



Florida Energy Systems Consortium

February 2015 Issue

FESC Highlights

Florida Energy News

U.S. Energy News

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2015 ARPA-E Energy Innovation Summit | February 9 - 11 | Gaylord Convention Center, MD

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Florida Energy Systems Consortium

Save the Date!

# FESC Research Workshop

May 20-21, 2015

Tampa, FL

The workshop brings together energy experts in Florida's State University System and industry to share their energy-related research findings and to promote future collaboration. The program will feature internationally renowned speakers, as well as presentations and posters highlighting FESC's innovative work leading to alternative energy strategies, improved energy efficiencies and expanded economic development for Florida.

Please mark your calendars.

The workshop details will be posted at our website soon.

Updates will also be posted on our Facebook and Twitter Pages!



## WORLD NEWS

Updates to Long-Range Global Energy Forecasts

2015 USDA  
Agricultural  
Outlook Forum:  
"Smart Agriculture  
in the 21st  
Century" | February  
19 - 20 | Arlington,  
VA

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The Energy and  
Materials Research  
Conference -  
EMR2015 |

February 25 - 27 |  
Madrid, Spain  
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The 32nd  
International  
Battery Seminar |  
March 9 - 12 | Fort  
Lauderdale, FL

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Advanced Biofuels  
Leadership  
Conference 2015 |  
March 11 - 13 |  
Washington, DC  
Click [here](#) for more

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EnergyWaterFood  
Nexus Summit |  
March 26 - 28 |  
Tallahassee, FL

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The International Energy Agency and ExxonMobil both released updates to their long-range global energy forecasts. Despite the current oil glut, rising demand from a growing global middle class and increasing world population will challenge supply again. The overall increase in energy demand will also drive greater GHG emissions.

[International Energy Agency: World Energy Outlook 2014](#)

The global energy system is in danger of falling short of the hopes and expectations placed upon it. Turmoil in parts of the Middle East - which remains the only large source of low-cost oil - has rarely been greater since the oil shocks in the 1970s. Conflict between Russia and Ukraine has reignited concerns about gas security. Nuclear power, which for some countries plays a strategic role in energy security (and which is examined in depth in this edition of the World Energy Outlook.

[ExxonMobil: Transportation Energy Shifting Towards Developing Nations](#)

**ExxonMobil**  
Energy lives here™

Global energy demand for transportation is projected to rise by 40 percent from 2010 to 2040. However, these energy needs will vary significantly by country. From 2010 to 2040, transportation energy needs in OECD32 countries are projected to fall about 10 percent, while in the rest of the world these needs are expected to double. China and India will together account for about half of the global increase.



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## [India and U.S. Commit to Global Fight against Climate Change](#)

### **The U.S. and India pledged to work together toward a new pact to curb global warming**

President Obama and Indian Prime Minister Narendra Modi made a "personal commitment" to work together toward a successful global climate change agreement in Paris later this year as part of a sweeping energy package unveiled in New Delhi yesterday on everything from boosting renewables to curbing air pollution.

The deal between the two leaders fell well short of one that Obama and his Chinese counterpart, President Xi Jinping, unveiled in Beijing last year. India offered no new concrete emissions targets yesterday, and Modi insisted that the landmark U.S.-China deal had no impact on his country. Still, he said, India is concerned about the threat of global warming.

10th Annual Cyber and Information Security Research (CISR)

Conference | April 7 - 9 | Oak Ridge, TN

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OneSpark Crowdfunding Festival 2015 | April 7 - 12 | Jacksonville, FL

Click [here](#) for more.

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Space Symposium 2015 | April 13 - 16 | Colorado Springs, CO

Click [here](#) for more.

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Hannover Messe 2015 | April 13 - 17 | Exhibition Grounds Hannover, Germany

Click [here](#) for more.

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Greentech Media Solar Summit 2015 | April 14 - 16 | Phoenix, AZ

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"It's my feeling that the agreement that has been concluded between the United States and China does not impose any pressure on us. India is an independent country, and there is no pressure on us from any country or any person," Modi said during a joint press conference after the two leaders had taken a stroll in the Hyderabad House gardens.

"But there is pressure," Modi acknowledged. "When we think about the future generations and what kind of world we are going to give them, then there is pressure. Climate change itself is a huge pressure. Global warming is a huge pressure. ... There is pressure on all countries, on all governments and on all peoples."

Obama, meanwhile, vowed to expand U.S. support for India's ambitious renewable energy goals—Modi has vowed India will expand its solar energy by 100 gigawatts by 2022—and announced new joint initiatives to improve air quality in Indian cities. In negotiating this year toward a new global climate deal that could be signed in Paris in December, Obama said, U.S.-India cooperation will be critical.

"The prime minister and I made a personal commitment to work together to pursue a strong global climate agreement in Paris. As I indicated to him, I think India's voice is very important on this issue. Perhaps no country could potentially be more affected by the impacts of climate change, and no country is going to be more important in moving forward a strong agreement than India," Obama said.

### **U.S. to help finance India's clean energy**

Despite the personal chemistry between Obama and Modi, the relationship between the United States and India in the U.N. climate talks has been rocky. The United States is pushing for a Paris deal that would for the first time see all major climate-polluting nations take equal legal responsibility for tackling climate change, while recognizing that wealthier and longer-polluting countries like the United States will have to take heavier cuts. India, meanwhile, has argued that the United States and other wealthy countries have essentially reneged on two decades of promises to cut emissions and deliver funding and has blasted wealthy nations for demanding that still-developing countries take on new responsibilities.

Yesterday's agreements did not make any concrete headway in bridging that gap, but advocates of a climate treaty said the commitment to cooperate was in itself important, as well as the practical steps to help ramp up clean energy.

"At the practical level, the bilateral steps announced today will help contain India's carbon emissions in ways that also address its urgent development needs. These concrete projects will demonstrate on the ground that the climate and development agendas are fully compatible. At the political level, the pledge by the two leaders to stay in close touch through the year on the climate negotiations is very encouraging," Elliot Diringer, executive vice president of the Center for Climate and Energy Solutions, said in a statement.



*At the practical level, the bilateral steps announced today will help contain India's carbon emissions in ways that also address its urgent development needs.*

*Credit: [White House/Pete Souza](#)*

International Biomass Conference & Expo | April 20 - 22 | Minneapolis, MN  
Click [here](#) for more.  
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2015 U.S. Department of Energy WINDEXchange Summit | May 17 - May 18, 2015  
Click [here](#) for more information  
[Add to GoogleCalendar](#)

AWEA WINDPOWER Conference and Exhibition | May 18 - 21 | Orlando, FL  
Click [here](#) for more information  
[Add to GoogleCalendar](#)

ESA 25th Annual Conference | May 27- 29 | Dallas, TX  
Click [here](#) for more information  
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58th Annual ISA POWID Symposium | June 7 - 11 | Kansas City, MO  
Click [here](#) for more information.  
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"This signals that India sees the Paris agreement as a priority, and establishes a direct channel that could prove absolutely essential to delivering the final deal," Diringer said.

As part of the agreement, the U.S. Agency for International Development will install a field investment officer in India with the backing of a transactions team to help mobilize investment for India's clean energy sector. Meanwhile, the Export-Import Bank of the United States is exploring projects with the Indian Renewable Energy Development Agency for up to \$1 billion in clean energy financing, and the Overseas Private Investment Corp. "plans to build on" Indian renewable projects, particularly in off-grid energy access. The United States also agreed to implement a U.S. EPA program to help measure and improve air quality in urban areas.

Carol Browner, a distinguished fellow at the liberal Center for American Progress and Obama's former climate czar, called the agreements "admirable."

Obama and Modi, she said, "established a new leader-to-leader channel for communication to work through issues in climate negotiations, affirmed ambitious solar energy goals for India, launched a new air quality initiative focusing on India's major cities, catalyzed new clean energy investment opportunities, and more. President Obama closed out last year with a historic joint climate announcement of our two countries' new greenhouse gas reduction targets, and he has started this year by taking a big step with India toward a clean energy future."

#### **Coal industry sees 'a deal in name only'**

The United States and India have also been at loggerheads over whether to reduce emissions of hydrofluorocarbons, known as HFCs, that are used in refrigerants and insulating foams. Ever since the United States and China formed an agreement last year to phase down HFCs, India has been the lone holdout among major nations in opposition to using the Montreal Protocol to phase out the pollutant.

When Obama and Modi met last year, they agreed to cooperate on "making concrete progress in the Montreal Protocol." They didn't make new promises yesterday, but analysts saw a victory in jointly reaffirming that old pledge.

"Today's joint HFC agreement shows that President Obama is continuing his leader-level campaign to eliminate one of the six main greenhouse gases this year using the world's most effective and efficient environmental treaty," said Durwood Zaelke, president of the Institute of Governance & Sustainable Development. "The agreement with Prime Minister Modi is a solid step forward on the climate front, and complements a similar set of agreements President Obama negotiated with President Xi of China."

Coal industry advocates, meanwhile, said they were less than impressed with the suite of U.S.-India climate agreements. They argued that only cuts equally as steep as those the Obama administration has pledged the United States will make would be economically fair but also maintained that India should not be cutting emissions at all, but rather ramping up coal use.

"The U.S.-India deal is a deal in name only. Like so many other world leaders, Prime Minister Modi of India is not willing to follow President Obama's rash lead in setting carbon reduction targets that will have a wholly negative impact on his country's economy," said Laura Sheehan, senior vice president for communications at the American Coalition for Clean Coal Electricity.

Power Up Energy Expo | Fall 2015 | South Walton, FL Click [here](#) for more.

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"Too many in India are not only without reliable power but without electrification altogether. Prime Minister Modi recognizes the valuable role coal will play in helping to lift his people out of poverty and fully develop all of India's potential. For the U.S. to go it alone in setting expensive and unwieldy carbon reduction regulations, while large countries like China or India fail to do the same, seems to ignore the reality of today's highly competitive global economy," she said.

## These Battery-Powered Trains are Almost as Magical as the Hogwart's Express



In what is probably a concealment of wizardry, the U.K. has launched a train that doesn't require steam, gasoline, diesel, or even electric cables to power it - but runs entirely via battery power.

The modified Class 379 Electrostar battery-powered train, or more affectionately known as Independently

Powered Electric Multiple Unit (IPEMU), is currently in a trial-run phase, carrying passengers until the middle of February. To Hogwarts, we assume.

The train is being tested on a 12-mile stretch between stations in Essex, cruising along at just a touch below the U.K.'s average rail speed of 65 miles per hour. The cars are powered by 80,000 phosphate and hot sodium nickel salt batteries — each approximately the size of a BIC lighter. With the oomph of these bite-size batteries, IPEMU could eventually help bridge gaps between electrified parts of the U.K.'s rail network, or in places where installing overhead electric systems would be too expensive.

The largest snag towards wider expansion of IPEMU's technology is the batteries' short lifespan: After two hours of charging, the train can run for only half that time. Which begs the question: Is a train that can only run for one hour worth all the hullabaloo? Here's [CityLab](#) to crunch the numbers:

Even as it stands, however, this battery-powered train could be a useful asset on some existing services. Take the 12-mile stretch on which the train is now being tested as an example. In a service day running from 7 a.m. to 10 p.m., a battery-powered train running slightly below the U.K.'s average rail speed of 65 miles per hour could comfortably make 14 round trips and still have time to recharge. So the application here suggests short, shuttle-type services, such as an airport express route.

[The Guardian](#) discusses how the trains could spread:

*Should the trial prove successful, a fleet of battery-powered trains could be seen across the network, potentially providing a cost-effective and zero emission replacement for the diesel engines that are still commonly used on branch lines.*

Battery-powered trains could be, according to CityLab, "one of the cleanest possible ways of getting from A to B." Check out the train in action (sadly, Dumbledore is nowhere to be seen):

## Why The World Isn't Ready For Renewable Energy - And How We Can Be

At 3:59 am on 8 November 2009, Spain's renewable energy control center registered a milestone: For a gusty moment, more than half of Spain was powered by wind.

The brief spike was cause for celebration. Powering the world using nothing but renewable energy is often seen as a naïve dream, despite the urgent need to reduce the amount of CO<sub>2</sub>-emitting power plants and tailpipes in the world. The fact that in 2010 a major European country like Spain drew 35 percent of its power from renewables is a sign that this dream could be a reality one day soon.

But it also highlighted a big problem: Spain's power grid isn't connected to the rest of Europe. When it was flooded with wind power early that November morning, authorities had nowhere to send the excess. So technicians had to shut off windmills to avoid overloading the country's electricity grid.



"That means a loss of profits," says Alberto Cena, a lobbyist for the Spanish wind industry. "We are suffering for our success."

Spain's pain may soon be shared by the rest of Europe, and by renewable energy providers in the U.S. with no way to get their green electricity where it's most needed. Even as twirling windmills and glittering solar panels spread, encouraged by subsidies for renewable energy in the U.S. and a promise that 20 percent of the [European Union's energy will come from renewables by 2020](#), there's a growing realization that our existing electricity infrastructure isn't up to the job.

### Facilitating renewables

When it comes to renewable energy, there are two basic problems: supply and transport. Unlike traditional nuclear or coal power plants, which deliver predictable, steady streams of electricity to houses and factories, wind, solar and hydro power depend on weather, which can be fickle and unpredictable. That means supplies can dip too low at crucial times or soar too high, sending excess electricity into a carefully calibrated power grid.

And renewable energy supplies are often located far from the cities and factories where electricity is needed most. The wind whistling across the wide-open plains of just three U.S. states – North Dakota, Kansas, and Texas – could power the entire nation. But without massive investments in new high-voltage power lines to move electricity from the Great Plains to the heavily populated coasts, windmills are useless.

The problem is that our electrical grids are relics, dating back a century. In the U.S., power supplies are still local affairs, supplying nearby cities or at best patching into rickety local networks that cover a few states. In Europe, the picture

is further complicated by national borders, which require reconciling the competing and conflicting regulations of dozens of different countries.

If renewable energy sources are going to be a part of our electricity supply, the grid needs a wholesale overhaul. While discussions about the smart grid often focus on smart meters in private homes and other micro-fixes, the most important investments will be massive, on the scale of the interstate highway system that changed the face of America a half century ago.

Planners are focusing on making power grids larger and more interconnected, to make sure that excess power can be moved where it's needed easily and efficiently. That's important because larger networks equal more stable energy supplies – and a higher percentage of renewables.

"If you have a large area, the wind is always blowing somewhere," says Paul Wilczek of the [European Wind Energy Association](#). "If we're able to combine wind farms over a large area, output is pretty flat."

As it stands, Europe's grid can't manage it all – and isn't yet ready for the thousands of windmills nine countries plan to install in the stormy North Sea, let alone pie-in-the-sky plans like filling the Sahara with solar panels.

### **Getting it done**

Big decisions need to be made now if we have any intention of getting improved grids in place in the next decade. In Europe, regulators hope to add more than 25,000 miles of power lines — a quarter of them long-distance, high-voltage wires to move electricity from coastal regions deep inland – by 2020. It's a tremendous task. "Short term in grid planning is not really short," Wilczek says. "This is infrastructure that's going to be there for 50 years, so you don't put it in fast."

Like a river, electricity flows indiscriminately whether or not customers are using their power at any given moment. Right now, anything that's not used is simply wasted, making up-to-the-second data provided by smart meters valuable to energy companies looking to fine-tune their output.

And in the long term, a steady energy supply will also require ways to store energy produced during off-peak hours, when supply is high but demand is low. Pilot projects to smooth out supply and demand using smart meters, batteries, water pumps, hydrogen fuel cells and even warehouses full of frozen fish are already in place. Electric cars, like the Nissan Leaf or Chevy Volt, are another way to store energy, by charging the car batteries using electricity produced during off-peak hours.

Improving the world's electricity infrastructure isn't sexy, but it's vital. When the lights still go at the flick of a switch half a century from now, we'll be glad we took the leap.

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### **Educating The Next Generation of Energy Engineers**

In 2005 Susan Hockfield, President of the Massachusetts Institute of Technology (MIT), challenged her university to make a significant response to trends in global

energy supply, such as exploding demand in emerging markets, and concerns about climate change and the environment.

Today, the MIT Energy Initiative (MITeI), formed in 2006, is celebrating its fifth year as research coalesces around the new framework. Students can now minor in Energy, as part of an inter-disciplinary course that spans the various schools within MIT. Moreover, a number of start-up laboratories and projects have flowered under the programme, as partnerships have been allowed to form with industry.

Of particular note is the Photovoltaic Research Laboratory, headed by Tonio Buonassisi, who has delivered online lectures about the prospect for an all-solar-power energy system. Indeed, MIT is at the forefront of global online education, having moved an increasing share of its curriculum to the internet for free. The



question, given MIT's laudable efforts to distribute ideas – and its early jumpstart into energy – focused education – is how these trends are playing out in the rest of the United States, and internationally.

Justin Ritchie, a doctoral candidate and sustainability coordinator at the University of British Columbia (UBC) in Vancouver, says that “demand for energy-focused engineering programmes is very strong.” Ritchie is a

recent graduate of the University of North Carolina (UNC), Charlotte, where the Lee College of Engineering has been expanding its energy-focused curriculum. The new [Energy Production and Infrastructure Center](#) (EPIC) at UNC aims to capitalise on the regional presence of such global infrastructure groups as AREVA, Shaw, Duke, and Siemens, by preparing graduates for new energy industries. The Center was formed just three years ago – has a meaningful shift in science and engineering education begun to unfold?

Very likely, yes. After a long drought, enrolment in science and engineering education has started to turn positive. This is crucial because, relative to Asia, trends in science and engineering education in the OECD, in particular in the US, have not been encouraging. STEM skills – science, technology, engineering and math – are increasingly wanted by employers in today's job applicants. The return of manufacturing to the US, driven in part by new oil and gas production and cheap, North American electricity, has highlighted the country's shortage of STEM skills, many of which got lured to the financial sector.

But a recent study from the National Science Foundation (NSF) finds that enrolment in graduate engineering programs has started to emerge from its slumber. According to the NSF, starting around mid-decade the pace of student demand rose strongly. In engineering specifically, enrolment advanced 20% from 2005 to 2010. And despite an overall slowing in 2010, the past decade saw a total increase of 34% in science and engineering graduate enrolment in the US.

One challenge for energy-focused engineering programmes is the lag time between the effort to form new academic concentrations, design curricula, attract professors and students and the disruption and volatility which govern energy markets. For example, countries such as Spain have created booms in renewable power, only to halt such growth with the suspension of incentives.

However, at UBC where another relatively new program in energy – focused

engineering is now attracting strong interest from students internationally, Professor Eric Mazzi from the [Clean Energy Research Center](#) (CERC) says there's little risk that curricula will become obsolete. "There are so many problems with our societies' energy systems that need to be addressed that there's more than ample material on which to train students. Our goal is to give students the fundamentals that every energy engineer should have for the foreseeable future, such as energy efficiency and the range of alternative energy systems which may emerge in coming years."

An area where professor Mazzi does identify a skill shortage is policy fluency. "Students having gained expertise in some area of engineering need business skills, an understanding of policy thinking, and the ability to manage projects. My opinion is that strong engineering skills combined with these other skills is where more concentration is needed. Our programme is still very much about engineering, but students also have to demonstrate some breadth of knowledge, such as completing our mandatory energy policy course." Professor Mazzi also observes another potential trend at CERC. "More than half of our incoming graduate students this year are international students, from Mexico, Asia, and Europe. This is an increase from the first three years of our programme, when just a quarter were international."

Sustainability also appears as a cohesive theme among energy-focused engineering programmes. Professor Mazzi points to [Cambridge University's Centre for Sustainable Development](#), offering an MPhil in Engineering, in this regard. And UBC's Justin Richie says, "what UBC is trying to do is bring together all undergraduate students under the aegis of sustainability, regardless of discipline." Sustainability could indeed be an optimal focus as it triggers a better set of questions about future policy and investment. Take Bill Gates' widely viewed 2010 TED Talk in which he backed a new push into nuclear energy. Most understand that nuclear power has stagnated for decades. Few engineering students choose the nuclear path, and the retiring class of engineers is not being replaced. But Gates' call for a nuclear renaissance raised questions not just of viability but also sustainability. How sustainable would it be to employ nuclear waste, however ingenious the idea may seem?

Sustainability and climate change may therefore wind up as the twin themes in energy-focused engineering. At MIT's rather hip and forward-thinking [SENSEable City Lab](#) – a fascinating, cross-disciplinary think-tank that brings together innovative data gathering, transport design, and energy efficiency thinking – the emphasis is on smarter infrastructure. Earlier in the 20th century, engineers were asked to make our cityscapes bigger, better, and faster. Today, energy-focused engineering graduates may be called upon to retrofit the built environment as it already exists, rather than building from scratch.

## FESC Highlights

### FESC Workshop Overview: Integration of Renewable Energy into the Grid

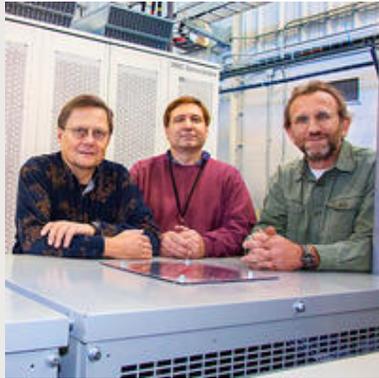


The FESC Workshop: Integration of Renewable Energy into the Grid, was held on February 2 - 3, 2015 at the Hyatt Regency located at Orlando International Airport in Orlando, FL. With over 100 attendees, this instructional workshop was designed to bring attendees up to speed on the issues related to the integration of renewable energy sources into the transmission system.

To view the presentations, please visit the Workshop page on our website: [www.floridaenergy.ufl.edu/public-outreach/2015-fesc-workshop/](http://www.floridaenergy.ufl.edu/public-outreach/2015-fesc-workshop/).

### **FSU: World's Most Powerful Electrical Testing System Unveiled**

Florida State University's Center for Advanced Power Systems has unveiled a new 24,000-volt direct current power test system, the most powerful of its kind available at a university research center throughout the world.



The new system will give CAPS the unparalleled ability to test electrical equipment in real-world conditions, and companies looking to build next-generation power equipment will be able to test those in the Tallahassee-based facility.

"It's a very long and expensive process for companies to do this at the electrical grid," said Ferenc Bogdan, senior engineer and associate in research at CAPS. "We can now do all of that cheaper and faster here."

FSU founded CAPS 14 years ago as an innovative, collaborative research center where scientists could develop smart energy systems for the nation's power and defense needs. It pioneered the power hardware in the loop (PHIL) test facility model that has now been replicated at other institutions, including Clemson University and the National Renewable Energy Laboratory.

PHIL simulation is a scientific experiment where a simulated electrical environment virtually exchanges power with real hardware, giving scientists a more in-depth look at how equipment would fare in real-world conditions such as a lightning strike or a power surge.

The new test facility is the latest piece of the center's PHIL testing program. It has a 24,000-volt [direct current](#) with a capacity of 5 megawatts, making it the most powerful PHIL system of its kind at a university research center worldwide.

To create the new system, the center put together four individual 6 kilovolt, 1.25 megawatt, converters that can be arranged in any combination, in series or parallel connection, to form an extremely flexible test bed for medium voltage direct current (MVDC) system investigations.

The MVDC system was built based on CAPS' specifications by ABB Inc., as a technology demonstrator geared towards research activities.

"This is the first time anyone has strung together four individual converters of this magnitude and operated them in a safe and controlled manner," said Michael

"Mischa" Steurer, senior research faculty and leader of the Power Systems Research Group at CAPS.

News of the facility has already yielded results for CAPS. Government research institutions, including the Office of Naval Research (ONR), have already committed to using the new facility at CAPS for testing and system investigation projects.

CAPS is a long-term contractor with the Navy, which is working to develop an all-electric ship.

CAPS researchers are also collaborating with Virginia Tech on a project for ONR to evaluate the performance of an electrical impedance measurement unit (IMU) developed by Virginia Tech and to be shipped to CAPS for testing. The purpose of an IMU is to probe a [power](#) system for its impedance characteristics to establish criteria for stable operation of the system. In plain language, impedance is the opposition a circuit presents to a current when voltage is applied at various strengths and frequencies.

The Navy has also committed funding to study design and performance of fault current limited MVDC systems and other operational aspects of MVDC systems.

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### **Jeremy L. Susac Named To Florida Energy System Consortium's Advisory Board**

Berger Singerman, Florida's business law firm, is pleased to announce that partner Jeremy L. Susac has been named a member of the prestigious Florida Energy System Consortium (FESC) advisory board.



Established in 2008, FESC was created to promote collaboration among the energy experts at Florida's 12 public universities for the purposes of sharing energy-related expertise, coordinating research projects at these universities, and assisting in the development and implementation of a comprehensive energy strategic plan for the state. The advisory board consists of statewide and national energy leaders who provide counsel on the direction of research, education, outreach, industrial collaboration and technology commercialization programs.

Susac is a member of Berger Singerman's [Government and Regulatory Team](#), and his practice focuses on energy and environmental law, and water/wastewater regulation. Based in the firm's Tallahassee office, Susac has extensive experience with regulations governing entities subject to the jurisdiction of the Florida Public Service Commission (FPSC), Florida Department of Environmental Protection (FDEP), and Florida Department of Agriculture and Consumer Services. This experience includes, but not limited to, land use, amendments to utility service territory, infrastructure siting, undergrounding of transmission/distribution lines, wetlands mitigation, the Clean Air Act the economic regulation of water/wastewater, telecommunications and project management in the clean energy space. Susac previously served as president of the Real Energy & Environment Strategies Group and as the executive director of the Florida Energy &

Climate Commission and the Governor's Energy Office. Prior to that, he served in leadership positions at the FPSC and FDEP.

Berger Singerman was recently recognized in *U.S. News & World Report* and *Best Lawyers'* "Best Law Firm" rankings for its expertise in real estate law as well as land use and zoning law in Florida. The firm was also recently named "Law Firm of the Year" by the Latin Builder's Association for its outstanding work in helping shape the real estate and construction sector in Florida.

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## NSF Grant to Spur Development of Better, Cheaper Aircraft



Lou Cattafesta is the co-director of the Florida Center for Advanced Aero-Propulsion.

As a result, they will focus on the issue of airflow control. Airflow, in its simplest terms, is how air travels through an aircraft's engine or over its wings and other parts of the plane. The flow can impact the aircraft's performance, safety and overall efficiency.

A Florida State University researcher is leading an effort to make aircraft cheaper and more efficient by combining the resources and ingenuity of both the academic and business worlds.

The National Science Foundation selected Lou Cattafesta, co-director of the Florida Center for Advanced Aero-Propulsion, to participate in a unique grant opportunity called the Industry/University Cooperative Research Centers Program. Through the program, Cattafesta received a \$15,000 grant to lead a team of FSU and Ohio State University researchers who will work in aerospace companies and government on some of the issues that make flight so

Engineers at universities and aerospace companies have been looking at airflow issues for years in an attempt to create improved aircraft designs.

"If you can reduce problems with airflow, you can make the planes much more efficient, improve fuel efficiency and reduce the cost of travel," Cattafesta said.

The team will use the grant to help plan the program and attract companies to the partnership. Each university is then required to bring in at least three companies as business partners, which will also contribute funds to the project.

By combining the efforts of the universities and industry and government partners, the research will draw on expertise from a variety of areas.

"It's a very multifaceted approach," Cattafesta said. "There are people with experience in fluid mechanics, mathematics, computer science and dynamics and control."

Cattafesta is planning an introductory planning session for any interested companies to meet with researchers from FSU and OSU in late April.

## **UCF, Partners form PRISM to Compete for Integrated-Photonics Institute for Manufacturing Innovation**

A consortia of photonics industry members is joining with five key research universities to compete for the federal government's Integrated-Photonics Institute for Manufacturing Innovation (IP-IMI) and \$110 million in federal funds to be matched by state and private funding for a total project value of more than \$230 million.

The University of Central Florida, Georgia Institute of Technology, the University of Alabama-Huntsville, Clemson University, the University of Illinois and partners have formed PRISM-the Photonics Research Institute for Sustainable Manufacturing-to focus their assets and expertise on an industry-led, not-for-profit IP-IMI centered in the Southeastern U.S. but with national reach.

With confirmed interest of more than 55 companies spanning the entire value-chain of integrated photonics, PRISM is seeking additional interested industry partners to participate in the development of an agenda of priority challenges in the evolution of integrated photonics. PRISM is gearing up to submit a full proposal by March 31.

The Department of Defense will award \$110 million to the winner of the IP-IMI, which will bridge the gap between basic research and product development.

Proposers are required to make an equal investment in the project. PRISM is anchored by \$120 million in investments already committed by the University of Central Florida, Osceola County, the Florida High Tech Corridor Council and Enterprise Florida in a 100,000- square-foot state of the art advanced manufacturing research facility being built in Osceola County. That facility is managed by the International Consortium for Advanced Manufacturing Research (ICAMR), a non-profit industry-led consortium.

PRISM is led by Winston Schoenfeld, who currently serves as director of the crystalline silicon (c-Si) branch of the Photovoltaic Manufacturing Consortium (PVMC), and was responsible for the establishment of the first industry-led domestic manufacturing consortium for c-Si photovoltaics. He also serves as director of the Solar Technologies Research Division at UCF's Florida Solar Energy Center, and is an associate professor of optics at CREOL, The College of Optics & Photonics. Schoenfeld has a broad background that spans both academia and industry, including high-tech startups, uniquely positioning him to lead this effort across industrial, academic, and government sectors.

The competition seeks to strengthen the U.S. manufacturing base by developing



innovations utilizing photonics circuits and identifying and overcoming obstacles in fabrication, packaging, testing and validation.

Osceola County's more than \$61 million investment for design, construction and equipment costs associated with the facility in addition to the land, makes pursuit of the grant more feasible, officials said.

Additional collaborators have the opportunity to help shape PRISM's response to the federal call to provide national leadership in establishing a robust and vital integrated photonics industry.

Political leaders have embraced the efforts of PRISM and ICAMR and emphasize the potential economic impact such an ambitious project will have in the region.

Congressman Dan Webster, who represents Florida's 10th district including part of the I-4 corridor, said "The University of Central Florida College of Optics and Photonics is a recognized leader in photonics-related R&D, and I am excited for the positive impact that this industry cluster will have on Florida's economic stability. Photonics is a critical aspect to our national security and global competitiveness, and I am in full support of UCF's new initiative."

Congressman Alan Grayson, whose district includes Osceola County, expressed excitement for the possibility of manufacturing growth in Central Florida and said UCF has the strengths needed to lead the effort.

"The university is a global leader in the photonics field and it is uniquely positioned to lead this nationwide effort," Grayson said. "An institute of this kind would be an incredible asset to the Central Florida community, bringing new employment opportunities to the area, increasing higher-wage jobs, and expanding our state's economy."

And Sen. Bill Nelson, who has been a consistent supporter of UCF and its research efforts, said, "This is yet another feather in UCF's cap as the university continues to establish itself as a major research institution."

Securing federal funding for PRISM would greatly add to the roughly 30,000 photonics-related jobs in the state, said Alex Fong, president of the Florida Photonics Cluster. While a 2009 report by The Corridor and Florida Photonics Cluster put the gross regional product at \$3.65 billion and sales of these companies at \$7.27 billion, the national impact of the industry rises to more than \$3 trillion.

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### **FAMU: New Better Buildings Challenge Partners Commit 70 Million Square Feet, \$1.7 Billion**

Building on President Obama's Climate Action Plan, the Energy Department announced today that more than 20 new partners have committed to improving

energy efficiency across their respective building portfolios by 20 percent over the next ten years.

These new partners, including the 6 multifamily partners announced by the White House earlier today, bring with them fresh perspective and leadership in newly represented sectors, spanning over 70 million square feet of fast-food, restaurant, manufacturing, university, and government facilities. As leaders in energy efficiency, partners will work with the Department to share their successful efficiency strategies and help pave the way for other organizations to follow.

"The Better Buildings Challenge partners announced today 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, while also cutting carbon pollution and creating jobs."

Spanning 1.7 billion square feet, food service facilities in the U.S. consume 400 trillion BTUs of energy annually, representing a significant opportunity for energy savings. Restaurant and fast-food owners including Arby's and CKE Restaurants, the owner of Carl's Jr. and Hardee's, are partnering with the Department to improve the efficiency of the food service sector. Facebook, another new partner, will focus on infrastructure upgrades across its entire suite of data centers. These partners, and the other organizations joining the Better Buildings Challenge today, will work with the Energy Department to achieve portfolio-wide energy savings and share successful, cost-effective strategies to maximize building efficiency:

- AHEAD, Inc., Littleton, NH commits 190,000 square feet of multifamily housing.
- Arby's Restaurant Group, Inc., Atlanta, GA commits over 2.5 million square feet as a food service partner.
- Bank of America, San Francisco, CA commits \$1.5 billion dollars as a financial ally.
- Celanese Corporation, Irving, TX commits 8 manufacturing plants.
- Chesapeake Community College, Wye Mills, MD commits 320,000 square feet.
- City of Philadelphia, Philadelphia, PA commits 15 million square feet of building floor space.
- CKE Restaurants Holdings, LLC, Carpinteria, CA commits over 2.5 million square feet as a food service partner.
- Commercial Power Partners, Los Angeles, CA commits \$50 million as a financial ally.
- Community Investment Corporation, Chicago, IL commits \$25 million dollars as a financial ally.
- Facebook, Menlo Park, CA commits 10 data centers.
- Florida A&M University, Tallahassee, FL commits 3 million square feet as a higher education partner.
- Gragg Cardona Partners, Washington, DC commits 49,000 square feet of multifamily housing.
- Holcim (US) Inc. Bedford, MA commits 12 manufacturing plants.
- Housing Authority of the Birmingham District, Birmingham, AL commits 3 million square feet of multifamily housing.
- King County, WA, Seattle, WA commits over 5.5 million square feet of building floor space.

- Las Vegas Sands Corporation commits over 19.5 million square feet as a hospitality partner.
- Newark Housing Authority, Newark, NJ commits over 1 million square feet of multifamily housing.
- PACE Equity, Milwaukee, WI commits \$25 million dollars as a financial ally.
- Parkway Properties, Orlando, FL commits 18 million square feet of commercial real estate.
- Rockwell Finance, Centennial, CO commits \$25 million dollars as a financial ally.
- Structured Finance, Los Angeles, CA commits \$150 million dollars as a financial ally.
- The DeBruler Co., Libertyville, IL commits 700,000 square feet of multifamily housing.
- The JBG Companies commits 12.5 million square feet of commercial real estate.
- Windsor Locks Housing Authority, Windsor Locks, CT commits 72,000 square feet of multifamily housing.

A cornerstone of the President's Climate Action Plan, the Better Buildings Challenge supports the Administration's 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 improving efficiency by least 20 percent, and another 4,500 by at least 10 percent, compared with their baseline years.

## Florida Energy News

### **FPL Announces Plans to Install more than 1 Million Solar Panels at Three Additional Solar Power Plants as Part of Continued Strategy of Advancing Affordable Clean Energy in Florida**

Florida Power & Light Company (FPL) today announced details about its plans to build substantially more solar energy capacity as part of its ongoing strategy of advancing clean energy while keeping electricity affordable for customers.

Before the end of 2016, FPL intends to build three new solar photovoltaic (PV) power plants that are being designed to cost-effectively complement other major system improvements, which include the retirement of some of the company's oldest fossil fuel-burning units and the continued investment in clean, fuel-efficient, 24-hour power generated from U.S.-produced natural gas and zero-emissions nuclear fuel.

"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 to triple the amount of solar energy we use to serve our customers before the end of 2016."

Currently, solar power – even the most economical large-scale installation – is generally not yet cost effective in FPL's service area, due in part to its higher costs

compared to the company's highly efficient system and low electric rates. However, FPL has identified three uniquely advantaged sites that will each facilitate the cost-effective development of a new, large-scale solar plant. In addition, as the cost of solar PV is projected to decline further later in the decade, FPL is optimistic that it could potentially add even more solar energy generation to complement its natural gas and nuclear resources while continuing to meet the electricity needs of Florida's growing economy and population on a cost-effective basis.

"As the economics of solar power improve in the years ahead, we believe we will be able to harness more and more sunshine cost-effectively, alongside essential, high-efficiency, clean natural gas generation and zero-emissions nuclear power, to continue powering our customers and the state's growing economy with affordable clean energy," Silagy said. "These exciting large-scale solar projects, equivalent to roughly 45,000 typical residential rooftop systems, will bring new tax revenue and several hundred new jobs to rural communities we serve and deliver emissions-free power when the sun is shining to our customers across the state."

Currently serving more than 4.7 million customer accounts across nearly half of Florida, FPL operates a diverse portfolio of energy sources to power the state's growing population and economy. As outlined previously in the company's 10-Year Site Plan filed with the Florida Public Service Commission, FPL anticipates a significant need for additional firm power generation beginning in 2019, when its total number of customer accounts is projected to top 5 million. To meet this need, FPL intends to issue a Request for Proposals (RFP) during the first quarter of 2015 to invite prospective bids. At this time, the company believes that clean, high-efficiency natural gas generation will likely be the most cost-effective energy source to meet this specific need.

Investments in high-efficiency natural gas generation since 2001 have enabled FPL to cut its use of foreign oil by more than 99 percent – from more than 40 million barrels of oil in 2001 to less than 1 million barrels annually today. The company has been strategically phasing out older, less efficient fossil fuel plants and replacing them with new, high-efficiency natural gas energy centers that use approximately one-third less fuel per megawatt-hour.

Since 2001, the effectiveness of these investments has saved our customers more than \$7.5 billion on fuel and prevented more than 85 million tons of carbon emissions.

The U.S. Environmental Protection Agency (EPA) calculates that this amount of carbon reduction is equivalent to removing more than 16 million cars from the road annually or switching more than 2 billion incandescent lights to compact fluorescents.

In addition to improvements in fossil fuel and renewable power, FPL successfully completed in 2013 the largest nuclear expansion in recent U.S. history – an investment that is now saving customers approximately \$100 million a year in fossil fuel costs without emitting any carbon dioxide or other greenhouse gases.

Unlike many electric utilities across the country, FPL is well-positioned to meet the EPA's targets for reductions in CO<sub>2</sub> emissions – with no expected additional costs – thanks in part to the company's investments in nuclear, solar and natural gas.

"There's no simple, silver-bullet solution to the complex challenge of planning to cost-effectively and reliably meet future energy needs. Energy issues involve long-

term, fact-based planning and decision-making. FPL's strategy of making smart investments in affordable, clean energy infrastructure is working. We take great pride in the fact that our electric rates have actually decreased in recent years, helping keep our typical residential customer bills the lowest in Florida and well below the national average, while we continue to deliver industry-leading reliability and invest in advancing a system that's already one of the cleanest and most efficient in the country," Silagy said.

#### **FPL's Affordable Clean Energy Strategy: Summary of Key Generation Milestones\***

- On Dec. 31, 2014, FPL retired two 1970s-era gas- and oil-fueled generating units in Putnam County (Putnam Plant Units 1 and 2), as planned. The units served FPL customers well for decades, and the timing of their retirement enables cost savings for customers as FPL's modernized system generates cleaner, more fuel-efficient electricity than ever before.
- By the summer of 2015, the new Palm Beach County Solid Waste Authority (SWA) waste-to-energy plant is expected to enter service, doubling the site's renewable energy capacity. FPL buys this renewable energy from SWA and uses it to power all FPL customers via its grid.
- Although large-scale solar PV remains the most economical way to utilize solar energy for FPL customers, the company also recognizes the role of distributed generation. In the coming months, FPL will build the first of several community-based solar installations as part of a pilot program that will be supported by the company and voluntary participation by customers. In addition, FPL continues to work on plans to install commercial-scale arrays at locations to be announced in the near future.
- In mid-2016, the new high-efficiency, natural gas-fueled FPL Port Everglades Next Generation Clean Energy Center is expected to enter service at the site of a former oil-fueled power plant, which was dismantled in 2013. Construction is progressing well, and the project remains on schedule and on budget. This project is the third in a series of three major modernization investments. The first two projects, the FPL Cape Canaveral and Riviera Beach Next Generation Clean Energy Centers, entered service in 2013 and 2014, respectively – ahead of schedule and under budget.
- By the end of 2016, the company expects to add three new large-scale solar power plants. FPL estimates that it will be able to build these facilities cost-effectively for customers due to several factors – in addition to the decreasing cost of solar PV – that include the sites' key characteristics such as their close proximity to existing power transmission lines and electric substations with adequate capacity for the additional generation.
- Clean, high-efficiency natural gas power continues to be the most likely option to meet the need for significant additional firm generation capacity beginning in 2019. To identify the best, most economical generation addition for customers, FPL will solicit proposals from interested outside parties and consider all qualifying bids in comparison with a potential new natural gas energy center that would be located on company-owned property in Okeechobee County.
- FPL continues to take a step-by-step approach to building two additional zero-emissions nuclear units at its existing Turkey Point site. Despite schedule changes announced by the U.S. Nuclear Regulatory Commission (NRC) in August and new timeline restrictions resulting from recent changes to Florida law, FPL continues to work toward bringing the units into service in advance of the 2030 deadline for the state to meet the EPA's pending Clean Power Plan to reduce carbon emissions from power plants.

- As the cost of solar PV continues to decrease, there is strong potential for several additional large-scale solar plants to be built cost-effectively in the next decade. FPL is analyzing potential sites in many parts of its service area.

*\*Note: The above list does not encompass all projected resource changes in FPL's service territory, including potential generating unit retirements and conversions and changes in purchased power contracts. The company's complete, detailed capacity projections are filed annually with the Florida Public Service Commission and publicly available at both the PSC's website and at FPL.com.*

### **Addition of Three Cost-Effective Large-Scale Solar Power Plants in 2016**

FPL has identified three sites with built-in advantages, such as the existence of sufficient transmission and substation infrastructure, which reduce the overall cost of building new solar plants.

In the coming months, FPL intends to present detailed plans to the local communities identified as the most likely locations for new solar plants. The anticipated plants and sites are:

- FPL Citrus Solar Energy Center – DeSoto County, near Florida's first large-scale solar plant, which FPL commissioned in 2009
- FPL Babcock Ranch Solar Energy Center – Charlotte County, in coordination with and with the support of the county and the Babcock Ranch community
- FPL Manatee Solar Energy Center – Manatee County, on the site of an existing fuel-efficient natural gas power plant that FPL operates

Each of the new plants is being designed for roughly 74 megawatts of capacity. With support from the local communities, FPL would begin construction on the plants later this year and complete them by the end of 2016.

These new plants, combined with community-based solar installations and other small-scale arrays that FPL is installing, would total more than 225 megawatts of new solar capacity. This would effectively triple FPL's solar capacity, which currently totals approximately 110 megawatts.

FPL's current solar portfolio includes 75 megawatts at the hybrid FPL Martin Next Generation Clean Energy Center; the 25-megawatt FPL DeSoto Next Generation Solar Energy Center; and the 10-megawatt FPL Space Coast Next Generation Solar Energy Center near NASA's Kennedy Space Center.

### **Clean, U.S.-produced Natural Gas Generation for Florida's Growing Economy**

As outlined in the company's 10-Year Site Plan filed with the Florida Public Service Commission in 2014, FPL projects a need for additional generation beginning in 2019. This projected need for new generation remains after accounting for all of the identified achievable potential conservation that is cost-effective. The current projection is that approximately 1,000 megawatts of firm capacity will still be needed beginning in mid-2019 due to several factors, including the retirement of older, inefficient plants and Florida's growing economy and population.

As part of its effort to meet this need, FPL plans to issue an RFP during the first quarter of 2015 to solicit proposals from interested outside parties. In order to identify the best, most economical generation addition for customers, all qualifying bids will be carefully considered in comparison with a potential new, FPL-operated

natural gas-fired combined-cycle plant that would be located on company-owned property in Okeechobee County, Fla.

"U.S.-produced natural gas is critical to keeping our customers free from the past's reliance on foreign oil," said Silagy. "Clean, high-efficiency natural gas energy centers, along with cost-effective energy efficiency programs and zero-emissions nuclear and solar power, ensure FPL can continue to deliver clean, affordable and reliable electricity for customers 24 hours a day, 365 days a year, now and in the future."

### **Reliable, Low-Cost, Emissions-Free Nuclear Power**

Today, FPL's nuclear power plants generate enough electricity to power approximately 1.8 million homes and prevent more than 15 million tons of carbon dioxide emissions every year – the equivalent of taking more than 2 million cars off the road, according to the EPA. In addition, because nuclear fuel prices are low and have remained steady for decades, FPL's nuclear plants are a key part of the company's affordable, clean energy strategy.

Over the past few years, FPL invested more than \$3 billion to successfully upgrade each of its nuclear units through one of the most complex nuclear projects in U.S. history. The new nuclear capacity added by the successful project is equivalent to a new medium-sized power plant. This investment, made possible because of Florida's nuclear cost recovery system, is now saving FPL customers an estimated \$100 million a year on fuel.

Emissions-free nuclear power remains a critical component of the company's long-term plans, and FPL continues to make progress on the licensing of two new nuclear units at the company's Turkey Point site. These units would generate enough clean energy 24 hours per day to power approximately 1.3 million homes for decades to come, saving FPL customers an estimated \$170 billion in fossil fuel costs and preventing approximately 418 million tons of carbon emissions over the initial operating life of the units, the EPA-equivalent of taking 88 million cars off the road.

In August of 2014, the NRC announced a delay in its schedule for reviewing FPL's previously submitted application for a combined operating license for the two new nuclear units, due largely to the agency's resource constraints. This forces an extension of the project timeline by approximately two-and-a-half years. In addition, recent changes to Florida's nuclear cost recovery law prevent certain work from being conducted until the NRC process is complete – causing an additional two-and-a-half year delay to the project timeline.

Despite this, FPL continues to expect that the new zero-emissions units will be built and producing power for its customers in advance of the state's 2030 compliance deadline for the EPA's pending carbon emissions reduction requirements, with the first unit projected to enter service in 2027 and the second to follow in 2028.

"Because we have lived and breathed our clean energy commitment for many years now, FPL is one of the cleanest electric generating companies in the U.S., positioning us well to meet the goals of the EPA's Clean Power Plan," Silagy said. "We are concerned that many other utilities and their customers may be facing potentially billions of dollars in compliance costs; however, we believe our customers will be protected from those potential rate impacts thanks to the

affordable clean energy strategy we have been implementing with the support of the Florida PSC and other important stakeholders over the past 15 years."

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### **Sen. Jeff Brandes, R-St. Petersburg, Files Bill to Reduce Taxes on Solar Power Systems**

A St. Petersburg lawmaker announced Tuesday the filing of a bill that would reduce the taxes on solar power systems for businesses that install them at their facilities.

The legislation, by Republican state Sen. Jeff Brandes, would expand existing law for residential solar installations to include commercial property. The bill would reduce the real estate or personal property tax for installations. In addition, devices that produce renewable energy would be exempt from tangible property tax.

Solar industry experts say the taxes are one of the barriers to expansion of solar in Florida. Those taxes, they say, made it difficult economically for the industry to make a profit.

"The Sunshine State should be the leader in solar energy," Brandes said. "This legislation is designed to remove barriers to businesses so that they can enter this growing renewable energy market. Reducing burdensome taxes is a key component to fostering the solar energy market in Florida."

Brandes' legislation is one of a growing number of efforts to change Florida policy in regard to solar.

What the solar industry really wants is a change in the state Constitution to allow solar producers to sell the power they generate directly to consumers.

Under current state law, only utilities can sell directly to consumers. That means a landlord of a shopping mall or even a residential landlord that has installed solar panels on the roofs of their properties cannot sell the electricity to their tenants.

Changing the law could undermine the utilities' business model and take revenue away from the power companies.

But a coalition of conservatives, liberals, retailers and environmentalists are circulating petitions to amend the Constitution if state lawmakers choose not to address the issue.

The unusual case of tea party and Christian Coalition conservatives making peace with liberal environmentalists shows how, at the grass roots level, demand for solar appears to be growing.

But the alliance of solar backers fears that utilities and conservative oil magnates the Koch Brothers (a major supplier of fuel for Florida power plants) will wage a fierce war against solar proponents' efforts.

In particular, backers said they expect the utilities to try to increase fees charged to solar owners to remain connected to the grid.

"It's great that they're offering to reduce the taxes," said Scott McIntyre, president of the Florida Alliance for Renewable Energy, and a solar contractor. "But this is a nice, interim, tiny step."



*Jeff Brandes, R-St. Petersburg, says Florida needs to be a leader in the solar power industry.*

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### **Protec Fuel Opens First E15 Ethanol Station in South Florida**

Protec Fuel opened an E15 fueling station in North Miami on Wednesday. Caraf Oil is the first station in South Florida to offer the ethanol-gasoline blend, according to the company.

Boca Raton-based Protec plans to open 28 E15 fueling stations in Florida and other Southeastern states.



*E15 is 15 percent ethanol, 85 percent gasoline and can be used in cars made in 2001 and later.*

E15 is 15 percent ethanol, 85 percent gasoline. Until recently, the Environmental Protection Agency limited motor vehicle fuel to 10 percent ethanol or less. E15 can be used in vehicles made in 2001 and later but can damage older engines.

The 85 percent ethanol fuel E85 is more widely available. In fact, the [U.S. Department of Energy's](#) Alternative Fuels Data Center [does not yet track E15 stations.](#)

"We wanted to be the first in South Florida to offer E15 since we have had success with customers with E85," Caraf Oil owner [Edwin Flores](#) said in a news release.

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### **Pembroke Pines Company to Monitor New York Mets' Energy Use**

A Pembroke Pines energy monitoring company was selected to help the New York Mets ballpark go green, the firm announced Thursday.

Entic will use its real-time analytics technology to keep track of energy use at CitiField Stadium. The Mets partnered with the Environmental Protection Agency to try to decrease the organization's environmental impact.

"We're honored to have the opportunity to work with the Mets and to demonstrate how we can help CitiField meet its goal of further reducing its carbon footprint," Entic CEO Carlos Diaz said.

The company also monitors the Miami Marlins' energy use.

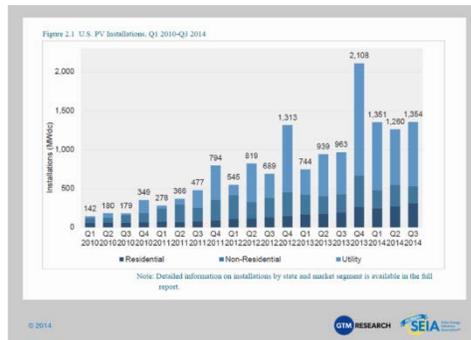
[Diaz was honored](#) as one of the *South Florida Business Journal's* 40 Under 40 earlier this year, when he said his ultimate career goal was to start an incubator to help fund South Florida tech companies.



*Mets games will now be broadcast on Clear Channel's 710 WOR AM.*

### United States Installs 1,354 MW of Solar in Q3 2014

Continuing its strong growth, the United States installed 1,354 megawatts (MW) [i] of solar photovoltaics (PV) in Q3 2014, up 41 percent over the same period last year. The numbers come from the latest edition of GTM Research and the Solar Energy Industries Association's (SEIA) U.S. Solar Market Insight Report, released today. According to the report, Q3 was the nation's second largest quarter ever for PV installations and brings the country's cumulative solar PV capacity to 16.1 gigawatts (GW), with another 1.4 GW of concentrating solar power (CSP) capacity.



Solar is proving to be an important and growing source of new generating capacity for the United States. Through the first three quarters of the year, solar represents 36 percent of new capacity to come on-line, up from 29 percent in 2013 and 9.6 percent in 2012.

"Solar's continued, impressive growth is due, in large part, to smart and effective

## U.S. Energy News

public policies, such as the solar Investment Tax Credit (ITC), Net Energy Metering (NEM) and Renewable Portfolio Standards (RPS)," said Rhone Resch, SEIA president and CEO. "By any measurement, these policies are paying huge dividends

for America. Every three minutes of every single day, the U.S. solar industry is flipping the switch on another completed solar project, benefitting both our economy and the environment.”

The report tracks installations across three market segments: utility-scale, residential and non-residential which includes commercial, government and non-profit installations.

Historically, the U.S. utility-scale market segment has accounted for the majority of PV installations, and this past quarter continued the trend. The U.S. installed 825 MW of utility-scale projects, up from 540 MW in Q3 2013. This marks the sixth straight quarter in which utility-scale PV has accounted for more than 50 percent of the national total.

The U.S. residential market exceeded 300 MW in a quarter for the first time in history. Impressively, more than half of this total came online without any state incentive. Residential continues to be the most reliable market segment, now growing 18 out of the past 19 quarters. GTM Research forecasts it to exceed the non-residential segment in annual installations for the first time in more than a decade.

“Residential solar has become a remarkably consistent, growing market” said Shayle Kann, Senior Vice President at GTM Research. “By the end of this year there will be more than 600,000 homes outfitted with solar, and we see no signs of a slowdown next year. By 2017, we expect the residential sector to be the largest in the U.S. solar market.”

The non-residential market continues its struggles of late, due in part to incentive depletion in California and Arizona. Installations in the segment were down 3 percent over Q3 2013. However, GTM Research and SEIA do expect year-over-year growth for the non-residential market.

The report forecasts the U.S. to install 6.5 GW of PV in 2014, a 36 percent increase over the historic 2013.

#### **Key findings from the report:**

- The U.S. installed 1,354 MW of solar PV in Q3 2014, up 41 percent over Q3 2013, making it the second-largest quarter for solar installations in the history of the market.
- Cumulative operating PV capacity has now eclipsed the 16 GW mark, thanks to four consecutive quarters of more than 1 GW installed.
- For the first time ever, more than 300 MW of residential PV came on-line in a single quarter and more than 50 percent of residential PV came online without any state incentive.
- 36 percent of all new electric generating capacity in the U.S. through the first three quarters of 2014 came from solar.
- Growth remains driven primarily by the utility solar PV market, which installed 825 MW in Q3 2014, up from 540 MW in Q3 2013.
- The report forecasts that PV installations will reach 6.5 GW in 2014, up 36 percent over 2013 and more than three times the market size of just three years ago.
- Q1 2014 was the largest quarter ever for concentrating solar power (CSP), due to the completion of the 392 MW Ivanpah project and Genesis Solar project’s second 125 MW<sub>ac</sub> phase. While no CSP plants came on-line in Q3

2014, Abengoa's Mojave Solar (250 MW) achieved commercial operation in December 2014, making 2014 the biggest year ever for CSP.

### SolarPuff Lantern is Inspired by Origami and an Earthquake

Alice Min Soo Chun, a designer and professor at the Parsons New School for Design, wanted to design something that could be used in relief efforts after a 2010 earthquake hit Haiti. After years of research, she invented the SolarPuff, a foldable lantern inspired by the principles of origami.

Small-scale solar panels promise many off-grid applications for renewable energy, and the SolarPuff is a particularly elegant example. This solar-powered lantern folds flat and weighs just 2.3 ounces. It pops open easily to disperse the light from its ring of LEDs, without a harsh brightness.



"One of the things I realized in disaster relief is that you need something that is very portable and lightweight," said Chun. Because the SolarPuff folds flat, one can pack dozens into a box that would carry only a few flashlights. And because its lithium-ion battery is re-charged with a thin solar panel, there's no need for extra batteries. It charges in about 4 hours and lasts for 8 to 10.

The lantern is water-proof, so it can be used outside in stormy conditions—or for more enjoyable water activities. "My son uses it in the bathtub," said Chun. "It will float where other flashlights and lanterns will sink."

In fact, the SolarPuff has many potential applications. In addition to providing light after a disaster, it can also be a replacement for kerosene lamps, which [contribute to global warming and create unhealthy indoor air conditions](#). It could also be an off-grid light solution for the 1.6 billion people around the world who don't have access to electricity.

"The thing that's great about the solar puff is that it answers an immediate need right now for people that need access to light," said Chun.

The light's simple cube design makes it attractive to anyone who wants a sustainable light for their home or for camping. "I'm really excited about the outdoor market and camping market, and the decor indoor market as well," said Chun.

Chun is a co-funder of [FAARM](#), a non-profit design collective that works to help underserved communities in a number of ways. The SolarPuff is FAARM's first product, Chun said. "The solar puff answers the question of one of the basic human necessities: light. But we hope to help develop local economies in areas where we distribute them as well."

The SolarPuff is currently available in Japan and the U.S., and can be purchased from [Solight Designs](#) for \$30.00. Chun said they plan to use a buy-one-give-one

model similar to Tom's shoes, so that a purchase in the U.S. will subsidize a donation in Haiti or a similar area.

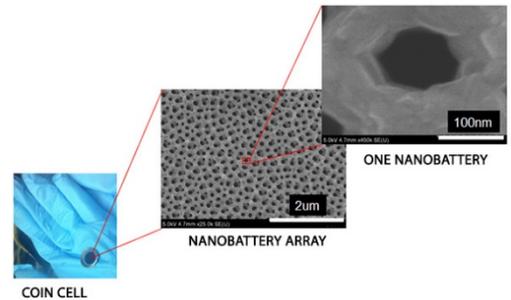
Keeping in line with FAARM's goals, Chun wanted to create something as beautiful as it is functional. "Even when you're impoverished, you still appreciate beauty and design."

Click [here](#) to view video.

## Nanopore: The Hole Story

Scientists at the University of Maryland have developed a tiny but powerful battery prototype, which uses a hole in a ceramic base for its innovative and unique design.

The miniaturization of battery components and the race to develop faster-charging batteries took another step forward recently, when academics at the University of Maryland published a paper outlining their research into a nanopore battery configuration. The article described the battery as "Composed of an array of nano-batteries connected in parallel, each composed of an anode, a cathode and a liquid electrolyte confined within the nanopores of anodic aluminium oxide, as an all-in-one nanosize device".



The nanopore is a tiny hole in a ceramic sheet that holds electrolyte (lithium salt (LiPF<sub>6</sub>) dissolved in organic electrolyte) to convey electrical charge between nanotube electrodes at either end. The ceramic material is alumina (Al<sub>2</sub>O<sub>3</sub>). It's grown on an aluminum foil by electrochemical method. During the process, highly ordered hexagonal nano-size holes are formed in the alumina. It's then released to become a free-standing membrane with honeycomb-like holes.

Scientist and lead author, Chanyuan Liu, explained that all the components of the battery are built inside a nanopore, with anode and cathode at each end. "So lithium ions can be shuttled between them through the nano-tubular channel and store energy. Billions of these identical nano-batteries are connected in parallel to be used at the same time."

The nanoscale architecture of the device is a unique design responsible for the success of the battery. Thin, high-surface-area electrodes reduce electron and ion transport time inside energy storage materials. And since the distance between anode and cathode is short and straight, the time it takes for lithium ions to travel between them is also minimized. Furthermore, each nanopore is identical in shape, enabling the tiny thin batteries to be packed efficiently.

Although micro or nano-sized batteries have been developed previously, Liu said her team's idea and design was completely different. The fabrication process has been challenging and although large-scale production of ceramic membrane has been realized by industry, and the coating method is scalable, it is expensive.

The battery has the potential to power devices that require fast charging, but small electronic devices hold most promise considering the massive production costs to

power large equipment.

Patent applications have been initiated, but it is too early to for Liu to talk about a product coming to market; however, when it does it is likely to be even more powerful than the current design. "This battery is only a prototype," she pointed out. "It's promising to be further optimized with more energy and power density."

The US DOE Office of Science-funded research was supported as part of Nanostructures for Electrical Energy Storage (NEES), one of 32 Energy Frontier Research Centers in the USA.

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## Why It's Taking The U.S. So Long To Make Fusion Energy Work

Hidden in the woods two miles from Princeton University's main campus sits a drab white building easily mistakable for a warehouse. Inside is one of the Ivy League school's most expensive experiments: a 22-foot-tall metal spheroid surrounded by Crayola-colored magnets. About half a dozen blue beams ring the sphere horizontally, while another set, painted red, rise vertically from the floor to wrap the contraption, like fingers clutching a ball.



*A researcher examines the National Spherical Torus Experiment.*

Last fall, construction workers hustled to finish an upgrade to yet another magnet, this one jutting through the center of the sphere like a Roman column. On a recent November afternoon, Michael Williams, the lab's head of engineering, weaved his way through workers and up a stainless steel scaffolding to get a better view.

"Fusion is an expensive science, because you're trying to build a sun in a bottle," Williams said.

This endeavor in the New Jersey woods, known as the National Spherical Torus Experiment, was created to study the physics of plasma, in the hopes that one day humans will be able to harness a new source of energy based on the reactions that power stars. The project has been shut down for two years to undergo an upgrade that will double its power. The improvement costs \$94 million, and is paid for -- like the rest of the Princeton Plasma Physics Lab -- by the U.S. Department of Energy.

Impressive as it may appear, this experiment is small compared to what once stood there. Earlier in the day, while walking over to the site from his office, Williams pointed out a sign on the National Spherical Torus Experiment building that read "TFTR." The abbreviation stands for Tokamak Fusion Test Reactor, a bigger, more promising fusion experiment that was scrapped in the mid-1990s.

"I keep telling them to take that down," he said.

The history of the U.S. Department of Energy's magnetic fusion program is littered with half-completed experiments and never-realized ideas. Currently, the most

ambitious project in all of fusion work is the International Thermonuclear Experimental Reactor, or ITER, a collaborative scientific effort backed by the European Union and six other nations, including the United States. Once it's built in southern France, ITER will be largest fusion reactor ever. The plans for this project dwarf the three similar U.S. fusion experiments, including the one at Princeton, in both scale and expense.

But ITER is sputtering with delayed construction and ballooning costs, and U.S. physicists are increasingly worried that their work at home, such as the National Spherical Torus Experiment, will be sidelined to fund the international project. They see the domestic research as crucial to understanding the nature of the plasma used in certain fusion reactions -- crucial, even, to getting facilities like ITER built in the first place. Meanwhile, critics view magnetic fusion research as a money-wasting boondoggle that will never be able to produce energy as cheaply as methods like solar and wind power.

After the visit to the facility, Williams returned to his office and I met with his boss, Stewart Prager, the head of the Princeton lab. Sitting in a tidy glass-paneled office overlooking the woods, he recalled an old joke about fusion -- it was "30 years away 30 years ago, and it's 30 years away now" -- and explained why the quip has taken hold.

"The true pioneers in the field didn't fully appreciate how hard a scientific problem it would be," he said.

But then he added: "Even having said that, if you look back at documents from the past, they laid out how much it would cost. That amount of money was never nearly delivered."

Fusion scientists make an incredible proposition: We can power our cities, they say, with miniature, vacuum-sealed stars. According to those who study it, the benefits of fusion power, if it ever came to fruition, would be enormous. It requires no carbon drawn from the ground. Its fuel -- hydrogen harvested from seawater -- is inexhaustible. It emits no gases that warm the planet. And unlike its cousin fission, which is currently used in nuclear power plants, fusion produces little radioactive waste, and what it does produce can be recycled by the reactor.

The only hurdle, as many U.S. physicists tell it, is the billions of dollars needed before the first commercially viable watt of power is produced. Researchers lament the fact that the U.S. hasn't articulated a date for when it hopes to have fusion go online, while China and South Korea have set timetables to put fusion online in the 2040s.

A so-called magnetic confinement fusion reactor would work by spinning a cloud of hydrogen until it reaches several hundred million degrees Celsius -- at which point it would be so hot that no known material could contain it. Instead, high-powered magnets in a vacuum would envelop the ring of hydrogen plasma.

Spun with enough heat and pressure, the positively charged hydrogen atoms, stripped of their electrons, would begin to overcome their usual tendency to stay apart. They would fuse into helium, spitting out an extra neutron. When those neutrons embed into a surrounding blanket of lithium, they would warm it enough to boil water, spin a turbine and make electricity. The long-term goal is to create a self-sustaining reaction that produces more energy than is put in.

The oil shortages of the 1970s kick-started federally funded fusion research. When petroleum-pumping nations in Middle East turned off the spigot in 1973 and then again in 1979, much of the world, including the U.S., was rattled by gas shortages and high prices. With Americans waiting in mile-long lines to fill up their tanks, there was a keen national interest in finding any fuel to replace oil.

The crises prompted Congress and President Jimmy Carter to create the Department of Energy, which immediately began to channel funding into alternative energy programs, including fusion. By the end of the '70s, experimental reactors were being built at the Massachusetts Institute of Technology and at Princeton -- including the latter's Tokamak Fusion Test Reactor, the "TFTR" whose outdated sign Michael Williams now walks past.

Adjusted for inflation, the U.S. was spending over \$1 billion per year on magnetic confinement fusion research by 1977, according to Department of Energy figures collected by Fusion Power Associates, a nonprofit that promotes fusion research. But by the time Ronald Reagan was elected president in 1980, gas prices had dropped. Eyeing cuts to government spending, Reagan and his Republican colleagues in Congress tightened funding for research into fusion and other alternative energy sources.

"The Republicans hated the Department of Energy because they were messing around with the private sector energy business," said Steve Dean, a former Department of Energy official who oversaw fusion experiments in the 1970s and now runs Fusion Power Associates.

In 1984, however, as the Cold War thawed, Reagan inked a deal with the Soviet Union, along with Europe and Japan, to fund and build what would become ITER. India, China and South Korea would eventually sign up as well. And even with the downturn in U.S. funding, investments made in the '70s started paying off. In 1994, Princeton's TFTR produced what was then a record-breaking 10 megawatts, enough energy to keep 3,000 homes lit for... well, for nearly a second.

Actually, less than one second of power is a bigger deal than it might at first seem. Fusion research can only advance in baby steps across generations of scientists, say experts. First, their goal is to build a multimillion-dollar reactor capable of sustaining plasma for a second. Then, perhaps within a decade of achieving that, their goal is to construct yet another reactor that keeps the plasma going for a minute. It's all part of a painstaking march toward creating a self-sustaining reaction that lasts indefinitely.

"One would have expected these ground breaking results to lead to an upsurge on fusion funding in the U.S.," said Dale Meade, the former deputy director of the Princeton lab, in an email to HuffPost. "It didn't."

Several months later, in Washington, D.C., then-Rep. Newt Gingrich (R-Ga.) gavelled in his first session as Speaker of the House. The GOP-led Congress soon slashed spending yet again in order to balance the federal budget.

"It was a lot of people losing their jobs and being knocked out of the field," said Raymond Fonck, an experimental fusion physicist at the University of Wisconsin who did some work on TFTR. "Some people left the field out of disgust."

Overnight, funding for magnetic fusion research fell by 33 percent -- some \$173 million in today's dollars. Princeton's TFTR was shut down. Plans for a new machine

to be built where TFTR stood were postponed indefinitely. (Today, the National Spherical Torus Experiment stands on that site.) And the U.S. pulled out of its agreement to help fund ITER, citing cost concerns -- only to [rejoin a few years later](#).

The magnetic fusion program "never really recovered from that budget cut," said Meade.

With less money available, the Department of Energy went ahead and funded a less expensive experiment at Princeton that became the National Spherical Torus Experiment, which began operating in 1999. All the while, Europe maintained its magnetic fusion program, and China and South Korea each started programs of their own. (In fact, designs for the scrapped U.S. experiment were eventually incorporated into reactors built in both countries.)

Magnetic fusion researchers received \$505 million from the federal government for the 2014 fiscal year -- about half of what they used to get, when adjusted for inflation. About \$200 million of that pot went overseas to help build ITER.

And even with the downturn since the 1980s, critics still say the program receives too much funding given that it has yet to build an economically viable reactor.

"The magnetic fusion energy program is one of these programs that gets a steady flow of money like clockwork, although it may not receive on a constant dollar basis what it used to," said Robert Alvarez, a former senior policy adviser for the Energy Department who now works at the Institute for Policy Studies, a Washington think tank. "But it still commands a great deal of money in the energy research and development portfolio. You've got to ask yourself: When is it time to fish or cut bait on this?"

Alvarez and other skeptics believe that magnetic fusion will never be inexpensive enough to compete with other sustainable energy sources, because new fusion reactors require billions of dollars to build and decades to complete.

"At \$10 to \$20 billion a pop, it just doesn't lend itself to innovation like wind or solar," said Thomas Cochran, a consultant with the Natural Resources Defense Council. He added that the "people who are closest to the technology" are unable to see the dead ends.

While money for magnetic fusion was cut during the '90s, funding for an alternate form of fusion, called inertial confinement fusion, took a dramatic leap. After the U.S. signed a treaty banning nuclear weapons testing, Congress paid for the construction of the world's largest laser 40 miles east of San Francisco, designed to compress a pellet of hydrogen with enough heat and pressure for its atoms to fuse into helium.

The laser-based approach to fusion is meant to offer both a potential new energy source and a way to develop hydrogen bombs without actually blowing anything up. Its early years, however, have not been entirely trouble-free. After falling five years behind schedule, going three times over budget and failing to achieve its 2012 goal of producing a self-sustaining reaction, the laser was labeled a fiasco by critics. Finally, though, the lab was able to [produce](#) its first significant fusion reaction in 2013.

Although magnetic fusion is further along, the stumbles of inertial confinement may have given all of fusion research a black eye. With magnetic fusion, the Department of Energy is under yet another budgetary constraint today. Eleven years behind schedule and crippled by decentralized management, ITER is becoming increasingly expensive. The U.S. is obligated to fund about 9 percent of the project, and what was once a \$1 billion commitment is swelling beyond the \$4 billion mark.

With Congress gridlocked, the money must come from within the department. In October, a Department of Energy advisory committee floated the idea of shutting down the fusion reactor at MIT, and, if necessary, shutting down one of the two other experimental reactors in the U.S. (the one at Princeton or another at General Atomics in San Diego). Even though the resolution was non-binding, the decision [drew the ire](#) of many fusion physicists. Fifty experts signed an emphatic letter to the department saying that the "underlying strategic vision that guides this report is flawed."

"The DOE is committed to creating opportunities for its fusion researchers to assert strong leadership in the next decade and beyond," said Ed Synakowski, the associate director at the Department of Energy who oversees fusion funding. He said that while the department has proposed closing the MIT lab, it would close one of the other two reactors only under dire budgetary conditions.

Earlier this year, the Obama administration slated the reactor at MIT for closure. [An aggressive lobbying effort](#) by Massachusetts politicians was the only thing that kept it open.

The possible closures have put the fusion community on edge. But what some find more worrying is the idea that the young scientific minds needed to tackle this multi-generational problem will instead look for careers in disciplines that are better funded and more stable.

"The older generation," said Fonck, "we get concerned that the younger generation will say, 'Well, there's no jobs in this field.'"

## 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-0001245](#): Support of Advanced Coal Research at United States Colleges and Universities**

Application Due Date: 3/6/2015

**[DE-FOA-0001235](#) - Lab & Bench-Scale Applications for R&D of Transformational CO2**

Application Due Date: 03/09/2015

**DE-FOA-0001247 - Enabling Technologies for Advanced Combustion Systems (ACS)**

Application Due Date: 03/13/2015

**DE-FOA-0001195 - Physics of Reliability: Evaluating Design Insights for Component Technologies in Solar 2 (PREDICTS2)**

Submission Deadline for Full Applications: 03/12/2015

**ANNOUNCEMENT: Availability of the Engineered High Energy Crop (EHEC) Programs Draft Programmatic Environmental Impact Statement (or Draft PEIS) (DOE/EIS-0481)**

**Draft PEIS Available: DOE welcomes comments on the EHEC Programs Draft PEIS during a 60-day comment period ending on March 17, 2015.**

**DE-FOA-0001250 - Exploratory Research for Extreme-Scale Science**

Application Due Date: 03/19/2015

**DE-FOA-0001108 - Sustainable and Holistic Integration of Energy Storage and Solar PV (SHINES)**

Application Due Date: 3/19/2015

**DE-FOA-0001246 - Offshore Storage Resource Assessment**

Application Due Date: 3/26/15

**DE-FOA-0001238 - Transitional Technology Development to Enable Highly Efficient Power Systems with Carbon Management**

Application Due Date: 3/30/15

**DE-FOA-0001213 - FY2015 Vehicle Technologies Office Incubator**

Application Due Date: 03/30/2014, 5:00pm EST

**DE-FOA-0001201 - Fiscal Year 2015 Vehicles Technologies Program**

Application Due Date: 04/10/2015

**DE-FOA-0001276 - Computational Materials**

Application Due Date: 4/17/2015

**DE-FOA-0001225 - Sunshot Technology to Market (Incubator Round 10, Solarmat Round 2, Sunpath Round 2)**

Application Due Date: 4/22/15

**DE-FOA-0001269 - Topical Collaborations in Nuclear Theory**

Application Due Date: 04/30/2015

**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)

**H2 Refuel H-Prize Competition**

Deadline: October 31, 2016

**DE-FOA-0001182 - Marine and Hydrokinetic Systems Performance Advancement II (SPA II): Component Metric Validation**

**DE-FOA-0001255 - Micro-Scale Optimized Solar-Cell Arrays with Integrated Concentration (MOSAIC)**

Submission Deadline for Application: TBD

**DE-FOA-0001256 - Micro-Scale Optimized Solar-Cell Arrays with Integrated Concentration (MOSAIC) (SBIR/STTR)**

Submission Deadline for Application: TBD

**ARPA-E - DE-FOA-0001261: OPEN 2015**

Submission Deadline for Full Applications: TBD

**DE-FOA-0001203 - Assisting Federal Facilities with Energy Conservation Technologies, Fiscal Year 2015 (RFI)**

Application Due Date: TBD

**DE-FOA-0001198 - Generators for Small Electrical and Thermal Systems (GENSETS)**

Application Due Date: TBD

**NATIONAL SCIENCE FOUNDATION**

**NSF PD 13-7607- Energy, Power, Control and Networks (EPCN)**

Full Proposal Window: October 1, 2014 - November 3, 2014

October 1 - November 1, Annually Thereafter

Supplement Deadline Date: April 1, 2015

**DEPARTMENT OF AGRICULTURE**

**RDBCP-REAP-2015 - Energy Audits**

Application Due Date: February 12, 2015

**NRCS - Conservation Innovation Grants**

Application Due Date: February 24, 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- February 11, 2015

Undergraduate: May 6, 2015

**STUDENT OPPORTUNITIES**

**Summer Undergraduate Research Fellowships (SURF) (2015-NIST-SURF-01)**

**#BioenergizeME**

Please visit site for more information.

**BUILD Funding Opportunity Announcement**

Concept Paper Submission Deadline: December 19, 2014

Full Paper Submission Deadline: February 11, 2015

**Race to Zero Student Design Competition**

Submissions Due: March 22, 2015

**DOE Office of Science Graduate Student Research (SCGSR) Program**

Application Due Date: 4/14/2015 by 5pm EST

**OTHER**

**AID-SOL-OAA-00005 - Broad Agency Announcement (BAA) for Powering Agriculture: An Energy Grand Challenge for Development (PAEGC) Second Global Innovation Call**

Application Due Date: February 12, 2015 by 4 pm

**ONR-15-SN-0005 - Naval Platform Power and Energy**

Application Due Date: February 16, 2015

**LITECAR Challenge**

Application Due Date: March 6, 2015

**Neutron Sciences Call for Proposals**

Proposal Due Date 4/8/2015 by 11:59 am EST

**BAA-RQKM-2015-0014 - Flexible Hybrid Electronics Manufacturing Innovation Institute**

Application Due Date: May 29, 2015

**N00167-15-BAA-01 - Energy Conservation Applications for the US Navy**

Response Date: November 30, 2016

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

## UPCOMING EVENTS

**2015 ARPA-E Energy Innovation Summit**

February 9, 2015 - February 11, 2015

Gaylord National Resort and Convention Center  
201 Waterfront Street, National Harbor, MD 20745

The ARPA-E Energy Innovation Summit brings together the very best minds in business, academia, and government to advance cutting-edge technologies that could fundamentally change the way we generate, use and store energy.

The 2015 Summit will be held February 9-11 at the Gaylord Convention Center, just outside Washington, DC. Registration is capped to ensure a quality and

productive experience for attendees, so be sure to register early and reserve your spot at the preeminent energy event of the year.

Click [here](#) for more information

### [Discover the Benefits of Free Trade Agreements: NAFTA, Colombia, Panama & South Korea](#)

February 11, 2015

National Entrepreneur Center  
3201 East Colonial Drive, Orlando, FL 32803

Discover how Free Trade Agreements can benefit your company! This seminar will help you understand how the rules and regulations that govern these agreements work, and how you can use these opportunities to build your advantage and "reach" in new and growing markets.

Click [here](#) for more information

### [MiaGreen 2015](#)

February 11, 2015 - February 12, 2015

Miami Airport Convention Center  
Miami, FL

The **MiaGreen Expo & Conference** is the only event in the United States providing access to the ever-growing, non-stoppable green, renewable and sustainable markets *for ALL the Americas*. This annual, well-established, business-to-business event is one-of-a-kind and grows bigger and better every year.

With its unique marketing mix (USA + Latin America & the Caribbean), **MiaGreen** has developed as the *one-stop, all-inclusive, interactive conference and marketplace* for **SUSTAINABILITY**, combining a major trade show with front edge extensive educational and networking programs.

Click [here](#) for more information

## [2015 USDA Agricultural Outlook Forum: "Smart Agriculture in the 21st Century"](#)

February 19, 2015 - February 20, 2015

Crystal Gateway Marriott  
1700 Jefferson Davis Highway  
Arlington, VA 22202

The U.S. Department of Agriculture announced on Dec. 8 speakers for the 2015 Agricultural Outlook Forum, "Smart Agriculture in the 21st Century," to be held from Feb. 19-20, 2015, at the Crystal Gateway Marriott Hotel, Arlington, Va. The forum's plenary speakers and sessions will take a global, modern look at different aspects of today's agriculture industry.

Agriculture Secretary Tom Vilsack and European Commissioner of Agriculture & Rural Development Phil Hogan will engage in a far-ranging roundtable discussion on agriculture. Dr. Richard N. Haass, President of the Council on Foreign Relations, will address "Food, Foreign Policy and International Order." USDA's Chief Economist Joseph Glauber will deliver the 2015 Agricultural & Foreign Trade Outlooks.

Click [here](#) for more information

## [The Energy and Materials Research Conference - EMR2015](#)

February 25 - 27, 2015  
Madrid (Spain)



This conference will provide an excellent opportunity for everyone involved to learn and discuss about the latest research results in materials and processes in the areas of:

- \* Biomass, bioenergy, biofuels
- \* Solar energy
- \* Fuel cells
- \* Hydrogen
- \* Wind power
- \* Geothermal energy
- \* Wave, tidal and hydropower
- \* Nuclear energy
- \* Energy production from fossil fuels
- \* Energy harvesting materials

- \* Energy transmission, distribution and storage
- \* Lighting materials
- \* Energy-efficient buildings
- \* Energy saving and sustainability

In the current situation, where world's energy system is likely to radically change in the next decades, research into materials, processes and systems is currently foreseen as a critical aspect in the development of cleaner and more efficient energy.

Click [here](#) for more information

### [The 32nd International Battery Seminar](#)

March 9 - 12, 2015

Ft Lauderdale, FL

In its 32nd year, the **International Battery Seminar & Exhibit** is the leader in providing key industry speakers to discuss the state of the art of worldwide energy storage technology developments for portable, automotive and stationary power applications. This meeting provides not only broad perspectives, but also informed insights into significant advances in materials, product development and application for all battery systems and enabling technologies. In addition, this meeting is renowned for offering broad networking and exhibiting opportunities to the international battery community. As the longest running annual battery industry event in the world, this meeting has always been the preferred venue to announce significant new developments and showcase the most advanced battery technology.

Click [here](#) for more information

### [Advanced Biofuels Leadership Conference 2015](#)

March 11 - 13, 2015

Washington, DC

ABLCL is the gathering point for the top leaders in the Advanced Bioeconomy - bringing together the entire spectrum of advanced Fuels, Chemicals & Materials CEOs and senior executives, business development, R&D leaders, strategic partners, financiers, equity analysts, policymakers and industry suppliers.

ABLCL looks at key technologies heading for scale, or deploying in force, plus advanced policies and financing strategies - and features definitive statements on direction, priorities, value chain build-out and supply chain selection from more than 100 C-Level execs.

Click [here](#) for more information

### [EnergyWaterFoodNexus Summit](#)

March 26-28, 2015  
Tallahassee, FL

## **ENERGYWATERFOODNEXUS**

The EnergyWaterFoodNexus is a new science enterprise launched at Florida Agricultural and Mechanical University through a global public-private partnership that seeks to provide sustainable and innovative solutions for energy, water and food security. The nexus approach is based on the premise that an action in one sector impacts the other. Therefore, the search for solutions must simultaneously investigate all three elements in a new science enterprise.

The inaugural International Summit in 2015 will connect participants with a growing global network of public and private sector industry thought leaders, innovators, policymakers, corporations, next-generation scholars, researchers and other stakeholders working in the energy, water and food sectors. Unconventional "Idea Hacks" held during the Summit will allow participants from diverse perspectives and disciplines to work together to tackle complex issues surrounding energy, water and food production.

Click [here](#) for more information.

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### [10th Annual Cyber and Information Security Research \(CISR\) Conference](#)

April 7-9, 2015  
Oak Ridge, TN

Cyberspace is fundamental to our national prosperity, as it has become critical to commerce, research, education, and government. Realizing the benefits of this shared environment requires that we are able to properly balance the risks and rewards, understand and communicate threats to security and privacy, and rapidly adapt any resulting approach to a changing adversarial environment.

The 10th Annual Cyber and Information Security Research Conference at Oak Ridge National Laboratory in Oak Ridge, Tennessee will bring together cyber security researchers, program managers, decision makers, security vendors, and

practitioners to discuss many challenging tasks and novel solutions pertaining to cyber security.

Click [here](#) for more information.

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### [OneSpark Crowdfunding Festival 2015](#)

April 7 - April 12, 2015

Jacksonville, FL

The One Spark Speaker Summit presented by Community First Credit Union will bring together some of the most accomplished founders, creatives, makers, and doers from around the country to share their stories with you.

It all takes place just prior to the opening ceremony for the World's Largest Crowdfunding Festival. Join us on Tuesday, April 7, 2015 at the historic Florida Theatre for the One Spark Speaker Summit presented by Community First Credit Union. Bring a friend. Tell a colleague. Let's learn and build something great together. See you there.

Click [here](#) for more information.

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### [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.

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### [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 m<sup>2</sup>  
\*Synergy with numerous energy topics: Wind, solar, hydro and geothermal power, energy storage, power plant efficiency and many more!

Click [here](#) for more information.

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### [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.

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## [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.

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## [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.

The Summit agenda is forth coming and will include:

- Updates on new technologies and advancements in wind energy deployment, including wind potential maps with taller hub height data, and offshore wind development technologies and policies new to the U.S.
- Annual market reports for utility-scale, distributed, and offshore wind
- Plenary sessions and regional breakout discussions
- Updates on national policy and DOE priorities
- Networking opportunities
- Awards recognizing excellence in partnership, education, and leadership

Recognizing that some of our partners will not be able to attend in person, we will broadcast some sessions via live webinar. Whether or not you plan to attend the Summit, please help us celebrate wind-related achievements of individuals and organizations with a WINDEXchange Award. The award categories are:

- Outstanding Wind Leadership in Education Award
- Outstanding Partner Award
- Outstanding Leadership Award
- Novus Ventus (New Wind) Award

Past award winners can be found at [wind.energy.gov/windexchange](http://wind.energy.gov/windexchange) under "Information Resources".

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National Renewable Energy Laboratory

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### [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.

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### [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.

Each year this international conference, the largest single event of its type, brings together industry professionals in the power generation field with a primary focus on instrumentation and controls. We anticipate over 50 technical papers/presentations during sessions with fossil, nuclear, and renewables focus, presented over a 3 day period. Additional schedule items include keynote messages from industry leaders, ISA and industry training sessions, EPRI I&C Interest Group Meeting, ISA I&C Standards working group meetings, Honors and Awards Banquet, and vendor exhibits by key suppliers. There will also be an Opening Night Reception.

Click [here](#) for more information.

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### [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.

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### [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.

Last year more than 900 thought leaders from industry, government, and academia attended the 2014 EIA Energy Conference. Participants discussed current and future challenges facing domestic and international energy markets and policymakers.

In the coming months, EIA will post additional information regarding the 2015 EIA Energy Conference, including confirmed keynote speakers, topic session participants, and a complete conference schedule. To be added to the mailing list to receive conference updates and additional information, email EIA at [conference@eia.gov](mailto:conference@eia.gov) or follow EIA on Facebook and Twitter.

Session topics include:

- Effects of changing world oil prices: production, economy, and geopolitics
- North American energy markets
- The role of emerging energy storage technologies in electricity markets
- Natural gas: domestic and global markets
- Greenhouse gas emissions: power and methane
- Developments in hydrocarbon gas liquids markets
- Electric distribution markets in the 21st century
- Energy by rail and water
- Energy infrastructure needs and options

Residential and commercial energy consumption.

Click [here](#) for more information.

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## [Waste Conversion Technology Conference & Trade Show](#)

August 17 - 19, 2015  
San Diego, CA



Waste Conversion Technology Conference & Trade Show

August 17-19, 2015  
Hyatt Regency Mission Bay Spa & Marina  
San Diego, California, USA

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.

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### [The Battery Show and Critical Power Expo](#)

September 15 - 17, 2015  
Novi, Michigan



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.

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### [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.

The symposium will cover a wide range of topics (such as life cycle assessment, business eco-systems, building Information modeling, sustainability, building components and systems, high performance buildings and big data technology) in multiple disciplines including, but not limited to, architecture, computer science, construction, economics, engineering, management, sociology, psychology and urban planning. Keynote presentations, technical sessions and poster sessions will be organized. All accepted papers will be published in the symposium proceedings.

Click [here](#) for more information.

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### [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.

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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](http://www.floridaenergy.ufl.edu)