



Florida Energy Systems Consortium

February 2016 Issue

FESC Highlights

Florida Energy News

U.S. Energy News

Funding Opportunities

Upcoming Events

Florida Institute for Cybersecurity Research Annual Conference | February 9 - 10, 2016 | Gainesville, FL

DistribuTECH | February 9 - 11, 2016 | Orlando, FL

ABLC 2016 | February 17 - 19, 2016 | Washington, DC

ARPA-E Energy Summit | February 29 - March 2, 2016 | Washington, DC

PURC Annual Conference | March 16 - 17, 2016 | Gainesville, FL

2016 Energy Solutions Conference | March 23 - 24, 2016 | online access

Palm Beach International Agricultural Summit | May 4, 2016 | West Palm Beach, FL

Better Buildings Summit 2016 | May 9 - 11, 2016 | Washington, DC

ESCC 2016: 3rd International Conference on Energy Sustainability and Climate Change | July 10 - 16, 2016 | Marathon, Athens, Greece

EV Transportation and Technology Summit | October 18-19, 2016 | Cocoa, FL

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WORLD NEWS

Denmark Broke World Record For Wind Power in 2015

Denmark produced 42% of its electricity from wind turbines last year according to official data, the highest figure yet recorded worldwide.

The new year-end figures showed a 3% rise on 2014, which was itself a record year for Danish wind energy generation.

The country's minister for energy, utilities and climate, Lars Christian Lilleholt, called the record significant and said: "Hopefully, Denmark can serve as an example to other countries that it is possible to have both ambitious green policies with a high proportion of wind energy and other renewables in the energy supply, and still have a high security of supply and competitive prices on electricity."

Two Western Danish regions - Jutland and Funen - supplied more electricity than the area's inhabitants consumed for the equivalent of 60 days of the year.

"The fact that we are now generating surplus power 16% of the time in the Western Danish power grid illustrates that... we can benefit from imports and exports across borders to an even greater extent," said Carsten Vittrup, an adviser to Energinet, Denmark's transmissions systems operator.

One of the main reasons for the record-breaking year was that 2015 was a particularly



windy year. If two large onshore windfarms at Anholt and Horns Rev 2 had not been out of action, wind would have made up 43.5% of total power, Energinet said.

As it was, wind turbines provided 55% of the electricity in Denmark's west, and 23% in its east.

Wind power in Denmark

On one day, 2 September, Denmark operated without any central power stations being switched on at all, using electricity exclusively from wind turbines, solar cells, local combined heat and power plants and imports from neighbouring countries.

On another windy day in July, Denmark produced so much electricity that it was able to meet all its electricity needs [and export another 40% of its power abroad](#).

The Scandinavian country's surplus wind energy is mostly sold to consumers in Norway, Sweden and Germany, while it imports hydroelectric power from Norway and solar energy from Germany.

The Danish government looks to be well on the way to meeting its goal of producing half of all electricity from wind by 2050, [despite mooting a scale back of ambitions](#) over the summer.

Reacting to the new figures, the European Wind [Energy](#) Association (Ewea) called for a renewed focus on how large amounts of electricity could be integrated into Europe's power systems.

"These figures show that we are now at a level where wind integration can be the backbone of electricity systems in advanced economies," said Kristian Ruby, Ewea's chief policy officer.

Half of the World's Newest Power Plants Are Using Renewable Sources



Nearly half of all the world's [power plants](#) brought online in 2014 produce their energy by renewable means. No longer a niche market, rapidly expanding green energy is set to become the world's main source of electricity within twenty years.

The International Energy Agency (IEA) says that green energy is currently the second-

largest source of the world's electricity, and it is gaining ground against its non-renewable and more polluting fossil fuel counterparts. A record high of 130 GW of renewable energy capacity was added to the power sector in 2014, in part due to supportive government policies and [subsidies for solar](#) and wind projects. While coal is

still the world's most relied-upon fuel for power plants, there has been a clear shift towards cleaner renewable energy sources, according to IEA's World Energy Outlook 2015 report, published in November. They predict that at the current rate of the industry's growth, renewables-based generation will reach 50% in the European Union, 30% in China, and 25% in the United States and India by 2040.

Global economic growth is expected to continue at current rates, and energy demand will grow by nearly one-third between now and 2040, according to the IEA report. They predict that China will soon reach a plateau of economic growth, and their demand for coal will remain stable or decrease in the next decade, but there will be dramatic increases in the energy demands of other countries in the developing world, like India and Indonesia. By 2040, Asia will be the consumer of up to 80% of all regionally traded coal and oil. But even as they pour more energy into their growing economies, many of those nations are also working towards better energy efficiency, adopting new technologies and government policies that aim to reduce energy waste. With improved efficiency and a global and regional shift towards wind and solar energy, we can expect a dramatic reduction in the rate of growth of energy-related carbon emissions coming from the energy industry.

Even so, emissions are expected to continue rising, with a global average temperature increase of almost 3C predicted by 2100. That temperature rise would have global implications: changing weather patterns and a rise in sea level will affect agriculture and increase water scarcity in many regions. The IEA report suggests that a "major course correction" will be necessary in order to reverse that trend and reach the world's climate goals. The report also warns that measures towards energy efficiency and the shift towards renewable energy could be undercut by consistently low oil prices. With cheap fuel giving less incentive to developing economies to reduce their oil consumption, up to 15% of the potential energy savings from efficiency measures would be lost. Up to \$800 billion of energy efficiency investments planned for the next 25 years could be discouraged if the price of oil remains low.

The price alone, though, isn't enough to cripple green energy's rise to the top spot in energy production: continued subsidies and government policies that benefit oil and coal companies are keeping the playing field uneven and putting green competitors at a disadvantage. It says something about current global attitudes towards climate that green energy power plants are being built so quickly despite the cheap appeal of the status quo.

Six Stories Show Renewable Energy Underpins A Climate-Friendly Future

In 2015 the world saw great momentum for climate action, culminating in a historic agreement in December to cut carbon emissions and contain global warming. It was also a year of continued transformation for the energy sector. For the first time in history, a global sustainable development goal was adopted solely for energy, aiming for: **access to affordable, reliable, sustainable and modern energy for all.**

To turn this objective into reality while mitigating climate change impacts, more countries are upping their game and going further with solar, wind, geothermal and other sources of renewable energy. As we usher in 2016, these stories from around the world present a flavor of how they are leading the charge toward a climate-friendly future.

1: Morocco is rising to be a “solar superpower.” On the edge of the Sahara desert, the Middle East’s top energy-importing country is building **one of the world’s largest concentrated solar power plants**. When fully operational, **the Noor-Ouarzazate power complex** will produce enough energy for more than one million Moroccans and reduce the country’s dependence on fossil fuels by 2.5 million tons of oil.

2: In Bangladesh, the number of solar-powered homes is surging, making it the world’s fastest expansion of solar energy. About 3.5 million homes—or 18 million Bangladeshis— now have electricity thanks to solar home systems. This means that besides reducing carbon emissions, these systems will help children at home, make it safer for women to walk at night, assist families to **receive remittances more easily**, and help more people **find jobs**.

3: China is turning 800 primary and middle schools in Beijing into “sunshine schools.” Once the project is completed, the rooftops of these schools will be covered with 100 megawatts of solar panels to power classrooms for teachers and students, making way for bluer skies and healthier air for local residents and more awareness about the environment in young hearts and minds. This will also help bolster China’s efforts to scale up renewable energy and reach its ambitious **climate targets set at COP21**.



4: Mexico’s efforts to promote more efficient household lighting have gone nationwide. The country has **achieved an energy efficiency milestone** by distributing almost 23 million energy-saving light bulbs for free. More than 5.5 million Mexican families **now use energy-saving lamps**. This helps these families save up to 18 percent on their electricity bill, and prevents an estimated 1.4 million tons of CO2 emissions each year.



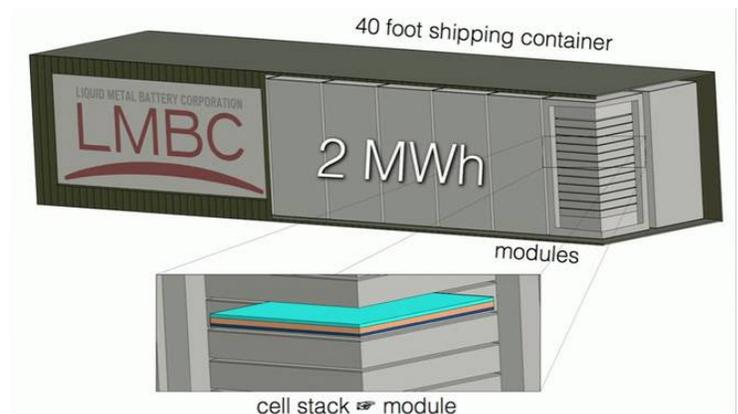
5: Tanzania holds immense potential in solar and wind power, according to an **energy mapping study** taking place in 12 countries. The study finds that the country has solar resources equivalent to Spain's and its potential for wind power exceeds that of the U.S. state of California. What does that mean for those who lack electricity access in Tanzania? One potential success story is the hundreds of rural water points that will soon **be powered by solar energy**, making it more affordable for farming communities to operate and maintain rural water systems.

6: Turkey has achieved a substantial growth of renewable energy in recent years. Since 2001, the country has commissioned 16,000 MW private sector hydro, wind, geothermal and other renewable sources. Today, more private investment continues to pour into Turkey to propel its power sector modernization. Supported by the Clean Technology Fund, private sector renewable energy and energy efficiency projects financed by EBRD, IFC and the World Bank are helping avoid an estimated 5 million tons of CO2 emissions each year.

Similar results are being achieved in **India, Kenya, Mongolia** and many other countries around the world. Now that the climate deal has been struck, it's time for countries to scale up action to make their economic development more sustainable and fully **climate operational**.

Energy Storage Cost to Drop 70% Over the Next 15 years, Predicts World Energy Council

The world of tomorrow *has* to be powered by clean and renewable sources of energy. We simply can't keep pumping toxins in the air that we breathe and messing with the composition of the atmosphere. But to get there, we not only need continued **exponential growth in wind and solar power**, but also lots and lots of energy storage capacity. Eventually.



It's not as crucial right now because **intermittent sources of power** are still a relatively small percentage of the total, but if we want to go much higher, at some point soon we'll need smarter power grids that can quickly shift energy from regions where there is a surplus to those that have a deficit *and* the capacity to store energy surpluses to act as a buffer against variability. Getting to that point is the holy grail of decarbonizing the electricity on which so much depends.

A new report by the World Energy Council provides some reassurances that this is a realistic scenario. The study, which is based on the work of over 20 industry experts and looks at the many new technologies that are in the R&D pipeline, forecasts that the storage costs of energy are projected to fall as much as *70% over the next 15 years*. That's a massive difference, especially since the cost of wind and solar should also keep falling rapidly during the same period. In the near to medium term, nothing else will be cost competitive with a mix of renewables + storage.

The report also explains why the costs of storage are actually cheaper than they appear because of bad methodology: "We found clear indications that a narrow focus on costs alone drives the common misperception that electrical energy storage is more expensive than it really is," said Gardner. The report calls for the true value of electrical energy storage to be recognised by taking into account *revenue* benefits (ie. storing power when there's a surplus and it is cheap, such as on a sunny, windy day, and selling it back when it is expensive, such as during peak demand time on a cloudy and non-windy day, can generate a lot of money, which helps pay for the storage).

Here are 5 policy changes that the authors call for:

Think more than just cost. Cheapest is not always best.

Look at storage through holistic case studies. It is not sufficient to only look at generic cost estimates.

Work with both operators and regulators to accelerate the development of flexible markets.

Make supporting policies and a regulatory framework to facilitate future commercial deployment of technology storage.

View storage as an essential component for grid expansion or extension.

If you're curious about what kind of energy storage innovations are in the lab, check out **grid-scale liquid metal batteries**. If they can be made cheaply enough, these could truly be world-changing. But even if these never work, just getting **lithium-ion batteries to be ever cheaper** should do the trick over time...

FESC HIGHLIGHTS

Florida's Farmers to Grow Crops Towards Renewable Jet Fuel

St. Lucie County's Treasure Coast Education, Research, and Development Authority (TCERDA) in collaboration with the Florida Energy Systems Consortium (FESC) had an USDA grant kick off meeting on Jan 6, 2016. The Commercial Aviation Alternative Fuels Initiative (CAAFI) is leading this Farm-to-Fly 2.0 initiative in cooperation with USDA Rural Development. Over 50 stakeholders including farmers, financiers, industry (processors), land owners, scientists, airlines, and FedEx attended the meeting.

Click [here](#) to view the full article.

Melting Greenland Ice Sheet May Affect Global Ocean Circulation, Future Climate



Scientists from the University of South Florida, along with colleagues in Canada and the Netherlands, have determined that the influx of fresh water from the Greenland ice sheet is "freshening" the North Atlantic Ocean and could disrupt the Atlantic Meridional Overturning

Circulation (AMOC), an important component of global ocean circulation that could have a global effect. Researchers say it could impact the future climate in places such as portions of Europe and North America.

Their study on the influence of freshwater influx on Labrador Sea convection and Atlantic circulation is published in a new issue of the journal *Nature Communications*.

"We derived a new estimate of recent freshwater flux from Greenland using updated GRACE satellite data," said USF professor [Tim Dixon](#). "The data suggest that the influx of freshwater from Greenland is accelerating, and has changed the Labrador Sea in ways that could lead to a weakening of the AMOC."

UF: How to Purify Mining Water in Hours, Not Years

Cleaning up the water left over from mining operations can literally take generations—25 years to 50 years on average—leaving billions of gallons of the precious resource locked up and useless.

Now, researchers have figured out how to trim that time dramatically—to just two hours to three hours. The advance could be a potential boon to mining companies, the environment, and global regions where water is scarce.



"I think the ability to save water is going to be really big, especially when you're talking about China and other parts of the world," says Mark Orazem, professor of chemical engineering at the University of Florida.

Mining operations use water for mineral processing, dust suppression, and slurry transport. When they're finished with it, the water holds particles of mineral byproducts, known in the phosphate mining business as clay effluent.

In the case of phosphate mines that are so common in Florida, the clay effluent has the consistency of milk. "It looks like a solid, but if you throw a stone into it, it'll splash," Orazem says.

The water is pumped into enormous settling ponds—some are as large as a mile square with a depth of about 40 feet—where the particles can sink to the bottom. Florida alone is home to more than 150 square miles of such ponds, an area that would cover about half of New York City.

But it's a lengthy process because the particles are electrically charged. Like charges repel and opposite charges attract. The particles's like charge causes them to repel each other, which keeps them suspended in the water instead of sticking together and sinking to the bottom.

Water Is 'Reused and Reused and Reused'

That means mining companies can reuse the water only a bit at a time—the part skimmed off the top. Not only is the particle-filled water useless, the land those settling ponds occupy is a valuable asset that could be used for other purposes.

Ideas for speeding up that process go back centuries. In 1807, an early application of the battery invented by Volta in 1800 showed that clay particles moved in response to an electric field. In the 1990s, an electric field was used to separate clay and water in batches, but that concept was deemed uneconomical.

The new design is different because it allows a continuous feed of clay effluent into a separation system. There, upper and lower plates are used as electrodes. An electrical potential difference is applied across the electrodes, creating an electric field, which causes the charged particles to move toward the bottom, where they form a wet solid called a cake. In the cake dewatering zone, the particles can't move, so the water is forced to the top.

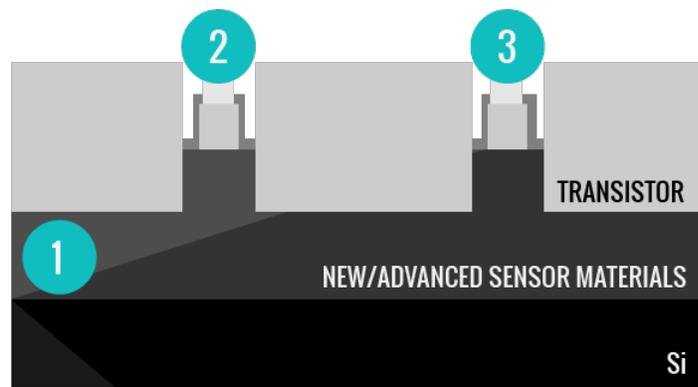
The cake can then be used to fill the holes created by the mining operation, while the water is now clear enough to be reused to process mined phosphate ore.

"Instead of having the water tied up in these clay settling areas, water is sent back through the process and then reused and reused and reused," Orazem says.

The researchers have created a lab-sized prototype and say the next step is to determine how to scale it up to a point where it can work in a real-world mine. While the concept was designed for Florida phosphate mines, it could be used anywhere and would be especially useful in arid North Africa. In Morocco and the Western Sahara, with 85 percent of the world's phosphate reserves, water is especially in short supply.

"Recycling water is going to be critically important," Orazem says. "So in Florida, it's an issue. In the desert, it's going to be a major issue."

ICAMR Partnership Tapped for Energy Research



The U.S. Department of Energy (DOE) recently selected representatives from Argonne National Laboratory for three of seven spots in its new Technologist in Residence pilot program, created to increase collaboration between the national laboratories and private-sector companies.

The pilot — which is partially sponsored by DOE's [Office of Energy Efficiency and Renewable Energy](#) — will partner Argonne with Capstone Turbine Corporation, which manufactures clean-and-green microturbine power generation systems; Cummins, which designs, manufactures, distributes, and services diesel and natural gas engines; and the International Consortium for Advanced Manufacturing Research (ICAMR), which helps create advanced sensors, photonics, and optics.

The four other spots went to Pacific Northwest National Laboratory, Los Alamos National Laboratory, National Renewable Energy Laboratory, Oak Ridge National Laboratory, and their respective partners.

Through the pilot, pairs of senior technologist from the laboratories and manufacturing companies will work together to develop technologies and devices that can help solve problems in energy and other critical areas.

"The need for fundamental and advanced research has not gone away," said Suresh Sunderrajan, director of Argonne's [Technology Development and Commercialization](#) division.

"Just about all of the really significant innovation we have seen over the last four or five decades has been the result of research that preceded that by 10, 20, or even 50 years."

An increased focus on commercialization is beneficial for industry, the laboratories, and consumers, he said.

"The laboratories — with their incredible resources, including supercomputers and one-of-a-kind analytical tools available here at Argonne — can help industry solve big, fundamental problems as opposed to providing a technical service," said Sunderrajan.

DOE is funding the pilot with a \$400,000 investment in each partnership, an amount that will be matched by the companies selected for participation. The pilot program is part of DOE's Clean Energy Manufacturing Initiative, which aims to increase American competitiveness in the production of clean energy products and boost U.S. manufacturing competitiveness across the board by increasing energy productivity.

"It's a vehicle that hasn't existed before," Sunderrajan said, adding that Argonne is excited to have won three of the seven awards, allowing it to partner with companies of varying sizes and with myriad goals.

Combined heat and power systems

Munidhar Biruduganti, principal research engineer in Argonne's Energy Systems division, spoke of the partnership with Capstone. He said combined heat and power (CHP) is a very important part of DOE's Advanced Manufacturing Office's research portfolio because of its impact on DOE's mission and objectives.

"Microturbines show great promise as compact, efficient, cost-effective CHP sources," he said. "To this end, several industry-specific technical issues have been identified by Capstone and Argonne. Through Technologist in Residence, the technologist pair will explore relevant solutions, including the development of low-cost, active combustion control systems and fuel adaptability."

Though Capstone is a small business employing just 225 people, its work could have an enormous impact, he said.

"The market and environmental benefits of Capstone's CHP systems are huge," Biruduganti said. "However, due to the relatively low research and development budget, many innovative ideas are yet to be realized. The Technologist in Residence pilot offers the needed resources for Capstone to avail itself of national laboratory resources and manufacture better CHP systems."

Energy-efficient heavy-duty vehicles

Glenn Keller, principal project engineering specialist for the Vehicle Systems Group in Argonne's Center for Transportation Research, praised DOE for reaching out to large industry and small business alike. He said he is excited to see yet another opportunity for the work of Argonne scientists and researchers to come to fruition.

"It's almost like we — the lab and industry — are on a road trip together, choosing the best possible technologies and strategies available at Argonne and coupling that with the industry's insight to bring their vision into reality," said Keller, who will help orchestrate the laboratory's effort with Cummins.

A long-time major manufacturer of heavy-duty engines for the trucking market and industrial engines and off-road products, Cummins will explore possibilities for the powertrain of the future with Argonne. "It's a great opportunity for Argonne," Keller said. "To work side by side with a commercial manufacturer is priceless."

"We are fortunate to be selected to work with Cummins to forward their mission," Keller said, adding that, among other goals, Cummins wants to explore the idea of creating range-extended electric vehicles for the heavy-duty trucking industry. "Anything we do to save fuel and energy in the trucking market will make America stronger because the industry is massive; there is not a single thing you can eat or touch that wasn't delivered by a truck."

Innovative processes, materials, and equipment for advanced sensors

Argonne and ICAMR, which represents multiple manufacturers, will use this opportunity to concentrate on the development of innovative manufacturable processes, materials, and equipment for advanced sensors and other future high-tech products, including emitters, modulators, and communications devices and systems.

"The result will be improved manufacturing," said John Hryn, process development engineer at Argonne. "We will be able to make devices that we were not able to make

before. The partnership will help advance numerous technologies that we use every day."

Both Argonne and ICAMR have interest in expanding thin-film processing technology, specifically metalorganic chemical vapor deposition and atomic layer deposition technology, for the commercialization and mass manufacturing of next-generation solid-state devices.

Argonne is a world leader in developing thin-film technology for non-semiconductor applications. This latest collaboration will enhance those efforts and build on a fruitful, pre-existing relationship between DOE and ICAMR leadership.

UCF Researcher Honored at "Oscars of Invention"



Jayan Thomas, Ph.D., University of Central Florida (UCF) associate professor, Nano Science Technology Center, CREOL and the College of Engineering and Computer Science, is among 100 finalists for R&D Magazine's prestigious R&D 100 Awards. Known as the "Oscars of Invention," the awards honor the top technology products and services of the year, including Thomas' energy transmitting and storing copper wire. Millions of miles of electrical cable provide grid power from generation and storage facilities to machinery, equipment and buildings. These three components are separate and distinct; however, the innovation to have combined power transmission and storage into a single cable is set to change this. The Univ. of Central Florida's energy transmitting and storing cables eliminate the

need for separate energy storage facilities by using the transmitting cable to store energy. This dual-purpose cable provides for improved integration of environment-dependent clean energy sources, such as solar and wind into the grid, as well as power load management, eliminating the need for separate traditional power transmission and energy storage.

Click [here](#) to see the awards list.

Florida Tech Professor Wins Federal Grant to Continue Solar Fuel Research

Florida Institute of Technology Professor Michael Freund, head of the university's Department of Chemistry, has been awarded a two-year, \$200,000 grant from the National Science Foundation to continue his work developing membranes for solar fuel generation.

Over the past two decades, Freund's research program has focused on the synthesis of polymers with advanced electronic properties. These materials are attracting considerable interest for use in plastic electronics, chemical sensing and energy storage and conversion.

The development of new, sustainable forms of energy remains one of the biggest challenges facing society

today. The sun provides an enormous amount of energy and indeed drives many of the systems currently used for generating energy, such as wind, hydro and biomass.



While photovoltaics continue to be developed to convert solar energy into electricity, it is essential that solar-derived energy can be stored when sunlight is not available. Currently, batteries can be used for storage, but the energy density in these systems is low relative to chemical fuels.

Freund is part of an international team of researchers working to develop an efficient, cost-effective method of converting solar energy directly into fuel, which would revolutionize how we generate and consume energy. The team includes leaders from top institutions including California Institute of Technology, Massachusetts Institute of Technology, Harvard University and Ecoles Polytechniques Fédérale de Lausanne in Switzerland. Their work focuses on chemical synthesis, solid-state chemistry and physics, electrochemistry, chemical kinetics and mechanisms, as well as theoretical and computational chemistry. Freund's research specifically targets the integration of components within membranes to form systems that function like an artificial leaf.

"We take photosynthesis in plants for granted, but plants are highly efficient and inspirational as energy harvesting and storage systems," said Michael Grace, Florida Tech professor and associate dean of the College of Science. "Dr. Freund's research aims to design new electrically-conductive materials as better artificial systems for harvesting the vast energy available in sunlight."

The team is funded through the National Science Foundation's Center for Chemical Innovation Program (<http://nsf-cci.com>), which is focused on long-term fundamental chemical research into solar fuels.

UCF Professors Investigate Gulf of Mexico Pollution



Scientists have been studying the effects of the Deepwater Horizon oil spill on the Gulf of Mexico for years, but research by UCF professors – and a \$1.5 million grant that funds their work – could shed new light on undetected pollution lurking beneath the seafloor. The catastrophic blowout of the Deepwater Horizon drilling rig in 2010 caused the largest oil spill in U.S. history, releasing an estimated 206 million gallons of crude oil into the gulf before it was capped 87 days later.

While visible evidence of the spill is largely gone, evidence of toxic compounds carried in the oil lingers. Some of those chemicals, known as polycyclic aromatic hydrocarbons (PAHs), are classified as hazardous because they can cause genetic mutations and cancer in organisms that come into contact with them.

There are hundreds of PAHs present in the environment, but the U.S. Environmental Protection Agency tracks only 16 of them, the ones the agency lists as “priority pollutants.” University of Central Florida chemistry professor Andres Campiglia says that many of the PAHs not included in the EPA list are actually more toxic than the ones being tracked.

“It is possible that many of those pollutants still remain in the gulf, and the true picture of the spill’s environmental impact and effect on the ecosystem – and human health – is unknown,” Campiglia said.

So why are those potentially more dangerous PAHs not routinely monitored in the environment? According to Campiglia, one of the main reasons is the lack of reliable analytical methods.

Campiglia, thanks to research he began a decade ago, now has the ability to do what other researchers couldn’t: detect these “forgotten PAHs.” The Gulf of Mexico Research Initiative recently awarded Campiglia a \$1.5 million grant to track down the environmental fate of those PAHs.

Over the next three years, Campiglia, the principal investigator, along with fellow UCF Department of Chemistry faculty members James Harper and Fernando Uribe-Romo, will focus on PAHs with a higher molecular weight than those currently monitored. Because of heavier weight, these PAHs can sink into the ocean bottom and remain longer in the environment than the ones monitored by the EPA. Some of these heavier PAHs are known to cause genetic mutations.

To positively identify those compounds, they’ll use methodology and instrumentation Campiglia developed at UCF.

They’ll use a pulsed laser to cause the samples to emit radiation in the form of fluorescence and/or phosphorescence. That will allow the researchers to measure the samples’ spectral features – for example, the intensity of radiation as a function of wavelength – as well as the time it takes for the emitted radiation to fade. Both results are unique for each type of PAH, so the combined information provides double confirmation.

“For each one of these compounds, there is a spectral fingerprint and a unique lifetime

decay,” Campiglia said. “It gives us unambiguous identification even if the compound is at much lower concentrations than their chemically and closely related siblings.”

The scientists will also collaborate with other gulf spill researchers to track down specific PAHs and better understand their environmental fate in the Gulf of Mexico.

FLORIDA ENERGY NEWS

Florida City to Buy Wind Power From Clean Line Transmission Project

The city of Tallahassee, [Florida](#) intends to buy up to 50 MW of wind power from a wind [transmission](#) project originating in the Oklahoma Panhandle, project developers announced Monday.

The Plains & Eastern Clean Line project will deliver energy from [Oklahoma](#) wind farms through that state and Arkansas on the way to a Tennessee substation.

Houston-based project developer [Clean Line Energy](#) called it the nation’s largest clean-energy infrastructure project, a direct-current high-voltage line stretching nearly 700 miles and transmitting close to 4,000 MW altogether.

“We commend Tallahassee for taking a leadership position and agreeing to provide their customers with access to some of the lowest-cost wind energy in the country,” said Michael Skelly, President of Clean Line. “This is another important step for the Plains & Eastern Clean Line and we look forward to helping Tallahassee to deliver on their commitment to increase their clean energy usage while keeping costs low.”

The city of Tallahassee is engaged in serving about 118,000 residential and commercial customers.

The Plains & Eastern Clean Line represents a \$2 billion investment in infrastructure that will provide renewable energy to the Mid-South and Southeast regions of the United States. The Plains & Eastern Clean Line will help unlock nearly \$7 billion in investments in new wind farms that could not otherwise be built due to the limitations of the existing electric grid.

“This type of agreement allows cities the ability to access world-class wind resources and deliver big savings to consumers,” said Andrew Gohn, Eastern State Policy Director for the American Wind Energy Association ([AWEA](#)), in a statement. “Building new transmission is essential to bring the lowest-cost wind in the country to places where the majority of American families live and businesses operate. The Plains & Eastern Clean Line will deliver clean, reliable, low-cost electricity for all those who plug things in for years to come.”

Construction of the Plains & Eastern Clean Line is estimated to begin in 2017 and will require approximately two to three years to complete. The Plains & Eastern Clean Line is expected to begin delivering electricity as early as 2019 and will provide clean power to more than one million American homes, providing public benefits for years to come.

In November 2015, the U.S. Department of Energy released its final environmental

impact statement for the proposed Plains & Eastern Clean Line transmission project. DOE's release of the Final EIS marks a key milestone for the Plains & Eastern Clean Line.

Based on the analysis presented in the Final EIS, DOE identified a preferred route for the direct current transmission line. DOE also identified its preferred locations for a delivery converter station in Arkansas as well as a converter station and associated project facilities in Oklahoma. DOE's participation in the project would be limited to states in which Southwestern operates.

Southwestern does not operate in the state of Tennessee, therefore, in the Final EIS DOE does not indicate a preference for the location of the DC transmission line or the converter station in Tennessee.

The Final EIS "did not identify widespread significant impacts as a result of construction or operations and maintenance of the Project." DOE also concluded that implementation of the environmental protection measures that Clean Line included as an integral part of the project would avoid or minimize the potential for significant environmental effects.

U.S. ENERGY NEWS

Renewables Boom Expected Thanks to Tax Credit

The U.S. solar and wind power industries will mark the holidays with heightened spirits after receiving multiyear extensions of their coveted renewable energy tax credits from a divided Congress.

On Friday, the House and Senate agreed by significant margins to grant extensions to the 30 percent investment tax credit (ITC) for solar energy and the 2.3-cent-per-kilowatt-hour production tax credit (PTC) for wind power.

Other technologies—including geothermal, marine energy and small hydropower—received one-year extensions to their 30 percent ITC under the joint spending and tax measures passed Friday and expected to be signed by President Obama this week.

The largest beneficiaries of Congress' year-end gifting were the solar and wind sectors, both of which will see their tax credits extended to at least the end of the decade.

"This is one of the most significant stimulus policies for the renewable sector I've seen in the past 10 years," said Alex Klein, senior director of renewable power research at the consulting firm IHS Inc.

The PTC for wind energy will remain at full strength through 2016, followed by incremental reductions in value for 2017, 2018 and 2019 before expiring in January 2020. The ITC for solar will continue at 30 percent levels for both commercial and residential systems through 2018, then taper off in yearly increments to settle at 10 percent in 2022.

"With predictable policies now in place, we will continue advancing wind turbine technology, driving down our costs and passing the savings on to American families and businesses in all corners of the country," Tom Kiernan, CEO of the American Wind Energy Association, said in a statement.

On a Friday morning conference call with reporters before the Senate vote on the tax extenders package, Rhone Resch, president and CEO of the Solar Energy Industries Association, said the industry group was "pretty excited about what's happening here, but we're not across the finish line yet."

The finish line came just a few hours later, as the Senate voted 65-33 in favor of a \$1.15 trillion omnibus spending bill and companion \$629 billion tax bill that should keep the government running through September (*Greenwire*, Dec. 18).

The House of Representatives agreed to the package in an earlier vote of 316-113.

Building a bridge for the Clean Power Plan

In addition to the spending and tax provisions, Congress also formally lifted a ban on U.S. crude oil exports, something Republicans and oil-state Democrats had sought.

Experts said the renewable energy provisions will result in billions of additional dollars in tax breaks for wind and solar power developers, something many Republicans were remiss to hand out. At the same time, the extenders should stimulate hundreds of billions of dollars in new renewable energy investment and help drive the nation's transition away from traditional fossil fuels in favor of cleaner forms of energy, observers said.

Malcolm Woolf, senior vice president for policy and government affairs at Advanced Energy Economy, a national business group, said, "Investors and project developers now have the market signal they need for investment, business growth and jobs in the coming years."

Several experts noted that one of the benefits of the ITC and PTC extenders is that they provide a bridge for renewable energy expansion between now and the first set of state compliance deadlines for U.S. EPA's Clean Power Plan in 2022. The CPP will require a 32 percent cut in utility-sector carbon emissions from 2005 levels by 2030, with some states seeing reduction requirements as high as 45 to 47 percent.

While states will be able to use a variety of approaches to reduce carbon emissions, experts predict that utilities not already investing in wind and solar power will begin shifting significant amounts of capital to the technologies, especially as installation costs continue to fall and issues around intermittency and grid interconnections are resolved.

"There will be a lot of build in markets where there's a need for CPP compliance," Klein said. "We expect a lot of incremental wind build in Texas and a lot of growth in solar in the Southeast and the Midwest."

SEIA's Resch said, "A big part of what we need to do going forward is help states understand ... the value proposition behind solar energy."

Julia Hamm, president and CEO of the Solar Electric Power Association, said in a statement that the five-year ITC extension "will allow for broader participation and deployment of solar applications across the country, especially in regions where local markets are less mature."

Praise for a 'level of predictability'

Market projections from SEIA and partner GTM Research indicate the U.S. solar market will add roughly 72 gigawatts of new capacity between 2016 and 2020, pushing the country's net solar capacity to more than 100 GW, or roughly 3.5 percent of all electricity produced in the United States.

Solar sector investment is expected to rise by \$40 billion between 2016 and 2020, according to SEIA, and after 2020 should draw an average of \$30 billion a year. Solar employment is also poised to nearly double over the same period, to roughly 420,000 jobs.

Wind industry officials did offer specific numbers on the PTC extension but made clear the multiyear deal provides companies "with a level of predictability needed to keep U.S. factories open while adding new wind projects to the pipeline."

Mike Garland, AWEA's board chairman and CEO of Pattern Energy Group Inc., one of the nation's major wind energy developers, said the five-year PTC extension "will allow us to make more supply commitments and build more projects, creating more jobs." AWEA credits the PTC for spurring a more than 300 percent increase in U.S. wind power since 2008—from 16.7 GW to 69.5 GW by the third quarter of 2015.

Supreme Court Rules In Favor of Demand Response: A Boon to Smart Grid

The Energy Department announced several new and exciting innovations and programs during Industry Day held at Oak Ridge National Laboratory (ORNL) in Tennessee Sept. 23-24. This included unveiling a 3-D printed building with integrated energy storage via bidirectional wireless power transfer to and from a vehicle, revealing the first-round winners of ORNL's crowdsourcing competition to advance innovative building technology ideas, and announcing a new open innovation program between ORNL and four industry partners.

FIRST DEMONSTRATION OF A 3D-PRINTED HOME POWERED BY VEHICLE

Known as AMIE, **Additive Manufacturing Integrated Energy**, this demonstration combines clean energy technologies and rapid advanced manufacturing techniques to showcase new approaches to energy use, storage and consumption. AMIE was developed as a model for energy efficient systems that link buildings, vehicles and the grid. ORNL and DOE's Building Technologies, Advanced Manufacturing, and Vehicle Technologies Offices collaborated with industry players to showcase how government and the private sector can work together to quickly bring innovative technologies to market. The demonstration also showcases additive manufacturing's rapid prototyping potential in architecture and vehicle design; the car and house both were built using large-scale 3D printers.

BUILDINGS CROWDSOURCING 1.0 WINNERS

ORNL launched the **Buildings Crowdsourcing Community Campaign** in March to give innovators an opportunity to present their ideas to leaders in the research and development community, with a goal of bridging the gap between cutting-edge ideas and the marketplace. More than 300 innovators, including students, designers and small businesses, participated in the campaign, voting and commenting on the submitted proposals in three categories: Equipment and Appliances, Sensors and Controls, and Envelope Technologies.

Equipment and Appliances: James Rowland, Mark Walter and Matthew O'Kelly won the category with their prototype of a hybrid air-water conditioner developed at Ohio State University. The design exploits synergies between conditioning indoor air, dehumidification, ventilation, and hot water heating to reduce energy expenditures associated with these processes.

Sensors and Controls: Jim White, Senior Energy Conservation Engineer at

Chelan County Public Utility District in Washington state, won the category for his idea to improve the design of variable air volume (VAV) mixing boxes by combining temperature and carbon dioxide sensors to control minimum airflow settings. A model of the concept was 3-D printed and exhibited at Industry Day. **Envelope Technologies:** Rod Stucker, an entrepreneur and owner of RM Enterprises in Idaho, won for his idea of a novel approach to installing high performance expanded polystyrene (EPS) foam window frames and insulated glass units at the job site.

NEW PUBLIC-PRIVATE OPEN INNOVATION PROGRAM (JUMP)

Building upon the first campaign's success, plans were announced for a new crowdsourcing campaign, called **JUMP**, or Join in discussion, Unveil innovation, Motivate transformation, and Promote technology to market. Four industry partners—A.O. Smith, GE, Honeywell, and United Technologies Research Center—will partner on the JUMP campaign to accelerate deployment and commercialization efforts of winning ideas by providing cash awards.

Better Power Lines Would Help U.S. Supercharge Renewable Energy, Study Suggests



Analysts have long argued that nations aiming to use wind and solar power to curb emissions from fossil fuel burning would first have to invest heavily in new technologies to store electricity produced by these intermittent sources—after all, the sun isn't always shining and the wind isn't always blowing. But a study out today

suggests that the United States could, at least in theory, use new high-voltage power lines to move renewable power across the nation, and essentially eliminate the need to add new storage capacity.

This improved national grid, based on existing technologies, could enable utilities to cut power-sector carbon dioxide emissions 80% from 1990 levels by 2030 without boosting power prices, researchers **report today in *Nature Climate Change***.

The findings come on the heels of the Paris climate agreement, in which the **United States pledged to cut its national emissions** by up to 28% from 2005 levels by 2025. About 40% of U.S. emissions come from the power sector, and the U.S. Environmental Protection Agency (EPA) **recently released rules** that task states with reducing power-sector emissions. States can choose from a menu of strategies, EPA says, such as boosting renewable energy use.

But some observers wonder whether the U.S. power grid can rise to the renewables challenge. **The grid is divided into several regional grids or "interconnections,"** which contain smaller subdivisions. Because regions experience both sunless and

windless periods, energy planners and experts have long believed that a wind- and solar-dominated grid would need to store some power for later use. The problem is that large-scale storage technologies haven't been commercially realistic.

Alex MacDonald, a National Oceanic and Atmospheric Administration (NOAA) in Washington, D.C., researcher, was familiar with that problem. But he realized that researchers hadn't explored all the potential solutions. For instance, meteorological data suggest that wind is always blowing somewhere in the United States, MacDonald says. So, although renewable energy output might be intermittent on a regional scale, it would have a more constant flow at a national scale. MacDonald wondered whether the U.S. grid might be able to overcome intermittency problems if it added high-voltage, direct-current (HVDC) transmission lines—which suffer less energy loss than do traditional alternating-current transmission lines—to connect regional grids, so that power could be moved to where it was needed.

MacDonald, Christopher Clack of NOAA and the Cooperative Institute for Research in Environmental Sciences at the University of Colorado, Boulder, and other colleagues wanted to test this idea. They built a computer model to analyze different configurations of a weblike network of interregional HVDC lines plus renewable energy installations. The model divides the United States into a grid of 152,000 squares that are assigned to regional grids. In order for the program to evaluate the potential for solar and wind power in each square, the researchers inputted data on sunlight and wind speeds between 2006 and 2008 (but the program excluded areas, such as national parks and mountain slopes, that typically can't host windmills or solar panels). Then, using forecasts for power prices and demand, the program could calculate where it would be economical to build wind and solar projects, and move renewable power from region to region. Finally, the researchers told their program to find the lowest-cost way to achieve certain emissions cuts while still meeting future power demand.

By 2030, with HVDC lines meeting at 32 nodes between regional grids, the United States could add enough wind and solar power to cut power sector emissions by up to 80% from 1990 levels, the researchers concluded. And they calculated that power prices would be lower, on average, than a business-as-usual scenario. And "these results are the minimum of what we could get to," MacDonald tells *ScienceInsider*, explaining that the researchers used very cautious assumptions.

Stanford University in Palo Alto, California, energy researcher Jonathan Koomey, who wasn't involved in the work, agrees that the NOAA team's assumptions are generally cautious. U.S. power demand may rise less than the team's projections, for instance, as a result of new energy-efficiency measures. And the team gets its rosy results even though it didn't add in the health and environmental costs of the pollution created by burning fossil fuels. But Koomey also offers major caveat: The study doesn't consider the potential for electricity demand to rise more than expected should electric vehicles catch on, he notes. If that happened, the United States would need more renewable projects to achieve the same emissions cuts.

The bigger hurdle to realizing the study's vision of a national grid, however, may be persuading policymakers, utilities investors, and landowners that it's a good idea, says Susan Tierney, a former U.S. assistant secretary of energy under President Clinton who's currently an energy consultant at the Analysis Group in Boston. "The problem is not rooted in technology, but rather in the way that the U.S. power system is organized legally, politically, economically, and culturally," she says. Utilities and politicians are sometimes loath to depend on distant power producers, for example, and communities often fight the construction of large power lines.

Koomey notes that the researchers aren't necessarily advocating a totally storage-free, national system or trying to bash storage technology. "They're just saying, 'Let's just explore a system without storage and see if it's possible.'" The answer, he says, is that it's more possible than many people might think.

New Report Finds More American Businesses Are Installing Solar Than Ever Before

Growth in the use of solar energy has surged 183 percent among America's top companies in the four years since the first Solar Means Business report was published. The recent study released by the Solar Energy Industries Association (SEIA) also shows a 59 percent growth in solar installations since just 2014.

For the fourth year in a row, Walmart ranked No.1 in the Solar Means Business report, which identifies major commercial solar projects and ranks top corporate solar users. The big box retailer, based in Bentonville, Arkansas, boasts a robust 142 megawatts of solar photovoltaic capacity at 348 locations.

Other top companies recognized for both their amount of solar capacity and number of solar installations include Kohl's, Apple, Macy's, Walgreens, Target, IKEA, Prologis, FedEx, Intel, General Motors, Verizon, Johnson & Johnson, Bed Bath & Beyond, Safeway, Hartz Mountain, Staples, L'Oreal, Kaiser Permanente and Toyota.

"These blue-chip companies have realized investing in solar is a common-sense, cost-effective decision that pays dividends for both the environment and their bottom lines," said SEIA President and CEO Rhone Resch. "Not only are they helping to create thousands of American jobs in solar, the nearly 1,700 systems currently in operation are generating enough clean, reliable electricity to offset nearly 890,000 metric tons of harmful carbon emissions a year."

"Solar is an important part of our renewable energy program," said Mark Vanderhelm, vice president of energy for Walmart. "We believe in advancing solar deployment by pursuing projects that make business sense. In fact, in 2014 we committed to doubling the number of on-site solar energy projects at our U.S. stores, Sam's Clubs and distribution centers by 2020. We're excited about our continued work towards meeting that goal and appreciate being acknowledged by SEIA for these efforts."

The report notes that growth in corporate solar adoption is no longer limited to traditional solar markets, but that "solar is a smart business decision wherever your business may be."

Combined, America's top corporate solar users installed 1,686 systems totaling 907 MW of solar. Representing a "Who's Who" of the corporate world, these companies are playing an increasingly important role in the development, expansion and promotion of solar nationwide, while also reducing their operating expenses, benefiting customers and shareholders alike.

"Prioritizing renewable energy options like solar power at our facilities not only helps us reduce our spending on traditional energy but also reduces business risk and our impact on climate change," said Rob Threlkeld, GM global manager of renewable energy. "As a result, we regained our ranking as the top automotive user of solar in the U.S."

"FedEx is committed to connecting the world responsibly and resourcefully," said Mitch Jackson, vice president of Environmental Affairs and Sustainability, FedEx Corporation. "This includes minimizing impacts on the environment with our 15 solar installations,

helping us avoid more than 4,600 metric tons of CO2 emissions in FY15, reducing our environmental footprint."

"Solar energy is an integral part of Intel's renewable energy portfolio, and we are committed to embracing, evaluating and implementing new projects and innovative learnings around the world," said Marty Sedler, director of Global Utilities and Infrastructure at Intel Corporation. "Solar will continue to be a core part of our alternative energy solution because it provides leadership, helps spur the market, makes renewables more accessible, and reduces the overall carbon emissions from electricity generation."

NY Governor Cuomo Directs 50 Percent Clean Energy Standard

New York Governor Andrew M. Cuomo has directed the State Department of Public Service to design and enact a new Clean Energy Standard mandating that 50 percent of all electricity consumed in New York by 2030 result from clean and renewable energy sources.

"Climate change is one of the defining issues of our time, and we must act now," said Cuomo. "We are taking real, enforceable actions in New York to lay the foundation for a thriving clean energy economy. With one of the most aggressive renewable energy goals of any state in the nation, we are leading by example to ensure the possibility of a bright future for generations to come."

New York State has taken action to modernize its energy system through the Reforming the Energy Vision (REV). REV has laid the groundwork for the State and the private sector to aggressively add renewables. Now, the Clean Energy Standard provides a cost-effective, efficient, and enforceable mandate to meet the goal of ensuring clean, resilient, and affordable energy. It will result in lower costs for renewable energy and create new opportunities to scale large renewable energy projects, says the government.

Additionally, Cuomo has directed the Department of Public Service to develop a process to prevent the premature retirement of safe, upstate nuclear power plants during this transition. As New York State continues to aggressively add new renewable resources, it cannot lose ground in the fight to reduce carbon pollution through the unnecessary retirement of safely operating nuclear power plants in Upstate New York. The early closure of those plants would result in increased carbon pollution from fossil fuel generators, reduced fuel diversity and unstable electric prices, as well as job losses and economic distress in Upstate communities. Support for nuclear plants is separate and distinct from the 50 percent renewable energy mandate.

Richard Kauffman, Chair of Energy and Finance for New York State, said: "This announcement codifies New York's commitment to powering statewide economic development with clean, affordable energy. The creation of a Clean Energy Standard is good public policy for the environment and our economy. Under Governor Cuomo's leadership and as part of his Reforming the Energy Vision plan, we aren't just talking about protecting and preserving our environment for generations to come—we're doing it every day."

The regulatory process to develop the Clean Energy Standard will include the opportunity for full and complete public and stakeholder participation. State law

requires that the Public Service Commission takes all reasonable steps to meet New York's goals set forth in the State Energy Plan. The Governor's directive sets forth a timeframe by which the Commission should act. The new standard, which will be developed by the Department of Public Service to complement the Governor's Reforming the Energy Vision plan, is expected to be presented to the Public Service Commission by June 2016.

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-0001463 - Radiochemistry Summer School

Application Due Date: February 12, 2016

DE-FOA-0001471 - Advancements in Algal Biomass Yield, Phase 2 (ABY2)

Concept Paper Deadline: February 12, 2016, 5pm EST

Full Application Deadline: March 25, 2016, 6pm EST

DE-FOA-0001282 - Scientific Infrastructure Support for Consolidated Innovative Nuclear Research

Application Deadline: February 18, 2016

DE-FOA-0001384 - Fiscal Year 2016 Vehicle Technologies Program Wide Funding Opportunity Announcement

Concept Paper Deadline: February 18, 2016

Full Application Deadline: March 28, 2016

DE-FOA-0001376 - Mineral Recovery Phase II - Geothermal Concepts And Approaches To Validate Extraction

Application Due Date: February 29, 2016

DE-FOA-0001505 - Support of Fossil Energy Research at U.S. Colleges and Universities Including University Coach Research and Research by Historically Black Colleges and Universities and Other Minority Institutions

Application Due Date: March 18, 2016

DE-FOA-0001430 - Atmospheric System Research Program

Full Application Due Date: April 20, 2016

DE-FOA-0001414 - FY 2016 Continuation of Solicitation for the Office of Science Financial Assistance Program

Application Due Date: September 30, 2016

DE-FOA-0001434 - Notice of Intent to Issue Funding Opportunity Announcement MEGA-BIO: Bioproducts to Enable Biofuels (No. DE-FOA-

0001433)

Full Application Deadline: TBD

H2 Refuel H-Prize Competition

Deadline: October 31, 2016

DEPARTMENT OF DEFENSE

N16A-T008 - Novel Separator Materials for Achieving High Energy/Power Density, Safe, Long-Lasting Lithium-ion Batteries for Navy Aircraft Applications

Solicitation Open: January 11, 2016

Solicitation Close: February 17, 2016

NATIONAL SCIENCE FOUNDATION

NSF 16-526 - Energy-Efficient Computing: from Devices to Architectures (E2CDA)

Full Proposal Deadline: March 28, 2016

NSF 16-524 - Innovations at the Nexus of Food, Energy and Water Systems (INFEWS)

Application Deadline: March 22, 2016

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

UPCOMING EVENTS

[Florida Institute for Cybersecurity Research Annual Conference](#)

February 9 - February 10, 2016

University of Florida

Gainesville, FL

The 2016 FICS Conference on Cybersecurity will be held at the University of Florida on February 9-10, 2016. The conference will include speakers and participants from industry, government, and academia to share innovative solutions related to cybersecurity (from network, software, to hardware). In addition to the conference, hardware integrity validation, security assessment, IOT security, mobile security, advanced electronic and non-electronic supply chain security and management through talks, faculty and students are available to discuss new collaborations, existing projects, and projects available to present posters based on their projects.

Click [here](#) for more information.

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[DistribuTECH Convention and Exhibition](#)

February 9 - February 11, 2016

Orange County Convention Center

Orlando, FL

DistribuTECH is the world's leading annual T&D event attracting 11,773 attendees from around the world. DistribuTECH will take place February 9-11, 2016 at the Orange County Convention Center in Orlando, FL.

Light & Power Executive Conference and Utility Products Exposition.

Mark your calendars and make plans to attend the utility industry's leading annual T&D conference a systems, energy efficiency, demand response, renewable energy integration, advanced metering, T& equipment, communication technology, water utility technology and much more.

Click [here](#) for more information.

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Advanced Bioeconomics Leadership Conference

February 17th - February 19th, 2016

Grand Hyatt

Washington, DC

New fuels, chemicals, and materials are changing our ideas of performance, cost and sustainability. But time is of the essence - for the companies, people, investors, governments and the public. What's deployed, and is coming up fast for deployment? What niches are open, opening, closing or closed? acceleration? Through our awards, receptions, on-stage discussions, and networking like crazy, you hottest sectors of the bioeconomy.

Click [here](#) for more information.

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ARPA-E Energy Summit

February 29, 2016 - March 2, 2016

The ARPA-E Energy Innovation Summit is an annual conference and technology showcase that brings disciplines and professional communities to think about America's energy challenges in new and innovative ways. It offers a unique, three-day program aimed at moving transformational energy technologies out of the lab and into the industry experts, thought leaders, and decision makers at the 2016 Summit to:

Experience first-hand the latest technological advancements across a wide variety of energy sectors
Attend practical seminars about transitioning cutting-edge technologies into successful commercial products
Network with breakthrough technology companies, federal government leaders, entrepreneurs and researchers
Meet influential government, research labs, and private-sector leaders and learn about partnerships
Hear insightful keynotes from industry leaders and luminaries on the future of energy technology
Apply to have your breakthrough technology featured in the highly regarded Technology Showcase

Click [here](#) for more information.

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PURC Annual Conference

March 16 - 17, 2016
Gainesville, Florida

Clean power seems to be everyone's aspiration, but the process for defining it and achieving it has become an initiative dominating most energy discussions these days, but the means by which to clarify the rule threads, such as state jurisdiction, renewable energy initiatives, the changing roles of natural gas, and energy economics for production change, giving rise to increasingly complex regulatory and political issues. And let's not forget the overarching goals of reliability and keeping energy affordable. New stakeholders and system working make decisions for the long term? What are their options and what are the likely outcomes?

Please join us for PURC's 43rd Annual Conference where we will examine options and decision making, industry roles and responsibilities, and water regulation. Speakers and participants will engage in discussions on:

- How will Florida respond to the Clean Power Plan initiative?
- What are other states doing?
- What is happening in the retail markets for natural gas?
- How will the Clean Power Plan and renewable energy options affect consumers?
- What are the disrupters in utilities? What threats or opportunities do they present?
- What can be improved in water regulation? How will water policy affect energy?

Click [here](#) for more information.

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2016 Energy Solutions Conference

March - June
Kick-off event: March 23-24
Simulcast - online access

The 2016 Energy Solutions Conference is a sequel to our highly successful Virtual Conferences held in 2015. It will include a Simulcast -- a virtual event available from wherever you are (via computer or mobile device) PLUS an Energy Expo in Cocoa, FL), for those who prefer to attend in person AND an Energy Expo. The Conference will take place as an innovative "modular forum" across a 4 month span, March - June.

Click [here](#) for more information.

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Palm Beach International Agricultural Summit

May 4, 2016
Palm Beach County Convention Center
West Palm Beach, FL

A forum by diverse stakeholders from Palm Beach County whose purpose is to educate and inform the public on modern agriculture and its role in advancing quality of life and the economy.

Click [here](#) for more information.

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Better Buildings Tomorrow 2016

May 9 - May 11, 2016
Washington Hilton Hotel
Washington, DC

The Better Buildings Summit is a national meeting where leading organizations across the country are committed to reducing energy intensity in their buildings portfolio-wide by 20% over the next ten years. This Summit is an opportunity to exchange best practices and highlight demonstrated market solutions with an equal emphasis on achieving greater energy efficiency in America's homes and buildings.

Click [here](#) for more information.

ESCC 2015: 3rd International Conference on Energy, Sustainability and the Environment

July 10th - 16th, 2016

Marathon, Athens, Greece

ESCC series aims on bringing together leading experts in the fields of optimization and control, energy efficiency, energy storage, and energy advancements and trending topics.

Click [here](#) for more information.

Note from the Editor

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