ENERGY TECH REPORT

CONNECT. EMPOWER. SUCCEED.

SPRING 2018

CDW PEOPLE WHO GET IT

Powering Future Success with Proven IT Solutions

As we look at the current Energy and Utilities landscape, it's an exciting time of growth and opportunity for our customers. With oil prices on the upside and energy consumption continuing to grow, technology is taking center stage and opening new opportunities across the industry.

In this issue of Energy Tech Report, we'll take a deeper dive into the key technologies and trends shaping the industry, including digital transformation and digitalization. For companies in the oil and gas industry and the power and utilities sector, moving to a more digital platform is no longer a futuristic vision, but a realistic, growing technology initiative leading to greater productivity, higher profitability and improved decision-making. Our seasoned IT leaders offer practical strategies and real-world applications to show you how to harness IoT and digital transformation to build a more agile and profitable enterprise.

Better IT solutions make for better business outcomes. CDW E&U is here to help you navigate the technology maze and support your ability to make well-informed decisions that drive value and performance. And keep in mind that, whether your organization needs a strategy for tackling security threats or IT equipment that can withstand the harshest environments, our technology experts are here to help. With decades of experience working with oil, gas and utilities companies, CDW can empower your IT organization while you power the world.

Mike Rapplean
Corporate Vice President, South Sales

IoT ABOUT CDW ENVISIONING WORKSHOP
Learn more about how CDW E&U can address your IoT needs. **CDW.com/IOT**

STAY INFORMED
For more energy and utilities news, and the latest trends and insights from industry experts, visit **biztechmagazine.com/energy-utilities**

CAPABILITIES BROCHURE
"Powerful IT" Find out how CDW E&U can help you maximize performance. **CDW.com/energycapabilities**

WEBSITE ABOUT CDW ENERGY & UTILITIES
Learn more about how CDW E&U can address your IT needs. **CDW.com/energy**

Table of Contents

Digital Innovation Key to Unlocking Powerful Value

Describing the past few years as challenging for the energy and utilities industry might be somewhat of an understatement. But there are glimmers of hope that the industry is turning a corner. Efficiency gains per barrel of oil equivalent have increased markedly. And innovative digital technologies continue to proliferate, driving game-changing advances in areas such as data analytics, IoT, artificial intelligence and robotics.

Energy and utilities companies willing to join the vanguard of early adopters will be most likely to reap the biggest efficiency gains, see the most impressive performance improvement, keep pace with fast-changing consumer expectations and build the strongest foundation for success in a highly competitive, yet still uncertain, future.

Take a closer look at five digital trends that could prove key to ensuring the resilience and sustaining the momentum required to thrive today – and tomorrow.

1 Edgy Approach to Data Analytics

Eager to gain competitive advantages and reduce costs, utilities plan to invest billions over the next few years to enhance their analytics capabilities, according to a recent report by GTM Research. The deployment of advanced metering infrastructure (AMI) and utility-owned hardware, such as smart meters, enabled the first wave of data analytics. In the second stage, utilities will also start leveraging grid-edge customer analytics – data captured at the edge of the electric power grid through IoT devices, such as customer-owned smart home appliances.

In addition to IoT devices, technologies such as Platform as a Service cloud offerings and back-office IT systems will help drive better customer analytics. In turn, utilities will increasingly be able to capitalize on Big Data to visualize and improve performance, enhance customer responsiveness and enable real-time grid optimization.

> In 2017, North American utilities spent $4 billion on advanced metering infrastructure (AMI), utility back-office IT systems and grid-edge customer analytics. Through 2021, they are expected to spend an additional $16 billion.[1]

2 Cybersecurity Stays Front and Center

Energy and utilities companies are finding that investment in IoT, automation and data-gathering technologies can be a double-edged sword. On one hand, digitalization opens the door to deeper business insights and more informed decision-making that enhances business performance and lowers costs. On the other hand, it generates significant risks. Critical infrastructure has always been a favorite, high-value target for cyberattackers, and a new generation of decentralized, internet-connected sensors and other devices add complexity and access points to the system, magnifying cyberrisk.

Data encryption, authentication technology, next-gen firewalls and physical security continue to be powerful security tools. But to further bolster their defenses, energy and utilities companies are also increasingly turning to:

- **Behavioral analytics** to monitor networks for suspicious activities that deviate from a baseline of "normal" actions.
- **Machine learning/artificial intelligence** that relies on advanced algorithms to assimilate normal user and device network activity and detect anomalies.
- **Threat intelligence** which uses information collected about existing or emerging network threats to inform decision-making by security experts.

> 66% of oil & gas respondents say their companies are benefiting from digitalization but it has significantly increased cyber risks.[2]
>
> 72% of utility professionals said physical and cyber security is either "important" or "very important" today.[3]

3 Get Smart with Artificial Intelligence

AI-powered transformation has the potential to fuel greater efficiency and massive savings in the energy and utilities markets, according to several recent reports. Here are just a few of the possibilities:

- **Revolutionize the demand and supply sides.** AI will serve as the brain of future smart grids, continuously collecting and synthesizing data to boost awareness, efficiency and maintenance of grid systems and power plants, support timely decisions about allocating – and optimizing – energy resources, and improve the customer experience. Advanced neural network design, natural language processing and machine intelligence technologies can all be overlaid on existing assets to monitor supply and demand, actively manage the grid, avoid disruptions and efficiently balance the use of fossil fuels and renewable energy sources.
- **Optimize energy exploration investment.** Deep machine learning can improve planning and forecasting, as well as drastically minimize drilling risk. AI can also assess a host of key variables ranging from well integrity and drilling equipment condition to seismic vibrations and thermal gradients in order to drive better operational decision-making and operational safety.
- **Maximize reservoir production.** AI systems already provide the foundation for digital oil field concepts and implementations, but they can also be used in modeling, field surveillance and reservoir characterization to contain production costs and increase recovery.

Although enthusiasm for AI is growing among energy companies, hurdles to adoption remain. These include reluctance to change, reliance on legacy technologies unable to incorporate AI and concerns about whether new technologies will deliver as promised.

> AI could eventually save $200 billion globally, predicts Steven Martin, Chief Digital Officer, GE Energy Connections.[4]
>
> $50 billion: the savings and increased profit the oil and gas supply chain can gain by adopting AI.[5]

4 The Robots are Coming

Industries across the board are increasingly embracing robotics to handle complex, repetitive tasks – and the energy sector is no exception. For example, robots are frequently used to automate the dangerous task of connecting hundreds of heavy drill pipe segments for land and offshore installations which speeds drilling operations, increases safety, reduces labor requirements and lowers installation, maintenance and operations costs.

Meanwhile, Robotics Process Automation (RPA) Bots are starting to make inroads in utility company back-office operations. By imitating how humans interact with applications, easy-to-implement RPA Bots can speed the execution of routine, repetitive, rules-based tasks and free up the human workforce to handle more skilled, cognitively demanding business needs.

> RPA Bots are the most mature segment of the broader emerging AI and Automation market.[6]

The first step toward integrating RPA Bots involves rigorously assessing automation suitability overall in order to avoid simply automating existing inefficient processes. Next, utilities can evaluate RPA opportunities in terms of business process suitability and potential benefits. Examples of processes typically ideal for RPA include:

- High-volume transactions prone to human error, such as salary payment based on time reporting data
- Workflow-enabled, standardized processes such as IT security operations
- Input-intensive tasks such as invoice processing

> A U.S. investor-owned utility implemented RPA Bots to manage billing for a major commercial and industrial customer, reducing the number of employees required to manage the account from 17 to 2.[7]

5 Cloud Computing Prospects Sky-High

In the energy sector and beyond, companies are looking at cloud computing in a new light. Instead of simply viewing it as a way to access cheap servers or storage, they see a must-have technology for fueling enterprise innovation and transformation. Thanks to cloud platforms, energy and utilities companies can capitalize on analytics, machine learning, IoT, edge computing, advanced SaaS apps and much more.

> Forrester predicts that in 2018 more than 50% of global enterprises will rely on at least one public cloud platform to drive digital transformation.[8]

Security concerns about the cloud initially impeded oil and gas company cloud adoption, given the plethora of sensitive information involved in the business. However, data security worries have diminished as the cloud has evolved, and cloud solutions specifically targeting the oil and gas industry are growing. In fact, the UK-based Oil and Gas Council makes a case that hybrid cloud solutions are particularly well-suited to the industry, offering powerful, scalable processing capabilities, seamlessly connecting global locations, strengthening security by storing data in a virtual hub instead of on local servers, and lowering IT costs.

> Since 2010, $5.75M of public funding has been granted to projects applying secure cloud computing to the oil & gas industry, including nearly $1M to Duke University to develop a service system to monitor and manage oil and gas leaks.[9]

Sources:

[1] biztechmagazine.com, "Utilities Will Invest Heavily in Data Analytics in the Years Ahead," January 2018

[2] Ponemon Institute Research Report, "The State of Cybersecurity in the Oil & Gas Industry: United States," February 2017

[3] utilitydive.com, "Why utilities say grid security is the most pressing sector issue of 2017," April 2017

[4] biztechmagazine.com, "What Is the Potential for AI in the Energy Industry?" October 2017

[5] digitalistmag.com, "Artificial Intelligence: The Future of Oil And Gas," August 2017

[6] utilitydive.com, "Rise of Robotics Process Automation Bots in the energy sector," December 2017

[7] utilitydive.com, "Rise of Robotics Process Automation Bots in the energy sector," December 2017

[8] forester.com, "Predictions 2018: Cloud Computing Accelerates Enterprise Transformation Everywhere," November 2017

[9] blog.linknovate.com, "5 Oil and Gas Trends to Watch in 2018," November 2017

A CHANGING PARADIGM:

Reimagining the Power Company of the Future

For the past century or so, the power and utilities business model has remained essentially the same. But that's not likely to be the case much longer.

As the International Energy Agency (IEA) points out in its recent "Digitalization & Energy" report, the astounding pace of recent technological advances coupled with falling technology costs and ubiquitous connectivity has unprecedented power to transform traditional models of producing and consuming energy.

At the same time, the research/strategy firm Futurum identifies three key disruptor trends that are driving fundamental change to the entrenched business model. These include:

- **Decentralization.** Major shifts are occurring in how and where energy is consumed. Businesses and residential households are increasingly generating their own energy, frequently through solar, wind, battery and other renewable sources. Many sell surplus energy back to their local utility, reshaping the market dynamic and increasing supply chain complexity.
- **Deregulation.** It's a whole new competitive world out there. Energy resellers offer consumers alternatives to established utility companies, while an entirely new breed of non-utility competitors – such as Amazon and cable companies – are competing for customer share (and loyalty) with energy monitoring and control devices.
- **Decarbonization.** Growing customer demand for energy from renewable resources is also redefining opportunity – and creating new challenges.

Whether motivated by environmental concerns or the desire to reduce costs, evolving consumer expectations are also influencing the way utilities conduct business. Consumers increasingly expect fast, easy communication via multiple channels, seek better analytics to help them monitor and manage usage, and want access to clean energy within their supply mix.

Rising to the challenge

To thrive in this radically altered competitive environment, utilities companies need to proactively embrace a broad range of digital technologies that will be foundational to developing new business models.

Of course, the energy sector has long been in the vanguard of digital technology adoption. Utilities began capitalizing on emerging technologies for grid management back in the 1970s, while technologies that model exploration and production assets have been staples in the oil and gas company arsenals.

Now, however, it is imperative for energy and utilities companies to leverage advanced technology, Big Data and the actionable insights they can provide in order to build highly efficient, innovation-ready cultures and ecosystems that minimize costs and maximize new opportunities.

The IEA report zeroes in on four opportunities that digitalization creates in the electricity sector by blurring the distinction between energy generation and consumption:

- **Smart demand response.** Households with smart appliances and devices that actively participate in interconnected electricity systems can manage when they draw electricity from the grid. This new flexibility in load balancing could save $270 billion of investment in new electricity infrastructure.
- **Smart charging technologies for electric vehicles.** Shifting charging to times when electricity demand is low could add additional grid flexibility, saving another $280 billion in infrastructure investment.
- **Integrating variable renewables.** Increased storage and digitally-enabled demand response can help utilities better capitalize on renewable sources such as wind and solar.
- **Distributed energy resources.** By facilitating development of resources including solar PV panels and wind turbines, and using new tools such as blockchain, digitalization can make it easier for household producers to store and sell surplus energy to the grid.

Game-changing technology building blocks

Utilities companies seeking to create value need to continue to embrace and integrate digital technologies that truly propel transformation, enabling them to capitalize on these – and other – opportunities. Technologies poised to deliver major benefits include:

- **Predictive analytics** critical to turning the volumes of Big Data captured from meters, weather, customers, distribution network operations, sensors, smart devices and more into actionable intelligence that improves operations, customer relationships and performance.
- **Internet of Things** sensors and connected devices that gather data from infrastructure to supply chain partners to field workers to customers.
- **Machine learning** to process and analyze massive amounts of data in order to optimize asset maintenance, investment planning, customer segmentation and operations automation.
- **Drones** that enable remote asset inspection and improve workforce productivity.
- **Cloud solutions** that offer a secure, cost-effective platform for storing data and supporting access to information and applications across the enterprise.
- **Blockchain tools** to help record and track transactions, strengthening trust, transparency and security.
- **Mobility** that provides the ability to better communicate with workers and consumers, improve worker safety and enhance the customer experience.

The key is to remember that digital transformation is a process, not an end in itself. Success requires taking a holistic approach that supports fundamental change enterprise-wide, opening the door to the development of new business models that reduce power system costs, boost efficiency, reduce outages, extend operational lifetimes and enable the active participation of consumers in balancing supply with demand.

Sources:

[1] opentext.com, Digital Transformation for Oil & Gas, OpenText, 2018

[2] idc.com, IDC FutureScape: Worldwide Utilities 2017 Predictions, IDC, November 2016

[3] capgemini.com, "Digital Transformation Trends in Energy & Utilities – QA Considerations," March 2017

[4] Iea.org, Digitalization & Energy Report, International Energy Agency, 2017

Oil & Gas: Turning Promise into Performance

Like utilities, oil and gas companies are grappling with how to capitalize on the promise of digital transformation to achieve operational excellence in a fast-changing, high-pressure environment. Success depends on integrating digitalization into a comprehensive strategic approach that empowers leaders and workers at every level to make smarter, data-driven decisions and better manage risk, cost and productivity.

Business modernization, cost-cutting and staying ahead of the competition were the top three drivers of digital transformation named by respondents in a recent survey of global oil and gas industry professionals conducted by OpenText.[1] Top priorities for digitalization projects were predictive analytics (24%), intelligent automation (12%) and smart devices (10%).

Reality continues to lag behind intention, however. Only 13% of those surveyed described their projects as established, while one-third said they were in the beginning/planning phase. As in many other industries, the biggest challenge to implementing the digital transformation strategy was culture, followed by integration with existing infrastructure/legacy systems, gaining senior management buy-in and linking initiatives to ROI.

> By 2020, non-utility companies and digital disrupters will seize 20% of the energy retail market, tripling the profitability gap between thrivers and survivors.[2]
>
> Utilities were expected to take on at least 40% of their 2017 earnings using new business models and services.[3]
>
> Digitalization has the potential to save power companies $80 billion each year – approximately 5% of total annual power generation costs.[4]

HOW TO CHART A REALISTIC AND REWARDING IoT ROADMAP

From business to government to healthcare, leaders are bullish on IoT. Energy and utilities companies have rocketed to the frontline of IoT revolution, fueled by their desire to boost operational efficiency, improve worker safety, enhance the customer experience and improve the bottom line. IoT solutions – such as smart meters that capture customer energy usage data, wearables that track field worker safety, and sensors and drones that monitor power lines and pipelines – offer promising potential to create value and strengthen performance.

Embracing the opportunities IoT offers is one challenge – actually generating ROI is another. "Emerging technologies like IoT can be difficult to digest and implement on a large scale," says Mike Verbeck, Business Architect–Digital Transformation/IoT at CDW. "Our first goal is to help companies think big and envision what is possible. Then we like to act small, narrowing down the possibilities and focusing on areas that can impact their business rapidly. Once that is validated back to the organization's leadership, we can expand it on a wider scale."

Start small, scale up

For example, take worker safety. Utilities companies seeking to better protect workers may be interested in providing a real-time video feed into a substation and/or Wi-Fi for on-demand communication. "The first step to getting more visibility into that worker environment would be building an infrastructure for a large-scale field area network that connects up all of the energy company's resources," Verbeck explains. "Video cameras, worker sensors and other connected technologies come into play once the infrastructure pieces are in place."

IoT also plays a key role in energy distribution, especially with the growing popularity of renewables. Verbeck points out, for instance, that sensor technologies can monitor wind turbines and solar panels on microgrids, generating data that gives power companies real-time visibility into the amount of energy collected, storage needs and more.

In addition, energy and utilities companies are starting to explore ways to create new IoT-based consumer offerings. Now that smart meters are becoming mainstream, for instance, one possibility is providing "smart home as a service," delivering smart lighting, voice-activated assistance and perhaps even the ability for consumers to sell excess energy from solar panels or wind turbines to the utility. "If the utilities don't expand their business model, a cable provider could come in and offer those services," Verbeck says.

Turn insight into action

With its exponential expansion in recent years, IoT has moved from hype and futuristic scenarios to a not-to-be-ignored strategy vital to digital transformation. "There are going to be about 50 billion IoT connected devices by 2020," Verbeck says. "If you think about it, that's a lot of data, infrastructure and services. What do you do with all of that? That's the struggle and the challenge."

For utilities and energy organizations looking to fully capitalize on IoT technologies to gain actionable insight into their operations and help them thrive in today's highly competitive environment, Verbeck recommends taking these four steps:

1. **Engage in blue-sky thinking but ground your IoT strategy in value-building initiatives.**
   Involve senior executives, line-of-business leaders, IT professionals and key stakeholders in in-depth goal-setting and creative brainstorming. What does your company want to use IoT-captured data and unprecedented operational visibility to achieve? Do you want to reduce worker risk, maximize well production, monitor asset performance, streamline supply chain operations or improve responsiveness to customers? What will it take to get from here to there?

2. **Break down big goals into manageable projects.**
   Review your existing technology infrastructure, and identify and prioritize specific solutions that can be aligned with it. As part of this assessment process, explore solutions currently used in your industry – and others – that could help you address challenges. Focus on short-term proof of concepts that you can build on and scale up.

3. **Develop a roadmap to guide your digital transformation.**
   To optimize your resources and deliver maximum value within a realistic timeline, sequence your IoT projects in order of digital transformation prerequisites and priorities. For example, if one of your company's goals is to better predict and balance energy usage to minimize spikes and outages, start by creating a customer dashboard that not only provides visibility into how many kilowatt hours they use, but exactly where and when they're using them – whether it's their TV, furnace, washing machine or old refrigerator in the basement.

4. **Partner with an IoT expert.**
   Developing and implementing a successful IoT roadmap is a complex initiative. Few companies know where to begin, and most lack the necessary internal expertise to converge existing IT and OT technologies as well as add sensors, cloud technologies, analytics and security. A partner with deep expertise and experience in digital transformation can help you design, implement, manage and support your new environment, providing valued guidance as you navigate your IoT journey.

The global market for energy and utility IoT applications should reach $59.9 billion by 2022, up from $21.4 billion in 2017.[1]

Improving customer experiences (70%) and safety (56%) are the two areas where enterprises are most often using IoT-generated data.[2]

92% of global enterprises surveyed named IoT their top priority but only 1/3 have even partially deployed IoT-based solutions.[3]

Using IoT in extraction processes could reduce oil and gas production costs as much as $30 per barrel.[4]

Maximize Your IoT ROI

Even as more organizations embrace IoT and recognize that the data insights it delivers drive higher productivity, improved efficiency and better profitability, many continue to struggle with how to best integrate this emerging technology into their operations.

CDW's complimentary half- or full-day IoT Envisioning Workshop is designed to help you develop a clear vision and an actionable road map. Here's how:

- **Preplanning Discussion**
  An initial meeting with a CDW Business Architect provides a thorough understanding of your goals and reviews the workshop process.
- **Assess Your Current Environment**
  At the workshop, CDW experts facilitate a productive review and discussion of your existing technology infrastructure, opportunities and challenges, and current initiatives.
- **Brainstorm IoT Solutions**
  The workshop also includes envisioning conversations to brainstorm potential initiatives for further differentiation and value, explore IoT solutions successfully deployed by other organizations, and translate your goals and challenges into an IoT roadmap.
- **Design a Realistic Timeline**
  The CDW team compiles the workshop results into a presentation for your key stakeholders to review and validate. We leverage CDW's experts as well as our extensive best-of-breed ecosystem of strategic technology partners to simplify complexity and orchestrate the elements required for moving forward successfully.

Sources:

[1] wespeakiot.com, "IoT in Energy, Utility Applications Market: Strongest Growth in Software, Services and Connectivity," November 2017

[2] forbes.com, "2017 Roundup of Internet of Things Forecasts," December 2017

[3] networkworld.com, "Is IoT really driving enterprise digital transformation?" July 2017

[4] Iotsworldcongress.com, "The IoT will enable the gas and oil industry to cut production costs by up to $30 per barrel," September 2017

GET SMART WITH YOUR UTILITIES DATA STORAGE

Today's utilities companies face challenges along every part of the power value chain – power production, power delivery and end-use – including legacy IT technology, mounting security threats and ensuring field technology is dependable. The largest problem these companies face, however, is collecting, managing and utilizing their growing amounts of data.

Regardless of a utility company's size or business model, ever-growing amounts of data are being amassed from multiple new data sources. As utilities are modernizing and upgrading to new technologies, including smart meters, smart grids and distributed capabilities, these new data sources can help organizations predict demand growth, shape customer usage patterns, prevent outages and more.

But at the same time, the amount of data generated by these technology advancements adds to operational complexity. In the past, utilities were reading customer meters on a monthly or bimonthly basis. Consider this: With new upgrades to an advanced meter infrastructure (AMI), reports show that meters are read about every 15 minutes. That's about 96 million reads per day for every million meters, and that's just a small part of what's being gathered by electric utilities.[1]

Putting Data to Work

As mobile applications, IoT technologies, wearable devices and other digital tools create exponentially more data, organizations risk becoming bogged down with data management processes that don't create significant value. According to a recent report, the increase in data — and the opportunities it presents — are significant.[2] In the years ahead, utilities are going to invest billions of dollars into more advanced analytics platforms that will leverage data from their own devices and the IoT devices of their customers.

To keep up with growing volumes of data and get the most out of analytics tools, however, organizations need to rethink their approach to data storage. Consider these questions:

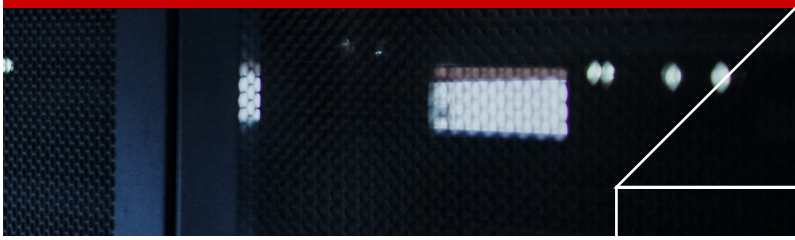
- Is the amount of data you need to store and manage getting out of control?
- Are you getting the most out of your storage capacity budget?
- Is it taking longer and longer to back up your data?
- Do you have a disparate, decentralized storage environment?

Streamline Storage to Improve Efficiencies

With a comprehensive storage solution designed to meet your utility company's unique needs, the latest storage technologies and management tools can help make the most of your existing resources and ensure maximum performance. The right tools allow you to maximize your data capacity and provide better insight into, and more flexibility to adapt to, your changing needs — all while easing the burden on your IT staff. In addition, a revamped storage solution helps lessen data center sprawl, which lowers power and cooling costs, improves performance, and reduces management responsibilities. And for many energy and utilities organizations, a third-party partner can help architect the ideal storage solution to match the unique demands of their data environment.

Ramp Up Storage Management with CDW:

- To get started, we'll set up an initial discovery session to understand your goals, requirements and budget.
- Next, we'll conduct an assessment of your existing environment and define your project requirements.
- Our team will then provide detailed vendor evaluations, technology recommendations, and proof of concept.
- Finally, we'll work with you on procurement, configuration and deployment of your customized solution, as well as ongoing product lifecycle support.



Sources:

[1] IBM.com, "Managing big data for smart grids and smart meters"

[2] biztech.com "Utilities Will Invest Heavily in Data Analytics in the Years Ahead," January 2018


CDW
PEOPLE WHO GET IT
CDW.com/energy
MKT24990