

Smart Buildings for Sustainable Energy Consumption

PREPPING THE MODERN LANDSCAPE FOR THE NEW "NORMAL" WITH SMART BUILDINGS

VALERIE ST JOHN: Hello I'm Valerie St John. Our focus today on BizWiseTV smart buildings for sustainable energy consumption. It's where climate concerns and the nation's economic crisis intersect, this need to seize control of our nation's energy consumption. But where to begin? BizWiseTV joins you today from Washington DC where we check in with the experts. We start with a visit to the Urban Land Institute for a big picture look at what must be done. The Obama Administration's message to the public sector is loud and clear. Taking steps to cut down on the emission of greenhouse gases is no longer an option, it's a requirement.

RICHARD ROSAN: I think the administration has taken a giant step forward and really acknowledging that the idea of the greenhouse gases have got to be reduced and they are really trying to see how that can be done at all fronts. And we know that one of the big things is that we have to do something about existing buildings.

VALERIE ST JOHN: Rick Rosan of the Urban Land Institute, ULI, says existing building emit nearly half of all greenhouse gas carbons, far more even than the much maligned automotive where much of the focus has been.

RICHARD ROSAN: Retrofitting existing buildings is one way to save enormous amounts of energy.

VALERIE ST JOHN: This is especially the case in some of the nation's oldest government structures, beautiful architecturally and from an energy usage perspective incredibly inefficient. So Congress has set aside \$10 billion to assist federal facilities managers in footing the bill for upgrades, improvements to air and heating systems, motion sensors for lighting, whatever high tech tools will do the trick.

RICHARD ROSAN: But I think we have to do this. Some of these things just have to be done even if they do cost more money. I think a lot of our work right now is to try to show the development community that many of these things don't cost more money. It's just about better planning and better thinking.

VALERIE ST JOHN: Rosan points out that building retrofits have become something of a movement, boosting in popularity as facilities managers realize they aren't so much an expense but rather an investment in later savings. Case in point the Empire State Building, an engineering icon, considered pretty green when it was built back in the 1930s it's on its way to being green again. Thanks to some inventing retrofitting the building will be, get this, an astounding 40% more energy efficient. Part of the process, removing and recycling the structure's 6,214 windows.

RICHARD ROSAN: They've actually assembled a small factor onsite. They're taking apart the glass, they're cleaning it. They're inserting what's called eFilm which is a material that absorbs the UV factor, UV rays from the sun. It actually has the effect of like putting in a new triple glazed window but using existing glass which is important from the recycling standpoint.

VALERIE ST JOHN: ULI's Ed McMahon says ceilings here will be raised to let in more natural light. A state of the art chiller plant on site will generate cold water to chill the air and cut down on air conditioning loads and air handling systems will be streamlined. ED Mc

MAHON: One of the things that I think is exciting about the Empire State Building is it's kind of like looking at this idea of integrated network cities. It's like an integrated networked building. It's thinking about it in a long term sense holistically with a smart system that makes the entire building much more efficient. And if you can do this in one of the most historic and iconic buildings in the world it really makes the case that you can do this everywhere.

VALERIE ST JOHN: But folks at the Urban Land Institute also stress that cutting carbon emissions must go beyond retrofitting existing buildings. After all, says Rason, 2/3 of the structures we can expect to see aren't even built yet.

RICHARD ROSAN: Americans are not aware of this enormous population growth that's going on. Every year we add about the population of a San Diego metropolitan area to the United States, just think about that, so we have to build enough buildings every year to take care of them.

VALERIE ST JOHN: Rosan stresses that land use and planning for compact development will be key in the coming decades. New structures, he says, should be more accessible via light rail and buses. And the buildings of tomorrow should be mixed use wherever possible bringing a greater variety of tenants into one area cutting down on the number of times a tenant is compelled to use a car to run an errand.

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RICHARD ROSAN: We've already probably gotten to some of the limits of what the present systems will take in terms of travel and moving around.

VALERIE ST JOHN: Back at the Empire State Building facilities managers are educating tenants about the impact of the decisions they make on energy consumption. McMahon points out that even small acts of green like having everyone turn off the lights when they leave the office can reduce operating expenses by 10%. ED Mc

MAHON: Little things can make a difference. One example of is that we're all familiar with these new digital picture frames that we've recently come out with. Well if every family in America had simply one digital picture frame we'd have to build six new power plants in the United States and so little things add up. And if you think about all our new digital television sets and all the computers and all the iPods and all the new technology we have, all that means that we're going to be using more and more energy so we need to think about all the little ways while we're using more energy to reduce that energy use as well.

VALERIE ST JOHN: Tenants, he says, should be made to understand how much power they hold at their fingertips. ED Mc

MAHON: It's an all hands on deck approach that it's the building owner and the building tenants working together to make the building work a lot better both for the building owners and for the people who work in the building.

VALERIE ST JOHN: Tough to disagree with that one. Our thanks to Richard Rosan and Ed McMahon of the Urban Land Institute and for more information head to uli.org.

MAKING GOOD ON THE PROMISE OF SUSTAINABILITY

VALERIE ST JOHN: So you're serious about facility sustainability? What's next? The challenges. Our next guest has truly earned the right to say, it's not easy being green, certainly not in government. Paul Brubaker joins us to apply his rich resume as former GAO Auditor, former Department of Transportation Administrator. He was also the second highest ranked IT official at the Department of Defense. He has faced and conquered many of the same challenges many of you will be facing or have already faced. He is now Senior Director with the Internet Business Solutions Group at Cisco which has loaned us to you today. Welcome, good to see you.

PAUL BRUBAKER: Thanks Valerie good to be here.

VALERIE ST JOHN: You often say you see life through an auditor's prism. How do you help public sector officials wrap their brains around these new mandates when they're trying to balance their budgets?

PAUL BRUBAKER: Right well I think you have to understand the culture that they're operating in which is very diverse, you have a lot of players particularly in the area of federal real estate management who are involved. You've got the general services administration. You've typically got the agency itself. Sometimes you have a building owner that also needs to play in this field the GSA may lease the space through so there are a lot of different players. But at the same time just the operating culture of the organization itself really plays a role in how well you can essentially begin to make significant changes to operations while you're operating the organization at the same time under normal policies and procedures that you've followed maybe for decades.

VALERIE ST JOHN: Yes give us an example (inaudible).

PAUL BRUBAKER: Yes a couple of examples. The way federal real estate typically works is the rents and the cost of utilities are all passed on to the individual tenants typically sub agency departments and what have you through an office of administration. Well this office of administration typically takes a piece the overall bill that gets passed out to everybody and that's how they fund their operation. So there's like this perverse disincentive to really lower those costs and do things what the private sector would regard a cost efficient manner. You've got a body of incentives that are playing into this. You've got the typical like I mentioned operating culture, just the way things have always been done. And then you introduce new things like information technology into the mix which will allow you to really understand your costs and control your costs. And introducing those new technologies, those new techniques, those new business processes sometimes get met with resistance and it's usually because there's a specific way of operating and it's hard to deviate from that. And folks liken it to when you introduce new things is to really almost like changing the wheels out on a speeding bus. It's very difficult to maintain the current operations and then introduce fundamental new tools to the mix that would really allow the cost reduction.

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VALERIE ST JOHN: So to some extent it's just inertia. We're used to the old. Why bring in the new? Don't change me now. I love it the way it is right?

PAUL BRUBAKER: True and one organization may have this really great idea that they want to impose or implement. Like for example General Services Administration may say, we're going to green everybody's buildings. But they've got to coordinate that with the tenants. They've got to coordinate that with the tenant processes and the procedures that already exist as well as integrate with the landlords' desires and wishes which isn't easy.

VALERIE ST JOHN: We've got having to deal with the landlords, making sure that everybody is in agreement with respect to what must be done. We've also got this inertia issue. Give us a landscape overview of some of the challenges senior executives are facing in the wake of all these mandates.

PAUL BRUBAKER: Well the legal challenges, sometimes there are conflicting rules, laws, regulations that may come into place. The other thing is just as I mentioned folks are used to operating in a certain paradigm and even the financial management folks are used to treating utility expenses and rent expenses and other expenses as a fixed cost and they never really expect them to be variable from year to year. In fact there's almost always the de facto position is just to increase them over time as opposed to really try to manage them and control them and achieve some cost reduction or some efficiency.

VALERIE ST JOHN: So it's just seen as a line item on the budget. Nobody ever holds it up and says, here is your bill this month, it could be this.

PAUL BRUBAKER: Essentially but that's all changing right now. There is a big movement to green buildings and you saw once President Obama got elected there was a whole movement to how do we green federal real estate. And there are some executive orders that are felt over from the prior administration which really weren't implemented. They came out and they were met with some fanfare but not really having the agencies embrace them the way you would expect them to. Green is here to stay. You can see this. You can feel it in the way the dialogues are going. Folks are looking to now really reduce the operational costs of these buildings and so that I sense a shift in the culture. But understand this is the US federal government we're talking about and shifting this culture is like turning a battleship in the middle of the Potomac River.

VALERIE ST JOHN: Especially when you're dealing with more than one agency. Sometimes you've got to make a change, there are multi-agency tenants within a building.

PAUL BRUBAKER: Yes that's especially true in the regional offices. For example if you go to any of the big major regional centers like Denver, Chicago, New York, Atlanta, San Francisco, Seattle there will be multiple tenants in a building so it does give GSA a little better ability to control. But again the coordination elements of that really are a challenge, you've got to coordinate with every single one of those tenants. Typically that building doesn't necessarily belong to the federal government. It belongs to a real estate company or a landlord so there's a whole bunch of negotiation that goes on with the folks to green that infrastructure if you will.

VALERIE ST JOHN: Let's talk a little bit about that. You have an audience of facilities managers here. What are some of the easy steps they can take right now to begin cutting back?

PAUL BRUBAKER: Sure there's definitely some low hanging fruit out there whether it's looking at your data center operations, almost every building's got some data center element in it, some data operation. Those are relatively easy to green and modernize. The other thing that you can do is you could look at certain technologies that exist today such as replacing your traditional incandescent bulbs with green lighting, even some of the motion-based switching that you have. And then there are some advanced technologies that are coming out and are right around the corner and some which are actually here like energy mediation devices which allow you to get really good visibility into the use of electricity in your building and will allow you to do really interesting things like integrate your physical access system with your electrical system. For example you can take your badge, swipe into the building and it can communicate with the mediator. It'll know that you're in the building and it can turn on your computer, it can turn on your lights, can begin to adjust the air conditioning in your office. But the most important thing about the mediator is it will allow you to establish certain rules and policies around your energy usage that will allow you to really manage your costs.

VALERIE ST JOHN: Excellent, so the idea is to get these systems communicating with each other to make it easy to

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manage and control the costs.

PAUL BRUBAKER: That's right and allow a certain degree of visibility among the facilities managers so that they can actually see their electric usage, their usage of other utilities such as water and others and then really begin to control, understand some of the proactive things they can do to control the costs.

VALERIE ST JOHN: So we know about the big mandate, cut energy consumption by 30% but what else is down the pike? What can we expect to see?

PAUL BRUBAKER: Well you see a use of more green vehicles. In fact the executive order that mandated the 30% reduction also talks about the desire to use more hybrid vehicles and plug-in hybrid vehicles. So you can imagine if you've got a fleet of plug-in hybrid vehicles and an agency fleet how that will impact the electrical usage during the course of the day and particularly around peak power. And you've got to have essentially smart grid technology embedded into the building which will allow you to draw from the batteries during peak power period or to charge during non-peak period. And so that's a whole area of technology that is currently being developed, currently being deployed, currently being tested.

VALERIE ST JOHN: And can we expect to see mandates reflecting that?

PAUL BRUBAKER: Yes I think you will. I think over time what's going to happen is like I say, green is here to stay and the political stakeholders understand that and you're going to see more and more green legislation. You're going to see more and more green-related regulation that comes down over the course of the next four to eight years regardless of frankly who's president. I think green is here to stay.

VALERIE ST JOHN: All right.

PAUL BRUBAKER: Folks are really tuned into this.

PAUL BRUBAKER: Excellent place to end. Paul Brubaker, Internet Business Solutions Group thanks for joining us.

PAUL BRUBAKER: Thanks Valerie, happy to be here.

VALERIE ST JOHN: And for more information head to cisco.com/go/ibsg/publicsector.

MAKING DISPARATE SYSTEMS CONNECT AND COMMUNICATE

VALERIE ST JOHN: Meeting the challenges of mandated conservation carries a huge set of considerations. For starters how do you get a handle on how much energy your facilities and their attendant systems are consuming right now? And how do you come up with an effective plan for making dramatic cuts? BizWiseTV's Robb Boyd joins us with a streamlined approach for tackling some of these challenges.

ROBB BOYD: Thank you Valerie. I'm joined in studio with Nick Chong who is Director of Product Management in our emerging technology group. Nick thank you for being with us.

NICK CHONG: Thank you Robb.

ROBB BOYD: I'm curious. This is the thing. We're targeting these buildings be it new or existing buildings as being inefficient users of energy these days. And you would argue that there are a lot of systems in the building that with a little bit of tweaking from a communications standpoint we can reap huge benefits from them from a savings standpoint. But first I don't even think we fully appreciate what systems are found in a given building. Can you help me understand what we might not be aware of there?

NICK CHONG: Yes sure. I think one of the things that we're highly aware of, the things on the building today are things that are IT-related right for example the PCs, the routers and switches. But there's a whole category of subsystems out there in the buildings that really tax energy. The big ones like HVAC hitting ventilation air conditions.

ROBB BOYD: Absolutely right.

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NICK CHONG: Lighting, electrical power systems and more recently the introduction of the newer technologies like sustainable systems out there for lighting for solar and fuel cells and all these wide area subsystems in the building.

NICK CHONG: So we have all these systems that use a lot of energy. What's the secret here? What is the challenge as far as getting control of these? Do we just need to raise the thermostat a little bit and we're going to get everything we need as long as we can make everybody uncomfortable or is there something more?

NICK CHONG: There's definitely something more. The truth is all of the system can act and function as a silo system, you can raise temperature of HVAC on its own. The challenge is really how do you bring all of the systems together to allow them to integrate and to allow them to communicate with one another. By doing so you will bring in much more intelligence into the system as a whole and much for efficiency that can carry across all the subsystems if you can just integrate and communicate.

ROBB BOYD: Interesting all right so I want to get into that more but help me understand what kind of information are we able to glean out of these systems because obviously the information's there. We're saying, it's not a lack of intelligence on the individual systems, you're saying, it's just a communication issue. But what kind of stuff are we seeing there and then what do we actually do with that information?

NICK CHONG: Yes so there are essentially three sorts of information that you can pull out. The first is usage. How much is being used? Whether it's a lighting or whether it's a power system how much is being used? The second it's accountability, who is using it, who is actually using it? And the third is efficiencies, how well are they being used? Are they being used at the right settings? Is there one side of the room that's heating, the other side is cooling that's causing an inefficiency across the room?

ROBB BOYD: So it's almost just an awareness that can go a long way right? I mean that's kind of seems to be a big movement now which is once you know actually how much energy you use then all of a sudden you become a much wiser user of that energy. But in combination of these things are we talking about let's get specific here, how are we actually doing this? We're talking about a product that Cisco's offering some sort. What is that product and how is it going to start doing these things?

NICK CHONG: Yes so that's great. Similar to what we've done in the days where we created a router before where we've been able to bring in integrate IT subsystems from the (inaudible) world, the Apple and the IBM world, we have introduced a new product known as the Cisco network building mediator. Incidentally it's bringing all the subsystems as I've mentioned in HVAC lighting, cooling, electrical systems and bringing along to get integrating it and allow them to communicate. The way it works is actually quite simple. The product itself is designed to allow you to start easy. There are five phases of implementation to that. The first one's simply to get you the measurement collecting all the meters and all the sub meters. The second is to create a dashboard where you can now see and visualize and get accountability on who is using what and when. The third piece is to tie all the subsystems together in your building and your IT to allow them to have more intelligence and more efficiency driven from IT to your building systems as well. And the fourth one is to be able to create logics among themselves. If someone swaps a batch at night what would you do to the electricity or and what would you do to your lighting? And then last but not least to allow you to offer some cloud services above that for energy saving cloud services, energy management and demand response services on top of that.

ROBB BOYD: Now this sounds like something that can be used with both new buildings, obviously Greenfield opportunities, but also existing building as well. So someone that's got a building that's old and is using these systems, it's not that they can't reap benefit out of this as well correct?

NICK CHONG: Yes absolutely Robb. The architecture we have designed caters for both what we call Brownfield which is existing building as well as Greenfield which is for new buildings and new cities to come.

ROBB BOYD: All right what is the actual benefit someone can get out of this because I think sometimes we get carried away to be green and to do things in a better way. But quite honestly if there's not going to be some distinct measurable benefit I don't know that too many people are going to make an additional investment in this area. We've had customers using this before. What kind of results are they seeing?

NICK CHONG: Good question. There are two aspects of ROI and savings that you can get out of this and they're quite clear cut. Foremost is CapEx. In particular when new buildings are coming up imagine now you can remove all those stand alone Gateways to bring all the subsystems on to the IP network. By using the mediator you have a

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multi-protocol, multi-function Gateway that is IT-enabled to bring all the subsystems in. The cost savings is about 50% just on the CapEx side of the house. Then with both existing buildings and newer buildings the other savings you can get out of that is all the Opex savings from all the energy savings and all the energy efficiencies that you can get out of that. Either because of education, the user's being more educated or being the system being more automated to allow the systems to be more efficient.

ROBB BOYD: I want to make sure I understand how this works because and make sure that it's clear this out so I'm going to practice on you for just a moment. The idea is we've got islands of systems that are speaking their own language. It's not that they lack intelligence in and of themselves. It's the fact that they're not able to share that intelligence. We are saying that if you take an existing network that's probably already there in every building and IP network that's you're using for data and communication now we can add this element on to the network. The mediator that you speak of is going to handle the translation so we can now expose that data and actually make more use of it and it's translating into significant energy savings. You said 30%? I don't know if you called that number out in terms of what people could expect?

ROBB BOYD: Yes for Opex savings our customers have seen anywhere from 10-30% savings.

ROBB BOYD: Now I like anything that allows us to be able to actually pay for itself in that situation so this sounds good. If someone wants to get more information, if they want to get more technical or anything beyond what we've covered today where could they go for more information?

NICK CHONG: Best way to get this information is www.cisco.com/go/mediator.

ROBB BOYD: go/mediator, I like it. Nick thank you so much for spending time with us.

NICK CHONG: Thank you so much Robb.

VALERIE ST JOHN: Our thanks to Robb and to Nick Chong for joining us for that segment and that's our show. I'm Valerie St John from Washington DC. Thanks for watching BizWiseTV, smart buildings for sustainable energy consumption.