Germany recorded 23.9GW of electricity generated from solar power according to manufacturer SMA Solar, enough to power 2.3 million homes. (Source: jikatu)

The country’s previous record of 22GW was set in May, in what is rapidly proving to be a stellar year for solar power capacity in the country.

Today, approximately 8.5 million people live in buildings in Germany that use their own solar power systems to generate electricity or heat. That figure, and the country’s output, are both likely to rise.

Stefan de Haan, analyst at market research firm IHS told RTCC that because of the number of people that own solar panels: “we will see a new record every year. This can happen [again] any year on a sunny day.”

In 1991 Germany launched its Energiewende policy transitioning from fossil fuels to renewable energy in the aftermath of the Chernobyl nuclear disaster. The country now gets nearly 25% of its electricity from renewables.

Germany’s Output Continued on page 2 and 3
The electricity share from renewables is slated to grow to around 39% by 2020, at least 50% by 2030, and 80% by 2050.

Despite de Haan’s optimism, Germany’s solar industry has had a great deal of bad news this summer. It awaits further cuts to its subsidy scheme, while two of Germany’s largest companies, Conergy and Gerhlicher Solar, filed for insolvency.

**Political scruples**

Government dithering over updating the German renewable energy act (EEG), which offered solar manufacturers a level of financial security, has been blamed for causing a wave of solar company insolvencies and job cuts.

Various factions of the government claim the uptake of solar power has happened too fast due to generous subsidies. They say these are now draining resources from other budgets.

Chancellor Angela Merkel, currently campaigning for a third term, promising to overhaul subsidies for renewable energy after the September general election.

Meanwhile, the solar industry is suffering because there are now too many companies operating in a limited sector.

Susanne von Aichberger, market and technology analyst at Solarbuzz told RTCC that the argument of over-production leading to higher costs for the government to support the solar industry “is nothing new”.

“I think that even if the government would use the last weekend as argument for cutting PV funding, it is unlikely that this record weekend would change their plans to cut PV. Had the last weekend been rainy, they would have referred to another record-weekend,” von Aichberger said.

**Weather**

Similarly, de Haan states that solar will continue to play a significant role in the energy mix regardless of whether the sun is shining or not.

“The average solar yield in Germany is something like 900kWh for every kilowatt installed,” said de Haan.

For project developers and installers, weather is also irrelevant.

“The hot temperatures in the summer don’t make a big difference, because in the German summer you always find weather that is suitable for construction work,” said von Aichberger.

“There is a strong impact though of the weather in the winter, in particular in the later winter like January or February, when the ground and snow tends to get deeply frozen in some areas in Germany and it gets difficult and dangerous to install.

“One issue that might negatively affect the PV market this summer is the flood, which caused a lot of damage and money might flow rather in reconstruction work, new furniture etc. than in PV systems,” Von Aichberger said.

“Imagine if we have five times that much how shall we handle that, where should all that go and so on,” said de Haan.

“We must use the time to make sure we can handle that when there’s much more PV installed than today and this will happen absolutely.”

Von Aichberger said: “Surely PV systems produce much more in the summer, but that’s why we have to look at PV as part of a new energy system, including all renewables and the remaining conventional power plants. It’s all technically doable, one just has to do it.
Trade spat

Germany and the European Union is currently embroiled in a trade case accusing China of selling solar panels on the EU market at below cost.

Media reports are circulating that the European and China have reached a resolution in the largest trade case between these countries, but officials refuse to confirm them.

“The dispute about trade sanctions with China is resolved for the time being,” a spokeswoman with the Economy Ministry who asked not to be named due to ministry policy told Bloomberg.

However, press officer to EU Trade Commissioner Karel de Gucht who imposed preliminary duties on Chinese products in June, told RTCC that discussions between the parties are still ongoing.

“All we can say is that talks are indeed ongoing and there are delegations of EU experts have been in Beijing for more than two weeks and now there’s a delegation of Chinese experts in Brussels so the talks continue – they are ongoing”.


Florida Institute for Sustainable Energy at the University of Florida
Has a New Director

Dr. Sean Meyn (ECE) is the new director of the Florida Institute for Sustainable Energy effective July 1, 2013. Here is his short bio:

**Sean Meyn** received the B.A. degree in mathematics from the University of California, Los Angeles (UCLA), in 1982 and the Ph.D. degree in electrical engineering from McGill University, Canada, in 1987 (with Prof. P. Caines, McGill University). He is now Professor and Robert C. Pittman Eminent Scholar Chair in the Department of Electrical and Computer Engineering at the University of Florida, the director of the Laboratory for Cognition & Control, and director of the Florida Institute for Sustainable Energy. His academic research interests include theory and applications of decision and control, stochastic processes, and optimization. He has received many awards for his research on these topics, and is a fellow of the IEEE.

He has held visiting positions at universities all over the world, including the Indian Institute of Science, Bangalore during 1997-1998 where he was a Fulbright Research Scholar. During his latest sabbatical during the 2006-2007 academic year he was a visiting professor at MIT and United Technologies Research Center (UTRC).

His award-winning 1993 monograph with Richard Tweedie, *Markov Chains and Stochastic Stability*, has been cited thousands of times in journals from a range of fields. The latest version is published in the Cambridge Mathematical Library.

For the past ten years his applied research has focused on engineering, markets, and policy in energy systems. He regularly engages in industry, government, and academic panels on these topics, and hosts an annual workshop at the University of Florida.
University of Florida Engineering Professor Recognized with 'Oscar of Innovation'

Kelly Jordan, assistant professor of nuclear engineering at the University of Florida, has been recognized for his role in developing one of the top 100 technology products of the year.

Jordan and collaborators at Adelphi Technology Inc. have been recognized for their “High Flux Neutron Source” beam instruments in this year’s R&D 100 Awards. R&D Magazine has covered research and development news for scientists and engineers for more than 50 years. Known as “the Oscars of Innovation,” the R&D 100 Awards identify revolutionary technologies from a wide range of industries, including telecommunications, optics, high-energy physics, materials science, chemistry and biotechnology. They have spanned industry, academia and government-sponsored research.

Jordan specializes in nuclear security — making sure potentially dangerous materials can be easily identified and safeguarded — as well as in radiation detection and nonproliferation. He received his doctorate in nuclear engineering from University of California, Berkeley in 2006 and worked as a reactor physicist at the Paul Scherrer Institute in Switzerland until he came to UF in 2011. In addition to teaching, he serves as the director of the University of Florida Training Reactor.

The award-winning DD-109X is a microwave-driven neutron generator that provides high fluxes of fast neutrons to small samples of nuclear materials. This is useful for identifying the composition of nuclear materials. Jordan compares the technology leap to a scenario where airport security have for many years tried to determine if passengers’ shoes pose a public safety risk, and then suddenly they receive a body scanner.

“You can’t just sweep your finger across [nuclear materials] and taste them to figure out what they are. You can’t even lift the lid and look at them. This is a technology that simplifies how we are able to identify a very complex substance,” Jordan said.

Those who keep tabs on the world’s supplies of plutonium and uranium will find the DD-109X — and the technology it harnesses, makes the job of identifying these substances a lot easier.

“This is a remarkable instrument for nuclear security as evidenced by recognition as an R&D 100 award recipient,” said David Norton, UF’s vice president for research. “Dr. Jordan’s innovative contributions are significant for UF and the U.S. nuclear engineering community. This award reflects most positively on Dr. Jordan’s research and the UF nuclear engineering program.”

Other technologies recognized by the magazine this year include an electron microscope capable of recording movies, a device that harnesses power from viruses, a robotic glove and an underwater vehicle that can operate both with and without a human crew. In addition to UF, this year’s list of innovators represent several of NASA’s research centers, Argonne National Laboratory, Sandia National Laboratories, Lawrence Livermore National Laboratory, and many other top research facilities.

Winners will be recognized at the R&D 100 Awards Banquet on Nov. 7 in Orlando. The full list of this year’s winners is available at http://www.rdmag.com/award-winners/2013/07/2013-r-d-100-award-winners.

UWF Students Claim Top Prize in Engineering Competition

After months of research, engineering, tinkering and writing, a group of local college undergraduates can say they have engineered one of the greatest student-made projects in the world.

University of West Florida Emerald Coast students Nathaniel Eubanks, Chris Hayes, Vadim Ilin and Andrew Potter recently placed first in the international Myron Zucker Undergraduate Student Design Contest for their project, “Design of a Solar Array Positioning Controller.”

Ilin, 31, said they built a device that follows the sun or any other light source so it autonomously gets energy no matter where it’s at.

UWF Competition Continued on page 5
“It was challenging for sure,” the Fort Walton Beach man said. “... It was very interesting to see all the different topics we covered in our curriculum coming together for this project.

“I still can’t believe (we won.) We didn’t expect it. We knew we had a good project, but this contest was an international award.”

Muhammad Rashid, an advisor for UWF’s Emerald Coast and Pensacola campuses, said the team’s work wasn’t something they simply put together. Students in his program work for two semesters to develop their projects, from conception to creating the packaging for the final product.

“I was not surprised when our nominations won,” said Rashid who submitted two projects in the contest, which placed first and second. “I was expecting at least one of them to place. We do so much work on it that the projects are good quality.”

Rashid said students present updates on their progress in the first semester and work with a mentor in the second semester. At the end of the second semester, each group of usually two to four students present their project to their class, instructors and other faculty.

The winning teams will receive their awards in October at the Industry Applications Society’s annual meeting in Orlando. From there, Rashid said the possibilities are endless.

“Our students are dedicated to high quality,” he said. “They graduate and get jobs with top companies like Motorola, GM and the military, or they go on to get their graduate degree from great schools like Georgia Technical Institute or the University of Florida.

“We believe our program provides a quality education and gives our students opportunities to use those skills in life.”

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**Engineers at University of Florida Lead Hurricane and Tornado Research**

Hurricane season has begun and Gator Engineering hurricane and tornado research is making headlines.

Earlier this week, Dr. David Prevatt, an assistant professor in the Department of Civil and Coastal Engineering, testified before members of the U.S. House Science Committee in Washington, DC. Prevatt researches how buildings can be built stronger to withstand extreme weather. He presented his latest research, and also requested support and funding for H.R. 1786 “The National Windstorm Impact Reduction Program” on behalf of the American Association for Wind Engineering (AAWE), the American Society of Civil Engineers (ASCE), and the University of Florida. He shared his first-hand experience surveying the damage to Moore, Okla. caused by an EF5 tornado last week. He also shared his concern for our national storm preparedness, with regard to structure:

“Our buildings and other infrastructural lifelines, such as bridges, tall buildings, airports, cell phone towers, defense related structures such as radars, are simply not designed to resist tornadoes of even lower intensities (EF1 to EF2: 86 to 135 mph), which are more common (90%).”

Prevatt is funded in part by a research grant from the National Science Foundation, specifically to develop engineering solutions for tornado-resilient and sustainable housing communities. He will be interviewed on NPR’s program Science Friday at 2pm Friday, June 7, 2013.

CNN recently visited the UF campus and spoke with Dr. Kamran Mohseni about his development of aerial and underwater hurricane drones. Using autonomous vehicles, or drones, as sensor platforms creates a new way of collecting hurricane data, one that reduces costs and would prevent the deaths of storm chasers -
UF Hurricane Research continued from page 5

people who risk their lives to deploy sensors during severe weather. By using an aggregate method of data collection, instead of piloting one large aircraft through a storm, an increased number of inexpensive sensors can— together with underwater sensors that passively navigate warm water currents— paint a much more accurate and detailed picture of where and how hard a storm will hit. This can dramatically improve evacuation efforts in coastal communities and beyond.

Much of the innovation in the design for the drones comes from biomimicry. Mohseni’s research lab includes a squid care facility that analyzes the animal’s naturally efficient underwater locomotion. Collectively, the air and sea crafts are programmed with swarming algorithms, generating group behaviors found in bees, birds and schools of fish. This helps the drones reach their target positioning uniformly, but once they get close enough, the hurricane takes over the controls.

UCF Discovery Boosts Energy Storage of Supercapacitors

Researchers at the University of Central Florida have developed a technique to increase the energy storage capabilities of supercapacitors, essential devices for powering high-speed trains, electric cars, and the emergency doors of the Airbus A380.

The finding, which offers a solution to a problem that has plagued the growing multi-billion dollar industry, utilizes a unique three-step process to “print” large-area nanostructured electrodes, structures necessary to improve electrical conductivity and boost performance of the supercapacitor.

Jayan Thomas, an assistant professor in UCF’s NanoScience Technology Center, led the project which is featured in the June edition of Advanced Materials, one of the leading peer-reviewed scientific journals covering materials science in the world. Thomas’ research appears on the journal’s highly-coveted frontispiece, the illustration page of the journal that precedes the title page.

Supercapacitors have been around since the 1960’s. Similar to batteries, they store energy. The difference is that supercapacitors can provide higher amounts of power for shorter periods of time, making them very useful for heavy machinery and other applications that require large amounts of energy to start. However, due to their innate low energy density; supercapacitors are limited in the amount of energy that they can store.

“We had been looking at techniques to print nanostructures,” said Thomas. “Using a simple spin-on nanoprinting (SNAP) technique, we can print highly-ordered nanopillars without the need for complicated development processes. By eliminating these processes, it allows multiple imprints to be made on the same substrate in close proximity.”

This simplified fabrication method devised by Thomas and his team is very attractive for the next-generation of energy storage systems. “What we’ve found is by adding the printed ordered nanostructures to supercapacitor electrodes, we can increase their surface area many times,” added Thomas. “We discovered that supercapacitors made using the SNAP technique can store much more energy than ones made without.”

Thomas, who is also affiliated with the College of Optics and Photonics (CREOL), and the College of Engineering, was recently featured on American Institute of Physics’ Inside Science TV for his collaborative research to develop a new material using nanotechnology that could potentially help keep pilots safe by diffusing harmful laser light.
The University of Florida on Thursday received an $8 million federal award and was named one of six universities nationwide tapped to conduct high-performance computing simulations aimed at addressing some of the world’s most complex problems.

The award from the National Nuclear Security Administration and accompanying designation as a center of excellence is a direct result of UF’s drive to boost its high-performance computing abilities, said David Norton, UF vice president for research.

“It really leverages the investment the university made in high-performance computing and HiPerGator,” Norton said. “All of that was key in getting this award. This is exactly what we need in moving toward top-10 status.”

HiPerGator, UF’s supercomputer, became operational in May and is among the fastest and most powerful in the nation.

The primary focus of the centers of excellence will be on the emerging field of predictive science. The six universities were selected either as a Multidisciplinary Simulation Center, or MSC, or as a Single-Discipline Center, or SDC. The MSCs will receive $3.2 million and the SDCs will receive $1.6 million each year for five years under NNSA’s Predictive Science Academic Alliance Program II agreement. The six universities are:

- University of Florida, Gainesville, Fla., “Center for Compressible Multiphase Turbulence,” an SDC
- Stanford University, Stanford, Calif., “Predictive Simulations of Particle-laden Turbulence in a Radiation Environment,” an MSC
- University of Illinois-Urbana-Champaign, Champaign, Ill., “Center for Exascale Simulation of Plasma-Coupled Combustion,” an MSC
- University of Utah, Salt Lake City, Utah, “The Uncertainty Quantification-Predictive Multidisciplinary Simulation Center for High Efficiency Electric Power Generation with Carbon Capture,” an MSC
- Texas A&M University, College Station, Texas, “Center for Exascale Radiation Transport,” an SDC
- University of Notre Dame, Notre Dame, Ind.,
- “Center for Shock Wave-Processing of Advanced Reactive Materials,” an SDC

“The College of Engineering formed the Institute for Computational Engineering three years ago in order to help our faculty leverage the UF investment in high-performance computing and successfully compete for major multi-investigator grants. Under Dr. Balachandar’s leadership, the institute has done just that. This is a great step forward for interdisciplinary research at UF,” said UF engineering Dean Cammy Abernathy.

Predictive science is the application of verified and validated computational simulations to predict the behavior of complex systems where routine experiments are not feasible. The selected centers of excellence will focus on unclassified applications of interest to NNSA and its national laboratories – Lawrence Livermore National Laboratory, Los Alamos National Laboratory and Sandia National Laboratories.

The centers will develop the science and engineering models and software for their large-scale simulations using methods of verification and validation and uncertainty quantification, with an additional focus on extreme-scale computing. The goal of these disciplines is to enable scientists to make precise statements about the degree of confidence they have in their simulation-based predictions.

S. “Bala” Balachandar, the William F. Powers Professor of Mechanical and Aerospace Engineering, is the principal investigator for the award work at UF. He said his team’s research aims to help develop better understanding and computer models that ultimately could improve health and safety. For instance, he said, improved computer models could better predict how high a dust cloud will rise from a volcanic eruption, allowing airlines to re-route flights safely around it. In the case of a poisonous gas release, emergency officials could use enhanced models to create better evacuation plans. The same modeling could be applied to predict how a dust cloud from a meteor strike might move.

Balachandar said his modeling could even improve needleless drug delivery, which relies on injecting drugs through the skin via high pressure gas.

Supercomputing continued to page 8
“Any problem that involves large numbers of particles and droplets moving quickly,” he said, “that’s what interests me.”

Validation of the computer models is the key, he said, and to that end his team will work closely with the NNSA laboratories and with partners at the Air Force Research Laboratory at Eglin Air Force Base in Florida.

UCF Student Crafts Record-Setting Antenna

A UCF engineering team has developed an antenna capable of surviving a record temperature of 1,300 degrees Celsius, a potential boon to manufacturers of high-performance turbine engines.

Haitao Cheng, a Ph.D. student working with Professor Xun Gong, used a unique fabrication process to construct the antenna, about the size of a stick of gum. The antenna communicates with a nearby ceramic sensor to detect temperatures in environments where most materials would melt.

The research, funded by a $950,000 grant from the U.S. Department of Energy, was designed to address the problem of efficient temperature monitoring of turbines – machines that produce most of the world’s electrical power and propel aircraft.

Turbine manufacturers are interested in making their machines run at higher temperatures to improve their efficiency, however the fuel that runs the machines burns at higher temperatures than most materials that can be used to measure temperature.

“Currently there are no sensors that can continuously and accurately monitor the temperatures of turbines,” said Gong.

Most antennas are configured on printed circuit boards (PCBs) which cannot survive extreme temperatures. Cheng wanted to create something that maintained the characteristics of PCB antennas but would be more robust and easily reproducible.

His solution was to create antenna layout on transfer paper, transfer the layout onto a sheet of alumina, and coat the finished device with a platinum paste.

Using a ceramic furnace in his UCF lab, he measured the antenna up to a temperature of 1,300 degrees Celsius, a record for published literature. This antenna is currently being used in the wireless sensing of high-temperature sensors developed by him and his teammates including Xinhua Ren and Siamak Ebadi.

Cheng presented his results in a paper to the IEEE International Symposium on Antennas and Propagation last month. He said he is ultimately interested in designing robust antennas for use in future space missions, to planets as distant as Venus where the environment is characterized by high temperatures and corrosive gases.

Florida Project Produces Nation's First Cellulosic Ethanol at Commercial-Scale

The Energy Department today recognized the nation’s first commercial-scale cellulosic ethanol production at INEOS Bio’s Indian River BioEnergy Center in Vero Beach, Florida. Developed through a joint venture between INEOS Bio and New Planet Energy, the project uses a unique hybrid of gasification and fermentation technology – originally developed with Energy Department support.

Cellulosic Ethanol continued to page 9
starting in the 1990’s – to convert wood scraps, grass clippings and other waste materials into transportation fuels as well as en-
ergy for heat and power.

“Unlocking the potential for the responsible development of all of America’s rich energy resources is a critical part of our all-of-
the-above energy strategy,” said Energy Secretary Ernest Moniz. “Today’s announcement of commercial-scale cellulosic produc-
tion represents an important benchmark for American leadership in this growing global industry. It also demonstrates the need
for early-stage investment in innovative technologies that will help diversify our energy portfolio, reduce carbon pollution and
lead to tomorrow’s energy breakthroughs.”

As the President’s Climate Action Plan made clear, biofuels have an important role to play in increasing our energy security, fos-
tering rural economic development and reducing greenhouse gas emissions from the transportation sector. The Energy Depart-
ment’s research and development efforts are helping to bring innovative, cost-cutting biofuel technologies on line, test the latest
engineering advancements and accelerate commercial production.

The Indian River County BioEnergy Center (Center) will have an annual output of eight million gallons of cellulosic ethanol per
year from vegetative, yard and municipal solid waste as well as six megawatts of clean, renewable power annually – enough to
run the entire facility and provide excess power to the local community.

The project’s gasification-fermentation technology – which produces fuel, heat and power – has its roots in a University of Arkan-
sas research project, supported by a $5 million Energy Department investment over fifteen years. The Department’s early suppo-
helped this technology obtain a number of patents, with the core intellectual property purchased by INEOS Bio in 2008.

In 2009, the INEOS Bio-New Planet Energy joint venture was awarded a $50 million Energy Department grant to design, construct,
commission and operate the Indian River BioEnergy Center. With a $130 million total project cost, the Center created more than
400 direct construction, engineering and manufacturing jobs during its development and has 65 current full-time employees.
More than 90 percent of its equipment was sourced by U.S. manufacturers across 10 states. The Vero Beach project will serve as a
test bed for producing commercial-scale cellulosic ethanol with this innovative conversion technology – helping to inform future
INEOS Bio facilities as well as other advanced biofuel projects across the country.

**County Celebrates Return to Biodiesel Production**

After a hiatus of more than half a year, Alachua County is resuming biodiesel production thanks to a new law championed by the
area’s state legislative delegation that makes related reporting requirements more manageable.

Florida legislators Rob Bradley, Keith Perry and Clovis Watson Jr. visited the Alachua County Hazardous Waste Collection Center in
Gainesville on Monday morning along with county commissioners and staff to commemorate the local government’s return to
biodiesel.

During its spring session, the Florida Legislature approved biodiesel legislation that was ranked as one of the County Commission's
top legislative priorities. The new law exempts counties, municipalities and school districts from a former requirement that man-
dated they maintain a fuel wholesaler license in order to produce biodiesel fuel for internal use.

The county began using waste vegetable oil to create biodiesel, which can be blended with typical diesel fuel for use in vehicles, in
2010. It halted its biodiesel production in December because it wasn’t worth continuing the effort under the previous reporting
requirements, county Environmental Protection Director Chris Bird said.

Staff then started working on legislation to address the issue, which succeeded.

Now, the county is resuming its biodiesel production. It uses the biodiesel in its garbage trucks primarily, but it can also use a bio-
diesel-fueled generator to power the entire Hazardous Waste Collection Center.
That can come in handy during a power outage or hurricane-level emergency, Bird said.

It costs about $2 a gallon to produce biodiesel, which is a cost savings since diesel fuel for its garbage trucks can cost upwards of $3.50 a gallon.

"It's saving money. It's helping the environment," he said. "It's kind of a no-brainer."

Instead of pouring used vegetable oil down the drain, residents and local restaurants can drop it off at the hazardous waste center or at one of the county's Rural Collection Centers so it can be put to good use. Biodiesel production is especially cost-effective for the county because it is doing it on a small scale, Bird said.

Bradley, Perry and Watson each spoke Monday before a group of about 20 people, which included County Commissioners Charles "Chuck" Chestnut IV, Robert "Hutch" Hutchinson and Lee Pinkoson and several county staff members.

Perry thanked the county's communications coordinator, Mark Sexton, for his work promoting the legislation in Tallahassee and said the new law will encourage schools and small municipalities to follow Alachua County's example and begin producing their own biodiesel fuel.

Bradley said the legislation was a win-win from a financial and environmental perspective and said he and his fellow legislators' work with the county in Tallahassee helped establish a good relationship moving forward.

"I think we really began laying the groundwork for a partnership," he said.

After the legislators and a few other people spoke, county staff briefly walked everyone through the biodiesel process. People drop off their used bottles of vegetable oil at the collection center, and the liquid goes into containers, where it is filtered and as much water is separated from the substance as possible. Fatty acids eventually are extracted from the vegetable oil, which then goes through several processes, including glycerol extraction, to be turned into biodiesel fuel.

Mike Keim, an environmental specialist with the county, gave the visitors a gander at what biodiesel fuel actually looks like, filling a large measuring cup with a blue gas-pump nozzle. The fuel he poured out was dark amber in color.

A square, transportable generator that was marked with information on the biodiesel process stood beside the production machinery.

"When that generator is running, everyone walks around here hungry," Keim said. "That fried-food smell is hard not to salivate over."

Florida State University research is behind products that are being marketed by Florida businesses that enhance the state’s economy and economic development.

On July 9, Gov. Rick Scott went to Tallahassee-based Bing Energy to sign HB 705 that creates the Florida Capital Technology Seed Fund to foster greater private-sector investment funding, encourage investments in start-up companies and advise companies on how to restructure their organizations in order to attract greater business opportunities.

During last week’s bill signing event, Bing Energy unveiled its first product — a hydrogen fuel cell designed to serve as a backup generator for cell-phone towers. The fuel cells use carbon-nanotube technology, known as “buckypaper,” which was developed at Florida State. It is a thin conductive material that is lighter and stronger than steel.
Bing Energy used public funding from the Florida Institute for the Commercialization of Public Research to produce its clean energy fuel cell. The fuel cells power a 3-kilowatt generator that will be installed in cell phone towers across China.

“The bill we are celebrating today will encourage greater investments in Florida’s start-up companies, ultimately leading to more jobs and opportunities for Florida families,” Gov. Scott said during last week’s event.

Among the other marketable products that are based on Florida State research that are being marketed by private firms is a new treatment for mild concussions produced by Prevacus, a pharmaceutical company. The drug has practical applications for athletes, military personnel and accident victims. Powers Device Technologies is another example of a company that used Florida State research to develop a practical product known as PAL, which uses music reinforcement therapy to stimulate the breathe-suck-swallow reflex in premature infants.

“Last year, university faculty researchers in Florida generated over $1.6 billion in research grants and contracts from government and private entities,” said Gary K. Ostrander, vice president for Research at Florida State. “The vast majority of these funds cycled through the Florida economy in the form of salaries and locally purchased goods and services.”

Research-generated grants and contracts combined with new and innovative commercial products based on university research and produced by private companies in the state have helped Florida emerge from the economic downturn by creating jobs, products and services that benefit everyone.

Firm with UF Ties Wins Cade Prize

NanoPhotonica is already working with four of the five largest manufacturers of display screens for electronic devices in the world.

On Thursday night, the company with offices in Orlando and in the University of Florida Innovation Hub in Gainesville won the fourth annual Cade Museum Prize and the $50,000 cash prize courtesy of the Community Foundation of North Central Florida.

In a pitch to about 350 people in a sold-out event at the Santa Fe College Fine Arts Hall, CEO Chris Morton described the "secret sauce" the company is producing for manufacturers to make display screens brighter and less expensive to produce.

With technology licensed from materials science research at the University of Florida, the company makes very thin displays from nanomaterials that convert electricity to light and can produce an image 10 times brighter than current screen technology.

"Look at your smartphone," Morton said. "You can't see it in daylight. You can't see it at an angle. It's fuzzy."

In addition to solving those issues, Morton said the nano-displays cost 60 to 70 percent less to produce than current methods because they can be produced by an inkjet printer at room temperature instead of having to use machines that cost millions of dollars. That will make electronic devices affordable to more people around the world.

In a prior interview, Morton told The Sun that the prize money would help with the final development of the materials to prepare them for mass production.
The company will also receive $10,000 in free legal services from the firm Edwards Wildman. The three runners-up will each receive $2,500 in legal services.

From 81 applicants, different panels of judges selected a Sweet 16 and a Final Four that competed Thursday night.

Prize director Richard Miles said applicants were judged on how innovative their ideas are, the potential impact of their creations and how close they are to market.

For the first time this year, the audience voted for a People's Choice Award following the company pitches, which went to Gainesville company Green Liquid and Gas Technologies.

The company has been a Sweet 16 finalist all four years and cracked the Final Four this year.

Green Liquid makes a machine called a pyrolyzer that cooks waste materials at extremely high temperatures in the absence of oxygen to produce fuel. It plans to build a model that converts waste plastic into crude oil.

CEO Norbert Richter said that 62 billion pounds of plastic go in landfills every year, equivalent to 200 million barrels of oil worth $19 billion at current market rates. The pyrolyzer can produce a barrel of oil for $10, less than it costs to produce oil from a platform off the Louisiana coast, Richter said.

The other finalists were Didrick Medical, a Naples company that makes finger prosthetics, and Gainesville’s Partender, which makes mobile software to help bars take inventory.

Americans Continue to Use More Renewable Energy Sources

Americans used more natural gas, solar panels and wind turbines and less coal to generate electricity in 2012, according to the most recent U.S. energy charts released by Lawrence Livermore National Laboratory.

Each year, the Laboratory releases energy flow charts that track the nation’s consumption of energy resources.

Natural gas use is up particularly in the electricity generation sector, where it has basically substituted directly for coal, while sustained low natural gas prices have prompted a shift from coal to gas in the electricity generating sector, according to A.J. Simon, an LLNL energy systems analyst.

The rise in renewables is tied to both prices (the underlying cost of solar panels and wind turbines has gone down) and policy (government incentives to installers of equipment or renewable energy targets in various states), Simon said.

Overall, Americans used 2.2 quadrillion BTU, or quads, less in 2012 than the previous year (BTU or British Thermal Unit is a unit of measurement for energy; 3,400 BTU is equivalent to about 1 kW-hr).

Once again, wind power saw the highest gains, going from 1.17 quads produced in 2011 up to 1.36 quads in 2012. New wind farms continue to come on line with bigger, more efficient turbines that have been developed in response to government-sponsored incentives to invest in renewable energy.
Solar also jumped from 0.158 quads in 2011 to 0.235 quads in 2012. Extraordinary declines in prices of photovoltaic panels, due to global oversupply, drove this shift.

This is the first year in at least a decade where there has been a measurable decrease in nuclear energy.

"It is likely to be a permanent cut as four nuclear reactors recently went offline (two units at San Onofre in California as well as the power stations at Kewaunee in Wisconsin and Crystal River in Florida)," Simon said. "There are a couple of nuclear plants under construction, but they won't come on for another few years."

Coal and oil use dropped in 2012 while natural gas use jumped to 26 quads from 24.9 quads the previous year. There is a direct correlation between a drop in coal electricity generation and the jump in electricity production from natural gas.

The majority of energy use in 2012 was used for electricity generation (38.1 quads), followed by transportation, industrial, residential and consumption. However, energy use in the residential, commercial and transportation sectors decreased while industrial energy use increased slightly.

**U.S. Energy Sector Vulnerabilities to Climate Change and Extreme Weather**

See the 2012 energy flow chart.

This report—part of the Administration’s efforts to support national climate change adaptation planning through the Interagency Climate Change Adaptation Task Force and Strategic Sustainability Planning process established under Executive Order 13514 and to advance the U.S. Department of Energy’s goal of promoting energy security—examines current and potential future impacts of these climate trends on the U.S. energy sector. Report updated July 16, 2013.

**Smart Energy: Five Metatrends to Watch in 2013 and Beyond**

Explore an interactive map that shows where climate change has already impacted the energy sector.

The Smart Energy paradigm is fast evolving from niche markets into a standardized part of the global energy portfolio. Oil majors, national governments, and technology developers have all reached the consensus that a more diversified energy mix is critical to sustainable economic growth in the future. As a result of this development, combined with the almost inexorable shift toward an electron-based economy, a range of new energy sources and advanced energy technologies has entered the market and started to post healthy revenue.

This white paper identifies five emerging metatrends that will have an increasing impact in 2013 and beyond. The five smart energy metatrends that Navigant Research has identified for 2013 are:

- Energy is becoming increasingly democratized
- The role of government innovation funds is changing
- Technologies are converging
- The Southern African Power Pool is becoming the new BRIC

Smart Energy continued to page 14
The role of utilities is changing

This white paper outlines key trends affecting the development of Smart Energy industries worldwide, the specific market impacts of these trends in 2013, and the longer-term impact of these emerging developments. Analysis and conclusions in this paper are drawn from the firm’s ongoing Smart Energy research coverage, with forecasts included for key market sectors.

Key Questions Addressed:

What are the emerging geographic markets for smart energy?

Why is the democratization of energy important and what will be the impact on energy markets?

Who is picking up the slack from the exit of the private equity market in early stage innovation funding?

How is the role of utilities changing in the new smart energy paradigm?

Who needs this report?

• Technology developers
• Utilities
• Government agencies and policymakers
• Investor community

Beacon Power LLC broke ground on a 20 MW flywheel energy storage site in Hazle Township, Pa.

The first 4 MW of storage are expected to begin commercial operations in the PJM Interconnection in September, with the full plant planned to become operational in mid-2014. Flywheels help to provide frequency regulation by absorbing excess electricity from the grid and storing it until it is needed, according to the company.

The company already has a 20 MW flywheel energy storage plant in operations in Stephentown, N.Y. The company filed for Chapter 11 bankruptcy in October 2011 and was bought by Rockland Capital in April 2012.

China’s spending to develop renewable energy may total 1.8 trillion yuan ($294 billion) in the five years through 2015 as part of the nation’s efforts to counter climate change, according to a government official.

China may invest another 2.3 trillion yuan in key energy-saving and emission-reducing projects, Xie Zhenhua, vice chairman of the National Development and Reform Commission, said today at a conference in Beijing. China stands by its pledge to cut carbon emissions per unit of economic output by as much as 45 percent before 2020 from 2005 levels, he said.
The increased reliance on renewable sources of energy fits with efforts by China, the world’s biggest carbon emitter, to help mitigate the effects of pollution blanketing its major cities. Along with renewables investments, the environment ministry is considering stricter controls on vehicle and industry pollution.

The government aims to have 100 gigawatts of wind-power installed capacity and more than 35 gigawatts of solar power by 2015, Xie reiterated today. China’s targets have encouraged companies including China Petrochemical Corp., also known as Sinopec Group, to strengthen their commitment to protect the environment.

Sinopec yesterday said it will invest 22.9 billion yuan on an environmental protection plan.

China asked seven cities and provinces last year to put in place regional caps and pilot programs for trading emission rights.

The country will gradually expand the regions falling under its carbon trading pilot program starting from 2015 in order to explore the potential for a national system, Xie said.
Recent 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.

- **DE-FOA-0000958 - Early Career Research Program**
  Application Due Date: Nov 19, 2013 5 PM EST
  [More information](#)

- **DE-FOA-0000957 - Small Business Innovation Research (SBIR)/ Small Business Technology Transfer (SBTT) FY 2013 Phase II Release 3**
  Application Due Date: Sep 04, 2013
  [More information](#)

- **DE-FOA-0000948 - Research Opportunities in High Energy Physics**
  Application Due Date: Sep 9, 2013
  [More information](#)

- **DE-FOA-0000847- Marine and Hydrokinetic (Wave) Testing Infrastructure Development**
  Letter of Intent Due: Jul 26, 2013
  Application Due Date: Aug 13, 2013
  [More information](#)

- **DoD SBIR 2013.3 - Small high-technology firms are encouraged to submit proposals to DoD for R&D projects with both military and commercial applications in response to the 2013.3 SBIR Solicitation, which will be publicly released on the DoD SBIR Web site on September 25, 2013.**

- **NSF -PD 13-1401- Catalysis and Biocatalysis**
  Full Proposal Window: Aug 15 - Sep 17, 2013

- **Most EERE financial assistance is awarded on a competitive basis, however, financial assistance can be awarded on a noncompetitive basis through the unsolicited proposal program. An unsolicited proposal is an application for financial assistance that is not submitted at the request of EERE or in response to a solicitation announcement. Unsolicited proposals are submitted solely at the discretion of the proposer. To submit an unsolicited proposal, send an e-mail to DOEUSP@netl.doe.gov**

- **Three New Manufacturing Institute (details will be announced):** [http://www.manufacturing.gov/news_050913.html](http://www.manufacturing.gov/news_050913.html)

Upcoming Events

- **Southeastern Coastal Wind Conference | Sep 11-12 | Charleston, SC | [More information](#)**

- **FESC and Florida Energy Summit | Oct 14-15 | Orlando, FL at the Rosen Shingle Creek | [More information](#)**

- **Florida Atlantic University’s 2nd Annual Sea Level Rise Summit | Oct 16-17 | Fort Lauderdale, FL | [More information](#)**

- **iiSBE Net Zero Built Environment Symposium | Mar 6-7 | Gainesville, FL | [More information](#)**