

Insights from the 2021

VIRTUAL SMART ENERGY
DECISIONS
INNOVATION SUMMIT



March 22-25, 2021

Emerging Technologies for the Future of Energy Management

The Smart Energy Decisions 2021 Virtual Innovation Summit was able to bring together its community of buyers and suppliers during a challenging time—evidence of the strength of our mission and the resolve of the industry to move ahead in developing and implementing strategies for energy efficiency and renewable energy.

Using our proprietary SED Virtual EventHub, the 5th edition of our Innovation Summit, presented March 22–25, 2021 allowed our buyer and supplier attendees to explore the theme of “Emerging Technologies for the Future of Energy Management.” The event featured pre-conference workshops, general sessions, buyer-only peer-to-peer and Town Hall gatherings, and exclusive one-to-one meetings between buyers and suppliers. This *Insights* report, part of our continuing series, offers excerpts from each general session to give you a taste of the thought-provoking content, as well as the spirit of collaboration in evidence throughout the event. We’re extremely grateful for the ongoing support of the SED Advisory Board, as well as our speakers, sponsors, and of course, our buyer attendees, in making this event a success.

The 2022 Innovation Summit will return IN PERSON for our 6th edition on March 14-16, 2022 at the Houstonian Hotel, Club and Spa in Houston, Texas. Our theme will be “Energy Management Strategies to Hit Emission Reduction Targets.” Buyers can [click here](#) for an application to attend. Suppliers can [click here](#) to explore sponsorship opportunities. We hope you’ll join us in Houston as our community unites, once again, to gain insights on cutting-edge strategies and share best practices to help move their energy and sustainability efforts forward.



Cordially,
Debra Chanil
Debra Chanil
Director of Research & Content
debra@smartenergydecisions.com



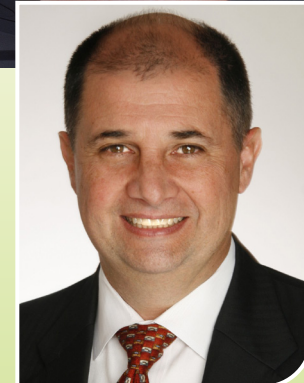
TABLE OF CONTENTS	
Editor’s Letter: Emerging Technologies for the Future of Energy Management.....	02
Opening Keynote: Intel 2030	03
Supplier Keynote: Decarbonizing with Integrated Energy Management.....	06
Keynote: Cal Poly Fast-tracks Decarbonization	09
Keynote: Innovative Energy Data Management	12
Supplier Session: IOT and the Future of Building Management	15



Opening Keynote: Intel 2030



Marty Sedler,
Director of Global
Utilities &
Infrastructure,
Intel Corporation



John Failla,
Founder and
Editorial Director,
Smart Energy
Decisions

Opening Keynote: Intel 2030

FAILLA: Intel has had some pretty ambitious sustainability goals tied to 2020 and the results have been very impressive. Give us a sense for how things have fared and cite the accomplishments that you're most proud of.

SEDLER: We've been able to deliver more than seven billion kilowatt-hours a year of green power and almost 82% of our global supply is from renewable sources. We've accomplished more than 100 onsite renewable projects around the globe, including 65 buildings and 22 different technology applications, and delivered more than four billion kilowatt-hours of conservation to our facilities since our baseline. To me, it's a tremendous accomplishment.

When you talk about what makes me smile, it's the physical projects. I really enjoy walking into the office—when we walked into the office, if anyone remembers that—and looking at 4,000 parking spots covered with solar, the largest solar private solar project in the state. We're providing shade from 110-degree temperatures in Arizona for our people and all of the power from that facility is delivered directly to our buildings.

FAILLA: You certainly have a lot to be proud of. Congratulations on those results. I know Intel's nature is to be constantly setting the bar higher. Your 2030 goals are even more ambitious. Tell us about where you're headed as it relates to energy savings, alternative energy, and emissions reduction.

SEDLER: It's kind of a three-legged stool—if you take away one of them you might be able to balance for a while but, eventually, you're going to fail and fall. If you could reduce your usage to zero, you wouldn't care about renewables, so you want to chip away at each one. Right now, we're on the plane. We know where we want to go. We're on a long, long, long flight and we just want to land it.

We are committed to being 100% green by 2030. We are currently most of the way there but the best fruit is at the top and it's also the most expensive and the most difficult to get. The progress at the beginning was faster, cheaper, and easier. Now, the challenges are really hitting. We're getting stuck a little and we need technology. We need changes in the industry. We need something to turn everything over.

Storage is one silver bullet. One of our toughest problems is that, so far, we've been able to buy solar offsite and purchase five times our peak load to use renewable energy credits during the other hours of the day. That works at the lower levels but the bigger you get the harder it is to over-generate. That's the inflection point at which you need storage or a totally new technology that runs 24 hours a day—or, or, or. That's the challenge we're getting into.

FAILLA: Storage is certainly going to be important for the future. What else do you think is going to be key for you to be able to reach those 2030 goals?

SEDLER: It's going to end up being technology, politics, customers, and utilities. It's going to take everybody to get together. But we have locations where there's no credible way to buy green power or there is no green power. We're going to have to look at enabling an entire ecosystem and figuring out what can we do in those locations.

We're going to need technology innovation. An example might be fuel cells. If you can use biogas for fuel cells, you can make it green. Right now, biogas is three, four, five times the price of gas so it's difficult to afford it, but it's a baseload resource. The future might include nuclear, it might not.

FAILLA: Intel recently announced a renewable energy deal in Oregon. You've been trying to get renewables in the state for quite some time. Tell us how you overcame those hurdles and made things happen.

Opening Keynote: Intel 2030

SEDLER: In Oregon, we did come up with something in conjunction with the utility about four years ago. About a week before it was going for approval in front of the commission, it was torpedoed by a couple of people in the public and a few others who jumped out and we had to withdraw it. We had a choice: give up or reinvent ourselves. We chose reinvention.

We worked with the utility very closely and created a “green tariff.” You can call it a bypass, you can call it whatever you want but, ultimately, it enabled us to go out and identify a project, negotiate it, get it together and bring it to them. They’ll contract it on our behalf, take the energy and then deliver it to us while keeping the revenue streams and their costs. We get the attributes and equal amounts of energy delivered. Of course, it’s on their system. They obtained approval for that mechanism so they’re able to do it with more people. With their help and leadership, we were able to put something into practice that not only helped Intel but is enabling many others to do the same.

FAILLA: With technology as a key factor in being able to achieve your 2030 goals, tell us about your philosophy for evaluating and adopting new energy-related technologies.

SEDLER: We believe that everything is either going to fail or succeed by technology. We’re going to reach inhibitors so technology is either going

to make or break everybody’s progress.

Sometimes we like to test things for fun. We did something in India, when you walk into the lobby of our building, you are walking on kinetic tile, which produces a little electricity and powers the front area. It isn’t efficient yet but we wanted to test it. Is it something that can eventually be put throughout a building or in an airport? We’re always looking for these new kinds of technologies. 🌐



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—Marty Sedler, Director of Global Utilities & Infrastructure, Intel Corporation

Supplier Keynote: Decarbonizing with Integrated Energy Management



Scott Hart,
Vice President/
General Manager, NRG
Business-Texas



John Failla,
Founder and
Editorial Director,
Smart Energy
Decisions

Supplier Keynote: Decarbonizing with Integrated Energy Management

FAILLA: Until recently, the energy business has been managed very separately between supply and demand management. There's this incredible push for integration right now driven by the wave of carbon reduction commitments large power users are making, which has been breathtaking. What do you think are the drivers behind this trend?

HART: For the past 20 years, the environmental movement has pushed electricity. More recently, the ESG movement has brought a different level of commitment. Now, we're at an inflection point, with Fortune 100 companies getting involved and tax subsidies effectively introducing large-scale renewables to the market, putting a lot of economic pressure on conventional sources of generation. Here in the Texas market, we've enjoyed extraordinarily low costs, which have attracted a lot of businesses and economic opportunities in the state. Now it's all come together. Intensity has picked up.

When I started with Green Mountain in 2004, we did have interest in renewables but more from local business owners than from the national players who couldn't handle the premiums associated with putting renewables under their products. Over time, specifically the last five years, we've seen the opportunity to provide the attributes that customers are looking for in a renewables project, meeting their consumption needs as well as their budget.

FAILLA: Based on your experience, you've seen lots of cycles of trends and fads. Is it different this time with this focus on decarbonization? Is there something more fundamental happening here?

HART: I think it is fundamental. You're seeing a modernization of the grid. You're taking a construct of the 20th century with large, industrial-sized generation plants and transmission and distribution lines and witnessing the introduction of large-scale renewables. It's going to take us some time

to manage the supply and demand operations of a grid like we have here in ERCOT, but I don't think there's any going back at this point. We've proven that renewables are economic. They certainly meet our environmental objectives, so now it's a matter of modernizing the grid. Helping customers understand how they buy and use their energy has an impact not only on environmental quality but also their budget outcome. And you don't have to sacrifice anymore. It used to be one or the other—now it's a win-win.

FAILLA: What are some of the implications energy and sustainability managers and large power users should take into consideration as a result of this overall focus on emission reduction?

HART: Over the past five years, we've seen that sustainability and energy teams are much closer and that you don't have to necessarily sacrifice your budget to achieve your goals. We're also seeing that they're entertaining much more of a demand side-approach and are looking at opportunities to participate to help supply that reserve margin and guard against scarcity issues.

It's very promising. It's going to take time and a different mindset around utilizing distributed energy resources, whether they're batteries, backup generation, or onsite renewables. To me, the answer is going to be all the above. We have all the tools, techniques, and technologies that we need; it's just getting the economics right. We're very close to making that happen and driving towards a more sustainable future.

FAILLA: What changes do you think energy and sustainability managers need to make in their traditional approach?

HART: The intensity of bringing renewables into the portfolio doesn't really match retail needs. We've built a product called Renewable Select that does. We think we found the right balance that will satisfy what the

Supplier Keynote: Decarbonizing with Integrated Energy Management

sustainability teams are looking for while at the same time addressing the budget consciousness of the energy team. It also introduces factors like a private DER program, in which we'll buy back a customer's optionality through our contract for those scarcity-type events. That's seeing a lot of promise as well.

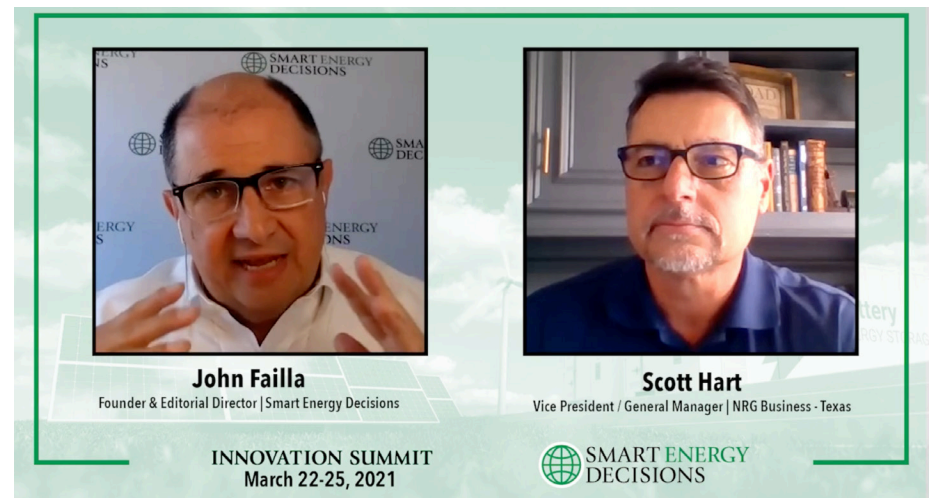
FAILLA: You referenced how energy and sustainability are working more closely together. Do you still see many customers clearly operating in silos where demand and supply are not working effectively together?

HART: It depends on your market. When you think about electricity, the business is still very local. Having local expertise and knowledge is something that comes into play because not everything works as well in certain segments. There might be an economic trade in one market for something that works in another. We're very fortunate at NRG that we've got coverage that allows us to have localized expertise while being able to scale it for someone who's looking for solutions all over the country.

Knowing those nuances of operation, whether you're in New England, Texas, or California, is critical, but what makes sense corresponds with how things work locally. We don't sell the same product in one market as we do in the other. We think that managed approach is what customers are going to look for in the future.

FAILLA: What role do you think DERs play in this overall integrated energy management program for large power users going forward?

HART: It will be increasingly important. There isn't one magic cure that will necessarily ensure we have a sustainable, low-cost energy supply. A DER is certainly a key element. It's one of the more expedient things that we can do to manage reserve margin and scarcity pricing issues and, most importantly, just pure resiliency to the grid. 🌐



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—Scott Hart, Vice President/General Manager, NRG Business–Texas

Keynote: Cal Poly Fast Tracks Decarbonization



Dennis Elliott,
Director of Energy,
Utility and
Sustainability,
Cal Poly State
University



John Failla,
Founder and
Editorial Director,
Smart Energy
Decisions

Keynote: Cal Poly Fast Tracks Decarbonization

FAILLA: The university has a very ambitious climate action plan that, among several of its goals, includes targeting net zero. Give the audience a sense of the scope of that plan.

ELLIOT: In 2014, we had a system-wide sustainability policy update, which mandated that campuses develop climate action plans in terms of Scope 1 and Scope 2 emissions to support California's reduction goals. Many institutions have voluntarily decided to take on responsibility for Scope 3 emissions as well.

We've signed on to the Second Nature climate leadership commitment, which essentially says we would ideally commit to owning responsibility for all Scope 1, 2 and 3 emissions as an institution. We would measure, report, and put plans in place to drive those emissions to carbon neutrality and climate resilience as soon as possible.

FAILLA: Rumor has it the university is actually looking to accelerate its existing net zero by 2050 target, correct?

ELLIOT: Yes, we are definitely exploring the opportunities to accelerate that goal. All of us are watching in real time as the impacts of climate change are unfolding in our communities. Certainly, there's an argument to be made that the wildfires in California are climate-driven. The extreme weather event we just saw in Texas that led to a collapse of the electric grid also had climate drivers. Those types of weather events are going to become more extreme and more frequent as climate change continues. That means 2050 is not fast enough for the planet or the people that live on it. Anybody who could be doing more should be, so we're exploring accelerating our plans as well.

The entire University of California system by decree from our central president has made a commitment as a system to achieve carbon neutrality by the year 2025. We're almost there. They started this work some time

ago. We collaborate and share ideas and resources and best practices. We want to learn from them.

For example, we're looking at a way to invest in energy efficiency retrofits of our existing buildings, the performance standard we should set for new construction to meet legal minimums required by code and still get a sweet spot on our return on investment, how much renewable energy to develop onsite or procure through credits and power purchase agreements, and what we should spend on carbon offsets to get to neutrality.

FAILLA: What do you think are the most interesting elements of the overall campus-wide utility plan?

ELLIOTT: Electrification is one major strategy. In California, we're all planning for relying on a carbon-neutral electric grid by 2045. That means we should be using electricity as our primary energy source as much as possible. Guidance has come out from the chancellor's office to say any campus considering making an investment in any equipment or system that depends on natural gas as that energy source really should think about it, not just twice, but three or four times because you're locking yourself into a carbon dependency for the life of that asset. We cannot take the carbon out of natural gas.

There's a lot of conversation around renewable natural gas. There is not enough biofuel in the nation to create the significant amount of biogas it would take to offset fossil fuel. There will be a place for that, but it's not a solution to carbon. Electrification is the solution. We need to get more efficient. We need to use less gas. We need to move things off of gas and over to electricity as a prime source.

FAILLA: Your dedication to innovation is incredible and it's all driven by these very ambitious commitments. In order to achieve these goals, you've

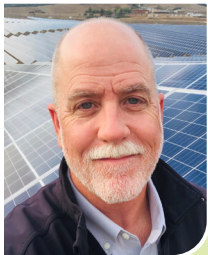
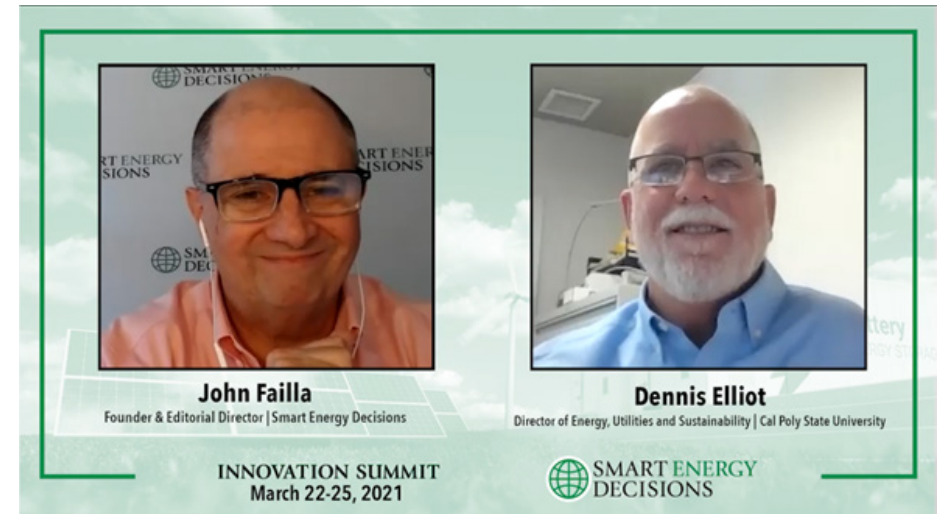
Keynote: Cal Poly Fast Tracks Decarbonization

got to focus on suppliers, right? So, it sounds like you're always on the hunt for new technology and new solutions. What's your approach to evaluating new suppliers and new solutions for your utility and your central plant operations?

ELLIOT: There's significant risk in adopting new technologies. The strategy that I use and that I see many of my peers using across the state is information sharing. Somebody's going to try something new. Let's not all try new things at the same time. Let's learn from each other. Where somebody sees value in taking on a risk to evaluate one thing, whether it's a grant-funded pilot or a vendor giving you a deal to try to get its foot in the door, people will take those risks. It's incumbent on us to measure them, report on them and share that information with our peers across the state so that we don't all have to learn those lessons the hard way. That is the purpose of these state-wide sustainability conferences and regular business meetings of our peers.

The CSU energy managers have a business affinity group. Much like vice presidents, executive facility officers and directors of facility operations, we meet as peers at least quarterly, if not more often. Pre-COVID, we tried

to travel and see each other's campuses and most recent projects to show off central plants and learn from each other and apply this knowledge from an individual campus to the 23-campus system. We want to work together and essentially get the benefit of high value without taking on excessive risk. 🌐



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—Dennis Elliott, Director of Energy, Utility and Sustainability, Cal Poly State University

Keynote: Innovative Energy Data Management



Robert Berninger,
Director Plant
Operations, Energy &
Engineering, Memorial
Sloan Kettering
Cancer Center



Debra Chanil,
Director of
Research &
Content, Smart
Energy Decisions

Keynote: Innovative Energy Data Management

CHANIL: Memorial Sloan Kettering Cancer Center, Evelyn Lauder Breast and Imaging Center, won a 2020 Smart Energy Decisions Innovation Award for Healthcare Energy Data Management for your Virtual Energy Monitoring and Fault Detection and Diagnostics program. From what I understand, the project started as a response to a New York City law. Tell us how the project was developed.

BERNINGER: Local Law 87 now requires all buildings over 25,000 square feet to have an energy audit and retro-commissioning done every ten years according to their block and lot number. In 2018, the Breast and Imaging Center was due. Along with the reporting, we also came up with many capital energy conservation measures (ECMs). One of the projects was to install virtual energy managing and fault diagnostics.

We've found that when we've done retro-commissioning in a building we're able to lower our energy usage, get the building back to its design intent, and save energy—but if you're not watching, it starts to creep back up to its old profile due to things not working correctly, staff making adjustments, or other factors. With the fault diagnostic detections, we can find out right away if something is not working or is not within parameters. Then we can get on top of it before it wastes too much energy.

CHANIL: The judges said that the project is a great example of continuous commissioning to ensure optimum performance in a challenging environment that requires patient comfort as a priority, and that not enough emphasis is placed on retro-commissioning and continuous commissioning. Tell me the difference.

BERNINGER: Retro-commissioning is bringing the building back to its original design intent. Recommissioning is going back and commissioning the building again. Then, continuous commissioning is using the tools that you have with the building management system and fault diagnostic

detection to make sure that the building is always operating at its design intent. If something drifts, you get an alert so you can go back and fix it right away.

CHANIL: You work with a number of different vendors. How do you choose them? What's your vetting process?

BERNINGER: Depending on what the project is, as long as they're not trying to defy the laws of physics, we will do a pilot in one of our smaller buildings to see if the project or product will work for us. As an example, in the case of demand ventilation control, using a company called Aircuity, we did it in a small, 50,000-square-foot building to show proof of concept.

CHANIL: What advice can you share with our energy and facility managers when it comes to working with different vendors?

BERNINGER: I like to make the vendors put their money where their mouth is. If you're willing to say this works and it's the best thing since sliced bread, come in, do a pilot and show it to me. If it works out, great, we'll pay to do the project. These buildings are playgrounds to me and we try to figure out how to play the best that we can in them.

CHANIL: Let's talk about some other projects that you've been involved with. You have some recent retro-commissioning projects to tell us about.


BERNINGER: We have done a bunch at this point in New York City. We have a good eight years behind us and we're already getting to start the first buildings all over again. In most of them, the retro-commissioning revolved around making sure that valves and steam traps are working correctly and the control set points are accurate. With all of those, we've also come up with capital ECMs running the gamut for demand ventilation control, VFDs on pumps and fans that didn't have

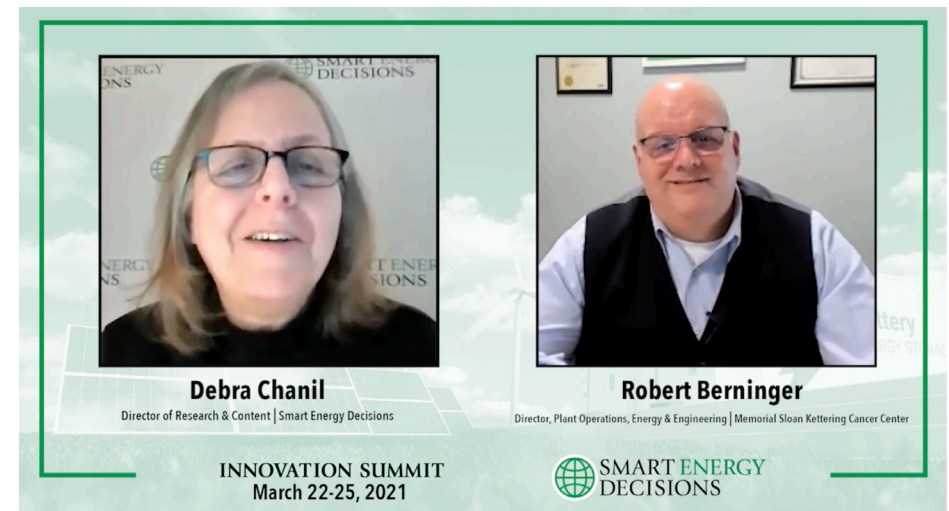
Keynote: Innovative Energy Data Management

them before, chilled water demand flow, or chiller optimization depending on whose trademark you're using at the moment. We've done ventilation control on our exhaust fans and in our lab exhausts, adding VFDs and making sure that we're measuring the weather, the wind direction, and speeds so that we can either increase or decrease our exhaust fans to ensure we have the right dispersion from the labs.

CHANIL: What about the new cogeneration project you have in the works?

BERNINGER: On the main campus in our Zuckerman Research Lab and our Rockefeller Research Center, we are doing a steam-to-hot-water conversion along with cogeneration. For the three buildings, we use condensate steam, which is a relatively wasteful system. The condensate runs once through, so whatever steam comes in gets condensed and dumped back down the drain. With this new project, we will be converting 130 air handlers that use steam, changing out the coils or reusing our chilled water coils for heating using low-temperature hot water. We're also installing 3.3 MW of cogeneration, which is matched to our base heating load so there is no waste. We're going to be using that power to offset electricity that we're purchasing. Overall, the project is saving the institution between \$8.5 and \$10 million a year in energy costs. We're

going to be reducing our steam usage by 80%. The only steam that we will be using on the main campus and in the Research Centers are for our steam turbine chillers—about 9,000 tons installed—and in our sterilization and cage washers for our laboratories and animal facilities. Phases two and three of the project are focused on those steam usages. At the time, it was not deemed necessary, but it's going to be down the road. 



“These buildings are playgrounds to me and we try to figure out how to play the best that we can in them.”

—Robert Berninger, Director, Plant Operations, Energy & Engineering, Memorial Sloan Kettering Cancer Center

Supplier Session: IoT and the Future of Building Management



Andrew Blauvelt,
Vice President,
Sales, Atrius



Ken Watson,
Senior Manager
of Key Accounts,
Atrius



Debra Chanil,
Director of Research
& Content, Smart
Energy Decisions

Supplier Session: IoT and the Future of Building Management

CHANIL: If 2020 has taught us anything, it's to expect the unexpected. Let's talk about how a year of COVID-19 has impacted building management in terms of occupancy and energy consumption levels.

WATSON: I would say 2020 was likely the most challenging year in modern history for anticipating and forecasting energy consumption. Because of that, the data from 2020 has skewed to the point where we can't use it to plan future usage based on historical year-over-year comparisons. Complicating that further are the severe weather events that we saw through different regions of the country. Obviously, the fallout from the pandemic is leading to stricter indoor air quality guidelines that are going to increase future energy consumption. Hopefully, we aren't affected by another pandemic any time soon but, again, the fallout from COVID-19 and the realities of climate change means that these types of unpredictable fluctuations in year-over-year consumption are likely here to stay.

CHANIL: Something that we've been hearing a lot about is organizations with goals tied to 2020 using baseline years. There are going to be benchmarking and measurement issues. How should companies be thinking about this?

WATSON: Organizations that have used 2020 as a benchmark for energy consumption planning and climate goals might want to look at revising their strategy for using that year. There were so many variables such as lowered energy consumption from reduced occupancy and potentially greater consumption from severe weather events. Also, adherence to new American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) guidelines is going to typically increase energy consumption at those facilities. We're also talking about national or global portfolios, so some of these things are going to influence certain regions

or facilities more than others. Essentially, what we are recommending to our customers is to start taking a more sophisticated, tailored, data-driven approach to benchmarking going forward.

CHANIL: You've laid out some of the problems. Let's start digging into what some of the solutions might be.

BLAUVELT: Moving forward, we're going to need to establish baselines that are based on predictive modelling leveraging machine learning. Predictive modelling uses real-time data to establish performance baselines essential to help teams forecast consumption and manage savings against those reduction targets. While corporate sustainability requirements are still a top priority, energy managers need to understand the effects of fluid conditions including occupancy levels, operating hours and new code requirements around ventilation and particulate levels.

CHANIL: Returning to offices is top of mind. What is predictive modelling's role in ensuring occupant health as people come back to their building?

BLAUVELT: We've been looking at a data-forward approach. We've introduced new data types into our system that allow us to take the same sort of regression methods using machine learning to predict certain conditions within spaces that aren't necessarily around your traditional energy management consumption and costs but more so around conditions in the space that would help reduce the transmission of airborne particulates.

In our platform, we use prediction at every level. For example, we assess air quality in relation to humidity, CO2, temperature, PM 2.5, PM 10 and VOCs. To model that and alert in real-time, we are using logic to create a calculated analytical point and allow for predicting that forecasted model 10 days into the future in up to 15-minute intervals at a high level of statistical accuracy. So, you can see when spaces will be safe or not and

Supplier Session: IoT and the Future of Building Management

then track and trend how those different variables are moving towards key point indicators of safe spaces.

CHANIL: This is dovetailing nicely into one of the themes of our event, which is new technology. Getting buy-in from the c-suite and all internal and external stakeholders is key to adopting new technologies. How should buyers engage their stakeholders on resource optimization and adding new solutions?

BLAUVELT: Leveraging the current conditions around indoor air quality requirements, fluctuating baseline models, and the uncertainty of future building operations provides us with a unique opportunity to engage those c-suite stakeholders in an honest conversation about what tools are needed for such a monumental task. The ability to aggregate, normalize, predict, and learn across your enterprise of sometimes thousands of buildings should no longer be considered a luxury. We need these tools now. Occupant safety and awareness is paramount to building credibility within an organization and further communicating that to the industry will help our partners be viewed as pioneers of providing safe and trustworthy spaces.

CHANIL: Staying on the topic of the buy-in, talk to us about occupant engagement.

WATSON: Occupant and stakeholder engagement's dashboarding can be a useful tool. It helps create a feedback loop that allows organizations to share things like real-time energy use, product status, green initiatives or post-COVID facility improvements like increased airflow, air changes and indoor air quality sensors with the folks that are actually occupying the building and may have concerns about coming back to work. 🌐



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—Andrew Blauvelt, Vice President, Sales, Atrius



SMART ENERGY DECISIONS INNOVATION SUMMIT

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March 14-16, 2022

The Houstonian Hotel Club and Spa, Houston, TX

Energy Management Strategies to Hit Emission Reduction Targets

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SVP, Enterprise Climate Strategy
Executive, Bank of America



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Associate Director of the Global Energy &
Sustainability Center of Excellence, Merck



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MANAGER OF CUSTOMER SOLUTIONS

Tim Gaghan

(267) 212-4983

tim@smartenergydecisions.com



DIRECTOR OF RESEARCH & CONTENT

Debra Chanil

debra@smartenergydecisions.com



www.SmartEnergyDecisions.com