South Africa, Kenya, the Phillippines and other countries, as the cost of batteries continues to decline.”

According to the IHS Markit *Grid-Connected Energy Storage Forecast Database*, Japan and the United States will be the largest energy storage markets, generating a third of market revenues totaling \$50 billion over the next decade. In Australia and Japan, energy storage penetration is expected to exceed 5 percent of installed power capacity in 2025, underscoring the growing role that energy storage will play in grid stability, renewable integration and overall energy management.

Half of all energy storage installations will occur behind the meter, driven by self-consumption and back-up needs. Eight countries will each have cumulative behind-the-meter storage power exceeding 1 GWh, including Japan, China and the United States. “Looking ahead to the future, half of all energy storage will come from households and businesses seeking to control their energy consumption, which will massively disrupt the traditional business models from established utilities and large equipment manufacturers,” Boust said.

FESC HIGHLIGHTS

FSU Receives \$10 Million For Nuclear Research Center

Florida State University will receive \$10 million from the U.S. Department of Energy to create a new Energy Frontier Research Center that will focus on accelerating scientific efforts needed to support nuclear waste cleanup.

The center will focus on developing technologies for recycling nuclear fuel and cleaning up Cold War-era weapon production sites. It will be led by Thomas Albrecht-Schmitt, the Gregory R. Choppin Professor of Chemistry at FSU.

“Science underpins every mission of the Department of Energy,” said Cherry Murray, director of DOE’s Office of Science. “These new Energy Frontier Research Centers will provide a foundation of basic science for a top priority of DOE — tackling environmental cleanup of hazardous waste from nuclear weapons research and production. “These projects bring together talent and leadership from top scientists to solve problems through scientific discovery.”

Albrecht-Schmitt specializes in radiochemistry and researches some of the least understood elements of the periodic table that are part of what's called the actinide series. His most recent work has been exploring the uses and underlying chemistry of the elements californium and berkelium, which are man-made elements that exist in extremely small quantities but are highly radioactive.

"I'm ecstatic that they have chosen FSU for a new center," Albrecht-Schmitt said. "When I came here, my goal was to make us a force in radiochemistry, and I think with this award, it shows we have accomplished that goal."

The grant will support 10 graduate students and seven postdoctoral researchers at FSU.

Albrecht-Schmitt's lab is a novelty in the world of university science. His chemistry lab is specifically designed to handle radioactive elements like californium or berkelium, making it the only university lab in the country equipped to do so. Because of this, the Department of Energy has worked with him extensively on research that illuminates the far regions of the periodic table.

"We are thrilled that the Department of Energy has chosen Professor Albrecht-Schmitt and FSU to be the home of a new Energy Frontier Research Center," said Vice President for Research Gary K. Ostrander. "The award reflects not only on his groundbreaking research thus far, but his ability to move the field of chemistry forward in the years to come, providing solutions to some of the world's most complex energy problems."

Three other institutions will also host research centers. They are The Ohio State University, the University of South Carolina and DOE's Pacific Northwest National Laboratory.

Albrecht-Schmitt received his doctoral degree in 1997 from Northwestern University and taught at Auburn University and University of Notre Dame before coming to Florida State in 2012. He holds an endowed professorship in honor of Gregory R. Choppin, the late nuclear chemist who co-discovered the element mendelevium, atomic number 101.



FAU's I-SENSE and Dioxide Materials™

Just as the summer is heating up, Florida Atlantic University's Institute for Sensing and Embedded Network Systems Engineering (I-SENSE) and Dioxide Materials™ have formed a unique partnership to develop and evaluate a novel low-cost, low-power, wireless CO₂ sensing system for heating, ventilation and air-conditioning (HVAC) applications. The technology that emerges from this joint project will help to significantly lower the amount of energy businesses and homes use for HVAC.

Located in the Research Park at FAU, Dioxide Materials™, in collaboration with FAU's I-SENSE, has received a Small Business Technology Transfer (STTR) grant from the U.S. Department of Energy to work on the project. This project builds on a private/public partnership that leverages the complementary skill sets and associated innovations of both organizations.

Dioxide Materials™ has developed low-cost, low-power CO₂ sensors for building HVAC applications. Their technology employs electrochemical sensors, similar to those in a household carbon monoxide (CO) alarm, making the sensor sensitive to carbon dioxide rather than carbon monoxide. The sensors can be manufactured much less expensively than the current generation of CO₂ sensors and can run on batteries.

Currently, Dioxide Materials™ has working sensors, but needs the electronics and communications systems to connect the sensors to a building's direct digital control (DDC) systems. I-SENSE is a leader in the design and application of low-cost, low-power telemetry platforms and sensor network systems. Together, the team will develop the electronics and software necessary to interface Dioxide Materials' sensors to a building's DDC system. This new technology will help to lower the amount of energy homes and businesses use for HVAC based on whole-building CO₂ monitoring without the need for expensive building rewiring.

Most current HVAC systems are designed to supply constant ventilation based on the design occupancy of the space. However, this method often results in significant wastes of energy and energy dollars. Demand control ventilation (DCV), the automated process that adjusts the volume of fresh air or outside air into a building, saves energy and electricity costs by using CO₂ sensors to measure the air quality and occupancy in each room, and adjusting the HVAC system accordingly. Although DCV is often seen in the construction of new multisensory LEED buildings, it has been slow to be adopted in commercial retrofits or remodeling projects, small commercial buildings and residential complexes.

"Our project will focus on robust, networked CO₂ sensing and HVAC system integration; we are excited to partner with Dioxide Materials™ to help them develop and test these innovative CO₂ sensors," said Jason Hallstrom, Ph.D., director of FAU's I-SENSE and a professor in the College of Engineering and Computer Science at FAU. "We expect this technology to substantially reduce the costs that are associated with installing DCV systems in commercial and residential buildings."

According to the U.S. Department of Energy, demand control ventilation using CO₂ sensors could reduce the energy costs of heating and cooling a building by 10 to 30 percent.

"By leveraging our expertise with FAU's I-SENSE scientists and engineers, we can have a tremendous impact on reducing energy waste in buildings," said Rich

Masel, Ph.D., founder and CEO of Dioxide Materials™. "Having CO₂sensors in each room so that cooling and heating are based on the number of people in the room rather than running at a constant temperature, will prevent energy losses from over ventilation, while maintaining indoor air quality."

FAU's I-SENSE is a leader in the design and application of low-cost, low-power telemetry platforms and sensor network systems. I-SENSE serves as a clearinghouse for sensing, communication, and data management technologies, providing expertise, engineering

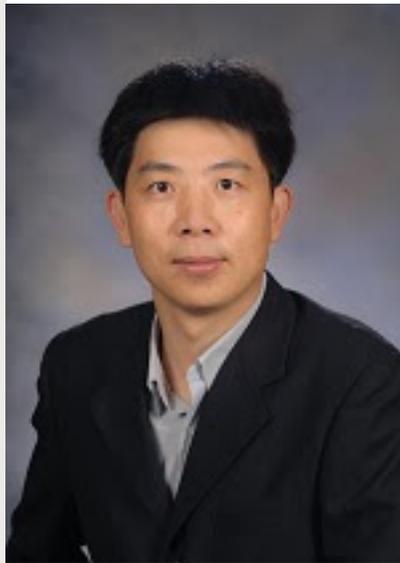


support, and project management services through its research, engineering and administrative cores.

Dioxide Materials™ is developing a new generation of low-cost, low-powered CO₂ electrochemical sensors for demand controlled ventilation (DCV) of HVAC systems. The devices are microscale versions of the **CO₂ electrolyzers being developed for CO₂ conversion** and use the company's **patent pending** CO₂ conversion catalysts to create an electrical signal that is proportional to the amount of CO₂ in the air. Dioxide Materials' low-power CO₂ sensors meet the battery operating lifetime requirement, eliminating the need for costly rewiring, and, unlike infrared-based sensors, are compatible with wireless thermostats.

Dr. Jiangeng Xue, University of Florida was Awarded \$225,000 From US DOE to Advance Novel Innovations in Solar Power Technologies

The Energy Department's Office of Energy Efficiency and Renewable Energy today announced a total of \$11 million for 16 projects intended to develop innovative, early-stage solutions in both photovoltaics (PV) and concentrating solar power.



Ten of the projects are small-scale research and development projects designed to push the limits of PV technologies, potentially advancing the state of the art in new cell and module architectures, efficiency, energy output, service lifetime, and manufacturability. These awardees will be funded under the Small Innovative Projects in Solar program developed to support progress toward leveling the cost of solar electricity to approximately \$0.02 to \$0.03 per kilowatt-hour by 2030.

Project Name: Single-Junction Organic Solar Cells with 15% Efficiency

Project Summary: This project aims to direct the nanoscale morphology in a low band gap molecular absorber through hydrogen bonding. By controlling the nanoscale morphology, researchers can increase energy output in organic solar cells. Improving charge transport through the control of nanoscale morphology is a significant barrier for substantial increases in conversion efficiency in organic solar cells.

UF Part of Next Generation Engine Research



Researchers at the University of Florida's Institute for Computational Engineering, or ICE, are studying the prediction and control of liquid sprays with the goal of impacting a wide range of applications from fuel sprays in combustion systems, liquid sprays for cooling,

3D printing, and mitigation of wake spray behind ships. The research team was selected for an up to \$7.5 million DOD research grant for fundamental understanding of spray physics and control to meet the performance and efficiency needs of the U.S. Department of Defense.

“For next generation jet engines we need to have absolute control over the fuel spray – we need to precisely control the size distribution of fuel droplets and where they disperse within the engine,” said S. “Bala” Balachandar, the William F. Powers Professor in mechanical and aerospace engineering at the University of Florida, and director of ICE. “This we need to do dynamically, by fully understanding how the spray responds to acoustic and electrostatic forcing. Our goal is to tailor what goes on within the jet engine so that we optimize performance, fuel efficiency and pollution.”

Over the next five years, the DOD will support the grant, and as much as \$1.5 million will directly support computational studies at UF. The grant is part of the DOD’s Multidisciplinary University Research Initiative, or MURI. The MURI program recently awarded 23 grants totaling up to \$162 million over five years.

“Over the past 30 years, the DOD’s MURI program has resulted in significant capabilities for our military forces and opened up entirely new lines of research,” said Melissa L. Flagg, deputy assistant secretary of defense for research.

The spray project is led by Olivier Desjardins, an associate professor of mechanical and aerospace engineering at Cornell University in New York. In addition to Balachandar, the team includes; Alberto Aliseda, associate professor of mechanical engineering at the University of Washington; Daniel J. Bodony, the Blue Waters Associate Professor of aerospace engineering at the University of Illinois at Urbana-Champaign; and Ted Heindel, Iowa State’s Bergles Professor in Thermal Science in the Department of Mechanical Engineering.

The team’s goal is to combine their expertise in theoretical, computational and experimental studies to develop spray controls. They expect to study many control methods – including flow conditions in the nozzle, electrically charged fluids, and the use of acoustic vibrations.

UF Cultivating Community Change: Certificate Program in Social Marketing



Dr. Laura Warner Sanagorski and Kathryn Stofer at the university of Florida developed the Cultivating Community Change certificate program with FESC funding for Extension and other educational professionals. The aim of this program is to improve the process of program delivery and ultimately increase the adoption of energy-conserving behaviors among participants' clients. This project is important because people need to change their behaviors to overcome environmental challenges. It focuses on program development & delivery incorporating principles of social marketing, the application of traditional marketing principles to programs that encourage behavior change that benefits individuals and the communities

in which they live. Social marketing is a proven behavior-change strategy that applies traditional marketing principles to behavior change that benefits a community and its residents.



This approach has been applied to natural resources preservation, energy use reduction, water conservation, and other environmental behaviors. This 8-12 hour, self-paced online certificate program was designed to provide an overview of this strategy as applied to Extension and outreach programming. Be one of the first to earn this certificate. No cost to enroll through December.

Link to register [here](#).

USF Research Suggests Fungi Can Recycle Batteries in a Green Way

A team of researchers is working to use naturally-occurring fungi for an environment-friendly recycling process to extract cobalt and lithium from waste batteries. "The idea first came from a student who had experience extracting some metals from waste slag left over from smelting operations," said Jeffrey A. Cunningham, Ph.D. and the project's team leader.

Cunningham's team is developing the environmentally-safe way to do this with organisms found in nature — fungi in this case — and putting them in an environment where they can do their work. "Fungi are a very cheap source of labour," he pointed out in his work to be presented at the 252nd National Meeting & Exposition of the American Chemical Society (ACS).

To drive the process, Cunningham and Valerie Harwood, Ph.D., both at the University of South Florida, are using three strains of fungi — *Aspergillus niger*, *Penicillium simplicissimum* and *Penicillium chrysogenum*. The team first dismantles the batteries and pulverises the cathodes. Then, they expose the remaining pulp to the fungus.

"Fungi naturally generate organic acids, and the acids work to leach out the metals," Cunningham explains. "Through the interaction of the fungus, acid and pulverised cathode, we can extract the valuable cobalt and lithium. We are aiming to recover nearly all of the original material," he added.

According to the results, using oxalic acid and citric acid, two of the organic acids generated by the fungi — up to 85 per cent of the lithium and up to 48 per cent of the cobalt — from the cathodes of spent batteries were extracted. ACS, the world's largest scientific society, is holding the meeting here from August 21 to 23. It features more than 9,000 presentations on a wide range of science topics.

UF Expert Rates Florida Utilities Readiness For Severe Storms

As the director of energy studies at the University of Florida's Public Utility Research Center, Ted Kury helps utility providers and policymakers decide how to best prepare for severe storms. With the first storm of the 2016 hurricane season in the books, Kury weighed in on how well utility companies have prepared, what homeowners can do and why we don't just put all of our power lines underground.

How would you rate Florida utilities' preparedness for a major hurricane?



Given the uncertainty that's out there, I would say they are as prepared as they can be. I don't really know that there is anything more that we can do from a preparedness standpoint. The utilities have been reporting to the Public Service Commission, which regulates Florida utilities, every year for the last 10 years now. They just finished their review of their new storm hardening plans for this season and they always complete it before storm season starts. They're ready.

What precautions have the state or state's utilities taken to prepare for the next major hurricane?

Following the hurricane season in 2004 and 2005, the state Public Service Commission convened a workshop involving utilities, consumer advocates and stakeholders around the state in order to establish what can and what should be done to better prepare Florida for the future. As a result of the series of workshops, the Public Service Commission issued an order that basically established a procedure that utilities would have to follow, data that they were going to have to make available for the commission, and reports that they were going to have to give to the commission. They also established an annual proceeding where the utilities would come to Tallahassee to talk to each other and the commission about the steps they have taken in the past year, how effective those steps were, and what they plan for the future. The utilities also formed a collaborative group that would work together to address some of the questions that were maybe difficult for the utilities to address by themselves. That is most of the work that PURC is centered on. We have been the centerpiece for that collaborative effort.

How will these precautions help utility consumers?

Well, they are going to help utility consumers in a couple ways: First, to make the system more resilient so that people will see either fewer outages, or when outages

occur they will be shorter. So people will benefit primarily through improved service in storm times; however; there is an insulator benefit as well. By running everything through the regulator, the utilities are assured that the improvements that they are making to the system are cost effective for the benefits that the customers are receiving. You could make the system a lot more resilient by spending a lot more money, but this may not provide value to the customer.

In your research on the viability of different methods of storm hardening, what was most surprising?

I think it might be surprising to anyone but an economist, who tends to see two sides of any issue. The major finding was that there are no easy answers. I think maybe we always suspected that but the research really proves that out. There is no one strategy that works all the time; there is no one tactic that you could employ that is foolproof in any situation. Every tool that you employ has strengths associated with it and weaknesses associated with it. That is why it is so important that the regulator and the utilities always consider the cost and benefit of the action because they both want the same thing: to provide the best possible service at the most reasonable costs to the end consumer. To that end there isn't one thing that always works. There are lots of things you can do. We have held workshops on refining vegetation management practices and learned a lot about the ways utilities maintain their system. We have done a lot of work on undergrounding of electricity lines and learned a lot about the costs and benefits of those tactics. There isn't one of them that is a silver bullet for the problem, they are all tools that can be used to mitigate risks, but they don't eliminate it.

A major debate is whether or not to underground electric wires, a topic you have researched heavily. What are the pros and cons of that move?

The major advantage of undergrounding your electricity lines is that it better insulates the system from damage from wind-related events; however, that is not the only threat to the system. So while mitigating the potential damage from wind related events, that's important. We have to remember that in hurricanes there are other types of damages as well. Hurricanes also cause storm surge, they cause flooding. So relocating your distribution lines underground, while it may help prevent it from wind-related damage, it makes it more vulnerable to water incursion from flooding and from storm surge and it comes at a cost. So you want to make sure that when you are undergrounding lines, you are undergrounding lines in places where wind damage is more of a concern, flooding and storm surge is less of a concern because what you are trying to do is provide the best possible service you can at the lowest possible cost. So you don't go around just undergrounding everything because that would certainly increase cost and, depending on where you are, it might actually decrease the reliability of your service. There are no easy answers. The one thing we learned from all the research is that it really depends. The

viability of an undergrounding project depends heavily on where it is, what types of measures are you taking, and what are the threats to the system.

How would moving Florida's wires underground impact consumers?

The most obvious way it is going to impact them is it is going to make service more expensive. So it is important that if you are going to increase costs to consumers you better make sure it is going to increase reliability and that the increase in reliability is worth it to the customer. The utility and the regulators are always working on that balance. You can increase reliability but it increases costs. So what translates to actual value for the customer?

What can homeowners do to reduce power outages during hurricane season?

Consumers can maintain their vegetation and make sure it is not a threat to nearby utility equipment. The utilities themselves may not have the rights or the ability to maintain some of the vegetation around their equipment. So in areas where that's true, the customer should do all that they can do to maintain it. That is the surest way to ensure that you are doing everything you can to help your own utility service.

FLORIDA ENERGY NEWS

FPL Launches Innovative Energy Storage Project in Conjunction with White House Summit on Scaling Renewable Energy and Storage

Florida Power & Light Company (FPL) announced an innovative new energy storage pilot project in conjunction with today's White House summit on scaling renewable energy and storage with smart markets. FPL's project aims to strengthen the electric grid by testing multiple applications of advanced battery technologies under real-life conditions.

FPL will install several different types of battery systems at locations in the southern Florida counties of Miami-Dade and Monroe to research a range of potential future benefits of energy storage, including grid reliability and power quality. In addition, the research has the potential to improve the integration of renewables in the future as FPL continues to expand its use of solar energy to serve its 4.8 million customers.

"President Obama believes in the need to transition to a cleaner, more reliable, and affordable 21st century power grid. Under his leadership, transformations in how we produce and consume electricity are decreasing carbon pollution, scaling up renewable energy,



FPL®

and generating savings on consumers' energy bills," the White House noted in a [statement](#) announcing a series of federal and private-sector commitments, including FPL's project.

"FPL is one of the cleanest, most affordable energy providers in the nation because of our persistent commitment to investing in the future. We are always looking long-term, and we recognize that energy storage has enormous potential for both the reliability of the grid and the advancement of affordable clean energy," said Eric Silagy, the company's president and CEO.

FPL's energy storage pilot program will look at various applications of battery technologies to study potential benefits. Key components of the project:

- Repurposing used "second-life" batteries from more than 200 BMW electric vehicles to test "peak shaving" for better grid management during periods of high demand via a storage system to be installed in a densely populated residential area in southwestern Miami.

- Designing a mobile storage system that could be relocated as needed to prevent power interruptions at major, economically important events (e.g. nationally televised sports, etc.). FPL plans to build the portable battery system in time for testing during the 2017 Miami Open at Crandon Park Tennis Center on the island of Key Biscayne.

- Building a battery back-up system in the Flamingo community of Monroe County – the southernmost tip of Everglades National Park, where a visitor center, campground and water treatment facility lie 45 miles from any other electric customer – to study ways to improve reliability for isolated areas and develop microgrid foundations.

"Many miles from the hustle and bustle of everyday life, Flamingo is the southernmost developed area in Everglades National Park, providing essential support and amenities so visitors have the opportunity to view wildlife in their natural, undisturbed setting. Because of our remote location, the concept of having clean, quiet, on-site back-up power is exciting. FPL's project could make a big difference for us and our ability to provide uninterrupted access to this national treasure for thousands of people around the world," said Mike Jester, chief of facilities management for Everglades National Park.

FPL expects to begin construction on the project this summer with most components in operation by the end of the year.

The project is an extension of FPL's clean energy research program, which includes a major, commercial-scale distributed solar energy system that opened in April at Florida International University's College of Engineering in Miami.

In addition, the company continues to make progress on the construction of three new solar power plants that will be among the largest solar power facilities ever built in the eastern U.S. Comprising more than 1 million solar panels, the new, cost-effective plants will begin powering FPL customers later this year, tripling the company's use of energy from the sun.

FPL's commitment to clean energy is not new. In fact, because of investments that have been made year after year, FPL is already cleaner today than the 2030 carbon emissions rate goal set for Florida by the U.S. Environmental Protection Agency's Clean Power Plan. At the same time, FPL's typical residential customer rates are about 30 percent lower than the national average.

In addition, as part of NextEra Energy, Inc., a global leader in clean energy, FPL is able to leverage the learnings and technical expertise of its sister company, NextEra Energy Resources, LLC, which has energy storage installations in operation or development in Arizona, California, Maine, Illinois, New Jersey, Pennsylvania and Canada.

For more information about FPL's affordable clean energy strategy, visit www.FPL.com.

Duke Energy Florida Brings Solar Power Plant Online

Nearly 15,000 solar panels soaking up the sun in Osceola County are now providing clean, renewable energy to Duke Energy customers in Florida.

The new Duke Energy owned and operated Osceola Solar Facility is about the size of 13 football fields and produces nearly 4 megawatts of carbon-free energy. It officially began commercial operation on May 12.



The solar plant's opening will be celebrated at the Aug. 1 Osceola County Commission meeting. At 1:30 p.m., commissioners will join Duke Energy representatives to sign a commemorative solar panel, which will be displayed at the commission office, 1 Courthouse Square, Room 4700, Kissimmee.

Florida's NextEra to buy Texas' Oncor

A Florida-based energy company announced an \$18.4 billion deal on Friday that would give it an 80 percent stake in Texas' largest electric utility under an agreement that could eventually help resolve one of the largest bankruptcies in U.S. history.

NextEra Energy Inc. said it was buying Oncor Energy Delivery Company from parent firm Energy Future Holdings, which entered bankruptcy in 2014 facing more than \$40 billion in debt fueled by low energy prices.

NextEra released a statement saying the move was part of a larger "overall plan of reorganization" to help Energy Future Holdings emerge from bankruptcy. The company said the deal will cover all debt associated with Energy Future Holdings' control of Oncor, which supplies power to more than 3 million people in Texas.

The deal must still be approved in federal bankruptcy court. NextEra also said it plans to file a joint application with regulators at Texas' Public Energy Commission.

Based in Juno Beach, Florida, NextEra plans to form a new subsidiary to assume Energy Future Holdings' share of Oncor, which is headquartered in Dallas.

"We are incredibly impressed by Oncor's management team and its employees, and we are committed to retaining the Oncor name, its Dallas headquarters and local management," Jim Robo, NextEra's chairman, said in the statement.

NextEra said there will be "no involuntary reductions to Oncor's workforce" for two years after the deal goes through. Over the same period, the company promised no major wage cuts or benefit reductions to Oncor employees.



The announcement comes two months after a group led by Dallas oil mogul Ray L. Hunt withdrew its nearly \$18 billion bid to buy Oncor and reorganize it as a real estate trust.

The Texas Public Utility Commission approved that plan on the condition that tax savings from a corporate restructuring be passed onto ratepayers. Hunt wanted \$250 million in tax savings to instead go to paying Energy Future Holdings creditors. His group withdrew the bid in May, saying creditors no longer supported it.

NextEra is no stranger to Texas. According to its statement, the company has invested more than \$8 billion since 1999 in Texas for transmission, power generation, gas pipelines and other initiatives. Robo referenced the company's "deep operating expertise in Texas and across the nation."

PSC Reports Increased Use in Consumer Renewable Energy Systems

Consumer confidence in generating and using renewables continued to increase, according to electric utility reports filed with the Florida Public Service Commission (PSC). In 2015, customer-owned renewable energy totaled 11,626 interconnections, up from 8,571 in 2014, an increase of 36 percent. Statewide, electric generation capacity from renewable energy systems reached 107,545 kilowatts (kW), an approximate 35 percent increase over the prior year.

Florida's PSC assisted this growth by amending its rules in 2008, making it easier for customers to interconnect their systems with the utility's grid. The PSC's rules promote development of customer-owned, clean renewable generation that also lowers their utility bills. When customers generate more energy than they use in a billing cycle, the excess energy is credited to their next bill to offset costs.

"Our rules assist customers who want to use renewables, and who also want to be connected to the grid," said PSC Chairman Julie Brown. "We've helped accelerate renewable energy use without compromising service reliability." Since 2008, the number of renewable systems has increased more than twenty-fold.

Solar photovoltaic panels continue to be the most popular renewable choice; however, wind turbines and anaerobic digester usage is increasing. Anaerobic digestion is a multi-step process that uses microorganisms to break down organic material to form methane and carbon dioxide gases, which are then used to generate electricity.

Florida's investor-owned utilities (IOUs)—Florida Power & Light Company, Duke Energy Florida, LLC, Tampa Electric Company, Gulf Power Company, and Florida Public Utilities Company—are required by the rules to offer an expedited interconnection agreement process so that homeowners and businesses interested in generating their own energy can do so quickly and safely.

Municipal electric utility and rural electric cooperative customers also have renewable generation incentives. Every Florida municipal and cooperative that sells electricity at retail is required, by statute, to provide a standardized interconnection agreement and net metering program for customer-owned renewable generation systems.

Florida's utilities reported the following information on customer-owned renewable generation for 2011-2015.

Individual utility reports on customer-owned renewable systems and summary data are available here and can be found on the PSC's website.

Residents interested in learning more about interconnecting renewable generation systems or net metering should contact their local utility.

For additional information, visit www.floridapsc.com.

Clean Cities Welcomes New North Florida Coalition

WHAT ARE THE KEY FACTS?

The Northern Florida Clean Fuels Coalition in Jacksonville has joined the Energy Department's Clean Cities Program.

North Florida Clean Fuels launched ChargeWell, an initiative to install 27 plug-in electric vehicle chargers.

By offering applicants a free charging station and \$7,500 towards installation, the coalition hopes to double access to charging infrastructure in the area.

The Energy Department's **Clean Cities program** combines technical expertise from our national laboratories with local expertise from our regional coalitions. This week, we welcomed the **Error! Hyperlink reference not valid.** in Jacksonville into our network of nearly 100 coalitions across the country. As part of Clean Cities, this group will continue to minimize the use of petroleum in transportation throughout their area.

This process is so rigorous that the program's last designation was in 2014, when we brought in North Florida's neighbor, Tampa Bay Clean Cities. When a community wants to establish a coalition, it gathers together stakeholders interested in alternative fuels and fuel efficiency, including vehicle fleets, city governments, fuel suppliers, electric and natural gas utilities, dealerships, and other non-profit organizations. This group chooses a coordinator, who leads the effort to understand the local market and demand for advanced vehicles and alternative fuels. If the conditions aren't right, even the best of

efforts will flounder. Based on this analysis, the group sets goals and action steps with support from the national Clean Cities program.

The North Florida Clean Fuels Coalition is well on its way towards achieving its ambitious goals. With 38 stakeholders, 2,000 alternative fuel vehicles, and 80 alternative fueling and charging stations in the region, they're starting with a solid base. Working with 25 organizations that use alternative fuels or vehicles, in 2014 alone they reduced more than 2.4 million gasoline gallon equivalents of petroleum.

The coalition has enabled a number of these efforts through \$5 million in incentives distributed to local fleets and infrastructure providers.

The Jacksonville Transit Authority plans to adopt more than 100 compressed natural gas (CNG) buses by 2020 as well as develop a CNG fueling station. St. John's County is purchasing 130 medium-duty CNG vehicles and has found a developer to build and operate a public CNG fueling station.

The coalition has also supported some seriously innovative projects. They've provided funding for the Florida East Coast Railway to test four locomotives that can run on liquefied natural gas, potentially displacing up to 80% of their diesel use. Because the coalition helped the City of Jacksonville purchase compressed natural gas trucks, the city is now exploring producing renewable natural gas from two closed landfills.

In partnership with the local utility JEA, North Florida Clean Fuels launched ChargeWell, an initiative to install 27 plug-in electric vehicle chargers. By offering applicants a free charging station and \$7,500 towards installation, the coalition hopes to double access to charging infrastructure in the area. JEA is offering an additional \$500-\$1,000 incentive for plug-in electric vehicle buyers. The coalition hopes these efforts can further accelerate the market.

On the other end of the spectrum, the North Florida Clean Fuels Coalition is working with the Jacksonville Port Authority to understand the types and ages of trucks that use the port. Based on this data, they hope to launch a Clean Truck program to reduce air pollution from these vehicles. They are also working with shipping companies that are using liquefied natural gas in their container ships.

From plug-in electric vehicles for consumers to the biggest ships, the North Florida Clean Fuels Coalition is already finding creative ways to use less gasoline and diesel in their area. We know that they'll be a great asset to Clean Cities now and into the future.

U.S. ENERGY NEWS

More U.S. Jobs in Solar Power Than Fossil Fuels

For the first time, the number of U.S. jobs in solar energy has overtaken those in oil and natural gas extraction, says a new report from the International Renewable Energy Agency (IRENA).

More than 8.1 million people world-wide are now employed by the renewable energy industry, a five percent increase from last year, according to the IRENA report.

In the U.S., renewable energy employment increased six percent, driven by growth in wind and solar. Solar employment grew 22 per cent, 12 times faster than job creation in the U.S. economy as whole, surpassing jobs in oil and gas. Employment in the wind industry also grew 21 per cent.

The report, Renewable Energy and Jobs-Annual Review 2016, also provides a global estimate of the number of jobs supported by large hydro power, with a conservative estimate of an additional 1.3 million direct jobs world-wide.

"The continued job growth in the renewable energy sector is significant because it stands in contrast to trends across the energy sector," said IRENA Director-General Adnan Z. Amin.

"This increase is being driven by declining renewable energy technology costs and enabling policy frameworks. We expect this trend to continue as the business case for renewables strengthens and as countries move to achieve their climate targets agreed in Paris."

The total number of renewable energy jobs worldwide rose in 2015 while jobs in the broader energy sector fell, says the report. In the U.S., for example, renewable energy jobs increased six percent while employment in oil and gas decreased 18 percent. Likewise in China, renewable energy employed 3.5 million people, while oil and gas employed 2.6 million.

As in previous years, enabling policy frameworks remained a key driver of employment. National and state auctions in India and Brazil, tax credits in the U.S. and favorable policies in Asia have all contributed to employment increases. Countries with the most renewable energy jobs in 2015 included China, Brazil, the U.S., India, Japan and Germany. The solar photovoltaic (PV) sector remains the largest renewable energy employer world-wide with 2.8 million jobs (up from 2.5 million at last count) with jobs in manufacturing, installation and operations and maintenance. Liquid biofuels was the second largest global employer with 1.7 million jobs, followed by wind power, which grew five percent to reach 1.1 million global jobs.

"As the ongoing energy transition accelerates, growth in renewable energy employment will remain strong," said Amin. "IRENA's research estimates that doubling the share of renewable energy in the global energy mix by 2030, enough to meet global climate and development targets, would result in more than 24 million jobs worldwide."

Solar PV is the largest renewable energy employer with 2.8 million jobs worldwide, an 11 percent increase from last count. Employment grew in Japan and the U.S., stabilized in China, and decreased in the European Union. Strong wind installation rates in China, the U.S. and Germany drove a five percent increase in global employment. to reach 1.1 million jobs.

New Concentrating Solar Tower Is Worth Its Salt With 24/7 Power

Deep in the Nevada desert, halfway between Las Vegas and Reno, a lone white tower stands 195 meters tall, gleaming like a beacon. It is surrounded by more than 10,000

billboard-size mirrors focusing the sun's rays on its tip. The Crescent Dunes "[concentrating solar power](#)" plant looks like some advanced communication device for aliens. But the facility's innovation lies in the fact that it can store electricity and make it available on demand any time—day or night.

Crescent Dunes, the flagship project of Santa Monica-based firm SolarReserve, has achieved what engineers and proponents of [renewable energy](#) have struggled with for decades: providing cheap, commercial-scale, non-fossil fuel electricity even when winds are calm or the sun is not shining. The facility is touted as being the first solar power plant that can store more than 10 hours of electricity, which translates into 1,100 megawatt-hours, enough to power 75,000 homes. "We can ramp up electricity generation for utilities based on the demand. We can turn on when they want us to turn on and we can turn off when they want us to turn off," SolarReserve CEO Kevin Smith says.

The trick is to have all those mirrors heat up a massive tank full of sodium and potassium nitrates that are pumped up to the top of the tower. There the molten salt can reach temperatures as high as 565 degrees Celsius. When electricity is needed, the hot salt is used to boil water and produce high-temperature, high-pressure steam, which turns turbines that generate electricity. The rest of the time, the molten salt can be stored in another insulated tank on the ground.



Large tracking mirrors, called heliostats, follow the sun throughout the day, reflecting and concentrating sunlight onto the top of Crescent Dunes' central tower. *Credit: [SolarReserve](#)*

Molten salt's physical and thermal properties make it a particularly good candidate for energy storage. It can be pumped just like water and stored in tanks just like water, says Cliff Ho, an engineer at Sandia National Laboratories who studies heat transfer and fluid mechanics for technologies such as concentrating solar power, but is not involved in Crescent Dunes. And although a handful of other concentrating solar plants around the world use solar rays to heat water directly into steam, it is much more volatile than molten salt and cannot be easily stored, Ho explains. That is why the Ivanpah Solar Electric Generating System in California, the world's largest concentrating solar-thermal plant at 377 megawatts, has no way to store all the energy it produces.

[Although a few other plants](#) like the Solana Generating Station in Arizona have used molten salt as a storage medium, they heat the salt indirectly, using solar energy to first heat other fluids such as oil. The benefit of using molten salt as both the energy collector that creates steam and the energy storage mechanism, however, is that it eliminates the need for expensive heat exchangers to go between different fluids. And with molten salt,

Crescent Dunes can operate at much higher temperatures than plants using other heat transfer fluids, which makes electricity generation more efficient, Smith says. Plus, the molten salt medium is cheaper, more environment-friendly, nontoxic and nonflammable compared with oil.

But molten salt technology itself is not new. "What Crescent Dunes brings to the table is that it proves that we can use this technology with concentrated solar power to generate nonintermittent electricity," says Yogi Goswami, a professor at the University of South Florida and an expert on solar power. The payoff, he adds, is that 10-hour storage eliminates the need for a fossil fuel power plant to back up electricity production on cloudy days and at peak usage hours in the evening. It also relieves anxiety for utilities concerned with overproduction of electricity by solar power plants during the day, which sometimes forces them to curtail electricity production or pay customers to take the extra power.

Ultimately, though, concentrated solar power plants must compete on price with photovoltaic power plants that convert sunlight directly into electricity, using solar cells. The [price of photovoltaic panels](#) has plummeted in recent years, making plants cheaper than concentrating solar plants. But photovoltaics cannot guarantee continuous electricity, certainly not at night, unless they are paired with their own storage medium, which is usually a big bank of batteries. But Ho says that when the cost of even the best battery technology is taken into consideration, photovoltaics are more expensive than concentrating solar power, which is now down to 10 to 12 cents per kilowatt-hour.

That is still nearly double the [goal](#) set by the U.S. Department of Energy to reduce the cost of solar power to six cents per kilowatt-hour by 2020. And skeptics doubt that concentrating solar power, even using molten salt, will be able to match coal- and natural gas-powered electricity. "Concentrated solar power plants are massive projects, requiring lots of steel and glass, which are unlikely to see significant changes in efficiency or cost," says Adam Schultz, a senior policy analyst for the Oregon Department of Energy. He thinks photovoltaic panels and batteries are more likely to drop in cost because "we continue to see newer technologies in that field."

SolarReserve's Smith, however, is confident that Crescent Dunes is just the first of many big molten salt towers. Concentrating solar power can be scaled up to provide more electricity and meet more of the grid's demands, he says. Crescent Dunes is already nearly six times bigger than Torresol Energy's 20 megawatt demonstration-scale plant that was completed in 2011 in Spain. And SolarReserve is planning to break ground on a second plant roughly the same size as Crescent Dunes in South Africa later this year. Other solar-thermal developers also have large towers under construction in Morocco and Chile that will use molten salt. With the first utility-scale plant completed, costs could eventually come down. "We've got a bit of a ways to go," Smith says. "But molten salt-powered technology has the most promise for energy generation and storage from solar power."

The Next Generation of Solar Panels

Scientists just got one step closer to the next generation of solar panels. Today's solar panels convert sunlight to electricity using silicon crystal chemistry. Future solar panels might rely on perovskite, a promising material that has the potential to make panels

cheaper, simpler, and more efficient. Scientists just need to tweak perovskite to maintain its light-absorbing capabilities for longer periods, and researchers at Los Alamos National Laboratory may have found a way.

The problem is that perovskite solar cells have the pesky tendency to degrade in sunlight. However, a new study has found both the cause and a solution for this issue, a research breakthrough potentially removing one roadblock to commercialization for this promising technology. In a key finding, researchers at **Los Alamos National Laboratory**, one of the Department of Energy's 17 **National Labs**, have found those degraded devices exhibit self-healing powers when given a little time in the dark.

The team determined that photo-degradation in perovskite cells is a purely electronic process. An electric charge accumulates in the photovoltaic solar cell, but doesn't cause chemical damage to the crystal structure. That means if you can reduce the charge, the solar cells can be just about as efficient as before. The trick is simply allowing the perovskite cells time in the dark and cooler temperatures for their self-healing powers to work.

Perovskite solar panels aren't yet ready for rooftops across America, but this development helps researchers tackle one of the biggest hurdles on the way.

Schneider Electric Unveils NEO Network to Help Corporates 'Get Smart' about Renewable Energy

On Tuesday, Schneider Electric introduced its New Energy Opportunities (NEO) Network, an online platform that it hopes will help commercial and industrial companies quickly identify and vet renewable energy and cleantech prospects.

John Hoekstra, Director of Sustainability and Clean Tech at Schneider said that the NEO network is the company's response to what it sees as "a void in the marketplace." He said for the past two or three years, Schneider has been working to create the new network through which [energy managers](#) and solution providers can engage with each other and/or their peers to solve their energy challenges.

For example, a corporate energy manager might be in charge of the energy costs of a building in Boston, Mass., a distribution facility in Calif. and a factory in China. Investigating renewable energy options for these facilities might involve fielding 40 to 50 phone calls from vendors, attending two or three conferences and then trying to figure out the market dynamics for each location. Hoekstra believes that by using the NEO network that same manager could "log in and quickly look at our discovery module that will have case studies and white papers as well as Q&A around say, solar in Mass. and batteries in California," he said. The platform addresses "that kind of pre-transaction intelligence in helping [energy managers] get smart so that they get comfortable around what options exist," he added.

The network simplifies and accelerates the buying process by connecting end users to viable projects and technologies, helping companies find the right tools and financial vehicles to meet their sustainability goals — whether it's a power purchase agreement (PPA) for electricity from a wind farm or distributed solar installed on a parking lot coupled with energy storage, according to the company.

Hoekstra said that Schneider enjoys a "trusted advisor status." As such, the company will act as the network moderator, building the platform and qualifying the organizations that participate. Schneider hopes that once a company decides to go forward with a transaction, that company will select Schneider to help carry out the project.

"Our vision is to remove the layers, the complexity, and advance informed decision making and partnerships," said Steve Wilhite, senior vice president of Energy and Sustainability Services at Schneider Electric in a press release.

Aggregating buying power is another avenue that Hoekstra hopes the NEO network may be able to facilitate. He said that retailers are part of the network and that because of their smaller size, they might not have the buying power to access [a large corporate PPA](#). However, "if you get 4, 5, 10 of them bundled together to make an aggregated buy, they can connect and understand the opportunity and maybe then get to participate in some of these," said Hoekstra.

"We hope that NEO can unlock that middle market to really advance the renewable energy agenda," he said.

The platform is subscription based. Hoekstra declined to disclose costs but said there are different categories for membership.

Storage in the Power Grid

The electric grid is in a rapid state of change. The arrival of intermittent renewable resources is creating significant new operating challenges for the utilities. [Batteries and other storage devices](#) are suggested as a means of providing local firming and backup for intermittent resources. This has led to a common focus on storing and returning energy to the local power system, be that a residence, commercial or industrial establishment. This storage/return can be used to reduce peak demand or provide backup, or to provide reserve capacity or flexibility for the grid operator.

But there is another area where storage devices may provide useful support, and the provision of two or more services at one time may well be the difference that makes the installation viable.

Batteries and other storage devices are generally equipped with an inverter, a device that converts between DC power, required for the battery, and AC power required for the grid. The user can manage the magnitude and direction of power flow by managing the inverter.

The inverter often has another capability that may add value, and that is the ability to provide or absorb reactive power from the AC source. Reactive power is actually real power that flows in one direction for half of each electrical cycle, and in the other direction for the other half cycle. There is real flow of power, but because the power flows equally in both directions over a full cycle (60 times each second), no energy is delivered.

Reactive power, measured in VARs, is used by utilities to manage voltage. The addition of high penetrations of intermittent generation is often being restricted because the intermittent capacity is causing voltage changes outside the allowable range, something that is seen by all customers that are nearby. Local inverters have the capability to support voltage, but there are some caveats. IEEE 1547 and California Rule 21 do not permit local inverters to manage voltage, but if the set point for reactive power or voltage is controlled by the utility, this restriction should be ineffective. The utility is responsible for system voltage, and any distributed control needs to be coordinated with other utility devices that control voltage.

So a site with storage and smart inverters may be capable of providing a number of key services that will support both the customer and the utility. Some of these are:

- Backup power and peak demand management for the customer
- Peak demand reduction for the utility
- Local distribution voltage management for the utility
- Provision of reserve and flexibility capacity for the utility

The actual location at an industrial, commercial or residential site may not be so important as the characteristics of the load and intermittent generation that are connected nearby. In the case of voltage management, utilities find themselves using old substation equipment (LTCs) to manage reactive power, and this setup is not optimal. Reactive power delivered to a customer causes real power losses in distribution, so the best place to locate devices that can supply or absorb reactive power to manage local voltages is as close as possible to any source that causes this need. It could be an industrial site, or at the other end, it could be a residential site with large vehicle chargers.



This technology has potential real value for the future. Getting the best economic value from the storage will require that it be used to meet as many needs as possible, and with new technology in communications, optimization, and control, it should be fully capable of delivering an outstanding service that will improve power quality for everyone, while reducing costs at the same time.

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-0001414](#) - FY 2016 Continuation of Solicitation for the Office of Science Financial Assistance Program

Application Due Date: September 30, 2016

[H2 Refuel H-Prize Competition](#)

Application Due Date: October 31, 2016

[DE-FOA-0001625](#) - Early Career Research Program

Pre-Application Due Date: 09/08/2016 at 5 PM Eastern Time (A Pre-Application is required)

Encourage/Discourage Date: 10/06/2016 at 5 PM Eastern Time

Application Due Date: 11/14/2016 at 5 PM Eastern Time

[DE-FOA-0001622](#) - Applications for Technologies Directed at Utilizing Carbon Dioxide from Coal Fired Power Plants

Application Due Date: October 3, 2016

[DE-FOA-0001606](#) - U.S-India Joint Clean Energy Research and Development Center

Application Due Date: September 23, 2016

NATIONAL SCIENCE FOUNDATION

[NSF 16-564](#) - NSF/DOE Partnership in Basic Plasma Science and Engineering

Full Proposal Target Date: October 21, 2016

[NSF 16-561](#) - Physics Frontiers Centers (PFC)

Preliminary Proposal Due Date (required) (due by 5 p.m. submitter's local time): August 01, 2016

Full Proposal Deadline (due by 5 p.m. submitter's local time): January 30, 2017

[PD 16-7607](#) - NSF Energy, Power, Control, and Networks (EPCN)

Full Proposal Window: October 1, 2016 - November 1, 2016

[PD 16-7644](#) - Energy for Sustainability

Full Proposal Window: October 1, 2016 - October 20, 2016

[NSF 16-503](#) - National Science Foundation Research Traineeship (NRT) Program

Letter of Intent Due Date(s) (required) (due by 5 p.m. proposer's local time): December 09, 2016

Applies to both tracks

Full Proposal Deadline(s) (due by 5 p.m. proposer's local time): February 07, 2017

Applies to both tracks

OTHER

[University of Florida Industry Partnerships \(UFLIPS\)](#)

[Read more at our website>>](#)

UPCOMING EVENTS

[Alternative Aviation Fuel Workshop](#)

September 14th - 15th, 2016
Macon, Georgia

Hosted by the U.S. Department of Energy's Bioenergy Technologies Office, the Alternative Aviation Fuel Workshop will be held in Macon, Georgia, on September 14-15. This event will include panel discussions from leaders in the aviation industry and the bioenergy sector. The event will also feature parallel breakout sessions that will focus on technical areas related to lignocellulosic biomass-based aviation biofuels. Participants will gather input on strategies to achieve affordable, scalable, and sustainable aviation biofuels.

Click [here](#) for more information.

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[Short Rotation Woody Crop Science & Technology in an Uncertain Global Marketplace](#)

October 11-13, 2016
Fort Pierce, FL

Short rotation woody crops (SRWC) are being developed as a sustainable supply of woody biomass for biofuels and bioproducts as well as for traditional solid wood and fiber products. Recent developments in SRWC harvesting for hardwoods and pine, are of interest. Also, discussion of emerging market opportunities and remaining challenges will be emphasized at the conference, as well as environmental and social goals. Topic areas include:

- SRWC to Advance Social and Environmental Sustainability
- Attributing value to external benefits of SRWC systems
- Creative uses of SRWC to achieve environmental and social goals
- Improvements in harvesting technology and productivity
- Adding value throughout the biomass supply chain
- Stabilizing, upgrading, and standardizing SRWC feedstock quality
- Genetic and tree improvement status of today's crops
- Optimizing SRWC production systems

Click [here](#) for more information.

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[Caribbean Renewable Energy Forum](#)

October 17 - 19th, 2016
Miami, FL

Launched in 2009, CREF is the largest annual gathering of regional and international energy investment opportunities in the Caribbean.

Gathering 500 delegates and 100 speakers across multiple tracks, CREF is THE place to meet officials, utilities and regulators to multilaterals, developers and providers of capital and technology. Caribbean countries were represented at CREF 2015 either by their government or their utilities.

Click [here](#) for more information.

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Electric Vehicle Summit

October 17 - 20th, 2016
University of Central Florida Solar Energy Center
Cocoa, FL

Response to last year's Summit was overwhelmingly positive, with 100% of surveyed attendees attending in 2016. The 2015 EV Summit featured presentations from 18 speakers on topics that included technology and fleet management. This year's Summit will focus on updates to the technology that will accelerate the deployment of electric vehicle transportation. Topics include transportation policy, wireless and workplace charging and the life-cycle assessment of EV vehicles. Panel discussions are also planned for the Summit.

Click [here](#) for more information.

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Algae Biomass Summit

October 23 - 26, 2016
Phoenix, Arizona

The 10th annual Algae Biomass Summit will take place October 23 - October 26, 2016 at the Spa in Phoenix, Arizona. This dynamic event unites industry professionals from all sectors of the industry including those involved financing, algal ecology, genetic systems, carbon partitioning, engineering, fertilizers, bioplastics, supplements and foods.

Click [here](#) for more information.

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Production of Renewable Ocean Energy for Small, Non Grid Connected Applications

November 2 - 3, 2016
Portsmouth Courtyard Marriott, New Hampshire

This conference is bringing together professionals who are developing power system technology and distributed power for many applications. Considering the many assets that MTS has in marine chemistry measurement; and current, tidal, wave, salinity, and thermal measurement systems would serve as a valuable contribution to the ocean energy community as well as to the MTS begin with a panel of users representing the Department of Defense, National Oceanographic remote communities such as island and indigenous peoples, followed by selected presentations.

Click [here](#) for more information.

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Power Generation Week

December 11 - 15, 2016
Orange County Convention Center, Orlando, FL

Power Generation Week consists of 5 events including POWER-GEN International, Renewable POWER International, COAL-GEN, and GenForum.

As the world's largest power generation event, boasting 20,000 attendees and over 1,400 exhibitors, Power Generation Week is designed to connect key suppliers and service providers with influential executives in the international power sector. Attendees and exhibitors can take advantage of attending an event in the power generation industry.

Click [here](#) for more information.

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15th IEEE International Conference on Machine Learning and Applications (IEEE ICMLA'16)

December 18 - 20, 2016
Anaheim, California

The aim of the conference is to bring researchers working in the areas of machine learning and applications will cover both theoretical and experimental research results. Submission of machine learning applications in fields like medicine, biology, industry, manufacturing, security, education, virtual reality, and problem solving is strongly encouraged.

Conference content will be submitted for inclusion into IEEE Xplore as well as other Abstracts and Citation Indexes.

Click [here](#) for more information.

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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