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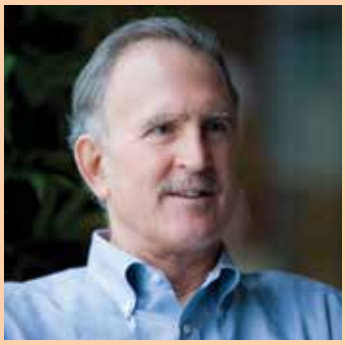

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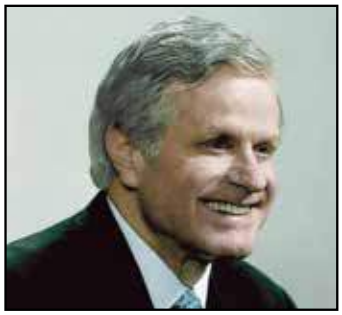

Dick Flanagan
flanagan@world-gen.com

Alstom invited World-Gen to the world's first solar energy smart grid storage demonstration project in Nice, France in 2014. Alstom, now GE, partnered with EDF, Saft and others to build a micro grid. See what's happening in the industry since from the Class of 2018 who share their experiences and visions. We are pleased and proud to present the19th Class of the Millennium.

GE's Power Services is doubling down on operational excellence, transforming to a new structure reports recently appointed President & CEO Scott Strazik on page 4.

Siemens and AES launched Fluence Energy, an energy storage technology and services company; Johannes Reinschke, CTO, and Dennis Fehr, CFO, share on pages 6 and 8.

ABB's wrap-around Ability/TM digital platform drives operational improvements Jon Towslee, Director of Business Development, tells us on pages 8 and 10.

Emerson fast-forwards to today's assets, microgrids, and storage requiring a new age automation model introduced by Rick Kephart, Director of Research & Technology, on page 12.

Greensmith Energy plans to continue to make energy storage an integral part of the energy infrastructure, President & CEO John Jung says on page 14.

Innowatts plans to disrupt the operating model of utilities by using artificial intelligence, Sid Sachdeva, Founder and CEO, predicts on page 15.

Trina is transitioning from a component manufacturer to a clean energy solution provider Jing Tian, President North America, said on page 16.

The biobased economy is approaching a tipping point in its growth and maturation, BIO President &CEO Jim Greenwood underscores on page 17.

Pattern Energy is expanding its portfolio by entering the Japanese renewable market in wind and solar, Michael Garland, President & CEO, lays out on page 18.

8 Minuteenergyrenewables believes dispatchable solar is an incredible growth market, Martin Hermann, Founder & CEO, plans on page 19.

Gilian Corral joins the Class of 2018 as a contributing editor to World-Gen on page 20. She reports from northern California.

Dick Flanagan

EDITORIAL CALENDAR

May/June 2018
INTERSOLAR NA 2018
SPI
EDISON ELECTRIC INSTITUTE (EEI)
ELECTRIFY EUROPE
BIO WORLD CONGRESS
Closing Date: May 1st

September/October 2018
BUECHE DIRECTORY OF DEVELOPERS
Closing Date: September 15th

November/December 2018
POWER-GEN WEEK 2018
Closing Date: November 1st.

SCOTT L. STRAZIK

President & CEO
GE Power Services

Scott is the president and chief executive officer of GE's Power Services business, a $15 billion revenue organization focused on after-market power generation services and solutions. In this role, Scott is responsible for developing and delivering a global services strategy that offers power producers the technology, services, knowledge and insights to make better decisions across the entire life cycle of their power generation assets. The largest industrial services business in GE, Power Services has customers in more than 150 countries.

Scott has more than 17 years of operations and leadership experience. In 2011, he was named Chief Financial Officer for GE Aviation's Commercial Engine Operations organization, and In July 2016, was named Chief Financial Officer for GE's Gas Power Systems business, a $10 billion revenue organization focused on gas power generation technology and solutions. Most recently, he was the Sales and Commercial Operations leader for GE's Gas Power Systems business.

Scott was named an officer of the General Electric Company in 2015 and appointed to his current role in October 2017. He holds a Bachelor of Arts degree in Industrial Labor Relations from Cornell University, as well as a master's degree from Columbia's School of International & Public Affairs with a focus on Economics and Public Policy.

2017 ACCOMPLISHMENTS

The energy industry continues to transform. Energy storage is playing a more critical role around the globe; hybrid technologies are disrupting markets and helping power producers take advantage of trending innovations such as battery storage capabilities—as the price of battery storage decreases and the scale of renewable energy increases, battery storage can balance supply and demand in microseconds.

Power Services is at the forefront of this transformation. In 2017, GE partnered with Southern California Edison (SCE) to co-develop and unveil the world's first battery-gas turbine hybrid system. This award-winning solution is called the LM6000 Hybrid Electric Gas Turbine (EGT), and it supports SCE's increasing renewable energy capacity by providing quick start, fast ramping capabilities when they're needed in short order. SCE is already reaping substantial benefits from EGT, including a 50% reduction in starts, a 60% reduction in GHG emissions and a 10-year forecast to slash water consumption by 45% (2 million gallons per year).

In 2017, we also achieved a significant milestone with our 9EMax gas turbine upgrade solution, which we developed in response to our customers' specific need for greater efficiency, output and flexibility. We performed the first 9EMax installation, initial validation and critical "first fire" tests at Tokyo Electric Power Company's (TEPCO) Futtsu power plant in Japan. TEPCO anticipates that 9EMax will help Futtsu to both lower its fuel costs by $7 million and reduce CO2 emissions by 40 tons each year.

We developed both technologies, part of GE's Fleet360* platform of total plant services solutions, in close partnership with our customers SCE and TEPCO. We used our "FastWorks" approach to gauge what factors our customers look for the most when deciding to modernize their power plants, and these key conversations pointed to common threads: better efficiency, additional output and broader flexibility.

2018 AGENDA

Last year, GE Power proposed an organizational realignment that embraces the reality of a softening and evolving global energy marketplace. For Power Services, this new structure will give us opportunities to use GE Power's scale to work in a simpler, more collaborative way and renew our focus on total gas plant services solutions.

We will continue to partner closely with our customers to help them navigate the transforming energy landscape and invest in new hardware and software technologies and capabilities to make them more competitive. We are building on our commitment to deliver the industry's most advanced technology and the success of our 7F Advanced Gas Path technology. With nearly 300 7F AGPs installed globally, we are expanding this offering across both our GE and Alstom fleets to help our customers dispatch faster, turndown lower and peak fire more efficiently. Another great example is our new high efficiency upgrade for the GT26 fleet, which we'll introduce later this year. It offers more efficiency, output and availability, and it demonstrates the strengths of GE and Alstom technologies working together across our fleets.

We are also double downing on operational excellence, making improvements across all areas of fulfillment to drive flawless execution in all that we do for our customers. We will continue to drive a strong partnership with FieldCore, GE's field services organization and the execution arm for Power Services. We created FieldCore as an independent GE company in 2017 to bring together field expertise and more than 10,500 people from Granite Services and GE's Power Services business into one field services organization focused on world-class execution.

PROJECT THE INDUSTRY GOING FORWARD

Digital industrial solutions and additive manufacturing trends will drive the transformation of our industry. Over the next decade, $1.3 trillion of value can be captured in the digital transformation of power. Software and data analytics, combined with advanced hardware, will create new digitally enhanced power generation capabilities that will deliver greater flexibility, reliability, affordability and sustainability, as well as improve efficiencies, reduce costs and create growth opportunities

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JOHANNES REINSCHKE

Chief Technology Officer
Fluence Energy

As Chief Technology Officer and Managing Director, Johannes Reinschke leads Fluence's technology selection, integration design, controls development and market & system modeling for Fluence's energy storage solutions.

Prior to joining Fluence, Johannes worked for Siemens for 18 years, in sales and software development/commissioning roles at Siemens Industrial Solutions and Services, in the Research Group in Siemens Corporate Technology, and most recently as Head of R&D for Active Power Systems and Storage at Siemens' Medium Voltage and Systems business unit.

In addition, in 2014, Johannes successfully initiated the EU-funded project "Storage-Enabled Sustainable Energy for Buildings and Communities" ("SENSIBLE"), and in 2015 he was the first coordinator of this project.

Johannes holds a Diploma in Physics from the University of Goettingen (Germany) and a Ph.D. in Control Engineering from the University of Cambridge (UK).

FLUENCE LAUNCHED

Fluence Energy, an energy storage technology and services company jointly owned by Siemens and The AES Corporation, launched business operations on January 1, 2018 in over 160 countries.

The Siemens global sales force will market and sell Fluence energy storage systems, including Siestorage, Advancion, and the newest Fluence platform, SunFlex Energy Storage for solar PV. This new partnership provides Fluence with a global sales presence in 160 countries from a trusted supplier to thousands of utilities, power developers and large commercial customers, while giving Siemens access to the most proven and widely deployed grid storage technology platforms.

ENERGY STORAGE

The market for energy storage is accelerating with Bloomberg New Energy Finance projecting it to reach $100 billion by 2030.

Utilities, developers and large energy users worldwide recognize energy storage's value as critical infrastructure that provides greater reliability, resilience and efficiency including:

Bankable, proven and industrial-strength technology platforms optimized for different customer needs, including speed of response, long-term dependability and integration with other power resources;

A comprehensive set of services and warranties covering the entire energy storage journey, from early-stage commercial analytics through the full operations and maintenance life-cycle of a project;

The broadest set of energy storage grid applications including power generation, transmission and distribution alternatives, renewable energy integration, and commercial and industrial applications;

Full turn-key installation and support services in more than 160 countries, tailored to meet specific needs and conditions;

A suite of financing packages through a new partnership with Siemens Financial Services, including leasing and project finance options.

In the US, Fluence will be the supplier of the world's largest lithium-ion battery-based storage project, a 100 MW installation in Long Beach, California serving Southern California Edison.

Fluence serves both existing projects and new projects for customers around the globe. Fluence will support (directly or indirectly): 40 MW of new 4-hour storage and 37.5 MW of existing 4-hour storage for San Diego Gas & Electric; A microgrid project for Italian energy utility Enel on the Mediterranean island of Ventotene; Three projects adding much needed reliability for Arizona Public Service's distribution grid in areas with high solar penetration; Six energy storage projects being installed across Germany; and Two 10 MW projects in the Dominican Republic.

SUNFLEX ENERGY STORAGE

Fluence's new technology platform, called SunFlex Energy Storage, enables solar facilities to sell up to 50 percent more clean energy per site.

With Fluence's new technology platform, solar energy can now be delivered when it is needed most, not just when it is available.

This innovation eliminates the need for back-up generation, such as peaking gas plants or reciprocating engines, to manage solar variability.

This is especially critical on many microgrids and islands, where solar and storage combined are now the cheapest and most reliable form of energy available.

The Fluence team originally developed energy storage solutions to replace inefficient or underutilized traditional power infrastructure assets such as power reserves, peaking, or wires.

Today, as new power investment is flowing mainly into new solar generation, we have the chance to make this more efficient from the start. With the Fluence solution, solar energy comes from the same site.

The Fluence SunFlex Energy Storage technology platform builds upon many of the industry-leading controls and architectural principles from Advancion and Siestorage.

The new platform captures the solar energy that otherwise would be lost and allows developers to add more solar panels without the cost of changing their interconnection.

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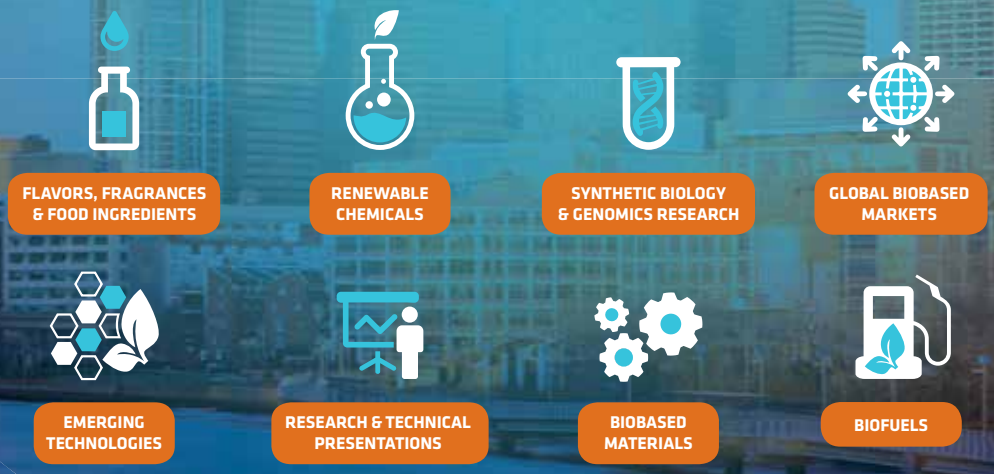

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DENNIS FEHR

Chief Financial Officer
Fluence Energy

As Chief Financial Officer, Dennis Fehr is responsible for the financial management of Fluence and the development of financial services for Fluence customers, and from a finance perspective the tendering and execution of projects and managing the procurement function.

Prior to joining Fluence, Dennis had a 15-year career with Siemens, holding various finance and business administration positions in China, Germany, Mexico and Indonesia at Siemens' Medium Voltage business unit.

Dennis holds a bachelor's degree in business administration from Berufsakademie Villingen-Schwenningen.

SFS

Fluence has a comprehensive financing program with Siemens Financial Services. The new financing program offers customers leasing and project finance options for qualified projects.

Fluence's combination of unmatched energy storage experience will drive down the total system costs of energy storage and accelerate the growth of this dynamic segment of the power market estimated to be a $100 billion market opportunity by 2030.

With nearly 500 megawatts of energy storage projects deployed or contracted in 15 countries, Fluence has nearly twice the track record of any other company.

The financing program with Fluence is unique in that it allows support to a wide array of clients around the world – from commercial & industrial (C&I) energy users to utilities and grid operators – with customized financial solutions to help address their specific project challenges.

C&I CUSTOMERS

C&I customers typically have smaller-scale projects and are looking for cash-neutral financing solutions, in which case equipment leasing or performance contracting solutions might work best.

SFS has gained important experience serving the growing energy storage market in several regions such as:

UNITED STATES:

Through a project finance solution, SFS committed a $50 million term loan to support the construction of AES's 100 megawatt battery system in Southern California, which is tied to a new, 1,284 MW combined-cycle natural gas generator. The system will replace 1960's-era power plants in Los Alamitos, Huntington Beach, and Redondo Beach.

GERMANY:

SFS established a program to provide packaged managed service solutions for municipalities eligible to participate in Germany's Frequence reserve control market. The program includes projects in the range of five to eight MW peak power that use Siemens' SIESTORAGE systems.

UNITED KINGDOM:

SFS in the United Kingdom recently announced an outcome-based finance model for purchases of Fluence's Siestorage energy storage systems, which are available to users with on-site electricity demand profiles anywhere between 1MW and 100MW.

To date, Fluence's teams have deployed or been awarded a market-leading 56 projects with a total capacity of 485 megawatts in 15 countries.

JON TOWSLEE

Director of Marketing & Business Development for the Americas, ABB Power & Water

Jon Towslee has over 25 years of energy industry experience including commercial & industrial power monitoring and energy management, demand management, industrial & utility generator control, HVAC, power factor correction, harmonic mitigation, electric power transmission and distribution, control and information system design and application, and energy system data modeling.

In his current capacity, Jon is responsible for leading ABB's Marketing & Business Development Team for the America's Power Generation and Water business.

Jon's primary area of interest is in the application of control and information technology to help companies better manage energy production & consumption while reducing environmental impacts through sustainability programs. Throughout the years, Jon has authored, co-authored and presented several papers including titles such as "Mobile 115kV Capacitors - A Brief Overview", "Practical Solutions for Information Gathering, Monitoring and Controlling Transformers and Ancillary Devices," "Emergency Load Management Systems," "Power Management: The Benefits of a Systems Approach," "Benefits of a Power Monitoring & Control System," "Benefits of a Demand Management System," and "Energy Economics: Enterprise Energy Management Solutions." Furthermore, Jon has also contributed a

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JON TOWSLEE

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chapter titled "Energy Management Key Performance Indicators (EnPIs) and Energy Dashboards" which are included in the book Energy Efficiency: Management Principles for the Process Industry published in 2015.

Jon earned his Bachelor of Science in Electrical Engineering from The University of Akron and his MBA from John Carroll University. He is a Registered Professional Engineer in the State of Ohio.

WHAT WERE ABB POWER GENERATION & WATER'S 2017 HIGHLIGHTS?

ABB's Power Generation & Water business unit had another solid year in 2017. Business continues to grow despite challenging head winds in the power generation market, stemming from relatively flat demand growth, increasing generation mix driven by renewables, and more competitive threats to the old base-load fossil fuel plants. This is attributed to our focus on making our customers more successful. Overall, ABB is well positioned and offers a complete range of solutions for the entire utility value chain from generation (both fossil and renewable) to transmission and distribution with our solutions and digital offerings.

ABB is helping its customers become more agile and efficient. Our services and projects businesses are helping more power generating plants manage cost, risk, and performance by improving their operational efficacy, increasing cyber resilience, and increasing reliability for their end customers.

WHAT ARE ABB POWER GENERATION & WATER'S MAJOR INITIATIVES/PLANS FOR 2018?

ABB's main focus is helping our customers address their most challenging business problems with the application of our ABB AbilityTM digital platform. These digital tools "wrap around" existing control systems and utilize performance monitoring, advanced analytics, and modeling to drive operational improvements, extracting more productivity from the large, existing mechanical systems found in power generating plants. The ABB Power Generation & Water business unit has four key areas within our ABB Ability digital offering that we are providing to our customers. They include plant performance improvement, increasing operator effectiveness, fortifying cyber resilience, and incorporating collaborative operations to provide unparalleled levels of technical and operational support. The ABB AbilityTM platform allows our customers to know more, do more, do better, together with ABB, utilizing our global collaborative operations centers and unlocking more potential from the generating assets they already own.

As 2018 progresses, the industry will learn a lot more about ABB AbilityTM. ABB has over 70 million connected devices, over 70,000 control systems, over 6,000 enterprise software solutions, and over 210 different ABB AbilityTM solutions in its installed base. This positions ABB as a global leader in its digital capabilities. When you couple this with our deep domain expertise and intense focus on customer outcomes, you can start to see why we are so excited about the digital future in Power Generation and Water!

WHAT IS YOUR FORECAST, OR PREDICTIONS, FOR THE MARKET OVER THE NEXT YEAR?

There are many moving parts in the power generation market these days. There are several trends that will continue approximately on the same trajectory this coming year. Demand growth will continue to be stagnate, driven by increasingly energy efficient appliances, machines, etc. Also, renewable and distributed generation sources will continue to lead generation capacity additions, further exasperating the variable loading of baseline fossil fuel plants. And finally, the challenges posed by an aging and retiring work force will continue to accelerate. Utilities will be losing hundreds, even thousands of years of collective knowledge and experience over the next decade. How does one begin to capture this knowledge and experience for the next generation of workers? We believe that digital technologies will play a significant role here as well!

Energy storage is starting to gain some traction in the market place. Energy storage units, coupled with smaller distributed gas turbines and or renewable resources will help to smooth the loading on the grid, but it may still be a few years off before it reduces the load volatility seen by the old baseline fossil power generating plants. Smart Grid upgrades and improvements will further buffer these plants, running as swing or peaking units from these load variations.

Finally, more of the old base-load fossil fuel plants will embrace digital technologies to improve their operations.

Newer plants are typically built with more efficient machinery, advanced controls, modern user interfaces, and digital monitoring capabilities. All they need to do is use the technology they are built with to win in the market place. It is the older plants that will benefit the most from the application of digital technologies. The base-line fossil plants are in "the fight of their lives," being forced to run in ways they were never designed or intended to operate. The changing generation mix is forcing many of these plants to operate as load following, swing, or peaker plants, meaning that they are not operating in their intended "sweet spots."

Performance monitoring, advanced analytics, and modeling will allow plant operators to get more output from the boilers and machines they already own and more importantly maximize performance as the plants operate in the "new mode."

Modest, incremental improvements in heat rate, ramp rate, and operator effectiveness, and overall plant performance will translate into reduced risk, improved business performance, and extended life, for older power generating plants.

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RICK KEPHART

Director, Research and Technology
Emerson Automation Solutions, Power & Water

Q: TALK A BIT ABOUT SOME OF THE TRENDS YOU'RE SEEING IN THE POWER INDUSTRY AND HOW THESE ARE IMPACTING AUTOMATION AND CONTROL.

A: We're seeing several important trends related to workforce dynamics. The first is turnover or "brain drain." For a long time, the power industry was a "closed" society. And what I mean by that is people worked their whole career there until one day, they retired. And — all of a sudden—guess what? All of that knowledge goes out the door that day.

Next, we're seeing people who have been coal plant operators for 20 or 30 years now operating gas-fired units. Despite their years of experience, they are essentially "newbies" since the plants operate so differently.

Finally, there is a new generation of operators entering the workforce. They've grown up with smart devices, so they are very comfortable using technology as a tool — it comes naturally to them. But because they are beginning their careers, they can't possibly know how to respond to certain operational upsets because it's all a new experience.

Q: HOW CAN YOU ADDRESS THESE WORKFORCE TRENDS THROUGH AUTOMATION AND CONTROL TECHNOLOGIES?

A: First of all, let's think about the control system as a mentor for less-experienced operators. Let me explain what I mean by this. By combining machine learning with automatic control and human factor design, we can embed the knowledge from experienced operators directly into the control system. It's almost as if that experienced person is standing over their shoulder. The control system recognizes what the current operating state is and what, if any, impending problems there are. When there are issues that should be addressed, the control system guides them. It's a kind of shirt tug that says "hey – you might want to direct your attention over here."

Working hand-in-hand with this is the digital twin—a high-fidelity simulator that runs in parallel with the control system. Since we're talking about supplying electricity to the grid, reliability is of utmost importance. Meeting compliance requirements is another major concern. For these reasons, utilities need to minimize risk. It's necessary, of course, but it's also a roadblock that prevents innovation. That's the beauty of the digital twin: It gives power producers a tool so they no longer need to be afraid to innovate. The digital twin creates a virtual environment of the plant—it's really an exact digital replica of the live plant. This allows engineers to test new control strategies in a safe environment and enhances the situational awareness of operators by teaching them how to respond to abnormal situations and alarm conditions without any risk or disruption to plant operations.

The digital twin also provides a modeled predictive data stream for analytics, capturing state variables that you physically can't measure at certain times – such as flame temperatures and flows.

As exciting as this is, it's really only the beginning. In the future, we see a time when operators and engineers will spend most of their time working in a virtual power plant environment, and the plant will just be running on its own. The plant will have a separate control system that marries data analytics, machine learning and control algorithms. The result is synchronized simulation that's running in a digital environment.

This is all made possible by the computing power now available in embedded machines, which allows us to push analytics and more advanced control functions to the edge … right where the I/O is. This is beneficial, as the controller then produces a richer, higher-resolution dataset for real-time datamining. And from this, deviations and patterns that signal impending failures or the onset of an abnormal process situation are presented to the operators, giving them ample time to respond.

Q: HOW HAS THE GROWTH OF RENEWABLE GENERATION IMPACTED THE BUSINESS OF AUTOMATION?

Let's start by taking a look at what I'll call the traditional model: bulk generation assets, primarily large-scale fossil fuel and nuclear plants. With these large plants, everything is generally located within three acres. Then the model evolved with the addition of hydro and utility-scale solar.

Now, let's fast-forward to today: The assets start to look substantially different. We're seeing homeowners putting solar panels on their roofs, and even utilities putting them on buildings and rooftops. Then, toss microgrids and energy storage into the mix, and things really start to get interesting.

Generation assets are much smaller and they are distributed across entire cities and regions. While they may be scaled down, there are thousands of them and they are more geographically dispersed. This requires a new automation model that puts all of the capability and intelligence of a DCS into a smaller footprint that is able to manage the flow of energy from various distributed resources. These smaller controllers are robust, integrating wide-area technologies that makes it possible to control geographically dispersed equipment using cell or other wireless technology. This is not easily accomplished with less-integrated programmable logic controllers (PLCs), which limit the broad information-sharing necessary for optimal operational efficiency.

These controllers also offer enhanced cybersecurity capabilities. The value of this can't be underestimated, particularly given the most recent reports that foreign entities have targeted the U.S. power grid. In this environment, its best to utilize automation

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JOHN JUNG

President & CEO
Greensmith Energy, A Wärtsilä Company

Greensmith Energy, a Wärtsilä company, is the world's leading provider of grid-scale energy storage solutions, integration and software. The company's mission is to make energy storage an integral part of a cleaner, more intelligent energy infrastructure and a more sustainable world.

To date, Greensmith has delivered more than 70 energy storage systems globally. Greensmith's GEMS software platform optimizes the performance of energy storage, as well as thermal generation and renewable energy, lowering costs and maximizing return on investment throughout the system's life.

Customers include AEP, E.ON, Duke, JCI, Oncor, AltaGas, and NextEra – all energy leaders who view energy storage as a strategic part of their future success. Greensmith's track record encompasses some of the largest and most noteworthy storage systems in North America energy market in recent years. As a result, Greensmith's GEMS platform stands alone as the most proven software platform available.

ABOUT WÄRTSILÄ

Wärtsilä is a global leader in smart technologies and complete lifecycle solutions for the marine and energy markets. By emphasizing sustainable innovation, total efficiency and data analytics, Wärtsilä maximizes the environmental and economic performance of the vessels and power plants of its customers. In 2017, Wärtsilä's net sales totaled EUR 4.9 billion with approximately 18,000 employees. The company has operations in over 200 locations in more than 80 countries around the world. Wärtsilä is listed on Nasdaq Helsinki.

GREENSMITH ENERGY MILESTONES IN 2017

- Greensmith Energy delivered 11 grid-scale system projects globally in 2017
- Greensmith Energy delivered the first commissioned Aliso Canyon Energy Storage System, and set an industry record for quickest delivery (January)
- Greensmith Energy software was selected by Oncor to enhance its existing microgrid (February)
- Greensmith Energy upgraded an existing 14 MWh AEP substation energy storage system with GEMS software (April)
- Greensmith Energy and AltaGas received the 2017 Greentech Media Grid Edge Award for the record-setting 20MW Pomona Energy Storage Project (April)
- Greensmith, AltaGas received the Grid Edge Award for the record-setting Pomona Project (June)
- Greensmith, E.ON, Tucson Electric Power completed the Iron Horse Battery Energy Storage Project (June)
- Greensmith Energy partnered with E.ON North America to deliver two 9.9 MW grid-scale short duration energy storage systems in Texas (June)
- The acquisition by Wärtsilä was completed in July
- Greensmith and AEP launched a hybrid hydro energy storage project in the United States (October)
- Oncor selected Greensmith as the software provider for its microgrid facility in Texas
- California ISO certified GEMS by Greensmith Energy as a Remote Intelligent Gateway (December).

AREAS OF FOCUS IN 2018

In 2018, Greensmith is focused on powering our world more sustainability through our hybrid energy solutions that integrate multiple grid assets including thermal generation, renewable energy and energy storage. These integrated energy solutions and hybrids reflect high-order thinking about the changing nature of the grid network, offering new and highly differentiating sources of value. Several customers are realizing the monetary value of storage as well as GEMS enables "value-stacking" or multiple applications such as spinning reserves and ancillary services.

GEMS has already delivered one of the most sophisticated microgrids in America at Oncor which includes batteries, inverters, solar, and several generators, as well as at Graciosa in the Azores. GEMS operates and optimizes the multiple grid assets, enabling the integration of renewable energy while increasing the reliability of the grid.

Greensmith Energy is continually working to ensure that our energy storage solution takes full account of the range of use cases desired and grid conditions faced by the customer – even as electric grids rapidly evolve, and are disrupted by deregulation, distributed energy resources, renewable portfolio standards, smart grid technologies, and more.

WHERE IS THE ENERGY STORAGE INDUSTRY HEADED?

Energy storage is becoming increasingly important to help strengthen the reliability and flexibility of the grid and integrate more renewable power onto the system.

Energy storage is uniquely positioned at the heart of all of this change. Unlike any other asset on the grid, energy storage can play multiple roles, acting as both load and capacity depending on whether it is absorbing excess generation or feeding back into the grid. Add to that its ability to react near-instantly, and energy storage

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SID SACHDEVA

Founder & CEO
Innowatts

WHAT IS INNOWATTS?

Innowatts is an energy intelligence and technology company that provides smart meter enabled predictive intelligence and machine learning solutions for utilities, energy retailers and energy consumers. Using smart meter intelligence and machine learning, Innowatts fundamentally transforms the energy value chain. Innowatts technology enables utilities to use customer-centric energy intelligence to optimize cost and enhance revenue growth. Through personalized energy products, programs and services, Innowatts provides reliable energy management for consumers and utilities. Innowatts suite of solutions is deployed across 14.2 million AMI meters worldwide, servicing 1.4 trillion load intervals across 4 continents.

WHAT CUSTOMER HIGHLIGHTS AND CORPORATE MILESTONES DID INNOWATTS ACHIEVE IN 2017?

In May 2017, Innowatts revamped and launched its full service eUtility. Built upon its PowerEASE technology, the eUtility scalable platform provides solutions for utilities looking to expand their smart meter analytics and intelligence offerings. Leveraging customer meter data across the energy value chain, Innowatts analytics provide accurate consumption and behavioral patterns, transforming the way energy is bought, sold, managed and consumed. Significantly improved load forecasting, reductions in power procurement costs and personalized products and pricing, allow utilities more insight into the grid, providing stability and reliability. Compared to traditional energy procurement, the eUtility platform allows utilities to purchase energy plans that optimize savings and work best for their customers. Innowatts platform provides incomparable granularity and speed for powerful bottoms-up forecasting.

With these proven benefits of the eUtility, Innowatts raised $6 million in series A round funding from a group of three global investors with deep ties to emerging technologies in the energy sector in 2017. The round was led by Royal Dutch Shell's venture arm, Shell Technology Ventures, which has shown commitment to bringing procurement and supply of energy to retail providers and large consumers across the value chain. Along with their investment in Innowatts vision as a means to propel the future of the retail energy spaces, Iberdrola Ventures – PERSEO, the corporate venture capital program (CVC) of Iberdrola, invested €3,100M in Innowatts. With 30 million customers, Iberdola is the leading global utility with expertise in the clean electricity market and innovative and intelligent smart grid technologies. The third member of the investment consortium was Energy & Environment Investment Inc., Japan's lead clean technology-focused venture capital. EE-I Japan is confident the capital will provide solutions for Japan's market deregulation, further digitizing energy procurement, marketing, demand response and energy efficiency. Together, these three global investors in the energy sector provided capital to propel Innowatts energy analytics development and digital e-Utility software.

WHAT IS INNOWATTS' VISION FOR 2018 AND HOW DOES IT DIFFER FROM ITS COMPETITORS? WHAT DO YOU SEE AS THE BIGGEST DISRUPTOR FOR THE INDUSTRY IN 2018?

Using artificial intelligence to drive the self-learning, self-servicing eUtility, Innowatts plans to disrupt the current operating model of utilities globally. Predictive analytics, AI and machine learning create a smarter approach across the energy value chain. As global market deregulation occurs, Innowatts is interested in streamlining energy markets through a holistic approach to create the utility of the future. In the case of a recent partnership, Innowatts integrated their AMI-enabled energy analytics, predictive load disaggregation and customer level forecasting into mPrest's production-proven Grid Modernization "System of Systems" applications and artificial intelligence analytics platform. Through similar partnerships, Innowatts will continue to drive grid efficiency and reliability by bringing visibility to the grid.

Smart metering is widely accepted in the utility sphere and artificial intelligence has been used to provide customers with basic services and billing capabilities. While legacy companies have recognized the power of artificial intelligence for utilities and in-depth, customer-level load disaggregation, Innowatts is unique in providing these integrated services across the utility value chain. With increased precision, artificial intelligence can make sense of this new wealth of smart meter data, disrupting the utility space and accruing large savings for customers. Using a customer-centric, bottom up approach utilities can integrate machine learning and artificial intelligence into their forecasting approach. With improved load forecasting accuracy of up to 30-50%, Innowatts customers can save on their bills by as much as 5-10%.

With the addition of DERs and assets onto the grid, utilities need to factor in the changes in customer demand and usage patterns. Using artificial intelligence, utilities can forecast and simulate consumption at a customer and feeder level to ensure decisions are optimized for the changing needs of the grid. While most energy procurement is done from a top-down approach, Innowatts bottom-up approach is revolutionizing the future of utilities.

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JING TIAN

President, North America Region
Trina Solar

Jing Tian is the president Trina Solar in the North America region, managing the company's operations in the United States and Canada. In this role, Jing is responsible for developing and delivering regional sales, marketing and operations strategies for one of Trina's key markets. Jing has held this position since 2017. Prior to this, Jing was Trina's Global Marketing Director. As such she has played a key role in building the brand and driving its market success globally.

Jing has over a decade of experience in the solar industry and joined Trina as the Global Marketing Director in 2013. Prior to that, Jing was the Director of Product Development at Nanosolar where she was responsible for the development of thin film solar modules. Jing also pioneered the development of the CPV module and tracker during her tenure at SolFocus.

Jing received a doctorate in Chemistry from Drexel University in 1993.

2017 ACCOMPLISHED

As the world's leading provider of smart solar solutions, Trina Solar delivers PV products, applications and services to promote global sustainable development. Through constant research and innovation, Trina continues to push the PV industry forward. Trina aims make smarter energy available to more people by creating greater grid parity of PV power and popularizing renewable energy. Our mission is to boost renewable energy development around the world for the benefit of all of humanity.

Through 2017, Trina Solar has delivered more than 32 GW of solar modules worldwide, accounting for more than 10 percent of global market share. This includes over 9 GW of modules shipped in 2017. In 2017, Trina shipped more modules outside of China than any other company. Through 2017, Trina has shipped over 6 GW of modules to the United States. In addition, our downstream business includes solar PV project development, financing, design, construction, operations & management and one-stop system integration solutions for customers. At the end of 2017, these solar projects contributed approximately 2 GW of capacity to the global power grid.

Trina continued to receive accolades for its reliability and bankability. In 2017, Trina once again received a top rating in the latest module bankability report published by Bloomberg New Energy Finance (BNEF). After having obtained the top spot among all its industry peers in the previous 2016 report, Trina Solar was once again rated bankable by 100% of the banks, EPCs, consultants and industry experts participating in the BNEF survey. DNVGL-PVEL also singled out Trina for their consistent excellence in their PV Reliability Scorecard, pointing out that Trina finished in the top group in each of their long-term reliability tests.

In 2017, Trina Solar began to celebrate the company's 20th anniversary and continue to achieve healthy, stable and sustainable growth. A group of investors decided to take Trina private, and delisted the company from the New York Stock Exchange. Trina also announced the initiative called Trina 3.0 platform which will transition the company from a component manufacturer to the leading clean energy systems solution provider.

2018 AGENDA AND INDUSTRY OUTLOOK

Solar energy continues to become cheaper, and now makes up a larger portion of the global and US energy mix than ever before. Five more countries are expected to become gigawatt scale solar markets, bringing the total to 14. While major markets like the US and China are expected to slow down, emerging markets will continue to grow and push the industry forward. There continues to be technology develop going past the cells and modules. Storage and module level power electronics will continue to increase energy production while making the energy produced more valuable. Trina believe improvements in module technology and lower balance of system costs will continue to reduce the cost of solar energy, and make it an increasingly competitive part of the global energy supply.

In 2018, Trina will be focusing on making the transition from PV manufacturer and system developer to becoming a smart energy solution provider. Trina will be taking the first step in this transition by increasing our energy storage offerings through TrinaBESS. We will also be launching our TrinaPro program, providing a more complete PV plant solution, rather than just providing the modules. Trina will continue to expand its offerings in the smart energy ecosystem by developing these offerings and launching energy internet-of-things products.

While Trina will be expanding its business scope outside of solar modules, we continue to apply our industry leading research and development capabilities in this area as well. We have already set out first efficiency record in 2018. We set a new record of 25.04% total-area efficiency for a large-area (243.18 cm2) n-type mono-crystalline silicon (c-Si) Interdigitated Back Contact (IBC) solar cell. The result was independently certified by Japan Electric Safety and Environmental Technology Laboratory (JET). Trina will also be introducing new module products in 2018, continuing to increase module power and energy production while reducing the levelized cost of energy from solar. Our new Duomax Twin bifacial modules offers up to 30% more energy production by converting light that hits the back of the solar module into electricity. The Duomax Twin's dual glass structure also offers better module durabili-

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JIM GREENWOOD

President and CEO
Biotechnology Innovation Organization (BIO)

The Hon. James C. Greenwood is president and CEO of the Biotechnology Innovation Organization (BIO), headquartered in Washington, D.C. BIO is the world's largest trade association representing biotechnology companies across the United States and in more than 30 other nations. BIO members are involved in the research and development of innovative healthcare, agricultural, industrial and environmental biotechnology products. BIO also produces the BIO International Convention, the world's largest gathering of the biotechnology industry, along with industry-leading investor and partnering meetings held around the world.

Before his role leading BIO, Jim Greenwood represented Pennsylvania's Eighth District in the US House of Representatives for six terms, from January 1993 through January 2005. Prior to his election to Congress, Mr. Greenwood served six years in the Pennsylvania General Assembly (1981-86) and six years in the Pennsylvania Senate (1987-1992).

WORLD-GEN: Please list your accomplishments in 2017.

The Biotechnology Innovation Organization (BIO) is the only trade association that advocates for diverse policies to support the entire biobased economy – the full value chain of technologies and renewable products, including renewable chemicals and biofuels.

For instance, BIO has been a champion of the Renewable Fuel Standard (RFS) since its inception. The reason is simple: this federal policy ensures that the U.S. transportation fuel market will be open to new, advanced biofuels if companies invest in the infrastructure and innovative biotechnology to produce them.

Late last year, the Environmental Protection Agency (EPA) issued a final rule for the RFS in 2018 that called for a small measure of growth for advanced biofuel. I am pleased to say that BIO's strong advocacy helped convince the agency to keep the program on course with increasing requirements.

This year, BIO will be leading the way to secure reauthorization of the Farm Bill energy title programs, which are good policies with a track record of success in incentivizing rural investment. Reauthorization of these programs will provide crucial access to capital and marketspace for companies developing renewable chemicals, which are key ingredients for building manufacturing infrastructure.

BIO is focused on ensuring that the RFS remains a market-driving force for all biofuels. We will continue to push EPA to recognize the progress advanced and cellulosic biofuels companies are making and to issue annual rules that accurately reflect actual expected production.

Recently, BIO and its member companies wrote EPA Administrator Scott Pruitt, asking him to take a renewed look at cellulosic ethanol progress. The industry remains upbeat on the potential for cellulosic ethanol from corn kernel fiber, as multiple companies are rapidly commercializing this new technology.

BIO was also successful in working with our Congressional champions – primarily Sen. Chuck Grassley – to extend the tax credit for second-generation biofuel producers, which was included with other renewable energy tax credit extensions in the budget continuing resolution for 2018. This credit is important to emerging technology companies trying to secure investment and capital.

WORLD-GEN: Please discuss your 2018 agenda.

Another top priority for BIO is the Qualified Renewable Chemicals Tax Credit. We worked with Senator Debbie Stabenow (D-MI) and Rep. Bill Pascrell (D-NJ) to introduce this critical legislation last year, which will provide renewable chemicals similar tax credits enjoyed by other alternative energies. We will continue to work to build congressional support.

In January this year, Agriculture Secretary Sonny Perdue delivered to President Trump a policy report identifying legislative, regulatory and policy changes to promote agriculture, economic development, job growth, infrastructure improvements, technological innovation, energy security, and quality of life in rural America. The report specifically calls out biotechnology innovation as a driver of rural economic prosperity now and into the future.

We look forward to working with executive branch agencies to develop streamlined, science-based regulatory policies and increase public acceptance of biotechnology products.

WORLD-GEN: What are your views on where the industry is headed?

We feel the biobased economy is approaching a tipping point in its growth and maturation. Already, a number of companies have successfully commercialized technologies for renewable chemicals, built biorefineries and created supply chains – and turned their attention to commercializing their next product. The economic impact is evident.

Bioeconomy Capital, an industry economic analyst, estimates that renewable chemicals now generate the equivalent of around one half of 1 percent of U.S. GDP, while petrochemicals generate around 3 percent. A new USDA study also shows that biofuels, bioplastics and renewable chemicals are generating significant income, job and economic growth opportunities for the agriculture sector.

Looking at several studies that measure various elements of the value chain, BIO calculates that the global economic value of the biobased economy – including industrial biotechnology, renewable chemicals and polymers, biofuels, enzymes and biobased materials – is $355.28 billion.

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MICHAEL GARLAND

President & Chief Executive Officer
Pattern Energy

Michael Garland has been the President and Chief Executive Officer of Pattern Energy since 2009 and also serves as the CEO of Pattern Development. Garland's 30 year career has focused on developing, constructing, managing, and investing in energy and infrastructure projects in the United States and around the world, totaling more than 5,000 megawatts of renewable energy projects worldwide.

Prior to joining Pattern Development, Mr. Garland was a partner at Babcock & Brown from 1986 to 2009. Previously, he worked for the State of California as Chief of Energy Assessments from 1975 to 1986. He sits as a Trustee of the University of California, Berkeley Foundation. He is based out of the San Francisco office.

Pattern Energy entered into the Japanese renewables market by acquiring a portfolio of projects and by making an additional investment in Pattern Development 2.0 to fund a well-established operating and development management team at GPI. The Japan power market consists of 248 GW of installed capacity of all forms serving 985 terawatt hours of demand. The Japanese Wind Power Association is targeting 36 GW of installed wind capacity by 2030 from a base of approximately 3 GW in 2016. GPI's development pipeline consists of 2.4 gigawatts of projects, including 600 MW of wind capacity which have qualified for FiT contracts.

Green Power Investments Corp. ("GPI") is a Japanese developer, owner and operator of renewable energy assets. The founder of GPI, Toshio Hori, was one of the earliest pioneers in renewable energy, having built some of the first large scale wind power projects in Japan, the United States and Europe. GPI is headquartered in Tokyo.

The $131.5 million acquisition price for the 84 MW project portfolio (Futtsu, Kanagi, Otsuki and Ohorayama) and the $27 million investment in Pattern Development 2.0 will be funded from existing corporate liquidity sources.

FUTTSU SOLAR

The 55 mw Futtsu Solar project commenced commercial operations in the first quarter of 2016 and operates under a 20-year power purchase agreement with TEPCO Energy Partner.

KANAGI SOLAR

The 10 mw Kanagi Solar project commenced commercial operations in the first quarter of 2016 and operates under a 20-year power purchase agreement with Chugoku Electric Power Company.

OTSUKI WIND

The 12 mw Otsuki Wind project commenced commercial operations in the fourth quarter of 2006 and operates under a 20-year power purchase agreement with Shikoku Electric Power Company.

OHORAYAMA WIND

The 33 mw Ohorayama Wind project is expected to commence commercial operations in March 2018 and will operate under a 20-year power purchase agreement with Shikoku Electric Power Company.

Pattern Energy will also enter into a 12-year hedge agreement for the four projects to manage the foreign exchange movements of the cash flows from the Japanese assets. The acquisition and funding of these projects is expected to close in March 2018.

TSUGARU WIND

The 122mw Tsugaru Wind project is expected to commence commercial operations in mid-2020 and will operate under a 20-year power purchase agreement with Tohoku Electric Power Company (unrated).

Located in Aomori prefecture, the 122 MW Tsugaru Wind project will consist of 38, 3.2 MW GE wind turbines.The $194.02 million total consideration for the acquisition of the Tsugaru project is split into two payments and will be financed so that no Pattern Energy corporate capital is required until commencement of commercial operations. The initial payment totaling approximately $79.72 million will be funded at the closing of construction financing for the project utilizing existing liquidity.

Local construction debt bridge facilities will close shortly thereafter replacing this capital and will provide a natural foreign exchange hedge during the construction period. The second cash consideration payment of \12.567 billion is payable to Pattern Development 1.0 upon the term conversion of the construction loan3, which is expected in mid-2020. As part of the agreement, Pattern Development 1.0 has agreed to reimburse Pattern Energy for construction cost overruns up to a cap.2) Based on a Japanese yen to USD exchange rate of \110 3) To the extent the term conversion of the construction loan does not occur, the second cash consideration payment will be made upon the commencement of commercial operations at Tsugaru.

ABOUT PATTERN ENERGY

Pattern Energy Group Inc. (Pattern Energy) is an independent power company listed on the NASDAQ Global Select Market and Toronto Stock Exchange. Pattern Energy has a portfolio of 25 wind and solar power facilities, including six projects it has agreed to acquire, with a total owned interest of 2,942 MW in the United States, Canada, Japan and Chile that use proven, best-in-class technology. Pattern Energy's wind power facilities generate stable long-term cash flows in attractive markets and provide a solid foundation for the continued growth of the business.

MARTIN HERMANN

CEO & Founder
8minutenergy Renewables

Martin Hermann is a serial entrepreneur with 26 years of with experience in the solar, clean-tech and high-tech industries, who has closed business transactions in excess of $5.3B. He founded 8minutenergy, which is now among the largest independent developers of solar and storage in the U.S. with a portfolio of more than 8,500 MWs and a track record of 1,500 MWs in executed PPAs.

Martin also developed a 100 MW solar PV module manufacturing plant as Chief Strategy Officer with Advent Solar. Prior to his engagement in renewables, he owned a semiconductor tools company for 10 years, which he sold to Intel in 2001. For six years after the acquisition, Martin served on the executive management team with Intel's wireless business group.

ABOUT 8MINUTENERGY

8minutenergy is focused on solar PV because we believe that it is the only mature form of renewable energy that continually becomes cheaper and more efficient. This is because solar PV technology is based upon semiconductor material and manufacturing processes. Just like your memory chip in your digital camera has gotten better and cheaper over the last years, solar PV cells are becoming more efficient and lower in cost every year.

8minutenergy is utilizing this exponential cost dynamic to its fullest extent in order to drive down the price of solar energy. With best-in-class technology, engineering excellence, and sophisticated infrastructure financing, we accomplish superior results, ultimately driving costs down and increasing energy production. A continuous and relentless process of system analysis, attention to equipment performance details, and meticulous site design produces the optimum solution for each project. This approach has allowed 8minutenergy to become the industry leader in levelized cost of energy (LCOE), while delivering superior financial returns and high quality projects.

We are hoping to lead the industry with our vision to make clean energy affordable and abundant. This will not only be important to increase the well-being of the nation's using solar PV, but also to make our planet more sustainable. We, together with many others, are striving to solve one of the world's most important issues.

2017 ACHIEVEMENTS

* Received Power Purchase Agreement to Develop 90 MW-ac Springbok 3 Solar Farm

* Expanded Into the Energy Storage Market with 1 Gigawatt Project Pipeline

* Closed Financing and Commenced Construction on 26 Megawatt Redwood 4 Solar Farm in Central California

* Announced with Capital Dynamics the acquisition and development of the 328 megawatt-dc Mount Signal 3 ("MS3") Solar Photovoltaic (PV) Project 2018

2018 IS THE YEAR THAT PV+S COMES OF AGE

8minutenergy launched into the storage market about a year ago with a 1-Gigawatt project pipeline. Since that launch we've seen a lot of interest and demand in the marketplace for PV+S projects. Utilities and corporations nationwide are looking for reliable, cost-competitive clean energy solutions. Solar PV and energy storage are poised to meet this demand while delivering incredible value for utilities. Not only can storage improve project economics, but it can also make renewable power dispatchable. In addition, the associated grid services that storage provides—frequency regulation, load following, ramping, and the rest are just beginning to be valued.

I believe that solar and storage together is the future of our industry—and of energy production generally.

THE BIGGEST CHALLENGE FOR PV+S IN 2018

The biggest challenge in 2018 for developers and utilities alike may be education about PV+S. Because it's a young industry, there is education and sophistication still needed around solar plus storage pricing and value. The prices we've seen from Xcel, Tucson and other on solar + storage are no surprise. But we do think there has been a lack of clarity as to what the prices are for. With the biggest question being—what is the battery size?

There needs to be a level of sophistication in any developer working in storage today in order to assess the benefits, starting from understanding how the asset will impact the power flow in the grid, to the integration into the operation room and controls. Utilities need to understand how they're going to use the battery to get the proper sizing, and to get the proper augmentation schedule so they can get their costs as low as possible for what they need.

The big picture, however, is that we're seeing tremendous excitement and interest in the marketplace.

WHY SOLAR AND STORAGE TOGETHER IS PERFECT FOR UTILITIES

The idea of storage has always made great sense for utilities, but there are three big reasons why utilities are now making the choice to incorporate storage. 1. Low cost solar and wind have made the need and opportunities associated with storage much greater. And as variable energy sources increase on the grid, the value of storage grows. 2. The costs of batteries have come down significantly. We believe "dispatchable solar" is an incredible growth market. We are at the point that we can get

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GILIAN CORRAL

World-Gen
Contributing Editor

Gilian Corral is being honored for her service as Contributing Editor to *World-Gen*. We are pleased to include her in the Class of 2018. Gilian has an MSc Degree from the London School of Economics and is a graduate of Virginia Tech with a BA degree in Public and Urban Affairs.

Gilian joins Lyn Coram, Dennis McLaughlin, Martin Pilsch, Dick Weisbrod and our many other outstanding editors over our thirty year history who have contributed so highly to the information on energy in *World-Gen* Magazine. You, our readership, benefit tremendously from their editorial as well as the newsfeeds we are honored to have on a daily basis, including 24/7 breaking news on our site from *Business Wire, PR Newswire, Globenewswire, the Dept of Energy and MIT News*.

SCOTT L. STRAZIK

CONTINUED FROM PAGE 4

greater flexibility, reliability, affordability and sustainability, as well as improve efficiencies, reduce costs and create growth opportunities for gas-fired power plants.

As an example, we have been working with A2A, an Italian utility, to optimize its power plants in a highly competitive market with stringent emissions regulations. GE's digital and hardware upgrades helped A2A to restart a plant, which couldn't respond fast enough to changing grid demands and ceased operation. The robust flexibility our technologies brought to the site were so successful that A2A is expanding the use of digital solutions to three more of its Italian plants.

Another growing trend is additive manufacturing, which is revolutionizing the way products and services are made and work. 3-D printers that create turbine engine parts cut down production time and make lighter components, but the real beauty is that it helps speed up innovation by allowing engineers to test new configurations and ideas faster and cheaper.

Using additive manufacturing, we achieved a new frontier in turbine engineering and production. We installed four different 3D-printed components in a GE GT13E2 gas turbine at the Heizkraftwerk Berlin-Mitte power plant near Berlin. These components were made with a lightweight configuration and engineered to include cooling channels and other customized features, helping the turbine run more efficiently and burn less gas.

MARTIN HERMANN

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V+S systems to beat the variable costs of existing peaker plants—and in sunnier areas of the country we can beat combined cycle plants. It's not even a question for new plants. It's truly incredible where we are today with storage, especially if you look at how reliable and stable these systems are. At 8minutenergy, we see the two technologies growing in tandem.

WHAT THE SOLAR+STORAGE MARKET NEEDS TO GROW

There are hundreds of innovations that will happen in the PV+S industry in the coming years—but the industry is poised for growth now. The most significant change is that we're seeing in the marketplace is a much more knowledgeable customer. That greater understanding of the value and opportunity presented by PV+S is the most significant change since we launched. Utilities are starting to get it, and it's exciting for all of us.

For utilities, it's about them making the paradigm shift from baseload to intermittent power. At 8minutenergy, we understand storage and we can show how a battery system provides benefits like frequency regulation and load shifting.

There are other benefits too, and we can monetize them to show the cost benefit ratios. We're already getting positive feedback from utilities on this.

Also, we are hyper focused on customer–we're technology agnostic and focused on delivering the best product. Right now, the industry is focused on differentiating through price but we're starting to see a maturation in how everyone is thinking about storage and solar.

A battery is like a Swiss Army knife: you can do a lot with it. The key is to stack those benefits–designing a battery system that meets the customer's needs, so they are using a battery 24-hours a day versus 1 or 2 hours.

We're very bullish on the future.

JING TIAN

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ty, which Trina backs up with a 30 year power warranty and a 0.5% degradation rate. Trina will also be launching our Splitmax module globally. The Splitmax module uses half-cells to offer a higher max power and great performance in high irradiance.

In 2018, Trina looks forward to continuing to provide leadership in the solar PV industry while expanding its business into other parts of the smart energy economy.

JOHN JUNG
CONTINUED FROM PAGE 14

can help utilities and customers smooth the integration of new assets, enabling the grid to emerge more stable and responsive. Energy storage's flexibility and improving economics have driven demand for this new asset class.

In 2018, the importance of software controls and optimization to maximize the performance and longevity of energy storage will become even more critical. The importance of integrating energy storage with other grid assets, both existing and new, through hybridized power solutions, will continue and I am excited by the real possibility of using renewable energy to fulfill baseload requirement. Battery commoditization will continue in 2018 and long-term technology performance and return on investment will be driven increasingly by the quality of integration, software and hybrid solutions.

ABOUT JOHN JUNG

As President and CEO, John Jung has led Greensmith Energy from concept-to-market leadership in grid-scale energy storage technology since joining the company in 2009. He set the commercial and strategic vision for Greensmith early on: to provide the energy storage technology platform of choice to customers and partners leveraging a battery-agnostic, software-optimized and distributed network approach.

Prior to Greensmith, John spent more than 20 years building high-growth, B2B technology companies and was a strategy consultant to several vertical sectors, including the electric utility industry. John has held C-suite level roles at four venture capital-backed technology companies operating globally, including a consortia-based electronic marketplace that served 21 of the 25 largest electric utilities in North America.

John also served as a senior strategy consultant for A.T. Kearney and Braxton Associates in the areas of corporate and business unit strategy; enterprise transformation; and portfolio-growth strategy.

John holds an MBA from the University of Western Ontario's Ivey Business School in London, Ontario, Canada, and an undergraduate degree in Economics and Sciences from the university.

RICK KEPHART
CONTINUED FROM PAGE 12

technology that not only helps utilities operate their plants reliably, but securely, as well.

Bio: Rick Kephart is Director, Research and Technology for Emerson Automation Solutions, Power & Water. He joined the organization (then known as Westinghouse Process Control) as a field engineer in 1990. In his current position, he manages a global organization responsible for the development of all software related to the Ovation™ automation platform. He holds a B.S. in electrical engineering from Penn State University, an M.S. in electrical engineering from the University of Pittsburgh, and is pursuing a Ph.D. in electrical engineering from the University of Pittsburgh.

EDITORIAL CALENDAR

May/June 2018
INTERSOLAR NA 2018
SPI
EDISON ELECTRIC INSTITUTE (EEI)
ELECTRIFY EUROPE
BIO WORLD CONGRESS
Closing Date: May 1st

September/October 2018
BUECHE DIRECTORY OF DEVELOPERS
Closing Date: September 15th

November/December 2018
POWER-GEN WEEK 2018
Closing Date: November 1st.

SID SACHDEVA
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ABOUT SID SACHDEVA

Innowatts is a 4 year old venture-backed energy technology company headquartered out of Houston, USA. It was founded with the vision of leveraging energy analytics to create a smarter and leaner utility value chain. Sid focuses on overall business strategy at Innowatts and is working closely with some of the world's leading energy providers on deploying Innowatts self- learning & self-serving retail energy platform. Under his leadership, Innowatts has grown organically to serve more than 15MM meters across 13 different energy markets and 3 continents. Prior to founding Innowatts, Sid spent 15 years working across companies, like Sony, NTT, and NRG Energy. At NRG, he built an energy forecasting and analytics group, enabling more than $4 billion of power procurement on an annualized basis. Sid holds a B.S. in Electrical and Computer Engineering from the National Institute of Technology in India and a Master's in Business Economics from the University of Delhi.

JIM GREENWOOD
CONTINUED FROM PAGE 17

The United States generates 58 percent of the global value of biased manufacturing, or more than $205 billion. And that economic activity supports employment for 1.66 million U.S. workers.

BIO will continue to look for ways to bring more companies into our membership to work together for good policies that build the biobased economy. We will also continue to host industry-leading partnering meetings that bring stakeholders together for collaboration and investment in commercializing new technologies. We will host the BIO World Congress in Philadelphia in July 2018 and in Des Moines in July 2019.

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LA BARGE
LECLANCHÉ
LENZING
LG&E POWER
LG SOLAR
LIBERTY MUTUAL
MD&A
MAGNETEK
MHPS
MISSION ENERGY
MISTRAS
NATURAL GAS CLEARINGHOUSE
NECA
NEPCO
NEXANT
NOOTER-ERICKSEN
NRG
NUS
NY MERCANTILE EXCHANGE
PB POWER
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PIC
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POWER MEASUREMENT
PRATT & WHITNEY
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RMI
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SAFT
SCR
SEMIKRON
SERMATECH
SIEMENS
SOLAR
SPI
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