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CLASS OF 2016

Jim Brannen
SIEMENS

Scott Osborne
BECHTEL

Paul McElhinney
GE

Bill Newsom
MHPSA

Veronica May
HONEYWELL

Elias Gedeon
B&W

Bruce Douglas
ITRON

Nigel Cockroft
JINKO

Jay Olearain
VERIZON

Sue Kelly
APPA

Tristan Grimbert
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Jeff Grybowski
DEEPWATER

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NUSCALE

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Francis Cann
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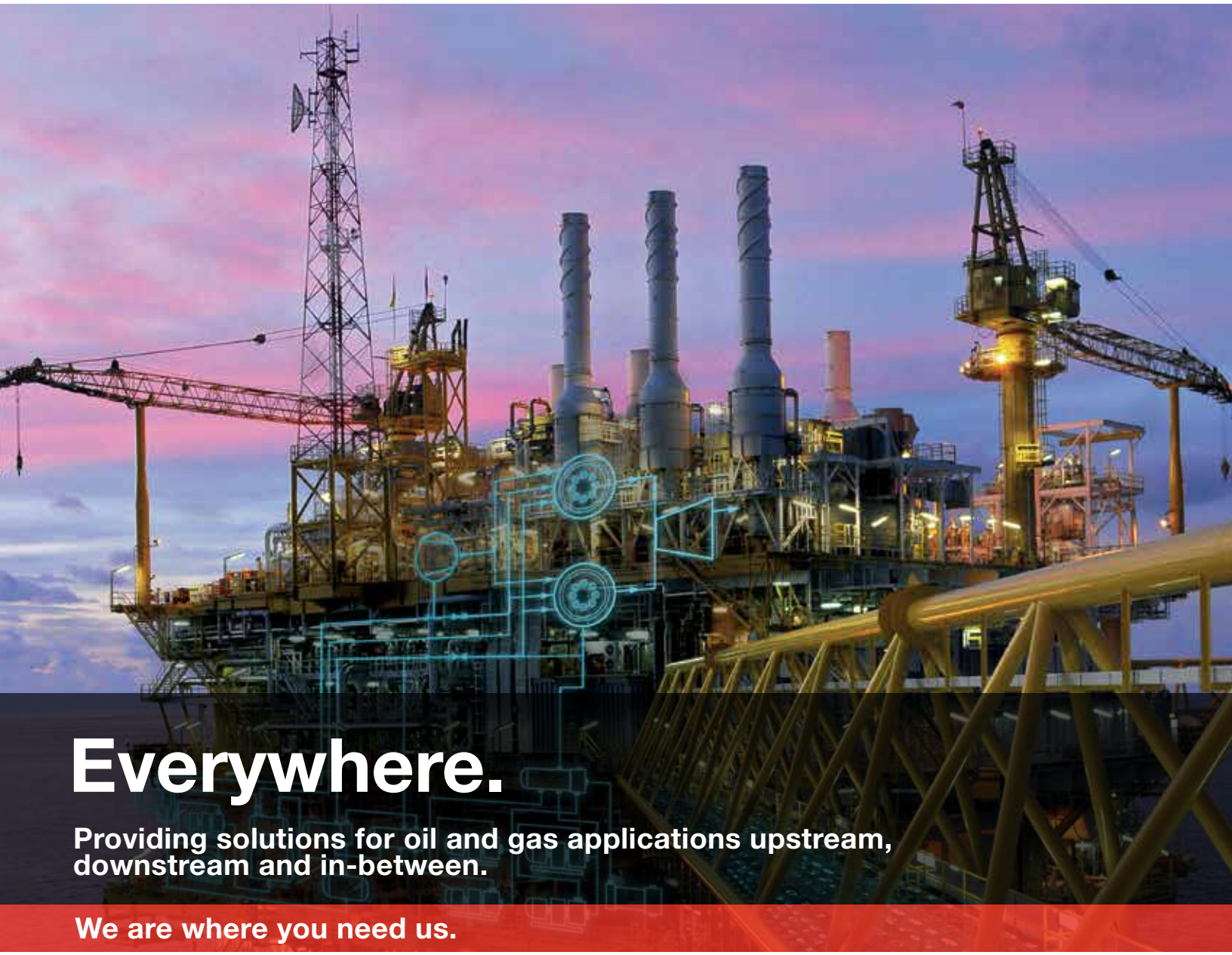

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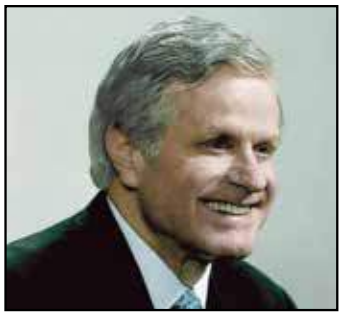

Dick Flanagan
flanagan@world-gen.com

It's a pleasure and privilege to introduce World-Gen's Class of 2016, the 17th class of the millenium.

Climate change is bringing on corporate change. These changes are transforming the fabric and future of the Americas' and beyond.

Please read on for the interviews in the Class of 2016 where it's all happening.

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Bonus Circulation at Conventions.

JIM BRANNEN

Regional Manager
Siemens

Jim Brannen heads up Siemens oil and gas operations in the Americas and comes to that market with an expanded portfolio.

A couple of years after he joined the company in 2012, Siemens grew its portfolio in the sector with two major acquisitions.

In December 2014, Siemens acquired the energy gas turbine and compressor business of Rolls-Royce Energy for about $1.3 billion. Then in the summer of 2015, Siemens joined forces with one of the best known names in the oil patch, Dresser-Rand, in a $7.8 billion merger. "Those acquisitions position Siemens to be a more dynamic force in both the oil and gas sector and the growing distributed generation market in the Americas," Brannen said.

ROLLS-ROYCE

The addition of Rolls-Royce Energy's aero-derivative gas turbines fills a gap in Siemens' portfolio by giving it an array of turbines in the 30-MW to 66-MW range. That means Siemens now has turbines with capacities from 4 MW all the way up to 400 MW.

Rolls-Royce Energy brought to Siemens its industrial RB211, which is derived from aeroderivative engines and is used as the power plant in several large airliners. In land-based applications, more than 650 RB211 turbines have been sold worldwide, and they have accumulated over 32 million operating hours. The turbine is widely used in both offshore power generation and mechanical drive applications.

The other end of that gap is filled by Rolls-Royce Energy's Trent gas turbine. The Industrial Trent 60 is also well-suited for onshore and offshore mechanical drive applications, and is particularly well-suited for applications that require variable speed capabilities such as natural gas liquefaction, gas transportation and gas injection for oil recovery. A heat recovery steam generator can be added to the Trent turbine to increase its output and efficiency.

The Industrial Trent engine also has a high availability rate and, if something goes wrong in the field, it is possible to do a field turnaround, Brannen said. "Prior to the Rolls-Royce Energy acquisition, Siemens had larger frame generators, north of 100 MW for utility applications, and lighter industrial generators, but nothing in that mid-range," he said.

DRESSER-RAND

The Dresser-Rand acquisition expands Siemens' footprint in the compression and reciprocating engine markets where Siemens previously did not have a presence; the merger also creates one of the industry's largest service fleets.

"It allows Siemens to deliver solutions in unconventional gas extraction, enhanced oil recovery and CO2 injection markets, as well as downstream in oil and petrochemical refinery markets."

One of the most important benefits of the Dresser-Rand merger is the worldwide brand recognition Dresser-Rand has in the market for the compression of natural gas for pipeline delivery. That opens doors for the rest of the Siemens portfolio, Brannen said. "You can go in the door with Dresser-Rand compressors and that gives you an opportunity to introduce a range of Siemens electrical products, such as automation, transformers and switchgear."

On the power side, the compact footprint and high efficiency of its new mid-range turbines give Siemens an array of options for inside-the-fence and non-traditional power applications.

DISTRIBUTED GENERATION

With high interest in distributed generation in recent years, the two acquisitions position Siemens to play a role in the transformation of the utility grid as it becomes more decentralized, whether with applications in remote oil fields, uses for pipeline compressors or in the growth of microgrids at universities, hospitals and industrial centers.

Dresser-Rand is already positioned in those markets, offering turbines for combined heat and power systems, biogas-fueled gen-sets, hybrid systems that can combine solar photovoltaic and engine-based gen-sets, biomass and waste-to-energy steam turbine generators, and engines for compressed air energy storage.

The potential presented by some of those opportunities was demonstrated in February when the Dresser-Rand business signed an agreement to be the exclusive supplier of gas engines for Kohler Power Systems' standby, prime and continuous power large gas generator program. The agreement marks Dresser-Rand's entry into the standby generator set market.

The acquisitions also are well timed to take advantage of the ongoing changes that are bringing more renewables and distributed resources to the electric grid and increasing demand for back-up and standby power resources.

States such as California and New York, for instance, have embarked on policies that encourage distributed resources such as rooftop solar panels, microgrids and energy storage systems.

The timing in the oil and gas sector is not as advantageous, but Brannen says "Siemens has the best portfolio to increase productivity and improve our customers' value for capital expenditure." Brannen is "confident we will see a turnaround in oil prices, and we will be well-positioned when it happens."

Jim Brannen is the Hub Head of the Americas Region for Siemens Oil & Gas and is responsible for key account management. He began this role in October 2014 when Siemens Oil & Gas was formed.


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SCOTT OSBORNE

General Manager
Bechtel

Scott Osborne is general manager of the Power business line of Bechtel's Infrastructure Global Business Unit. The Infrastructure GBU is headquartered in London and comprises the former Power and Civil GBUs, which were joined in 2015. The scope of services for Infrastructure spans airports, highways, bridges, rail, telecommunications, tunneling . . . and, of course, power generation.

The Power business is significant in and of itself, capturing fossil fuel power generation plants, particularly combined-cycle projects at present; renewable projects, including solar and wind; transmission lines; and plant conversions from coal to natural gas. Nuclear power generation is in a different division.

Some of the current projects under Power's purview include Panda Energy's Stonewall generating station and Hummel Station generating station, as well as Advanced Power's Carroll County generating station and Cricket Valley Energy Center.

Stonewall is a 778MW combined-cycle generating station located four miles outside the northern Virginia town of Leesburg. Generation is meant to begin next year.

Hummel Station is near Harrisburg, PA, where Power is working with partner Siemens to undertake one of the largest coal-to-gas power conversions in the nation. This, too, will be a combined-cycle plant, one designed to produce 1,124MW. The generating station is rising on the site of the retired Sunbury coal-fired plant near Shamokin Dam in Snyder County. Compared to the old facility, the new Hummel Station will produce 180 percent more electricity, reduce SO2 and NOx by more than 90 percent and use 97 percent less cooling water. Siemens will produce the power island including the combustion and steam turbines, generators, and heat recovery steam generators. Construction is expected to last 30 months and be complete in early 2018. "I think our partnership with Siemens has been especially strong," Osborne says. "We understand how each company works from the upfront planning through the engineering phase and into the field, and the marketplace seems pleased with the results."

The Carroll County, OH project for Advanced Power began last April and is meant to be finished next year. It, too, is a combined-cycle plant and will produce 700 MW that will be sold into the PJM market. It features two GE 7FA.05 gas turbines and a D602 steam turbine. Bechtel has a turnkey engineering, procurement and construction (EPC) contract for the project.

More recently, Advanced Power again chose Bechtel for a project 60 miles north of New York City. Bechtel was selected as the EPC contractor for the Cricket Valley Energy Center, 60 miles north of New York City, designed as a 1,000MW combined-cycle natural gas plant using GE turbines.

Recently completed projects include the Panda Sherman combined-cycle project north of Dallas, and Temple 1 and Temple 2 projects in Temple, Texas.

"Combined cycle is our main focus," says Osborne. "Of course, we have lots of experience in all sectors but power generation is moving toward gas. Combined cycle is a growth market with the available low cost natural gas and these types of projects fit nicely into where we at Bechtel can bring our strengths to bear, that is, in large, complex projects, especially ones for which we can work from the initial planning stages all the way through to warranty. We believe we can bring outstanding value to clients with our EPC approach. We have skill sets and experience that are both broad and deep."

At the moment, most the work is domestic, but Osborne says there are good prospects for new work in Mexico and Canada as well as in Africa and the UK, where development is moving away from coal and toward gas.

"Here's what we can really bring to the table," Osborne says. "Bechtel is full-service. We have all the competencies: that is, engineering, procurement, construction – from start-up to commissioning. We self-perform the work, which means we have the ability to control our destiny and provide a level of certainty of outcome. We are a one-stop shop - not a model everyone has, and it creates value for our customers."

Bechtel has more than size and 100+ years of experience to offer. Osborne likes to say the company is nimble and innovative. "We pride ourselves on being a 'learning organization,'" he says. "We learn from each of our past projects and hone our delivery. We can come to the table with a standardized delivery model and modify our execution approach where that makes sense. We standardize the "what" associated with project delivery, but allow the flexibility to implement the best in class tools and technology, that is, the "how" associated with project execution. This model allows us to put the customer first and deliver a project that meets their unique needs. With respect to combined cycle we have developed a center of excellence. Hundreds of engineers concentrate just on combined cycle, researching past projects to learn what worked and what did not and developing new techniques to effect greater efficiencies. It's a good example of our 'learning organization' culture."

Osborne points as well to what he considers other Bechtel strengths. For example, he emphasizes the time and effort Bechtel works to what he calls "aligning with the customer" long before construction begins. This starts by being "totally open and transparent. We want to find what's really important to our customer and ensure our values and objectives are aligned. When construction begins, we want to be 'joined at the hips.' Successful projects are the ones aligned from the beginning," Osborne says. "There's hard work to be done at the

(continued page 26)

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PAUL McELHINNEY

President and CEO
GE Power Services

One of the often-cited benefits of GE's acquisition of Alstom's Power business is the opportunity for the Power Services business—the new global entity created by combining both companies' services teams—to integrate the Industrial Internet and GE's software solutions portfolio into Alstom's global installed base. As the world's Digital Industrial Company, GE is transforming the power industry with software-defined machines and solutions that are connected, responsive and predictive. The company knows industrial machines and businesses, and it knows how to build software that will best serve and optimize them. GE has invested more than $1 billion in the Industrial Internet, with more than 14,000 software professionals around the world working to optimize industrial asset performance and industrial operations.

GE's Industrial Internet applications and solutions run on Predix*, the world's first and only cloud platform built exclusively for industry. With one common, connected language and a dedicated cloud built for industrial data, Predix offers the strength, scale and security that operators require to thrive in the new industrial era.

Now consider that GE's Power Services business serves an installed base of more than 28,000 power generation assets globally. These assets provide nearly 1,600 GW of power—enough to power more than 1.5 billion homes—and represents about 40 percent of the global thermal energy sector. The continued infusion of Industrial Internet technologies into GE equipment, as well as the introduction into Alstom-supplied systems has the potential to save utility and industrial power plant operators millions of dollars in operational and maintenance costs.

A HUGE OPPORTUNITY

By tapping into the Industrial Internet through GE's Predix cloud platform, utilities and industrial power plant operators can improve the life cycle performance of their power generation equipment through the power of software and big data analytics. For years, the energy industry has collected data on its generation assets, but only a small fraction of this data is actually being used. As utilities and industrial operators more fully embrace the potential of integrating software with their hardware, there is a huge opportunity for the industry to connect the operational and informational technology worlds with external data sets.

Some operators have already bet on software solutions and seen significant benefits. For example, Whitegate Power Station's Bord Gáis Energy, a subsidiary of the Centrica Group in County Cork, Ireland, became the world's first power plant to install GE's Asset Performance Management (APM) system—an advanced software solution that taps into industrial-scale data analytics to predictively identify operational issues before they occur. With the Irish government's 2020 targets aiming for 40 percent of gross electricity consumption to come from renewable energy production, a greater requirement for reliable, on-demand generation capacity has been created. Bord Gáis Energy took this into consideration when it decided to better prepare its power station for future grid challenges.

The solution included a condition-based, real-time monitoring platform featuring 141 sensors throughout the power plant. GE's APM technology monitors Whitegate's hardware assets around the clock and provides a single, consolidated view of plant performance. These insights are then translated into operational recommendations to help the station focus its maintenance activity on minimizing downtime. Additionally, the software's comprehensive data analytics helps the Whitegate staff detect operational anomalies, including combustion dynamics and parts degradation, before they become serious issues that could force the plant offline for costly unplanned repairs. GE's analytics integrate multiple data sources and provide a deeper insight into how the whole system works. For example, they are able to see both short-term implications—such as increased fuel burn and revenue from advantageous wholesale sales—and long-term ones including the consequences that operational stresses can impose on equipment. It's all about data, analytics and better productivity—the idea is that companies have software running on all kinds of machines used in the workplace. If these devices could collect data and transmit it to a central location where it could be analyzed by software, it could be very useful to businesses.

In a power plant, GE's new software and hardware solutions can create a virtual replica or "digital twin" of the entire industrial complex for analysis. For example, both Exelon and Public Service Enterprise Group (PSEG) are implementing pioneering projects with GE's Digital Power Plant, which is designed to drive continual improvement of assets and operations. The Digital Power Plant helps utilities and other industrial operators save millions of dollars in operational and maintenance costs by enabling them to manage their power generation ecosystems cleanly, efficiently and securely with unprecedented intelligence and precision. It will enable companies to harness information technologies that transform the way electricity is generated and managed worldwide, helping minimize the impact of power production and consumption on our climate.

ABOUT PAUL McELHINNEY

Paul is the president and chief executive officer of Power Services, a $15 billion organization within GE Power. Based in Baden, Switzerland, Power Services is a combination of two of the best service teams in the power industry – GE's Power Generation Services and Alstom's Thermal Services.

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BILL NEWSOM

Executive Vice President
New Generation Systems - MHPSA

The recent early delivery of its advanced class M501J gas turbine to Grand River Energy Center (GREC) near Tulsa, Oklahoma is one more benchmark for Mitsubishi Hitachi Power Systems in a series of engineering, technology, materials and manufacturing achievements over the years. While the M501J being installed at the Grand River Dam Authority's GREC generating facility will be the first, largest Advanced Technology Gas Turbine to come on line in the Western Hemisphere – a monumental feat in its own right – the roll out could be considered, well, routine.

But that's only because MHPSA takes such breakthroughs and achievements in stride. Its accomplishments are a reflection of the strategic attitude and engineering prowess that have guided two iconic Japanese leaders – Mitsubishi and Hitachi – to the forefront of power generation technology.

"We are proud to be part of Grand River Dam Authority's strategic plan to create reliable, efficient, lower cost energy for its customers," said Bill Newsom, MHPSA, Executive Vice President, New Generation Sales and Operations and World Generation Class of 2016 inductee. "The J-series is the powerful 'agent of change' in achieving those goals. We expect it to be the standard of excellence by which all others are measured," Newsom added.

That is a pretty high bar. MHPS's Advanced Technology Gas Turbine is capable of achieving a combined cycle efficiency of 62 percent with sustained 1,600°C (2,912°F) turbine inlet temperatures. The J-series gas turbine offers the largest output and the highest performance among heavy-duty gas turbines in commercial operation in the industry. It also has resulted in the most efficient use of fossil fuel resources while providing significant environmental benefits including the reduction of CO2 emissions of approximately 60 percent in combined cycle operation when compared to older conventional coal plants.

The M501J turbine has an ISO base rating of 327 MW in simple-cycle operation, and a rated rotor speed of 3,600 RPM. It is 3.3 times higher than the largest gas turbines in 1980. Back then large gas turbines were rated at 100 MW. The M501J emits 96 percent less nitrogen oxides (NOx), and 99.9 percent less sulfur dioxide (SO2) than older coal-fired units.

The jumbo M501J unit weighs 320 tons, and this 60-Hz machine has a ramp rate of 40 MW per minute and a startup time of about 30 minutes from ignition to full load. In a 1-on-1 combined-cycle configuration, the turbine delivers 470 MW, with efficiency approaching 62 percent. The new J-Series technology fires at an inlet temperature of 600 degrees C, about 100 degrees hotter than its G-Series predecessor.

"Raising firing temperatures has been the biggest technological challenge in increasing efficiency," Newsom says. But for MHPS engineers, metallurgists and scientists, it has been mission accomplished, after eight years of developing, testing and validation. The M501J-series is the first high temperature advanced technology gas turbine on the market.

The M501J commercial operating fleet has collectively logged about 220,000 actual operating hours to-date. Each passing month, the fleet generates about one unit year's (8760 hours) worth of electricity which is added to the total actual operating hours.

PRACTICAL VERIFICATION

MHPS has an advantage when it comes to certifying equipment/system performance and validating reliability. "Competing turbine manufacturers only use test-bed examination and focus on short term validation," says Newsom. MHPS on the other hand carries out verification testing at its Takasago Machinery Works combined-cycle (T-Point) power plant near Kobe, Japan. The equipment undergoes step-by-step testing of its overall design, performance capabilities and efficiency. "A key feature of the T-Point testing program," he points out, "is the equipment is actually supplying power to the Kansai area grid in Hyogo Prefecture which includes Japan's second largest city, Osaka. We get greater than 99 percent reliability."

The testing process for the M501J got underway in February 2011, and the long term validation continued for years. Since then it has established itself as the standard for 21st Century natural gas-fired power generation systems with 17 J-series units already in commercial operation around the globe at six different power plants. Currently 41 units have been sold and are being built. "We're also getting ready to announce sales of several more units in the U.S. in the coming weeks," said Newsom said.

ABOUT BILL NEWSON

Bill Newsom is the Executive Vice President of New Generation Systems for Mitsubishi Hitachi Power Systems Americas, Inc., headquartered in Lake Mary, Florida and Executive Vice President of MHPS Canada. Mr. Newsom is a graduate of the University of Florida (BS Mechanical Engineering) and began his career with Westinghouse Electric as a Design and Performance Engineer for new and retrofit steam turbines. He held various positions in manufacturing, applications and strategic marketing at different locations including Charlotte, NC and Orlando, FL. In 2001, he moved to Boston, MA to work for Calpine as an equipment specialist to support development, construction, commissioning and operation of combined cycle power plants.

In 2004, Mr. Newsom joined Mitsubishi Hitachi Power Systems Americas' service organization to lead the sales and marketing of steam, gas, generator, and long term programs for the Western Hemisphere. In 2009, Mr. Newsom moved to MPSA's Headquarters office in Lake Mary as Vice President and Officer of the Company to lead the Sales, Marketing and Commercial Operations for all New Unit Products. In 2015, Mr. Newsom was appointed Executive Vice President of New Generation Systems.

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VERONICA MAY

Vice President & General Manager
Honeywell's UOP Renewable Energy
and Chemicals Business Unit

The U.S. Renewable Fuel Standard (RFS2) mandates an increase in renewable transportation fuels, and Europe is requiring a 10% increase by 2020.

Honeywell UOP's innovative renewable fuel technologies are playing a crucial role in addressing climate change and greenhouse gas emissions (GHG). Its Ecofining™ process produces green diesel and green jet fuel from a range of sustainable feedstocks.

RENEWABLE DIESEL

Honeywell Green Diesel™ made from the Ecofining process is chemically identical to petroleum diesel but with 85 percent lower GHG. It also has ultra-low sulfur and low NOx emissions and performs equally well at both cold and warm temperatures. Production costs per gallon for Honeywell Green Diesel are significantly lower than FAME technology, and it blends in any proportion with petroleum fuel as a pure drop-in replacement.

DIAMOND GREEN DIESEL

The Ecofining process technology is powering the largest commercial advanced biofuel facility, located in Norco, LA, which has been producing 130 million gallons of renewable diesel annually since 2013. The facility is owned jointly by Darling International, the world's largest producer of sustainable natural ingredients, and Valero Energy, the world's largest independent petroleum refiner.

"Commercial production at the Diamond Green Diesel facility is a significant milestone for the renewable energy industry," said Veronica May. "Honeywell UOP has leveraged more than 100 years of refining technology innovation to develop technology to produce real alternative fuels, including Honeywell Green Diesel and Honeywell Green Jet Fuel, from a range of inedible biofeedstocks."

ECOFINING IN ITALY

ENI, Italy's largest energy company, and Honeywell UOP retrofitted its Venice refinery from a petroleum diesel facility to a renewable diesel facility using Ecofining technology. Now up and running, the first phase has a processing capacity of 400,000 metric tons annually (MTA) with the second phase expected to produce 560,000 MTA.

RENEWABLE JET FUEL

The UOP Renewable Jet Fuel™ Process converts feedstocks such as algae and camelina into on-spec renewable diesel and jet fuel. The process was originally developed under a grant from the U.S. Defense Advanced Research Projects Agency (DARPA) for the U.S. military and commercialized by AltAir Fuels.

Located in Paramount, CA, AltAir currently operates the world's first continuous, dedicated renewable jet fuel production facility, which was retrofitted from a petroleum refinery. United Airlines is purchasing 15 million gallons of renewable jet fuel from AltAir over a three-year period. The fuel can be blended up to a 50/50 ratio with petroleum-based jet fuel and reduces GHG emissions between 65 and 85 percent depending on the feedstock.

UOP PARTNERS

Honeywell UOP formed a joint venture with Ensyn to offer Rapid Thermal Processing technology (RTP™). This technology converts cellulosic biomass feedstock from forestry residuals into a liquid renewable fuel that offers a virtually carbon neutral alternative for heat and power generation.

REFINERY REVAMPS

Refineries can repurpose idled or underutilized assets using the Ecofining™ process to realize additional profits without high capital investments. "We have implemented two renewable revamps with others in the works," May added. A U.S. refinery implementing the Ecofining™ process can generate Renewable Identification Number (RIN) credits. U.S. Refiners are required to submit RIN credits to the Environmental Protection Agency, or EPA, to show that they have covered their annual obligations. To ensure compliance with the Renewable Fuel Standard (RFS) obligated parties are to demonstrate they have met their RFS quota by submitting RINs on a quarterly and annual basis. The RIN can be sold and traded separately from the biofuels that created them.

Honeywell UOP (www.uop.com) is a leading international supplier and licensor of process technology, catalysts, adsorbents, equipment, and consulting services to the petroleum refining, petrochemical, and gas processing industries. Honeywell UOP is a wholly owned subsidiary of Honeywell International, Inc., a Fortune 100 diversified technology and manufacturing leader based in Morris Plains, NJ.

ABOUT VERONICA MAY

Veronica Magyar May is Vice President and General Manager of Honeywell UOP's Renewable Energy and Chemicals business, headquartered in Des Plaines, Illinois. Veronica's business leverages UOP's 100+ years of refining technology innovation to develop technologies that convert second-generation bio feedstocks into renewable diesel, renewable jet fuel, and liquid fuel from biomass.

She holds a Bachelor of Science degree from Carnegie Mellon University in Pittsburgh. She is a member of the America Institute of Chemical Engineers and holds a patent in using Expert Systems as a Method in Delivering Diagnostic, Problem Solving, and Training Technical Services to Customers.

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ELIAS GEDEON

Senior Vice-President
& Chief Business Development Officer
Babcock & Wilcox

Elias Gedeon heads up global sales and business development for Babcock & Wilcox Enterprises (B&W) spun off on July 1, 2015 from the parent company. He's responsible for these activities for all three operating segments: Global Power, Global Services and Industrial Environmental. B&W, a global leader in energy and environmental technologies and services, employs approximately 6,000 employees in 25 countries. Revenues for 2015 were $1.76 billion, an increase of 18.3% from 2014 and new bookings at $1.84 billion, up 16.7% from previous year. Gedeon leads the group from B&W headquarters in Charlotte, NC and travels about 50 percent of his time.

GLOBAL POWER

B&W's Global Power covers all new utility steam generation, renewable power, environmental solutions and industrial power. "On utility projects outside N. America, we work with Japanese, Chinese, Korean and Spanish EPC's where typically our portion is 20-25% of the total plant," Gedeon said. B&W also has two major Joint Ventures in Asia. "Babcock & Wilcox Beijing Company in China with 5,000 MWs of fabrication capacity and Thermax B&W Energy Solutions in Pune, India with capacity of 3,000 MWs a year, each serving their respective markets" Gedeon added.

WASTE TO ENERGY (WTE)

There are 86 Waste to Energy (WTE) units in the US, 500 in Europe and 330 in Asia. "We have recently inaugurated new units at one of the largest WTE facilities in the world and the first in the US in 20 years, a 150 MW facility at West Palm Beach, FL." Gedeon said. He sees a renaissance in the US in waste energy facilities and continuing growth in Europe where landfills are restricted and governments are giving subsidies for waste energy. "We have many WTE facilities under construction in the UK and northern Europe and now see large opportunities in the Emirates, Kuwait and Turkey for municipal solid waste energy," Gedeon shared.

B&W collaborated with eSolar to develop Concentrated Solar Power (CSP) tower technologies by delivering a total of 5 MW water/steam solar receivers for the Sierra Sun Tower plant in California. "We're looking at prospects in the Middle East and Europe and are working with developers in the permitting process," Gedeon offered.

GLOBAL SERVICES

B&W's Global Services focus on major service projects, parts and technical services for B&W's 300,000 MWs of installed generation in 90 countries and those of its competitors. "The North American market remains our largest installed base and we are expanding our operation internationally in this segment," Gedeon pointed out.

B&W was awarded recently an $18 million contract to engineer and install a replacement reheater at Xcel Energy's' Pawnee Station in Brush, CO.

"We provide construction services on new and retrofit projects in N. America. We also see substantial opportunities to retrofit facilities with our own ash-handling systems to meet the new requirements," Gedeon said.

B&W continues to build a more diverse backlog, both by geography and market.

INDUSTRIAL ENVIRONMENTAL

B&W's Industrial Environmental segment has a customer base of several thousand businesses in over 60 countries across six continents. B&W acquired MEGTEC in June, 2014 with 600 employees in 13 offices. This company manufactures air pollution control systems for industrial applications, and coating and drying equipment for a variety of processes, including energy storage. "Our biggest clients are still those seeking industrial air pollution abatement and recovery. That was part of our diversification program that we started a couple of years ago, and we continue to look at other opportunities for acquisition, be it in this arena, industrial environmental or other arenas to help us diversify our products and services to a certain degree away from coal. Coal will continue to play a role in our business, but renewables is the biggest growth market right now for us. We also continue to look to see what other ways we could diversify for the future," Gedeon underscored.

ABOUT ELIAS GEDEON

Elias Gedeon has more than 35 years of experience in the power generation industry and has held various sales, operations and P&L leadership positions in the US and overseas.

Prior to joining B&W in May 2014, he served as Alstom Power's Boiler Group Vice President, Global Sales and Marketing since 2009, and from 2003 as Alstom's Power Vice President Sales, Americas. From 1981 to 2002, Mr. Gedeon held a number of positions of increasing responsibility at Foster Wheeler Power Group and its subsidiaries including Executive VP, Global Sales and Marketing, VP, Operations, Foster Wheeler Energia S.A. Spain. He began his professional career as a Service Engineer with Foster Wheeler Energy in 1981 and has worked and lived in many countries.

Gedeon holds a bachelor's degree in engineering from Stevens Institute of Technology and an Executive MBA from the University of Michigan.

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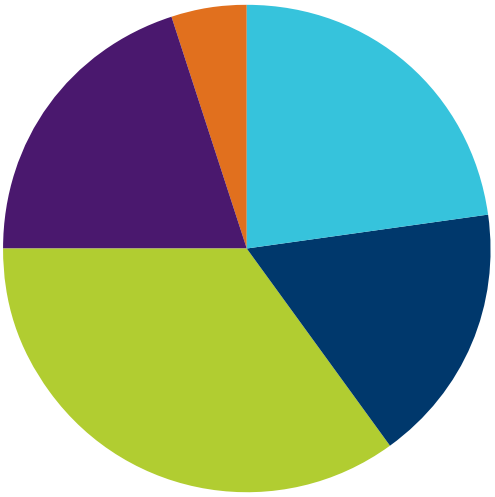
EVENT DEMOGRAPHICS

Attendees

Job profile (by title)

- 23% C-LEVEL
- 17% VICE PRESIDENT
- 35% DIRECTOR
- 20% ACADEMIC
- 5% OTHER



1,200+
ATTENDEES

60%
INTERNATIONAL
(50 COUNTRIES)

40%
ATTENDEES ARE
VP OR C-LEVEL

720
COMPANIES

Companies Represented

- Chemical
- Biotech
- Biofuels
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BRUCE DOUGLAS

Senior VP and General Manager
ITRON Software and Services

In January 2015, Bruce Douglas was appointed senior vice president and general manager of Software and Services at Itron, a world-leading technology and services company dedicated to the resourceful use of energy and water. He is responsible for Itron's Software and Services growth plan, leveraging the company's existing Electricity, Gas and Water business lines as well as broadening the solutions portfolio globally. He joined Itron with more than 20 years of experience, including building software- and services-related businesses at both global corporations and start-ups.

"My goal as SVP and GM of Software and Services is to tap into Itron's deep knowledge and extensive expertise and leverage it to solve our customers' challenges," Douglas said. Itron has more than 8,000 customers in more than a hundred countries using 145 million communication devices to better manage energy and water.

In the fall of 2015, Itron announced its new Software and Services business strategy under Douglas' leadership. His vision for the organization is driven by the demand in the marketplace for lowering risk and complexity of systems in the age of the Internet of Things. His goal is to build off of the company's current business of more than 250 managed services customers in North America by expanding the company's portfolio of analytics-based offerings.

BRINGING SERVICES TO SOLAR

Under Douglas' leadership, the company launched Itron Total Services for solar, which combines production measurement, asset monitoring, sensing applications and forecasting for photovoltaic (PV) generation.

"Itron Total Services combines Itron's industry-leading, revenue-grade solar monitoring with multiple areas of expertise within the company and packages them into one overall solution, providing the ultimate benefit for our clients," Douglas said. "Today, Itron monitors nearly 100,000 U.S. solar installations representing over 500 Megawatts."

Sunrun, the largest dedicated residential solar company in the U.S., is an example of an Itron customer that is utilizing Itron Total Services for solar to provide accurate, reliable measurement and monitoring of solar production for home solar installations. With Itron Total Services, Itron's services team runs, manages and maintains Itron's solar offering for Sunrun, including the collection, storage and validation of solar PV production data.

LEADERSHIP IN METER DATA MANAGEMENT

In his role leading Software and Services at Itron, Douglas is responsible for Itron's software products, including its industry-leading meter data management (MDM) solution, Itron Enterprise Edition (IEE) MDM. IEE is in production at 72 energy companies and manages data from more than 37 million meters across six continents.

The MDM solution recently received recognition when Itron was ranked the top Leader in the Navigant Research Leaderboard Report on Meter Data Management Systems (MDMS). According to the report, published in Q4 2015, while it is a close race at the top in this highly competitive field, Itron surfaced "as the company to beat, as it is firmly entrenched in the MDMS market and has big plans for the future."

According to the Navigant Research report, Leaders attain their rank by offering comprehensive MDM solutions that align with the current needs of utility customers while also developing strategies and roadmaps that address the future needs of the market. In addition, these companies have a global network of customers and partners and a heavy presence in the market. Leaders have clearly differentiated themselves from the competition through exceptional product development, a strong base of customers and a forward-looking strategy for their solutions.

"Itron believes that utilities want more from their data to enhance the return on investment from their AMI and smart grid systems," Douglas said.

Itron was also named by Gartner, Inc. in the "Leaders" quadrant of the Magic Quadrant for Meter Data Management Products.

GARTNER REPORT

According to the Gartner report, leaders in this market normally are included on shortlists for MDM products for all types of utilities worldwide. They should perform profitably, grow their revenue and have a presence in all major markets. Their functionality must be above average, and their technology and scalability must be leading-edge.

This is the third consecutive year that Itron has been positioned in the Leaders quadrant.

"As a pioneer in meter data management, Itron has extensive knowledge and experience in helping utilities manage their data," Douglas said. "We believe that MDM is transitioning from solely automating utility billing to providing value-based analytics that drive outcome-based solutions. Itron is committed to helping deliver new business value to our utility customers around the world."

Itron's MDM solution integrates with the company's smart grid and automation solutions and creates value and insights from smart metering data. The highly-scalable MDM solution provides a central repository that ensures data remains secure, audited and easily accessible to individuals across a utility's enterprise.

Itron's MDM solution is pre-integrated with Itron Analytics, which can be

(continued page 27)

NIGEL COCKROFT

General Manager
JinkoSolar (US) Inc.

Founded in Shanghai, China in 2006 and publicly listed on the New York Stock Exchange in 2010, JinkoSolar has grown to position itself, as a top three solar PV manufacturer in sales volume for 2015, up from number ten in many markets just three years ago, according to Nigel Cockroft, general manager of JinkoSolar (US) Inc. headquartered in San Francisco.

Cockroft's team in San Francisco has contributed significantly to that success, producing a 50-fold increase in product sales over the past three years having shipped over 1,000 MW in the US alone in 2015.

GLOBAL REACH

JinkoSolar's global reach includes sales in more than fifty countries, with regional offices in Germany, Italy, Canada, Switzerland, Australia, Japan, and Africa. Its manufacturing plants, located in China, Malaysia and South Africa, produces an annual solar module production capacity exceeding 5 GW.

The vertically integrated company manufactures polycrystalline modules for the US market with a strong focus on product reliability, efficiency and on-time delivery. JinkoSolar's latest product, JinkoMX, uses integrated circuit optimizers to directly address the issues of panel shading, hot spots and mismatch, minimizing the possibility of panel degradation.

JinkoSolar's sub company, Jinko Power, develops, builds and operates solar farms in China, now totaling more than 1 GW in operation. "This business is rapidly expanding and Jinko is doing preliminary development in other countries," Cockroft said.

US SUBSIDIARY

JinkoSolar opened its US subsidiary in 2010 with Cockroft joining in late 2012. The company's growth is powered by very good local customer support and logistics, Cockroft said. Each major customer is assigned a project manager and is offered financial, technical management and legal support. "We have local US control, and we consistently do what we say we will do," he said.

Cockroft received his PhD in Physics in New Zealand and relocated to the US in 1987. He built upon a seven-year R&D management role at Los Alamos National Laboratory concentrating on lasers and photonics. Later, he joined a Silicon Valley–based fiber optics company, serving in executive management roles in development, production, sales and marketing. Cockroft joined the solar industry five years ago, working with three other Chinese companies before coming to JinkoSolar where he put together the high performance team in San Francisco.

The majority of JinkoSolar's US business in the past four years has involved sales of PV modules to utility scale projects with just 10% of its sales to residential and commercial customers. In 2015, more than 1,000 MW were shipped in the US, Cockroft said, including supplying over 100 MW of panels each for two separate projects. "Our sales in 2016 should be substantially higher in the utility space. Our goal is

(continued page 27)

JAY OLEARAIN

Director of Business Development, Energy and Utilities
Verizon

WORLD-GEN: PLEASE EXPLAIN VERIZON'S NEW IOT PLATFORM, "GRID WIDE UTILITY SOLUTIONS." HOW MANY METERS ARE WE TALKING ABOUT?

Jay Olearain: Commercially launched in July of 2015, Verizon's Internet of Things (IoT) platform service offers utility companies an easy, secure and reliable on-ramp to grid modernization. Specifically, Verizon's Grid Wide Utility Solutions offers an integrated as-a-service solution for smart metering, demand response, meter data management and distribution monitoring and control. With an estimated market of 147 million electric meters and 330 million water and gas meters in service in the U.S. today, the opportunity for intelligent solutions and services in the utilities market is enormous.

WORLD-GEN: ARE YOU INTERESTED IN ALL THE UTILITIES, IOU'S, MUNI'S, CO-OPS? HOW DOES IT HELP THEM?

Jay Olearain: By rolling out Grid Wide, Verizon is aiming to transform the delivery and consumption of energy nationwide for investor-owned, cooperative and municipal utilities and their customers. Designed to leverage the benefits of smart meters and distribution monitoring and control, the solution comes equipped with a wide range of cloud-based applications intended to help utility companies improve operational reliability and reduce costs as well as increase efficiency, drive incremental revenue and improve customer experience.

WORLD-GEN: HOW DOES 'GRID WIDE' WORK?

Jay Olearain: In addition to the traditional smart metering and Advanced Meeting Infrastructure (AMI)/Meter Data Management (MDM) services and functionality, Grid Wide provides a wide array of additional capabilities to support secure and reliable grid modernization efforts. For example, when a power outage occurs, the smart meter communication card leverages Verizon's 4G LTE high speed signaling channel to notify the utility of an outage via the Grid Wide platform. The utilities can then pinpoint each outage at an exact address and can see if it's one person that's affected or if it's a widespread outage. And they know exactly where to send crews to restore power.

Another Grid Wide feature that can help save time and money is the ability to remotely disconnect and connect service. For example, utilities no longer have to send out a truck and worker to manually switch off the electricity at a house or apartment if someone is moving. With Grid Wide, they can do this remotely, through the hosted application, across the LTE network, right to the meter — it takes about 10 seconds to kill the service and eliminates two truck rolls.

WORLD-GEN: PLEASE DEFINE "SMART ENERGY AS A SERVICE?"

Jay Olearain: What is really game changing about our Grid Wide technology is that we have created it as an as-a-service model. We are offering a solution that doesn't necessarily require a large capital budget so that utilities can consume these services as they need them. By purchasing this as-a-service model, utilities don't have to swap out the entire meter population; instead, they can immediately begin to solve for problem areas such as hard meter reads, power quality monitoring and existing AMI stranded meter fill-in on a per-month, per-meter cost basis.

WORLD-GEN: WHAT SHOULD ORGANIZATIONS THAT ARE INTRODUCING SMART GRID INITIATIVES CONSIDER WHEN IT COMES TO SECURITY?

Jay Olearain: Securing the smart grid must go beyond brand reputation to issues of public safety. As grid modernization projects are adopted, the significance of integrating a fail proof cybersecurity program from the inception cannot be overstated. The energy and utilities sector handles large amounts of proprietary customer data including social security numbers, birth dates, bank account details and credit card numbers. This data, when combined with the critical mandate to protect national infrastructure from external threats, reinforces the imperative for organizations to double down on security measures.

Vulnerability to cyberthreats grows as an increase in systems results in more potential entry routes to customer data. This is especially true as energy and utilities companies roll out web-based solutions such as online billing and IoT devices such as smart meters to deliver efficiencies and enhance the customer experience. Therefore, managing risk while disrupting traditional business models must go hand in hand.

Organizations must understand the security risks and implement plans and systems to safeguard all devices, sensors and things connected to their networks. The goal is to help maintain a safe environment for customer information while also helping protect public safety.

WORLD-GEN: WHAT DOES THE ROAD MAP FOR GRID WIDE LOOK LIKE AHEAD?

Jay Olearain: We have a detailed road map of enhancements to support other electric, gas and water meter manufacturers that we will be introducing in the coming months.

Jay Olearain is Director of Internet of Things for the Energy and Utility verticals working in Verizon's Product and New Business Innovation organization.

SUE KELLY

President and CEO
American Public Power Assn. (APPA)

HOMEGROWN MAKES A DIFFERENCE

It's not uncommon on restaurant menus today to see where the ingredients in your meal are coming from: beets dug from a family farm in Virginia, pork pastured on a green field in South Carolina, blueberries from wild bushes in Maine. That menu might even tell you how many miles your food traveled to your plate, and the growing trend seems to be the closer the better. "Buy Local" is the buzz phrase — and those who do are called "locavores." Maybe buying local should also be considered when it comes to power.

Public power seems to be gaining in popularity, or at least gaining attention. Some communities in the U.S. are making an effort to buy their distribution systems and run their own utilities, although the resistance from incumbent utilities has been stiff to say the least. "Our business model is appealing — local decision-making, local jobs, and revenue that is pumped back into the community. It's no surprise that as the buy local trend grows, so does the number of towns looking to go public with their power," Kelly said.

PUBLIC POWER

Public power is in close to 2,000 cities and towns and serves 48 million people. If customers experience an outage, they call a member of their community. And while the idea is gaining traction in communities throughout the country, many of our own customers don't know the value of the utility they have in their own towns and cities. "It's our job at the American Public Power Association to help you tell your customers, your communities and the world the public power story." Kelly added.

APPA 2016–2018

Raising awareness of public power is one of six focus areas in APPA's 2016–2018 strategic plan. The industry is changing, and that change is driven by technology and regulations that will impact your customers. Amidst this change, public power customers need to know the value they're getting through their community-owned utility.

EPA

Another strategic priority APPA will be working on in 2016–2018 is addressing increased federal regulation of public power utilities. A prime example of this is the U.S. Environmental Protection Agency's Clean Power Plan, a plan to limit carbon dioxide emissions from existing power plants. In 2015, APPA staff labored long to provide comments to the EPA on its proposed regulations, which would have imposed drastic requirements on many APPA members.

When the final regulations came out in August 2015, the EPA had improved a number of its provisions. But the final rule is still challenging for many of our members, and in fact will be harder for some of them to meet than the first proposal. While APPA supports the need to lower CO2 emissions, we are concerned that the EPA's plan still tries in many states to do too much, too fast. The ultimate outcome will be an adverse impact on electricity costs for a substantial number of APPA members.

But in the meantime, APPA members have to be prepared to help their states comply.

"The public power business model strives to deliver low-cost, reliable power while practicing good environmental stewardship. I've been representing community-owned utilities for more than three decades now and I believe in the mission of our members," Kelly shared.

I hope members of their own public power community, appreciate and support their homegrown utility and know that they make a difference every day.

ABOUT SUE KELLY

Sue Kelly has been president and CEO of the American Public Power Association (APPA) since April 2014. Prior to becoming president and CEO, Kelly was APPA's senior vice president, policy analysis and general counsel. In that capacity, she helped APPA and its members in energy policy formulation and with policy advocacy before the Federal Energy Regulatory Commission (FERC), federal courts, and other governmental and industry policy forums.

From 1998–2004, Kelly was a principal with the Washington, D.C. law firm of Miller, Balis & O'Neil, P.C. She represented cooperatively and publicly owned electric utilities and their trade associations, as well as other governmental entities, assisting them with restructuring-related issues before the FERC, federal appellate courts, and state public utility commissions. From 1995–1998, Kelly served as the Senior Regulatory Counsel for the National Rural Electric Cooperative Association (NRECA). She represented NRECA before the FERC, state public utility commissions and courts, and served as a liaison from NRECA to many industry groups.

In March 2008 she was appointed to a one-year term on the U.S. Department of Energy's Electricity Advisory Committee (EAC). She served a second term on the EAC from June 2012 to April 2014. In April 2010, Kelly was elected president of the Energy Bar Association. In January 2015, she was selected to serve as an associate member on the Commodity Futures Trading Commission's Energy and Environmental Markets Advisory Committee. She is also a member of the E Source Advisory Board.

TRISTAN GRIMBERT

President and CEO
EDF Renewable Energy

Tristan Grimbert, CEO of EDF Renewable Energy, the North American Renewable arm of Electricité de France, participated in a panel discussion covering market trends at the annual REFF Wall Street conference hosted by Euromoney and ACORE.

WHAT IS DIFFERENT ABOUT THE RENEWABLE MARKET TODAY THAN TWO YEARS AGO?

Tristan Grimbert: First, there is a lot more money looking to move into renewable energy. It is not only yield cos. There is an imbalance between the amount of money and the number of projects available for investment.

Second, our business is becoming more and more technical. Being able to deliver on the business plan requires more and more technical knowledge and resources. I am thinking in particular about turbine performance, congestion risk and basis risk. As there is more penetration of renewables, the ability to understand and act on business risk and market conditions is becoming critical.

The third thing that is different is we have reached a turning point in the last year in the US where we can talk again about carbon pricing and about moving away from subsidies to something that would recognize the cost of carbon. My hope is that, within the next five years, we will move away from renewable portfolio standards and all the subsidies to a truly market-based mechanism for carbon pricing. That is my hope.

WHAT ARE YOUR GREATEST CHALLENGES TODAY?

Tristan Grimbert: Defining a viable business model in the distributed space is a challenge with the lack of differentiation and the repetitiveness and credit issues. A lot of people are moving into that sector. It is very difficult to figure out how to make money. That is one area with which we are struggling.

Another challenge is finding the right balance for spending on the development pipeline in relation to the size of the market when the tax incentives are always on the verge of expiring. Five years ago, there were too many projects under development. I think the wind pipeline was something like 351 gigawatts for an annual market of six to eight gigawatts, so it was 50 years of projects. Today, the number has been reduced significantly.

Lastly, it is a challenge to forecast the price and cost curves accurately. We must take a view on the future price for electricity and the future cost of solar and wind equipment and the future cost of capital. We have been talking about yield cos and their impact on the cost of capital the last couple of years, but at some point the cost of capital will start going back up. You do not want to be caught in a trap where you have offered an aggressive electricity price to win a power purchase agreement and then the cost of capital goes back up. On the equipment side, we expect the costs to keep falling , but the question is to what extent.

SOMETHING LIKE 38% OF US ELECTRICITY SUPPLY IS FROM COAL. CONSULTANTS EXPECT A THIRD OF THAT TO BE RETIRED BETWEEN 2017 AND 2020, BUT THERE IS A DEBATE ABOUT WHETHER THAT CREATES A LOT OF OPPORTUNITY TO REPLACE THAT CAPACITY. DO YOU THINK THIS IS A GREAT OPPORTUNITY?

Tristan Grimbert: The coal retirements will allow us to keep a market in the range of five to 10 gigawatts of new wind capacity additions a year, and that is critical. You do not need a lot of storage to allow much more penetration of wind and solar. The coal retirements driven by the Clean Power Plan will allow the utility-scale wind and solar markets to continue adding capacity over the next 15 years at the current level. It was suggested earlier that the growth rate is accelerating. I do not think we have an acceleration of the growth rate, but I think we will have stable growth.

LET'S PROBE ON STORAGE. MANY PEOPLE SAY THE WIDESPREAD ADOPTION OF BATTERIES WILL LEAD TO A FUNDAMENTAL CHANGE IN THIS MARKET. DO YOU AGREE?

Tristan Grimbert: We are building a 20-megawatt battery storage project right now in PJM, and we have more in development. PJM does not need a lot of storage in order to be able to manage the intermittent generation on the grid, so that market reached saturation quickly. The potential storage market is about a tenth of the wind capacity: rough calculation, back of the envelope, you need an order of magnitude less capacity in storage than you need in intermittency. Keep in mind that storage is a transmission asset. The more reliable and the more structured the grid, the less you need storage. So, yes, storage is a market for us, and we are in it, but it is a fraction of the solar or wind potential market in terms of capital deployment.

Storage is a diverse universe. We can talk about a battery bought by a residential customer all the way to a pumped storage hydroelectric project or thermal storage facility for a city that is huge in scale. I think it will be all of the above. You need to manage the grid in a way that you can provide some load-shifting equipment or load-following equipment.

The question about battery storage is the timing. The timing depends on the transition to distributed generation. Battery storage at the residential or commercial

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JEFF GRYBOWSKI

CEO
Deepwater

As the saying goes, dynamite comes in small packages and with respect to one of the most sought after energy projects in the United States, the State of Rhode Island is proof. Supporting the country's first off shore wind project, the smallest State in the USA has lighted the fuse on the package, and it is about to enjoy the energy from the explosion and a positive aftermath.

At the moment, there are twelve off-shore wind projects in various stages of development in the United States, but none has taken to water. In 2009, the U.S. Department of Interior under President George Bush, developed a final set of rules for the development of offshore wind farm projects. This was followed in 2012 by a grant competition selecting seven winners for an advanced technology demonstration project. States along the coasts of the U.S.–East, West, Great Lakes and Gulf, already planning the installation of offshore wind farms, were in the competition. Seven projects were identified to develop these demonstrations. Ultimately three projects would be should be selected in 2014.

In this respect, a great deal of the success of the State of Rhode Island in bringing their project to reality has been overlooked. As early as 2009, then Rhode Island Governor Donald Carcieri, chose the firm Deepwater Wind to design, develop, install and manage the placement of a wind farm that would ultimately provide electric power to the population of Block Island, off the Rhode Island coast. As a result, Rhode Island, noted largely as a pass through from Massachusetts to the North and Connecticut to the South via I-95, will become the first state to have an off-shore windmill farm, an accomplishment that is truly significant.

DEEPWATER WIND

Deepwater Wind, as the driving force on this project, brings together a host of participants. Jeff Grybowski, CEO of Deepwater is a recognized leader in off-shore wind technology. Recently elected to the Board of Directors of the American Wind Energy Association (AWEA), Mr. Grybowski is tasked with the management of the various facets of the Block Island project.

RHODE ISLAND

Rhode Island's Governor Gina Raimondo continues the State's support, recently commenting that, "Rhode Island, is proud to be home for the nation's first off-shore wind farm." Not only will the project provide nearly all of the electric power to one of its communities, Block Island, it will demonstrate the ability of a state governmental organization to select private organizations that will bring together an incredibly diverse group to complete the project. The group currently involved will include state and city organizations, diverse engineering capabilities, multiple union groups, off-shore capabilities and design, development and management skills.

BLOCK ISLAND

The site was selected by the Rhode Island Coastal Resources Management Council after a comprehensive analysis and ocean mapping project. The Block Island Wind Farm project is owned and managed by Deepwater Wind headquartered in Providence. The 30 megawatt program, when completed will cost approximately $290 million, largely financed by Capital funding institutions. The generation of off-shore power is provided by an almost constant source. The power generated by the wind driven turbines will be transmitted via cable laid on the ocean's floor, connecting to the receiving source, in this case Block Island.

The final installation and start up is scheduled to be completed by the fourth quarter of 2016. To date, installation of five "steel jacket foundations" was completed with the last portion, the deck platforms, secured at the wind farm site. Governor Gina Raimondo said, "With this project, we're putting hundreds of our local workers to work at-sea, and at our world class ports to build a project that will help diversify Rhode Island's energy mix and protect our environment."

RHODE ISLAND SEAPORTS

The two major Rhode Island seaports, The Port of Providence and Quonset Point, plus the ports of Galilee and Block Island have been engaged for storage, support and fabrication activities and load-out. The first portion of the site construction was completed during the first week of December 2015.

An important factor in the success of the first phase of construction, transport and placement activity, was the ability to coordinate not only multiple locations, but a number of transport and fabrication disciplines. The project has brought over 300 local workers possessing a myriad of skills that include vessel operators for tugboats, crew ships, and monitoring vessels, longshoremen, electrical and steel workers, and of course a host of technical skills.

Floating craft included over a dozen construction and transport barges. Most of the barges for the first phase of the project were loaded at the port facilities at Quonset Point. The industrial complex there will continue to provide critical support for the project and will house a permanent site for maintenance facilities in support of the active windmill farm.

PORT'S MANAGEMENT TEAM

The final stages of the project include the arrival of the 95 foot long windmill tower sections to the Port of Providence, the first of which have begun to arrive. Additional sections will continue to arrive.

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DAVID HUCKEBA

Vice President
SCR

While much of the power industry is experiencing a downturn in hiring and career movement those who have, and maintain, professional-personal relationships will continue to succeed regardless of the direction of employment in our industry.

Through a full and aggressive schedule of industry participation in tradeshows, association meetings, and the course of daily business it has become obvious that the overall feel of employment opportunity in the industry is "flat". That said, dealing with hiring authorities and candidates, Huckeba sees that there are opportunities for career advancement continuing to be offered. In such a market, should a change in employment or need for a new-hire exist, it is ever more important to have a network of industry contacts to rely upon.

"From a career's start through its completion, the power of personal interactions will prove time and again to be as valuable, if not more valuable, than education and experience," Huckeba points out. The ability to use your network (both peers and industry leaders) for access to knowledge, information, and people, is like money in the bank – always ready, always available. Add to this the incredible positive return that is gained from giving back to your network, and you'll understand a professional recruiter's mindset.

DEVELOPING RELATIONSHIPS

Consistency in developing relationships is key. Extend yourself. Whether in a relationship-creating environment such as a tradeshow, in an elevator, or in an airport terminal when you see another passenger carrying an industry hard-hat, extend yourself and watch what happens. You simply never know where the addition of one new contact to your professional network will lead. For those of you less inclined or comfortable in meeting new contacts this skill can be acquired. Some research into topics such as how to work a room, how to meet new people, and similar subjects will lay-out for you the basic steps you can take to master these skills.

And, while the opportunities to expand your network through technology (social media, recruiting boards, etc.) is an attractive shortcut, the reality is they also require you to create and share content, as well as take an active role in discussions to establish yourself as a thought leader and remain relevant. As in any personal or professional relationship the idea of investing time and energy, by giving back is critical.

"Ask yourself, when was the last time you were asked to help someone within your network with career or technical advice," Huckeba shared. How did you respond? Enthusiastically, or with resentment that someone infringed on your time? I've identified a common thread among successfully selected candidates. Each has excellent peer references and has been referred to as being helpful, a team player, and a trusted resource. Giving back to your network not only pays emotional dividends, it also has tremendous positive impact on how you are perceived within your network.

Loving what you do is important, loving or at least caring about those you work for, around and with, is equally as valuable.

"For what it's worth, take the extra step to make yourself known and build both a strong network and positive reputation within your industry," Huckeba said. The idea of spending at least one night each week dedicated to expanding your knowledge and influence through association memberships, industry leadership positions, and reading industry blogs can become an easy and enjoyable routine. You will be amazed at the career opportunities that become available through this small investment of time.

Strategic Contract Resources, LLC (SCR) is an international supplier of personnel to the petrochemical, oil & gas, power, renewable power, and process industries. We provide highly skilled project personnel and candidates for direct-hire employment to help organizations source and hire more efficiently, access better talent, and better control hiring and turnover expenses.

SCR's responsibility is to provide project personnel in a timely manner and minimize its clients' costs. SCR fully screens all personnel for both qualifications and soft skills required to be successful within its client's environment. Industry knowledge and strenuous screening process results in SCR providing only the top qualified personnel, saving time and money. Visit SCR's website (www.scrllc.net) to discover the benefits of our direct-hire recruiting services, innovative personnel delivery programs, 24-hour access to management, and flexible cost-effective solutions for your workforce needs.

ABOUT DAVID HUCKEBA

David Huckeba's experience includes over 24 years serving the power generation and energy industries. His background and expertise span a wide variety of consulting and support activities including recruiting, direct hire placement, project management, documentation development, training and e-learning activities. With previous titles including vice president, Power Industry consultants; director, General Physics; and manager, PennWell Publishing, he possesses a broad and deep network of consultants and clients. Mr. Huckeba served 20 years in the Submarine Service for the U.S. Navy. He attended the University of Alabama and holds a bachelor of science, management and marketing from Charleston Southern University.

JOHN HOPKINS

Chairman & CEO
NuScale Power

John Hopkins had been a corporate officer at Fluor Corporation for 12 years when he was asked to lead the effort at NuScale Power, a company formed in 2007 to develop a passively cooled, small modular nuclear reactor based on research originally funded by the Department of Energy. John has been leading the company as its chief executive officer since 2012.

The company's design, after more than 15 years of work, is now poised for full-scale commercial development with the February announcement from DOE that it had awarded a site use permit to Utah Associated Municipal Power Systems (UAMPS) for a project in Idaho. This site use permit allows UAMPS to conduct studies and eventually build the first NuScale SMR plant within the boundary of the Idaho National Laboratory.

The venture began in 2000 when DOE paid a visit to Oregon State University (OSU). Dr. Jose Reyes, who was then the head of the Department of Nuclear Engineering and Radiation Health Physics there, was asked if he could lead the development of a small nuclear reactor that would be funded by DOE.

By 2003, Dr. Reyes concluded there could be commercial applications and, with aid provided by OSU, his team built a one-third scale electrically-heated version of a plant as a test facility for their design.

In 2007, the university granted NuScale Power, which Dr. Reyes had recently founded, exclusive rights to the nuclear power plant design, as well as the continued use of the test facility, through a technology transfer agreement. In 2008, NuScale began ongoing dialogs with the Nuclear Regulatory Commission which have continued to the present. Dr. Reyes is now NuScale's chief technology officer.

One of Fluor's business groups, which included Hopkins, got wind of the effort in 2011 and following three Fluor board meetings the company decided to become the primary investor in NuScale. In March 2013, NuScale responded to a DOE solicitation to fund the development of a small modular nuclear reactor. In December 2013 DOE announced an award of $217 million in matching funds over five years to NuScale, which had beaten out five competitors and the contract was signed in April 2014.

With solid funding in hand, Hopkins was asked to lead the development effort and become NuScale's CEO. He accepted the offer and took early retirement from Fluor. By the end of 2015, Fluor had invested more than $300 million in NuScale's effort.

"If you look at energy requirements in 2030, based on the world population and with the focus on reducing green-house gases, could you imagine no nuclear plants," Hopkins asked. "It has to be part of the supply chain," he concluded.

At the time of his retirement from Fluor, Hopkins had been with the company for 24 years and served from 2010 to 2012 as group president for the Corporate Development and New Ventures Group. Today, in addition to being CEO of NuScale, Hopkins is currently serving as vice chairman of the board of directors of the US Chamber of Commerce in Washington DC.

The NuScale small modular reactor is designed as an advanced light-water reactor intended to deployed in multiples each of which can be operated independently within a multi-module configuration. The reactors operate inside a water-filled pool built below grade, and operate using natural circulation. "There are no pumps and no need for emergency generators," said Hopkins. The system uses a convection process to circulate water through the reactor. Up to 12 50MWe (gross) modules can be monitored and operated from a single control room. For a fuller description of how the reactor will operate, go to the company's website, www.nuscalepower.com.

On February 19, DOE announced that it had granted a site use permit to UAMPS. The permit allows the Salt Lake City-based energy cooperative to find an ideal location for the reactor on the DOE's 890-square-mile Idaho National Laboratory (INL) site. The project will be based on NuScale Power's design. Hopkins said this is a major milestone for NuScale, and is a testament to DOE wanting the development to reach commercial reality.

UAMPS, a political subdivision of the State of Utah, is made up of 45 municipal utility members from Arizona, California, Idaho, Nevada, New Mexico, Oregon, Utah, and Wyoming. Hopkins said 34 members have signed up to buy power from the new plant.

Hopkins said NuScale will submit its design to the NRC for certification by the fourth quarter of this year. Four sites are being evaluated at the INL site. He predicted site preparation will be complete in 2018 and the plant could be operational by 2024.

The cost of a twelve unit plant to the first customer will be $2.8 to $2.9 billion. With multiple customers and full manufacturing capability, the costs will go down, Hopkins said. In contrast, a large nuclear plant costs $16 billion, he said.

What Hopkins likes about NuScale's design is its scalability. Twelve modular 50MWe (gross) modules can be built for a total of 600MWe (gross), and each module is independent of the other. "You can start generating power with two while continuing to build the next modules," he said.

Other features Hopkins touts: each module core contains less than 5% of fuel in a large reactor. The nuclear core is 1/20th the size of the large reactor. Fuel assemblies, at roughly 2 meters in length, are half the height of those in a large reactor. While refueling could be done every four years, it will actually be done every two years due to an NRC requirement for equipment inspection. Overall NuScale power modules are smaller, simpler, safer, and more economic. "A lot of what large reactors need, we don't need," he said.

ANDREW de PASS

CEO
Conergy

Andrew de Pass, CEO of Conergy shares his perspectives on the renewable energy market.

WHAT IS DIFFERENT ABOUT THE RENEWABLES MARKET TODAY COMPARED WITH TWO YEARS AGO?

Andrew de Pass: I come at this from the perspective of a solar company. Two years ago, oil prices were higher, so it was not as difficult to make competitive bids to supply electricity in certain countries. Of course today we also have the whole yield co craze whereby long-duration cash flows are in vogue. This has the potential, with the launch of vehicles like the SunEdison yield co aimed at emerging markets, to give developers like Conergy more transparency and visibility on take-out pricing in those markets. So one change is the fossil fuel pricing and a second is the attractiveness of the long-duration cash flows in the capital markets.

IS ACCESS TO CAPITAL NO LONGER AN ISSUE FOR THIS INDUSTRY?

Andrew de Pass: The cost of capital and availability vary at different stages from early-stage development, mid- to late-stage development, during the construction cycle from notice to proceed to the commercial operation date, and then for operating assets. The market for operating assets is extremely competitive, and there is price visibility and good availability of capital. In certain markets, construction finance remains a challenge. For example, as we look to finance projects in new markets like Turkey or Mexico or Southeast Asia, construction finance is more challenging and expensive. In the US, it is available for properly structured projects.

Late-stage development capital is available and the returns have definitely been pushed down. For example, in the UK where we developed, constructed and operate more than 200 megawatts in the last 12 months, we were buying later-stage development rights for a cash-on-cash return of 1.25 to 1.5 times investment, and that has now been pushed down to 1.1 times.

The returns are still very attractive in early-stage projects where the dollars per megawatt to develop are low in solar, $25,000 to $50,000 maximum, and the returns can be multiples. But you have to work with a portfolio because you can lose money in any one project. The point is it is important to differentiate among stages of development.

WHAT ARE YOUR GREATEST CHALLENGES TODAY?

Andrew de Pass: Conergy has a global footprint and so the challenges vary by country. We operate in 15 countries. One of our challenges in the developed markets is they are moving away from utility-scale to distributed generation including industrial rooftop. We expect this trend to continue over the next five years. Distributed generation is a different business than utility scale because you have to acquire customers, you have challenges with credit assessment, you have to scale up and the projects are relatively small. The question is: How are we going to make money consistently in such markets?

We are too late in the US to tackle residential, but we are a leader in solar in many other markets where residential is starting to take hold, and the discussion amongst senior management and the boards is: Do we or don't we do this? The projections say that residential could be 30% of these markets and then you ask, "What is the business, and how do we do it effectively?" It is a customer acquisition business; it is not a technology business. What can we learn from the best practices in the US, and can they apply in other markets? Some do, and some don't. So our challenge is, in addition to the complexity of managing a global solar downstream company, how do we make money consistently in distributed generation specifically with rooftop?

WHICH COUNTRIES ARE YOU TRYING TO MOVE TO DISTRIBUTED?

Andrew de Pass: In the US, we are focused on small-scale utility as well as commercial rooftop. We think in the US market you have to have financial innovation, so we recently closed on the first commercial PACE deal with tax equity with the project owned by Conergy. In the UK, we launched a commercial industrial product. In Germany, we have rooftop partnerships with utilities like RWE and local residential players.

We are focused on batteries. Conergy has an R&D lab focused on storage in our headquarters in Hamburg because we think it is critical to integrate storage into our system offering in the medium term. Our R&D specialists in storage used to think it would take four or five more years to become economical; we see the trend accelerating to a point where we now expect batteries with a couple hours of storage to become economical in the next two years.

In Germany, solar kits are offered today with storage. This makes sense in Germany because there is no residential net metering. We have pilot projects that are relatively small for the use of lithium ion batteries for small utility-scale solar projects.

DO YOU THINK WE WILL SEE AN ABRUPT SHIFT IN PUBLIC OPINION ON CARBON IN THIS COUNTRY?

Andrew de Pass: I do. We have to create a level playing field and simplify. When you compare the US to other markets from a regulatory and incentive standpoint, this whole tax equity thing is a nightmare. ITC and PTC: they are a nightmare for developers and operators to understand.

(continued page 25)

FRANCIS CANN

VP & Business Development Director
WSP/Parsons Brinckerhoff Power Group

Francis Cann was recently appointed vice president and business development director for the power group at WSP | Parsons Brinckerhoff, a global engineering and professional services organization. In his new position, he is responsible for business development strategies in power generation, transmission and distribution (T&D), hydropower, renewables, and energy services projects across the U.S.

The power group at WSP | Parsons Brinckerhoff, a part of the firm's U.S. Industrial and Energy sector, is a leading provider of technical, project management and consulting services for both T&D and generation projects. The group's work includes application of conventional technologies for new power generating facilities and rehabilitation of older plants, as well as more innovative techniques to increase energy efficiency, including cogeneration, combined-cycle generation and the use of renewable energy sources.

Mr. Cann has over 35 years of experience in the power engineering and construction industry, having managed major projects involving nuclear generation, coal power, combined cycle systems, hydropower, power delivery, and energy plant upgrades. He earned a bachelor's degree in mechanical engineering from Manhattan College and began his career as a mechanical engineer in nuclear generation in New York City. Through the 1980s and 1990s he travelled across the U.S. and Mexico working on numerous major power plant projects. In the 2000s he diversified his career in coal power, combined cycle power, hydropower, power delivery systems, energy plant upgrades, chemical plant upgrades and U.S. military base upgrades. He recently managed a $1.6 billion utility electric capital improvement program from planning/conceptual design through commissioning, consisting of 400 projects ranging from $50,000 to $50 million each.

According to Mr. Cann, with the aging T&D infrastructure in the U.S. there is a surge in demand for T&D and substation engineering capabilities. "At WSP | Parsons Brinckerhoff, we offer expertise in conventional high-voltage overhead transmission and specialized underground transmission systems," Mr. Cann explained. "We've worked on every major network element, including overhead lines, substations, underground and submarine cables, protection and control systems, and supervisory control and data acquisition (SCADA)/distribution management systems."

With lower gas prices, Mr. Cann finds there is an incentive to add gas-fueled power plants to generating companies' fleets for peaking and to the private industrial sector to take advantage of the market price. "The desired addition of gas units is producing opportunities for our generation group as this is one of our specialties," he pointed out.

He also finds that with the current oil glut there is a pressing need for storage solutions, particularly underground facilities. "Facing the challenges of stockpiling their excess capacity, major oil companies are finding that underground storage in salt caverns can be a cost-effective approach," he noted. "At WSP | Parsons Brinckerhoff, we have decades of expertise in the development of these types of underground storage facilities."

Mr. Cann continues to see opportunities with renewables as well. "Development of solar, wind and biofuel resources will continue to expand as we move toward a more carbon neutral posture in the U.S.," he said. "And since these resources are not always near the electric grid, there will be a growing need for interconnection facilities and T&D capacity to bring the power to where it's most needed."

Despite today's low oil prices, Mr. Cann remains bullish on the energy industry. "While we are certainly in a period of transition, with significant turmoil in energy markets, the U.S. is on a course that will result in greater diversity of energy resources and major upgrades to our electric utility infrastructure," he commented. "It has always been my belief that times of great challenge are also times of great opportunity, which succinctly describes the U.S. energy industry today."

ANDREW dePASS

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We have to work through archaic documentation. Whether or not the tax credits are extended — the ITC was extended in late 2015 for an additional 5 years —, we really need a level playing field. We have to price fossil fuels correctly. A carbon tax should be part of the mix. It makes logical sense and is the right thing to do.

Can we do it politically? I think so. What will be the tipping point? Demographics. With the people in the younger generations, the need to do something about climate change is ingrained. Once they vote in greater numbers, they will have an impact.

ABOUT ANDREW DE PASS

In 2015, Andrew de Pass was appointed Chief Executive Officer of Conergy and is responsible for the day-to-day management of the company.

Andrew graduated in 1989 from The Richard Ivey School of Business Administration at the University of Western Ontario with a Bachelor of Arts with honors in Business Administration, and was awarded the Gold Medal. He received the designation of Chartered Financial Analyst in 1998.

SCOTT OSBORNE
CONTINUED FROM PAGE 6

beginning, but time and effort early pays off as the project proceeds."

Next is the execution planning. "The execution team analyzes what is different about its project, starts with a standard plan and modifies it to suit the project. The mantra has always been plan-plan-plan and our plans are living documents; they can and do undergo revisions. We also take pride in 'looking around the corners.' We think about the variables, what might be different, and we are ready for the unusual. We are not looking at what we did last month, but what's going to be happening in three months, including weather and issues that might affect supply of craft. We don't send a team into the field and wave goodbye. We are always looking at ways to support them, to get them what they need on time, to eliminate or lower potential roadblocks."

Osborne is not unmindful of the competitive nature of the business. "Combined cycle is highly competitive and is pressed with aggressive schedules," he says. "It's a low-margin and high-risk business. Everyone knows these jobs have to be done efficiently, and for Bechtel most projects operate under lump-sum turnkey contracts.

Osborne believes that other Bechtel advantages are cultural. "We have a strong relationship with the building trades," he says. "We've worked with them for a long time. We have a very strong safety culture, one we can put up against anyone else in the industry. We also have a very strong family culture; we want people to go home to their families every night; I think we are a leader in this. We want to be the contractor of choice, an employer that emphasizes safety, family, and a place where people can bring up any kind of issue. Generally, people on a project work for us for three years. They are part of our team. We want Bechtel projects to be places people want to work."

Bechtel's relationship with OEMs and vendors is also strong, according to Osborne. "They know we will live up to our promises," he says.

TRISTAN GRIMBERT
CONTINUED FROM PAGE 20

level is only viable if there is no net metering. Net metering is not viable above a certain percentage of distributed generation because it imposes a cost on the utility. Someone has to assume the storage.

If distributed generation grows quickly, then we will reach the ceiling for net metering and any additional storage will have to done by the customers.

Storage will happen; there is no question about it. Whether it happens in three, four or five years depends on the distributed generation market.

WHAT WILL BE CARBON'S TIPPING POINT?

Tristan Grimbert: Carbon pricing is the most American way to address global warming. What is more volatile than CO2? It goes everywhere. It is a global issue, and carbon pricing is the capitalist way to address it. Cap and trade was proposed by Americans, and then it was shut down. Carbon pricing would be a better way than a haphazard mix of subsidies with, for example, a New Mexico PTC and some tax exemptions and different provisions in Arizona. No. Let's price what is creating the problem and, then, if we have to produce massive wind in California or Texas, we will do it because the market is sending the right price signals. It may take some catastrophic climate event, but I have no doubt it will come because it is the American way to address global warming.

WHAT ARE DEVELOPER RETURNS TODAY?

Tristan Grimbert: Too low. I am not in the business of deploying at the lowest cost of capital. I am in the business of creating value. The cost of capital is one part of the equation, but the job is to find differentiators. It is not the size of the market; it is not the growth; it is how much better you are than your competitors. The returns for this effort are always too low.

SOME OF YOUR COMPETITORS HAVE YIELD COS. DO YOU SEE EDF RENEWABLE ENERGY MOVING IN THAT DIRECTION?

Tristan Grimbert: No, I don't. Right now our business model is that we develop projects for ourselves and we sell up to 50% to co-investors. Sometimes we sell more, and sometimes less. We do tap the market by selling assets. We see yield cos playing in that market, but they are only a portion of that market and there are plenty of investment firms and other people who are trying to deploy long-term capital at competitive rates, so we do not think it necessary to have our own yield co.

We can sell to yield cos or we can sell to people who are not yield cos but have an efficient cost of capital and are looking for long-term investments.

EDF RENEWABLE ENERGY HAS BEEN A BUYER OF DEVELOPMENT RIGHTS TO PROJECTS FROM SMALLER DEVELOPERS. IS THAT PIPELINE GETTING SMALLER, STRONGER, OR REMAINING THE SAME?

Tristan Grimbert: We have done some acquisitions. What is difficult about the development business is that when you think you are 90% done, it means you are only half way through. Getting the project to be completely de-risked is what really trades value.

Because the market has run faster than anybody expected, and we have been very successful, the pipeline is a little small today. We started about a year ago to rebuild our pipeline. We are doing that partly by acquisition. We may buy a pipeline. We may buy a project. We will keep developing ourselves. The overall supply of new projects is low compared to the appetite of the market. I attribute this to the impending expiration of the tax credits.

JEFF GRYBOWSKI
CONTINUED FROM PAGE 21

The Port's management team, headed by Waterson Stevedoring, will provide stevedoring and marine terminal operator services. Waterson will utilize members of the International Longshoreman's Association (ILA) to discharge the towers and move them from the Port's main terminal to a specially prepared manufacturing facility provided by the Port of Providence

All of the turbine components have been staged at the temporary facility in Providence, where the assembly of the turbine components will be completed. General Electric recently completed purchase of the offshore wind component of Alston Wind Energy. GE will be providing five 6-megawatt Haliade 150 offshore wind turbines which will be the mainstay of the Block Island Wind Farm. Fabrication of the windmill units, including the installation of the electrical, mechanical and safety equipment will be completed by General Electric at the port facility. When completed, each of the fifteen turbine towers will consist of three sections which will be 270' high and weigh 440 tons.

Load-out prior to transport to the water site and erection of the windmills will also be handled at the Port of Providence. The Port will utilize a number of cranes available including two of its Liebherr Mobile Harbor cranes and a Liebherr 1600 crawler crane, a special super heavy duty crane capable of handling the incredible length and weight of the windmill structures and turbines. Completion of the project is set for the fourth quarter, 2016.

ABOUT JEFF GRYBOWSKI

Jeff Grybowski has been involved in the development of Deepwater Wind's Block Island Wind Farm since its inception in 2008. He earned an A.B. with Honors in Public Policy from Brown University, a J.D. with High Honors from the University of North Carolina at Chapel Hill School of Law, and served as a Law Clerk to the Chief Judge of the U.S. District Court for the District of Rhode Island.

BRUCE DOUGLAS
CONTINUED FROM PAGE 16

delivered off the shelf or through cloud-based services solutions. The analytics solution enables utilities to turn metering data into actionable intelligence, improving operations, distribution system efficiency, reliability and asset management.

In addition, with Itron Total Services, Itron manages all aspects of a utility's data collection system, including MDM and analytic applications, with a simplified, subscription-based pricing structure.

DELIVERING OUTCOMES

A central theme to Douglas's Software and Services strategy is Itron's commitment to delivering outcomes for customers around the world. Itron has the deepest, most insightful experience of any company in the industry. Coupled with its leading technology platforms and end-to-end services offerings, Itron can deliver true business outcomes to its customers. More than simply selling and deploying products or solutions in the field, Itron's outcomes-based approach seeks to deliver results and solve problems such as water conservation and efficiency, integration of renewable energy, grid optimization and revenue assurance.

"Our philosophy is different because instead of asking our customers what do you want to buy?, we ask what do you want to achieve?" said Douglas. "We become a trusted partner and solve the customers' challenges—we're not just another vendor selling a system.

We are committed to helping customers achieve the results they need to succeed."

With a strategy that is founded on knowledge, experience and service, and the backing of Itron's leading technology, Douglas is building a Software and Services organization that will enable Itron to offer new levels of insights to its customers—and deliver business outcomes like never before.

NIGEL COCKROFT
CONTINUED FROM PAGE 17

also to at least double sales to residential and commercial customers."

Addressing long term prospects for solar technology, Cockroft said it is well established, having been improved upon for the last 30 years. "The technology is evolving in terms of efficiencies and will continue to do so," he said. In general, he said success in the solar industry is dependent on running a very integrated operation, including sales, marketing, engineering and manufacturing.

Cockroft said Jinko is very efficient in terms of its overall integrated financial management, both at its headquarters and in its regional offices. The company maintains good communication with customers and investors. "Jinko is not a mystery to either as some other Chinese companies have been," he said. "The evolving strength of Chinese companies will result from better business integration in other countries."

EDF renewable energy

POWERING PROGRESS

With over 6 GW of development expertise throughout North America, EDF Renewable Energy is the trusted leader in the development and management of renewable energy projects.

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