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2017 Deloitte Renewable Energy Seminar

Innovating for tomorrow

Retrospective

Deloitte Center *for*
Energy Solutions

Opening address

The Deloitte Center for Energy Solutions hosted the 2017 Deloitte Renewable Energy Seminar in Phoenix, Arizona, from November 13–15, 2017. The seminar theme of "Innovating for tomorrow" invited executives, researchers, entrepreneurs, regulators, and investors from around the world to share their viewpoints on the drivers behind the sector's emergence into the mainstream and the advancements required to continue its remarkable growth.

Marlene Motyka, Principal, US and Global Renewable Energy Leader, Deloitte Transactions and Business Analytics LLP, set the tone for the day's discussion by quoting Thomas Edison, one of the fathers of the electric grid: "We are like tenant farmers chopping down the fence around our house for fuel when we should be using nature's inexhaustible sources of energy: sun, wind, and tide." Proving prescient, nature's inexhaustible resources are more important today than ever before as nations and businesses around the world grapple with reducing local air pollution, greenhouse gas emissions, and improving the resiliency of their electricity systems. While corporate procurement of solar and wind power has helped to propel renewable energy forward over the last year, new approaches and technologies will likely be needed to take renewables to the next level, both in the United States and abroad.

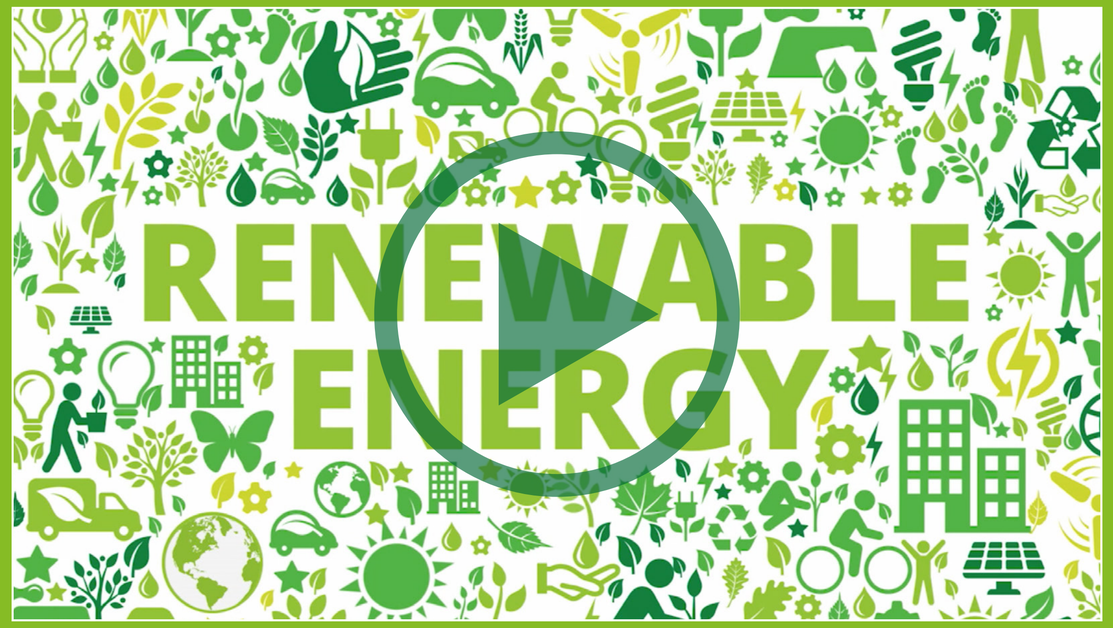
As Ms. Motyka highlighted, among other activities, innovating for tomorrow will likely involve developing new business models and turnkey solutions, addressing the needs of "prosumers," evolving regulatory policy and market structures, deploying a smarter grid, and integrating distributed generation more effectively with the help of advanced analytics, blockchain, and energy storage. Building upon these themes, this retrospective provides an overview of memorable insights from the event, along with links to other seminar materials.

Click on the navigation tabs below to get started.

"Corporate support and procurement of renewables has really been key—and the momentum continues."

Marlene Motyka, US and Global
Renewable Energy Leader, Principal,
Deloitte Transactions and Business Analytics LLP

2017 Deloitte Renewable Energy Seminar opening video



Innovating
for tomorrow

Overview of seminar themes

Progress and promise: Renewable energy industry overview

Despite federal policy uncertainty, the promise of renewable energy remains strong over the long term, due to ongoing state support, increasing cost-effectiveness, and growing demand from consumers and businesses.

Wind and solar: A deep dive

Declines in the leveled cost of energy for renewables are expected to continue, and solar and wind, along with energy storage and peaking natural gas plants, could form the core of the US generation mix in the future.

Embracing corporate technology innovations

As in other industries, adopting digital technology is a priority for the renewables sector since technologies such as analytics, sensors, and the Internet of Things can help make energy more affordable, more reliable and more secure.

The industry impact of battery storage developments

Batteries are already changing the game by enhancing grid resiliency, balancing supply and demand, and enabling integration of renewables—and this momentum is expected to accelerate as prices continue to drop, possibly at a faster rate than experienced with solar.

Blockchain: Disruptive innovation for the renewable energy industry

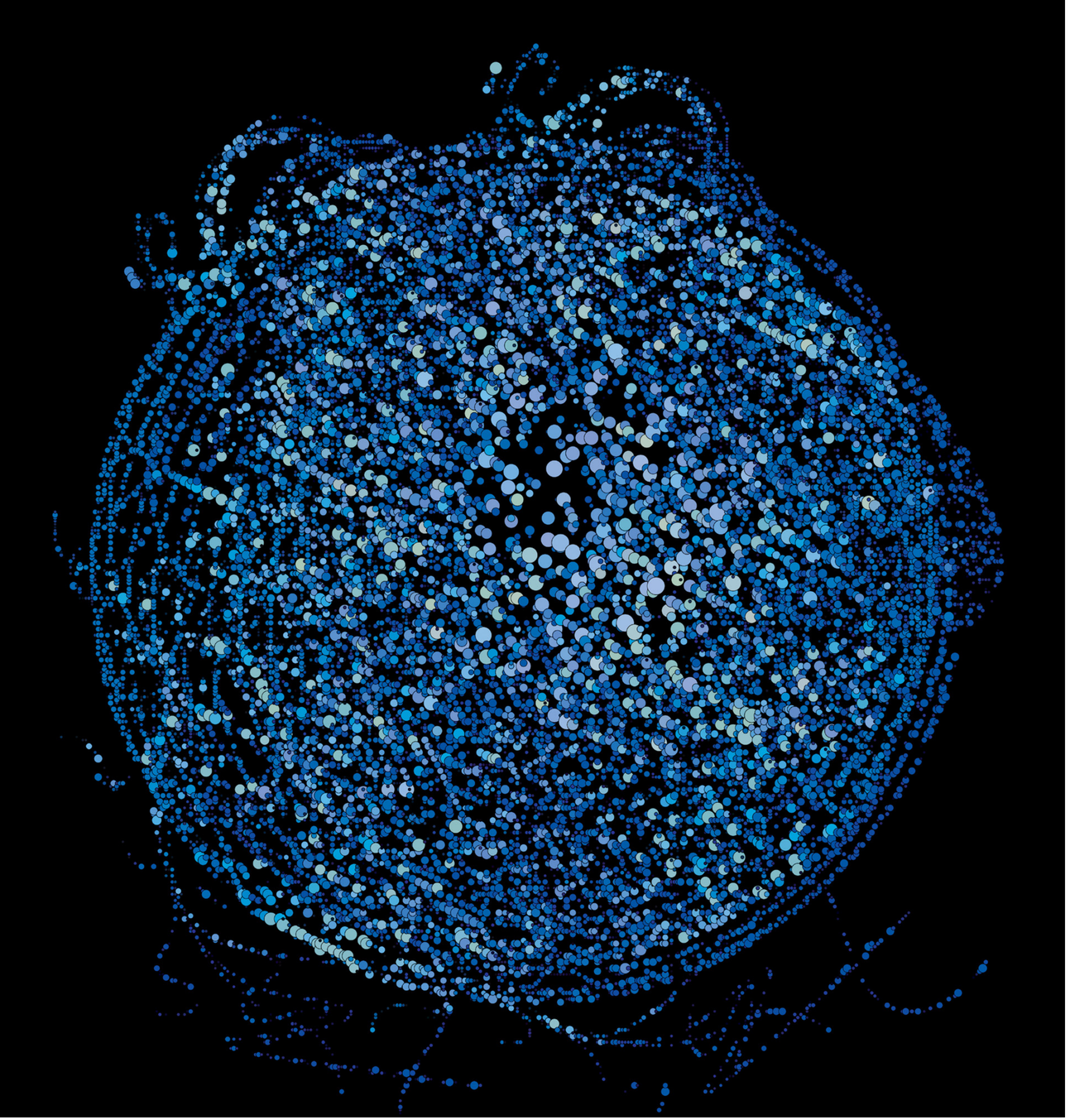
In addition to driving down back-office costs while maintaining transparency, blockchain puts everyone involved in an energy transaction on equal footing, thus paving the way for new energy markets where owners of distributed energy resources, whether large or small, can participate.

Integrating the grid: Variable and distributed energy resources

Accommodating increasing amounts of variable and distributed energy resources is more a matter of cost than technology, because grid integration can be achieved today with existing solutions such as advanced analytics, energy storage, and inverters.

Solar commercial and industrial: Challenges and opportunities for growth

New opportunities for commercial and industrial solar are on the horizon as community solar programs proliferate and overall project economics become more attractive, due to decreasing soft costs and the inclusion of battery storage as prices decline.



Plenary sessions

Click on session titles to go to the highlights.

Progress and promise: Renewable energy industry overview

In 2016 and 2017, renewables were the overwhelming choice for new generation capacity in the United States, and investment levels remain high.[1] Notably, growth in the sector has been strong despite flat electricity demand and steady competition from low natural gas prices.

Greg Wetstone articulated four reasons for the sector's progress in the United States: 1) aggressive renewable portfolio standards in populous (big load) states; 2) increasing demand from both residential consumers and American companies; 3) a supportive tax platform; and 4) dramatic improvements in cost-effectiveness. Regarding the latter, Mr. Wetstone emphasized that onshore wind and utility-scale solar are now competing directly with combined cycle natural gas.

How are these drivers impacted by today's political reality? Jeff Shapiro discussed various scenarios that could play out related to US federal tax reform. In terms of creating challenging headwinds for the sector, he pointed to retroactive provisions in the House bill that could alter the established rates and rules around production tax credits for wind as well as potentially troubling language on the continuous construction requirements for both solar and wind projects. Mr. Wetstone agreed, further explaining that the provisions in the House bill, regardless of whether or not they are enacted into law, have already introduced uncertainty into the market. This, along with potential new tariffs on imported solar panels as a result of a pending trade case, is causing some investors to hesitate.

Despite these headwinds, panelists stressed that the promise of the renewables sector in the United States remains robust over the long term. The transition to renewables cannot be stopped, only slowed, amid favorable national and global trends. These include growing consumer interest in renewables and electric vehicles around the world; efforts by US states and corporations to fulfill the terms of the Paris Climate Accord; and renewables increasingly beating other forms of generation on cost both domestically and abroad.

Source: 1. American Council on Renewable Energy

Jeff Shapiro, Partner, Peck Madigan Jones
Greg Wetstone, President and CEO, American Council on Renewable Energy (ACORE)
Moderated by Marlene Motyka, US and Global Renewable Energy Leader, Deloitte Transactions and Business Analytics LLP

"Renewables, I would argue, are at grid parity today."

Greg Wetstone, President and CEO,
American Council on Renewable Energy (ACORE)

"The financial markets are certainly viewing the inclusion of energy storage as 'the next big thing' and they want to be involved."

Brian Cassutt, Vice President, Finance, AES Distributed Energy

The industry impact of battery storage developments

Battery storage can add value to the electricity supply chain in multiple ways. It is capable of performing both supply and demand-related functions, extending behind the meter as well as in front of it. The ubiquitous nature of the technology may indeed be one of its biggest challenges, since policymakers need to rethink the traditional definitions of "generation, transmission, and distribution" and the rules concerning who is allowed to participate in those markets. The many applications of energy storage also make it harder for potential customers to determine how they can benefit from it.

Mark Frigo noted that lithium-ion batteries have become the mainstay in terms of energy storage technology because "everybody has them" in their smartphones and other small devices. Lithium-ion is also the power source of choice for the emerging electric vehicles (EV) market. He further explained that the expanding EV market is contributing to cost reductionhelping to reduce the cost of utility-scale energy storage, because the batteries are made in the same factories. Even though the perception still exists that energy storage is too expensive, panelists stressed that both long- and short-duration applications are economically viable in many instances, and that trend lines suggest battery costs are dropping even faster than solar costs did. As prices fall and performance improves, Brian Cassutt observed that financial markets are taking notice, with investors expressing greater willingness to fund solutions that include a storage component.

Panelists pointed out that the main applications for utility-scale storage at present are for grid resiliency and ancillary services, such as frequency regulation and voltage control. On the utility-scale side, Mr. Frigo noted that transmission and distribution deferral is another application for batteries that is "really taking off." Meanwhile, customers' desire for self-reliance and relief from high electricity prices is driving robust behind-the-meter markets in Europe and Australia.

The panel concluded by emphasizing that battery storage is on the cusp of rapid growth. Revised market designs and greater revenue certainty will be required to continue this momentum, but more clarity is expected to come as policymakers catch up with the many ways in which batteries can be used to enhance grid resiliency, balance supply and demand, and further the integration of renewables.

Brian Cassutt, Vice President, Finance, AES Distributed Energy
Mark Frigo, Vice President, Head of Energy Storage North America, E.ON Climate & Renewables, North America, LLC
Moderated by Jeff Craft, Partner, Deloitte & Touche LLP

Integrating the grid: Variable and distributed energy resources

Will utilities be up to the challenge of integrating increasing amounts of variable and distributed energy resources (DER) into the grid? Panelists think so, especially since utilities are increasingly being proactive and innovative with programs such as green tariffs and rooftop solar programs. John Sterling observed that initiating these new programs may present risks, but customers want cleaner energy, so utilities are pushing forward. Alex Rojas concurred, noting that integrating the grid is a journey that differs for every utility, depending on their priorities and those of their customers.

When asked if any technological breakthroughs will be required to further progress, Mr. Rojas said managing the intermittency of renewables is more a matter of cost than technology because it can be addressed with existing solutions such as advanced analytics, energy storage, and inverters. Mr. Sterling suggested the industry needs to deploy more advanced inverters; costs need to fall further; and utilities need to obtain a better understanding of the storage value stack. Just as utilities became comfortable with solar and now own it, they will also become more comfortable with storage, he added.

Concerning the role software plays in grid integration, Mr. Rojas said that utilities need better ways to monitor, control, and dispatch DER. Mr. Sterling added that utilities have distribution management systems and advanced metering infrastructure, but now they need to develop distributed energy resource management systems, so they can make more seamless connections. At present, utilities are trying to figure out "how things plug in and work together," he observed.

As for regulatory issues, partnering with and raising awareness among regulators will be key for utilities, Mr. Rojas told the audience. Because customers want clean energy and there is little debate about how to produce it, "the industry will get there slowly but surely," he concluded.

John Sterling, Senior Director, Research and Advisory Services, Smart Electric Power Alliance
Alex Rojas, Director, Distributed Technology, Ameren
Moderated by Scott Smith, Vice Chairman, US Power & Utilities Leader, Deloitte & Touche LLP

"Integrating the grid is more about declining costs because the technological breakthroughs have already occurred."

Alex Rojas, Director, Distributed Technology, Ameren

"Solar, wind, storage, and peaking gas will win across the country simply because they're the smart economic choice."

Tom Festle, CFO, E.ON Climate and Renewables North America, LLC

Wind and solar: A deep dive

The current state of solar development reminded Dan Whitten of the opening lines of *A Tale of Two Cities*: "It was the best of times; it was the worst of times." How so? Impressive and accelerating growth is presently being offset by a number of threats that could have a chilling effect on the US renewable sector, at least temporarily. These include a pending trade complaint, in which tariffs may be placed on imported solar panels; possible revisions to the phasedown timetables of production tax credits for wind and investment tax credits for solar as part of federal tax reform proposals; and the Department of Energy's proposed Grid Resiliency Pricing Rule, which would allow power-generating facilities to recover certain costs, so long as they provide "essential energy and ancillary reliability services" and keep 90 days of fuel on-site criteria that, in practice, would mainly be met by coal and nuclear plants.[2]

But for the longer term, panelists were optimistic about the prospects for wind and solar, citing the potential for continued cost reductions, opportunities for innovation in financing structures as well as technology, and increasing consumer demand for green power. Both panelists mentioned advances in energy storage as supporting wider deployment of wind and solar power, across utility-scale, residential, and commercial and industrial markets. Dan Whitten explained that energy storage is presently in the phase where the industry knows how to implement it, but few are making money on it yet. "Cracking that nut," he emphasized, will completely change the game.

Tom Festle expressed confidence that the leveled cost of energy for renewables will continue to drop, and that solar and wind, along with storage and peaking natural gas plants, will soon constitute the bulk of the US generation mix. In addition, the whole transmission and distribution system could look completely different than it does today in as little as 10 years, he concluded.

Source: 2. Tom DiChristopher, "Energy Department proposes change to electricity pricing that could boost coal, nuclear plants," *CNBC*, September 29, 2017, https://www.cnbc.com/2017/09/29/energy-dept-proposes-power-pricing-that-may-boost-coal-nuclear-plants.html, accessed November 24, 2017.

Tom Festle, CFO, E.ON Climate and Renewables North America, LLC
Dan Whitten, Vice President, Communications, Solar Energy Industries Association (SEIA)
Moderated by Christine Carmazzi, Partner, Deloitte & Touche LLP

Embracing corporate technology innovations

As Thomas Edison said, "There's a way to do it better—find it." And, as moderator Dale Jekov pointed out, for over 100 years the energy industry has been doing exactly that. Panelists discussed several recent technology developments that are helping the renewables sector to "do it better" by overcoming long-standing challenges, ranging from intermittency and "the duck curve" to non-dispatchability.

As in other industries, digital technology was top of mind among panelists since it can help make energy more affordable, more reliable, and more secure. In terms of new technologies that are making an impact on the sector, Rick Thielke pointed to blockchain as having great disruptive potential, particularly if it is used in conjunction with energy storage to facilitate seamless energy trading among groups of "prosumers."

Amy Francetic commented that the sector "doesn't have to wait" for technology breakthroughs on the equipment itself. Instead, digital advancements in the form of software, sensors, analytics, and the Internet of Things, when deployed effectively, can improve equipment performance by up to 20 percent—and these types of technologies exist right now. Interestingly, some forms of predictive analytics and artificial intelligence have been developed and refined by the oil and gas sector for equipment maintenance, and can now be shared across the energy space.

Driven largely by the desire for energy security, João Metelo added that the world is experiencing a huge revolution in distributed power and microgrids. And, as this revolution expands and global energy demand increases, ocean-based forms of distributed generation will likely need to be integrated into the mix, such as offshore wind power, both stationary and floating, and tidal power.

Of course, no discussion of technology innovation is complete without mention of cybersecurity. As electricity grids, microgrids and distributed energy resources interconnect, cyber risk escalates. Thus, it is becoming paramount for energy companies to attract the expertise needed to protect their systems as they get smarter—and as cyber criminals become more sophisticated.

Amy Francetic, Managing Director, Invenergy Future Fund
João Metelo, CEO, Principle Power
Rick Thielke, Senior Vice President, Product, Ayata
Moderated by Dale Jekov, Partner, Deloitte & Touche LLP

"Secure borders from an energy standpoint is a common theme."

João Metelo, CEO, Principle Power

Blockchain: Disruptive innovation for the renewable energy industry

"What on earth is blockchain?" While it seems like everyone is talking about it, the reality is that few understand it yet. As panelists pointed out, that is because blockchain is relatively new and it can have a myriad of applications, at least in theory. However, at its core, blockchain is a technology that creates a distributed ledger to help organizations with tasks such as record-keeping, transferring value without an intermediary, or executing contracts automatically. Or put another way: "It's a way of making sure information being sent and information being received is the same," explained Michael Prokop.

When asked how blockchain might disrupt and transform the energy industry, Robert Trinnear stressed it can drive down the cost of transactions by eliminating the current expensive system of multiple checks and reconciliations, which are required to process energy trades. Glen Mackey agreed, suggesting that blockchain could help streamline markets that demand transparency and consistency, such as those for renewable energy certificates.

Meanwhile, Scott Kessler described blockchain as a "hyper-efficient communication mechanism" to extract data about distributed resources such as rooftop solar photovoltaic systems. He elaborated that the magic of blockchain is that it can facilitate computations at the grid edge itself. This stands in contrast to our current system, which takes all the data from the grid edge, centralizes it, processes it, and exports command signals back out to the grid edge at sub-second intervals, which is hard to do.

The panelists suggested that utilities need to figure out new business models, and that blockchain opens the door to getting value from distributed energy resources just as easily as from larger systems. But first they must show regulators how it can help create fair and efficient marketplaces. Robert Trinnear pointed out that regulatory support is critical. "Every regulator wants to understand the market structure and transactions, see the transparency and know that, at the end of the day, the consumer is protected," Trinnear concluded.

> "Whether the transacting party is your utility, your neighbor, or a large generator, blockchain puts everyone on equal footing."
>
> Scott Kessler, Director, Business Development, LO3 Energy

Scott Kessler, Director, Business Development, LO3 Energy
Glen Mackey, CRO, NRG Energy, Inc.
Robert Trinnear, Managing Director, The Energy Authority (TEA)
Moderated by Michael Prokop, Managing Director, Deloitte & Touche LLP

Solar commercial and industrial: Challenges and opportunities for growth

Despite strong growth in utility-scale and residential solar over the last few years, the commercial and industrial (C&I) sector has progressed at a much slower rate. While several large Fortune 500 corporations have demonstrated the benefits of solar photovoltaic solutions with several high-profile installations, smaller C&I customers have largely not followed suit. What's holding them back?

Panelists identified four factors that are hindering growth in the C&I market. The first is difficulty in assessing customer credit. Though residential consumers have FICO scores and large Fortune 500 companies have public credit ratings, David Feldman explained that smaller businesses do not have such measures, which makes it harder for them to obtain financing for their solar projects. Jon Peeples agreed that scale is a barrier, both in terms of the size of the project and of the company, since installations need to be grouped together to attract financing. At present, however, financial institutions generally do not have the ability to efficiently scale a portfolio of C&I solar projects. David McIlhenny added that low electricity prices in certain areas of the country are also a barrier, especially since C&I customers are often able to obtain clean, affordable renewable electricity by purchasing it from their utilities, as opposed to siting generation facilities on-site or entering into power purchase agreements directly with developers.

Regardless of these barriers, panelists remained decidedly bullish on the prospects for the C&I market in the long-term. Some see new opportunities for this segment as community solar programs catch on, since it is easier to underwrite an entire program than individual projects. These programs also shift some of the credit risk to the program sponsor, most often a utility or a municipality, which can presumably replace customers who do not fulfill their contractual obligations. Decreasing soft costs and the inclusion of battery storage as prices decline are also expected to aid the C&I market by making overall project economics more attractive.

David Feldman, Senior Energy Analyst, National Renewable Energy Laboratory
David McIlhenny, Managing Director, Project Finance, SunPower Corporation
Jon Peeples, Business Development Officer, US Bank
Moderated by Keith Adams, Principal, Deloitte Transactions and Business Analytics LLP

"Community solar gardens could catch on as a way to do C&I."

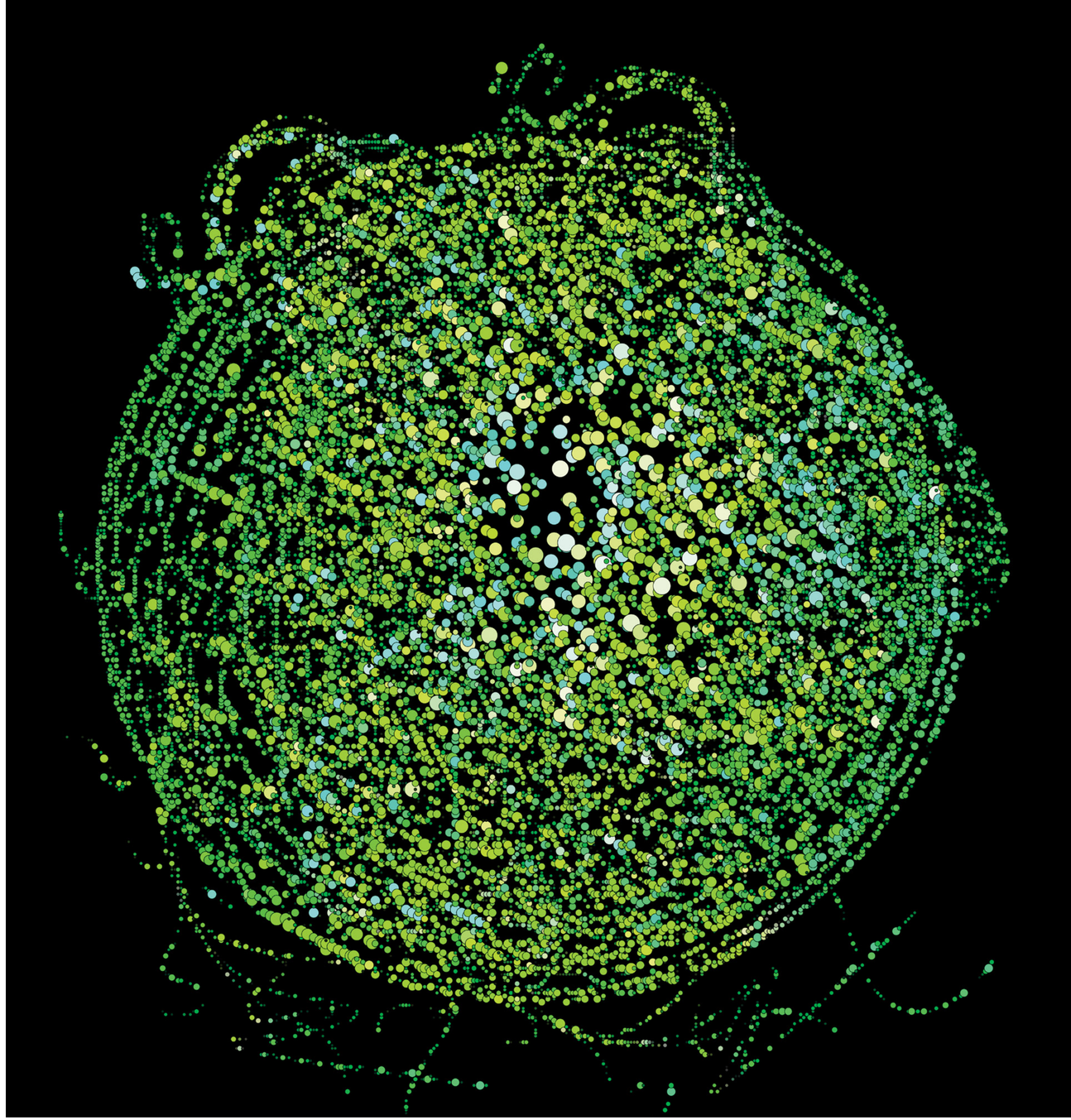
Jon Peeples, Business Development Officer, US Bank

Elective sessions—Featured topics

Several elective sessions were offered concurrently throughout the seminar. Some provided insights into broad special topics while others delved into the technical aspects of accounting, tax, and finance as applied to renewable energy.

- Integrating DER into the grid: The third-party perspective
- Digital transformation: Cloud, automation, blockchain...and beyond!

Click on session titles to go to the highlights.



Integrating DER into the grid: The third-party perspective

It is not uncommon for utilities and third-party providers to compete for a customer one day and then work together the next. What is behind this new era of "coopetition"? The complexity of integrating DER into the grid appears to be the answer. Microgrid projects, for instance, can involve varied loads and diverse assets, spanning everything from wind and solar installations to fuel cells to diesel generation units—not to mention the control systems that are required. Panelists, representing "third parties" or non-utility providers, commented on the challenges and opportunities of integrating DER into the grid:

- Motivated by cost, reliability and resiliency, C&I customers across the country increasingly want integrated behind-the-meter services.
- More utilities are willing to collaborate with third-party providers because they are looking to grow their businesses.
- One of the biggest challenges is a fragmented market, with integrators on one hand and distributed generation providers on the other.
- Fragmentation can be problematic because C&I customers are generally becoming more sophisticated and they often want holistic solutions.
- Well-structured partnerships and collaboration between third parties and utilities can help quell the noise in the market by simplifying sales and delivery.
- At the end of the day, it is about delivering a superior electron: this implies providing cost savings and predictability via a clean, sustainable on-site solution.

Eric Dupont, CFO and Executive Vice President, PowerSecure International, Inc.
Asim Hussain, Vice President, Marketing & Customer Experience, Bloom Energy
Moderated by Christian Grant, Senior Manager, Deloitte Consulting LLP

Digital transformation: Cloud, automation, blockchain...and beyond!

What does "digital" mean to you or to your organization? For some, the term refers to a cloud-based enterprise solution. Others suggested it refers to a mobile app. And still others pointed toward analytics. Regardless of one's personal interpretation, "digital" encompasses all of the above and more, extending into automation, blockchain, robotic, artificial intelligence, and additive manufacturing, just to name a few. However, even though the concept of digital is gigantic, companies shouldn't be afraid of it. When thinking through their digital transformation journeys, panelists advised companies to enable a culture of discovery, look outside the organization for assistance, and above all, take action.

- Our personal lives are driving digital adoption in business.
- Executives must be overt in their digital intentions.
- The phrase "fail fast" is often used to describe a culture that encourages experimentation and fosters innovation.
- Companies integrating digital technologies and applications into their business models will stumble but they will also learn.
- On the digital maturity curve, the energy and resources industry is far ahead in some ways, and far behind in others.
- Sometimes the fastest way to begin the digital journey is to hire a third party that can help you with something you care about.

Dan Kinsella, Partner, Deloitte & Touche LLP

Charlie Sanchez, Senior Manager, Deloitte & Touche LLP

Elective sessions—Technical and business topics

- Accounting for ASC 606, revenue from contracts with customers
- Accounting for ASC 842, leases
- Accounting for PPE impairments and AROs
- Accounting hot topics
- Advanced HLBV modeling
- Building the digital organization of the future
- Controllership of the future
- Digging in: Beginning of construction for energy credits
- Energy market update
- Introduction to tax-equity structures
- Lease tax-equity structures: Tax perspectives
- Modeling partnership flip structures
- Navigating DC: Regulatory developments, guidance, and process
- Partnership flip structure: Tax perspective
- Renewable energy project considerations when transacting with regulated utilities
- Renewable project financing alternatives
- Tax controversy trends, tax litigation, changes to IRS audits of partnerships
- Traps for the unwary when purchasing projects before, during, or after construction
- Useful lives and asset repowering to qualify for tax credits

Click on session titles to go to the highlights.

"There are endless possibilities to create change to drive sustainability now and in the future: it's time to lead the way."

Marlene Motyka, US and Global Renewable Energy Leader,
Deloitte Transactions and Business Analytics LLP

Concluding perspectives

A wave of grassroots support from residential consumers and corporations as well as state and local governments has driven the US renewable energy sector forward over the last year, despite unsettling shifts in federal policy. Movements such as the We are Still In campaign, and the findings of the Deloitte Resources 2017 Study, suggest that this support remains firm. Importantly, electricity customers' growing demand for greater affordability, resiliency, and environmental stewardship provides a powerful impetus for innovation, which will be required to keep the sector's remarkable momentum going. Ranging from microgrids to batteries, from blockchain to new financing structures, this innovation is already on its way, extending into every aspect of producing and delivering electrons from clean, renewable sources. Now, more than ever, sharp minds are needed in the quest to find even better ways to harness nature's inexhaustible sources to provide energy security to all. Considering the challenges of climate change and grid resiliency, perhaps there isn't a more important sector in which to contribute one's time, talent, and fresh ideas.

Please join us next year to continue the dialogue.

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Deloitte Center *for* Energy Solutions

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Through the Center, Deloitte's Energy & Resources group leads the debate on critical topics on the minds of executives—from the impact of legislative and regulatory policy, to operational efficiency, to sustainable and profitable growth. We provide comprehensive solutions through a global network of specialists and thought leaders.

With locations in Houston and Washington, DC, the Center offers interaction through seminars, roundtables, and other forms of engagement where established and growing companies can come together to learn, discuss, and debate.

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