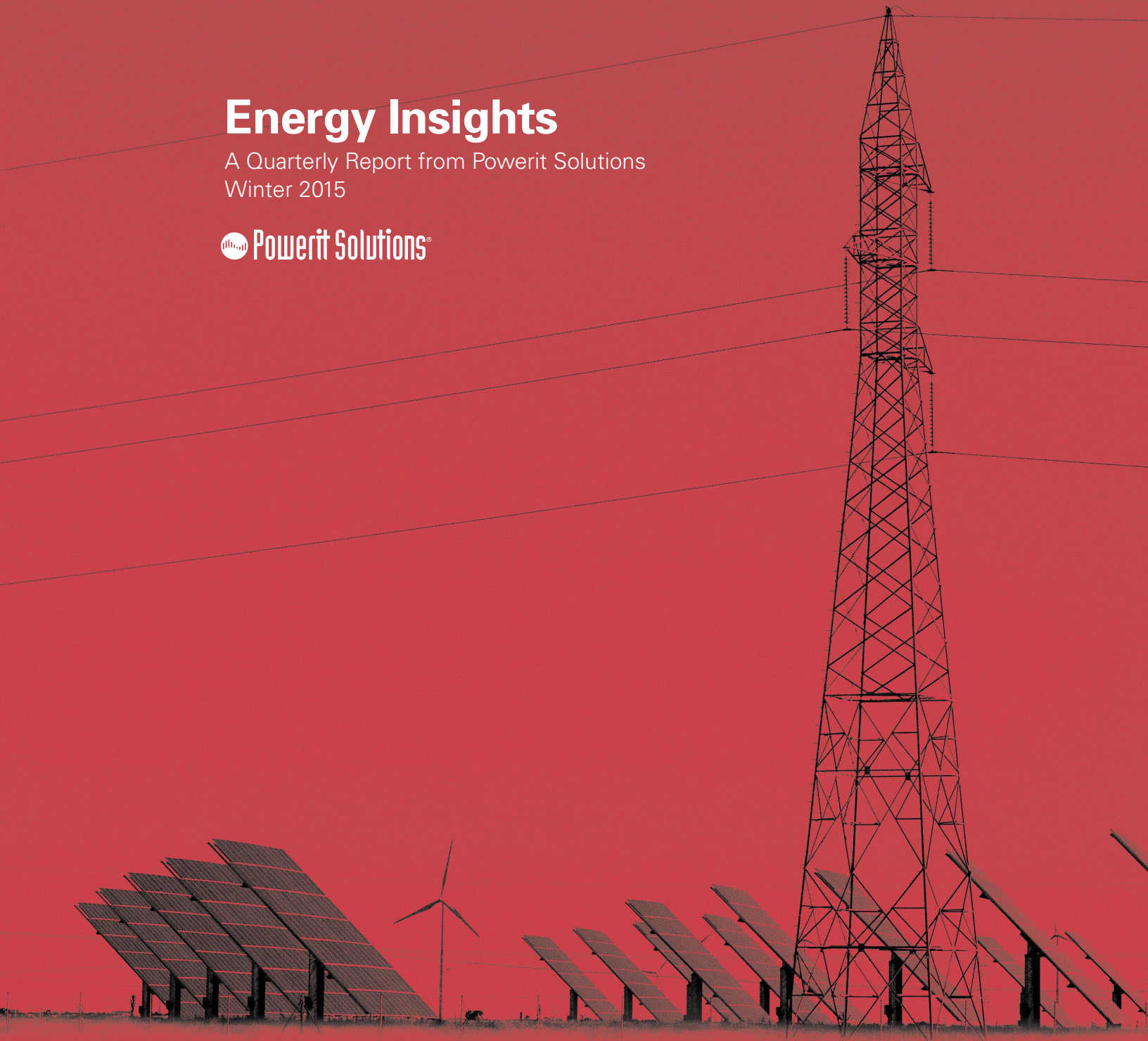


Energy Insights

A Quarterly Report from Powerit Solutions
Winter 2015





Dear Friend,

Welcome to Powerit's third corporate report.

In addition to providing information on the latest innovations from our company, we're also offering a cutting-edge analysis of our industry as it increasingly expands around the world.

As you'll see, the powerful article line-up in our publication reflects both this micro and macro impact.

Please be sure to read:

- The wide-ranging conversation with Barry Haaser, Executive Director of the OpenADR Alliance, who talks about OpenADR's global progress, potential and possibilities.
- A far-reaching piece that explains how industrial facilities are becoming "batteries" in an effort to better manage their energy usage.
- An incisive look at the key industry trends of 2015—both challenges and opportunities—that we all need to understand in order to achieve success.
- And an in-depth introduction to Powerit's new Microgrid Controller, which helps manufacturing facilities optimize microgrids, minimize demand from utilities, save additional money from solar installations and improve photovoltaic ROI.

If you'd like to discuss any of the breakthroughs mentioned and assessed in this corporate report—or where our industry is going in 2015 (and beyond)—please be in touch with me.

For our part, at Powerit, the goal and objective remain the same—helping customers thrive, thanks to big, bold technology solutions that work hard and well.

I look forward to connecting.

Sincerely,
Kevin Klustner
CEO, Powerit Solutions

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OpenADR — Progress, Potential and Possibilities

A Conversation with Barry Haaser

Executive Director, OpenADR Alliance

Open Automated Demand Response (OpenADR) is an open and standardized way for electricity providers and system operators to communicate demand response (DR) signals with each other, and with their customers, using a common language over any existing IP-based communications network, such as the Internet. As the most comprehensive standard for Automated Demand Response (ADR), OpenADR has achieved widespread support throughout the industry.

The following conversation is with Barry Haaser, Executive Director of the OpenADR Alliance (www.openadr.org), which was formed by industry stakeholders in 2010. The OpenADR Alliance's mission is to foster the development, adoption and compliance of OpenADR standards through collaboration, education, training, testing and certification. The ultimate goal is to help utilities meet growing energy demand cost effectively while allowing customers to control their energy future.

➤ *What are the most important trends in ADR that you currently see?*

The biggest trend is the transition from traditional demand response to automated demand response. And, as part of this transition, we are seeing a host of innovative new programs from utilities to engage customers in fresh ways. A good example is price-based programs. We're also seeing ADR actually being captured in new energy codes. ADR is now written in the California building code, for instance. New or renovated buildings over 10,000 square feet require an ADR interface. On a national level, energy efficiency programs are now granting credits for ADR.

What are your thoughts on the migration of DR programs?

We're working hard to get OpenADR adopted outside of California. There's obviously strong support in the California market, because it was born there. A part of our effort involves

education. Utilities and energy providers need to know the benefits of ADR. I think we're making progress and headway, because more and more utilities are starting ADR pilots and developing ADR programs.

What is the role of automation in DR?

The nice thing about OpenADR is that it removes the human from the equation. You no longer have a person on the receiving end of an inquiry. Everything is automated — from the energy provider generating the message to the end customer. It's out of sight and out of mind for the customer. The control systems are pre-programmed. And the option is always there to opt out. Automation is increasingly playing a key role, and OpenADR is now being directly designed into a wide range of products, including lighting controls, gateways, residential thermostats and commercial thermostats.

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What about the international adoption of the OpenADR standard?

There's currently tremendous traction in Asia and Korea. And there are active projects in Thailand and China, too. We're also starting to see more action in Europe. I think Europe is under-served by DR, so it's a totally new and emerging market. We're now in discussions with utilities in Europe to help them understand the benefits for their countries and regions.

Why does Asia seem to be ahead here?

In Japan, I think the earthquake and closure of the nuclear plant were big motivators, and this helps explain why Japan will adopt broadly. Korea is facing generation shortages, so ADR helps with grid balancing. China has production and generation limitations. Europe has a set of different issues. Several countries are de-commissioning nuclear reactors. There's also a preponderance of renewables in the grid, and that creates some instability because of intermittency. Finally, let's talk about Latin America. The countries there have aging infrastructure and generation and distribution issues, so they're beginning to explore ADR. Mexico, for its part, has a de-regulated energy market, which presents another set of issues.

How does OpenADR enable end customers to participate in grid balancing differently? And how does it enable utilities to roll out new and different programs that can help drive DR 2.0?

Open ADR is definitely a plus for grid balancing, and there are discussions now underway to implement it on a broader scale. OpenADR can also help with complex net load curves. We're also seeing some pilot projects where OpenADR is being used in grid balancing programs that communicate with electric vehicle charging systems. Lastly, I want to mention some projects that are just getting underway involving super-fast response times that are under 10 seconds.

What are some of the surprising things you're seeing when it comes to DR and ADR?

There are a number of utilities that are concerned about smart thermostats, but they're not part of DR programs. On the whole, though, I'm pleased that utilities are beginning to think holistically about their overall energy efficiency and energy storage strategies. This is a really good thing, and it bodes well for the future on so many levels.

Barry Haaser has over 30 years of experience in high technology and energy industries. He is the President of the Lakeview Group, a company providing marketing and association management services to energy-related trade associations. Barry has extensive experience creating and managing industry alliances and trade associations, including, the DASH7 Alliance, Digital Home Alliance, EIS Alliance, Home Lighting Control Alliance, LonMark International, OpenADR Alliance, SunSpec Alliance and the USNAP Alliance.

"I think we're making progress and headway, because more and more utilities are starting ADR pilots and developing ADR programs."

The Industrial Facility as Battery

by **Patty Solberg**

Vice President of Products and Marketing, Powerit Solutions

In financial terms, industrial facilities often lump electrical expenses in with fixed overhead costs today.

But this doesn't have to be the case; by tapping in to energy flexibility through automated demand response (ADR) programs, a facility can actually produce savings. It will probably take some time before a factory or plant's energy monetization surpasses its energy costs, but there are measures enterprises are taking today to reduce costs, and I believe that ADR can help to tip this balance.

New DR 2.0 programs open up ways that industrial facilities can help to balance the

grid. By offering shorter-duration participation, facilities may be able to participate with flexible loads, with no impact to production. Facilities often have ancillary loads, or time-insensitive loads, that can be turned down or delayed for tens of minutes—allowing them to bid these loads into synchronous reserves or other similar programs. These short-duration, short-notice programs require sophisticated demand management software. Demand management software identifies, connects and leverages inherent energy storage—and this technology solution can be harnessed to help balance the grid.

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➔ Just as important, there are increasing ways that facilities can get paid for this balancing service. There are cases right now where installing batteries to provide frequency regulation services makes economic sense. And, based on our experience, we know that tapping into latent flexibility at a manufacturing site can be much less expensive, by an order of magnitude, than installing electrical storage. The grid needs balancing resources for an increasingly intermittent supply and demand, and just as the cheapest electron is one you don't use, the cheapest storage is the type you don't have to install.

By installing demand management software, and harnessing load and process flexibility, an industrial enterprise is essentially turning process buffer into a “battery” for its own microgrid, or for the greater utility grid.

Converting an industrial facility into a “battery” doesn't require a uniquely designed solution. Standardized Demand Management software exists, and it allows a configuration of site and process-specific requirements to feed into a demand management solution. The sophisticated software solution offers several savings mechanisms to provide a favorable ROI.

The first step is installing this demand management software and connecting it to major consuming loads. Then, it's important to identify the areas of energy storage—be they thermal, process or other consumption flexibility—and configure a comprehensive demand management solution with constraints to ensure that tapping into the storage doesn't impact operations. The last step is signing up for ADR programs in order to monetize the load.

There are some barriers that need to be addressed for broad adoption.

Many industrial enterprises aren't confident that they can implement the change. Regulation and availability of smart grid programs can be a problem. And some industrial executives and managers are concerned that the conversion will negatively affect operations—both production throughput and the general business focus.

It's important to remember that manufacturing facilities zero in on the best ways to ship quality product, not on energy arbitrage. And, while there's been an emphasis on improving energy efficiency for quite some time, monetizing energy flexibility is still a new concept, so it will take getting used to.

There are ways for utilities and ISOs to help speed adoption. Providing flexibility in program design elements like the event duration, frequency and notification timing would make them more business-friendly. By defining program rules – which dovetail with production processes, rather than disrupt them – utilities will enroll more industrial loads.

Powerit Solutions taps into inherent process storage as a retrofit activity. We're not overhauling processes, or creating energy reserves in manufacturing. But, as industrial engineers continue to apply demand management solutions, and begin to monetize their energy flexibility, I believe they will build more flexible processes, and buffer energy resources when possible, in order to buy and sell energy at the most advantageous prices.

“By installing demand management software, and harnessing load and process flexibility, an industrial enterprise is essentially turning process buffer into a ‘battery’ for its own microgrid, or for the greater utility grid.”



Taking Greater Advantage of Renewables and Demand Management Technology in 2015

by Kevin Klustner

CEO, Powerit Solutions

Last year was a tipping point for microgrid optimization in the manufacturing sector.

Even though we're still in the early stages of this process, improving prices, innovative financing and regulatory incentives for solar and wind have spurred industrial facilities across the board to embrace renewables, reduce their dependence on the grid and still meet their demand response commitments—often through cutting-edge Automated Demand Response (ADR) solutions.

I believe that this momentum will continue in 2015, regardless of how low fossil fuel prices go. And I say this because there's an irreversible desire within the manufacturing industry to reduce dependence on coal-fired production while boosting renewable usage.

Managing a Holistic Energy Envelope

Industrial facilities that want to take greater advantage of renewables over the next 12 months must evaluate the competitive market first. Then they need to assess the tax options and incentives, which are financially significant. Analyzing the impact of renewables flowing into a facility is absolutely essential too—especially given the intermittency that characterizes solar and wind.

This requires a comprehensive strategy that factors in demand management to optimize renewables with what comes off the grid. The bottom line here is that manufacturing operators must be prepared to manage a holistic energy envelope. But, in my opinion, the cost-effective results are well worth it.

As we head into 2015, it's also important to remember that each industrial facility has its own unique energy profile, and every city has its own set of utility and ISO programs, so there's no one-size-fits-all solution. Facilities with spiky or volatile profiles, for example, may be able to reduce peak demand charges by smoothing demand peaks with batteries, or through optimizing the demand of the loads. But facilities with time-insensitive loads, on the other hand, may be able to shift them in order to reduce high on-peak charges.

It's extremely valuable to understand the availability of demand response and real-time pricing programs. For instance, what programs pay industrial facilities for grid-balancing services? Or where is there a cost advantage for energy purchasing flexibility that helps determine the value of a storage solution?

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➔ **The Growing Importance of Storage Solutions**

And, speaking of storage solutions, in my view, they will become more and more important in 2015 as manufacturing facilities try to mitigate the intermittency—and even volatility—of solar and wind. In many cases, this volatility can mean a reduction in energy charges without a commensurate drop in demand or capacity charges.

That's why industrial plant operators must be careful when it comes to choosing the type and size of storage they're going to adopt.

The two main types of storage to be evaluated are inherent process storage and new energy storage, such as batteries.

Inherent process storage provided by demand management software, such as Powerit's Spara DM® technology solution, can be up to an order of magnitude less expensive than a new battery system, and it doesn't require permitting or a new utility interconnection. This process storage can be supplemented with the installation of batteries, and, together, they can provide a balanced solution, each able to respond with different speed and duration.

Public-Sector Innovation in the Energy Space

The growth of renewables and demand management in industrial facilities during 2015 will accelerate if the public sector continues to open up and innovate in the energy space.

One of the states that's out front in this area is New York, which recently launched its Reforming the Energy Vision (REV) initiative. REV is designed to transform New York's energy regulations and markets so that distributed resources can play a part in long-term energy planning. That means incorporating utility-owned and third-party-owned rooftop solar, on-site generation, plug-in EVs, energy storage systems, smart home or building energy controls, and a variety of other grid-edge devices and systems into the mix.

A Significant Legal Case For Demand Response

Another key variable that will help determine the pace of expansion for renewables and demand management within the manufacturing sector during 2015 will be FERC Order 745, which was recently vacated by the U.S. Court of Appeals.

The Appeals Court ruling called into question FERC's ability to regulate the participation of retail energy customers in wholesale capacity markets, which account for tens of billions of dollars in demand response capacity. These are the markets where demand response—turning down power use or firing up onsite generators during times of peak grid demand—has led to big reductions in energy costs.

At this point in time, it's unclear whether the FERC case is headed to the U.S. Supreme Court. While we're waiting, though, there's considerable uncertainty about what can—and can't—be done in terms of demand response.

I believe that this legal battle is the result of established energy providers trying to protect their demand models—as well as their revenue and profit streams—in a newly energized commercial world that is rapidly gravitating to renewables and storage. Ultimately, I expect demand response to prevail and endure in the industrial sector. As one wise commentator recently noted, the FERC battle is like hotels trying to destroy Airbnb or taxi companies seeking to restrict Uber.

In the meantime, I see manufacturing facilities continuing to alter their energy equations in 2015, with steadily increasing renewables use, greater adoption of demand management technology and more movement to optimized and cost-effective microgrids that can help save additional and much-needed money.

Powerit Solutions Introduces Its New Spara DM[®] Microgrid Controller

Innovative Technology Helps Manufacturing Facilities Optimize Microgrids, Minimize Demand From Utilities, Save Additional Money From Solar Installations and Improve Photovoltaic ROI

SEATTLE — February 2nd, 2015
Powerit Solutions (poweritsolutions.com), an international clean technology company that sets the demand management standard, today announced the introduction of its new Spara DM[®] Microgrid Controller.

The new technology solution helps manufacturing facilities optimize their microgrids—on-site, renewable power and

storage system networks—by continually balancing demand with generation. More than just managing storage, the Spara DM Microgrid Controller manages energy intensive loads and processes, tapping into inherent process storage to optimize the facility's consumption.

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- ➔ More specifically, Powerit Solutions' new Spara DM® Microgrid Controller helps minimize demand from the utility, which reduces both the facility's impact on the grid and its capacity charges. In addition, the Microgrid Controller solution equips the facility to participate in advanced demand response programs that generate revenue for the enterprise and allow the utility to balance demand across the grid. Spara DM Microgrid Controller builds on Powerit's strong solution for managing loads, and incorporates the monitoring of local renewables, and the charging and discharging of local storage to manage a connected facility microgrid.

"The appeal of microgrids is clear," says Kevin Klustner, CEO of Powerit Solutions. "They give industrial facilities more control over their energy supply and costs, provide a backup in case of grid outages, and relieve pressure on the utility grid. A reality is that harnessing process flexibility through load control can be an order of magnitude cheaper than installing batteries."

Adds Klustner: "An often overlooked component is how to control the demand side of a microgrid. Our new Microgrid Controller solution helps with this control and lets facilities harness additional cost savings from their solar installations and manage electrical storage as part of a holistic facility microgrid. This solution is also exceedingly valuable, because it manages energy intensive equipment and taps into inherent process flexibility to absorb solar variability, reducing peak demand in the process."

A number of Powerit customers are embracing the new Spara DM Microgrid Controller, and the data shows that the solution is already yielding

significant benefits—to industrial enterprises operating microgrids, and to the grid as a whole. Furthermore, Spara integrates with industrial automation systems, leveraging the infrastructure and adhering to process constraints to provide savings without impacting production.

In a scenario analysis for a manufacturing facility in Southern California, for example, demand management provided 5.5 percent in demand reduction on its own. A photovoltaic (PV) installation provided 1 percent reduction on its own, because while it produced energy during peak hours, a few cloudy days—or even hours—meant that a demand reduction wasn't guaranteed. These peaks on cloudy days were managed and reduced by Powerit's new Spara DM Microgrid Controller solution, however. And, when the Powerit solution was added to the solar installation, demand reduction increased to 7.7 percent and incremental annual savings reached \$48,000, thus improving the ROI of the PV installation.



"The math here is simple," explains Klustner. "It's 1 + 1 = 3. Solar provides kWh savings, but by adding our new Spara DM Microgrid Controller solution, a manufacturing facility can boost kWh savings, further reduce costs and make its solar investment even more cost effective."

"This solution is also exceedingly valuable, because it manages energy intensive equipment and taps into inherent process flexibility to absorb solar variability, reducing peak demand in the process"



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