Boston Data Center Focus Group Two June 2, 2015 @ 1:00 PM

[TRANSCRIPTIONIST’S NOTE: At times, there was audio interference where dialogue fader in and out.]

MALE1: May name is Sam. My company is a multi-tenant data center colocation provider. The industries we typically serve are enterprise customers in highly regulated industries like banking, financial services, health care, federal and state government. My role in the data center process is I run product development and compliance. I don’t do site level operational management but I’m part of the decision process for the design and review and approval of equipment purchasing within the facility. We do this for three sites today in the U.S.

MOD: And we’ll go on to Dave.

MALE2: Dave, I manage one data center from an operational standpoint, day-to-day activities, and then out of equipment, I have input in the decision-making process. The industry is higher ed and number of data purchases –

MOD: Yeah, how many data centers do you –

MALE2: Just one, with a variable number of satellite closet server, base servers, around campus that we’re trying to consolidate at this time.

MOD: And David?

MALE3: Yes, David number 1, I participate in decisions while purchasing equipment for the data center. I participate in decisions about servicing or maintaining equipment for the data center. We have one primary data center. We have smaller DR data centers, DR sites, we have 50 plus IT closets and the primary data center is 75 hundred square feet.

MOD: And what industries?

MALE3: It’s higher ed as well, higher ed medical.

MOD: Higher ed medical, okay. All right, I think I have a behemoth over here.

MALE: A behemoth? Is it too much to disseminate?

[Laughter]

MOD: After you ask the question, like I don’t know how many I have. I had to assume it was a lot.

MALE4: Yes, I participate in decision and decision and purchasing, maintaining equipment – yes. How many data centers and server rooms do we have – in excess of several hundred, I would say? It’s more than one data center. The only data centers I’m involved in currently myself, four on the east coast. Majority of data centers are over 10 thousand square feet, all of them. The average number of racks exceeds way over two thousand. How many servers are there in the organization as a whole? I checked off 50 thousand but it’s probably different; it’s a very conservative number. What type of data centers, basically all the above server rooms, enterprise, cloud, high performance and multi-tenants, colocation with hosting facilities as well. With sectors, data centers, all of the above, IT services, energy, utility, media, telecommunications, banking, healthcare, education, colo shared and so on. We touch every segment of –

MOD: Of the universe.

MALE4: We’re considered MOW, most of world, and definitely in all 50 states in the union, and most of the free world. Yes, the current facility in Watertown, was built five years ago.

MOD: I’m going to stop you there and we’ll get back to some of the things you talked about later, okay? So just to get us going, tell me quickly what are the top two factors you consider when setting up a new data center or doing a major upgrade. So if you haven’t done one lately just imagine though if you were going to either build a new one or do a major upgrade on an existing data center, what would be the top three factors that you’re going to take into account in your decision making? Anyone want to start?

MALE1: Yeah, I’ll go. There’s three factors, one is availability of power, how much power do you have, how many utility feeds, how diverse? And what are the expansion capacities there? Power is key. Second is network, if I’m building a brand new site, I’ll look for what is the availability of fiber connectivity and network access to that site. If it’s a retrofit, an upgrade, then are there ways to bring in existing carriers, upgrade network connectivity and so on. So power network. And the third is all of the critical facilities and can we then do additional things like cooling and do we have room for staff. How do we do security around it? So there’s other considerations like that but those are the top three.

MOD: Thanks. Things to add? Things to repeat?

MALE2: Cost, cost basis. These are a big factor for us because we’re a nonprofit, so the bottom line is very important. And also reliability is a huge factor for us. We really are on the bleeding edge of technology. We usually will come in once it’s been established and has been a proven provider.

MOD: Okay, anything else?

MALE4: A lot of the other stuff.

MOD: A lot of the other stuff.

MALE4: I will add to that, our facility is only five years old but we built a larger facility at the expense of making it a low density facility. So the way our growth rates have moved forward because of virtualization, we’re only at 30 percent capacity. We don’t think that we’re actually going to grow much more than that. But what we have a need for now is high density cooling storage, so storage growth has been exponential and because our facility wasn’t built for high density cooling, that’s where we’re kind of having to juggle things. So I think if we were to do it again, it would be a smaller facility but with capacity of high density.

MOD: So, capacity and anything else?

MALE2: Yeah, high density cooling. Yeah, cost is absolutely critical for us as well.

MOD: [Jim]?

MALE2: I’ll go back to some of the points that Sam had brought out here. First of all, we won’t all get location geographically, we’re looking primarily at cost of energy, fuel costs, availability of fuel, and availability of power are key factors geographically where we’re going to build a data center again. Business needs are going to dictate a lot too on that, what type of businesses we want to serve, whether it be collocating – or we’re going to build internally for a company, has a lot to do with location.

MOD: Might make a difference based on that too. So I know, at least you mentioned around the periphery of power or energy, at least in terms of supply and reliability of supply, does energy efficiency enter into this as an important factor? Or is that a less important factor in terms of –

MALE: It’s a huge factor.

MOD: A huge factor, how about you, Sam?

MALE1: Yeah, so I think qualifying that cost of power is a key driver for the data center operation in terms of ongoing operational costs, power expense is a very big part of it. As far as the customer base we serve, financial services, government, there is an increased push on having more environmentally friendly sources of power, not just lower costs of power, but sources of power. So for us, our biggest challenge is to find a tradeoff between getting environmentally sustainable energy sources but doing it in a cost effective way. We’re not going to do green energy just for the sake of being green. We’re going to do it where it makes economic sense.

MOD: Okay, Dave?

MALE2: I think our advantage is that we’re able to look at it from a broader perspective than just the data center because our facilities management group handles our power. So it’s not just our department, it’s the whole university, it’s all the buildings, it’s everything else. So we’re able to leverage that Green Grid, green initiative a little bit more effectively across the whole campus. But yes, we’re constantly looking at ways to try and save power and we have just recently upgraded all of our rack units to more efficient, blower driven, ramp up for the need, and ramp down when the need’s not there. We’re actually just rolling those out, they just went and got permission a week ago.

MOD: Okay, and David?

MALE3: Our data center was built specifically to be a green computing environment, we have a four hundred percent air site economizer. Our cooling costs are zero for three-quarters of the year. On the electrical side, we went with flywheels which is supposed to be more green than batteries, but operationally we found out that the cost for the flywheels with maintenance is triple of what the cost for operating batteries are, so that’s something that we’d really never do again.

MALE: Really? I find that interesting.

MALE3: Yeah, the higher the load on the initial wheels, less time you have to transition over.

MALE: Even with the changeover of batter.

MALE3: So we built our data center in two different transitions, so two different phases. Thank you. The first phase was done five years ago, the second phase done three years ago, and a five-year warranty on the flywheels. We lose one flywheel approximately every six months on average. At the end of that five-year term, which is coming up now, the maintenance cost is 50 thousand dollars for one year. So we’re looking at another couple of years down the line, we’re looking at a minimum of a hundred grand a year for maintenance cost on flywheels, which -- the biggest problem we’ve found with the flywheels is that there’s only one company that’ll maintain them, as opposed to ten different companies that can maintain battery banks, there’s only one company that will touch flywheels and they push it as an added cost out to generators, you have to go to fast start diesels. So it really pushes the reliability, yeah. So it was more cost on the outset, more cost to maintain and it always makes me sweat when we have a power event, like I count one-one thousand, two-one thousand, three-one thousand, so like if that’s 15 seconds worth of power –

MALE2: The Massachusetts Coalition for College is out now.

MALE3: The Green Grid in Holyoke.

MALE2: It’s the exact same issues you do, design build on that was a company I’m very familiar with, I just did a tour of that facility about a month ago, 7x24. And the exact same issues presented themselves as David, that you were speaking about here. Flywheel technology is alternative but it doesn’t come anywhere near meeting the UPS battery backup systems, especially environmentally sound batteries like UG batteries that are sealed. You’re not dealing with liquids, you’re not dealing with the issues you have with higher energy gases and so on and so forth. Also bloom energy power cells are definitely a big one, depending on the capacity you’re looking for, smaller data centers, 30 thousand square foot facilities and what not. AT&T has been using it, but they don’t use that --

MOD: I didn’t even hear what you said.

MALE2: -- have been incorporating those into some of their smaller facilities that are coming online recently.

MALE1: I think the direction, also to agree with you, is that you go with – Tesla made a big announcement about the power company.

MALE3: The first thing when I saw that, I was talking to our electrical engineer and I said – we think one of those Tesla battery modules would take up the same space as the flywheel module? Exactly what we’re thinking about is pulling the flywheels and putting Tesla batteries in.

MALE2: That’s why you would want more time to transition over to your engines. I mean, we’re looking at engines today that can be online fully on the plus in 18 seconds. We look at some of these engines that some companies who did some presentations today, like Compass and whatnot, the technology for diesel engines has become so reliable and the start times, especially the compressed air solution for starting –

MALE4: Caterpillars come online in five seconds.

MOD: Well actually, it’s important for later on but I want to lead up to it and we want to have another discussion, so it’s very interesting and valuable what you’ve been saying.

MALE2: I find this guy, I think he wants to be argumentative.

MOD: I’m going to segue though, to something that’s related here, which is, who do you go to, to get reliable information about technology that you choose? And then in particular I’m interested – we’re focusing on energy efficiency here, so particularly technology that would improve your energy efficiency. Who do you go to? Who do you trust?

MALE2: We have other facilities engineers.

MOD: Other facilities engineers, okay.

MALE: Other than Mike.

[Laughter]

MALE2: And Gartner is a resource that I know the university uses quite a bit.

MOD: So Gartner is a consulting group? What are they?

MALE: They’re analysts.

MOD: Industry analysts, okay. So you trust them. Okay, who else?

MALE3: Along the same vein, Uptime is another industry analyst that people listen to. Peer groups and industry groups like this – like as an attorney for Ascom. This is where you probably meet your other facility engineers. Networking peer groups, vendors that come in and do a lot of show and tell.

MOD: Are they trustworthy?

MALE2: I would say we take everything that a vendor says with a grain of salt, maybe two.

MOD: You talk to them.

MALE2: Yeah, you want to hear what’s going on.

MOD: They wouldn’t be able to vet everything for you.

MALE2: I’d say it’s a 50/50 – technology on vendors.

MALE4: In my particular case, I think networking with other industry leaders would be educational, depending again exactly what – we more or less do what we call pursuit situations so looking at that to service particular needs, whether it’s medical needs, whether it’s the financial industry or the education industry, a lot of times we’ll get into consulting with those different people. Some of the finest design engineering firms are right here in Boston, Massachusetts, we’ll consult those. And then of course, being the mega company that we are, we have our own laboratories that we consult. And I think you can think of some of those names without mentioning who -- laboratories [inaudible due to simultaneous dialogue 22:04].

MOD: Other engineering firms?

MALE4: We talk to them to do group of concept –

MOD: How about people that use – maintain the system, do you get information from them about –

[Laughter]

MALE3: I like to talk to the guys who come in to do the annual maintenance, I always talk to them, that’s why I learn a lot about the flywheel, I talk to the guy who does the annual maintenance. You know, just cheap s\*\*t and buy the guy a cup of coffee and he spills the beans.

MOD: Okay.

MALE3: That’s a good resource, David, I’m finding myself more and more that the OEMs are starting to fall short with having the fuel technicians that actually know their technologies to the extent that they should. Sometimes when my own in-house personnel having to teach these guys to write a simple Bitmap register map, and then upload it and I’m paying big time. I had one team, I’m not going to mention names, I had for a week and a half two men who were just sitting there scratching their heads, they couldn’t figure out how to upload a Bit register map because they didn’t have serial port cable to fit their device. Told me the only cable around was a Trinidad, yeah.

[Laughter]

MALE3: So to the point I can’t rely on the OEM service people to provide me with a great deal of reliable information. And then again, there are the – that are very competent and very capable and know their product. But I’m going to argue the point and I just had this discussion with two major suppliers down at the symposium. From a manufacturer standpoint, when this costs hundreds of millions, tens of millions of dollars in product and I call for warranty service or I have T&M on it or I’ve got a service level agreement, that their field technicians aren’t necessarily up to speed with their own products, and that’s a big problem. That’s a big problem for us as the end users in a mission critical environment. So they really have to start coming up to speed with training their field technicians in the appropriate disciplines and providing the end user with that type of service.

MALE4: I think they’ve gotten very much like robots. The plug and play device, you know, push/pull for drive or power unit. Anybody can do that. We choose not to. We’d prefer to have the vendor come in and do that.

MALE3: Plug and play repair. But as long as it’s beyond that, it turns into a really big time consuming process to get to the bottom.

MOD: So that creates a problem if you want to do something cutting edge, who you going to find for feedback on that? Can you get reliable estimates of energy use from the sources that you have?

MALE4: In our facilities?

MOD: If you’re going to install a new piece of equipment, can you get reliable assessments of what the energy use is going to be and potentially what the energy savings are going to be? Or is that not that available?

MALE4: I do real time energy monitoring so we make changes to the system and observe.

MOD: So once you have it, what if you’re talking to somebody and say – well, what’s this going to save me? Can you get good information?

MALE4: I think the manufacturers are terrible on the specs on what they provide us. I think it ends up being a range and if you really push them for it, and I’ve gone through this from the [decent 25:44] level to specific manufacturers. I can’t get a straight answer. Tell me what it’s going to do at 50 percent utilization, tell me what it’s going to do at 75 percent utilization, tell me what it’s going to do at 90 percent utilization. Nobody, nobody will put a hard number to it. I have worked this in many different sectors, most recently with lighting retrofit [at a quarter of a million square foot 26:11] facility, and I think my best reliable resource for getting those calculations was from the utility suppliers themselves, giving me numbers that were more or less closer to the fact of what my savings was going to be for whatever. But again, you’re true, with sliding scale, you’re looking at a massive building going from standard fluorescent eight-foot tubes to LED tubes with a huge reduction in kw but at 20 percent lighting levels, you start to bring those lighting levels up, that curve actually changes. To be able to plot that accurately isn’t difficult in itself but different numbers involved. So I would go back to my utility and get the numbers because they’re the ones that are giving us a discount.

MOD: Well, they do have that investment in it, that’s for sure.

MALE2: And I would agree with David that the real time, what’s actually happening, get some trending, you know, develop some patterns off of that, once you have it, you have it. Nobody can take it away from you.

MOD: How about you, Sam?

MALE1: Yeah, I mean, I think decent crews so I think, you get real time reporting around it. When you’re doing a commissioning process, you get to see some level of what efficiency would be at that level. But that doesn’t mean that’s how it’s going to function operationally when the system’s in production.

MALE4: Let me just add some input into that. We’re constantly on a 24-hour basis looking at the power utilization calculations and in all our centers nationally. So we look at that number and we put it collaboratively together to see how effectively across the board with all operations across the country.

MOD: Well, it sounds like you have lots of points of comparison. That’s for sure. So from the questionnaire that you filled out here, I know that, I think you told me in the beginning but of course I’m not sure now – how many of you – I want to know if you lease data center equipment and facilities, say if you mostly lease and own or if you only own, because these next questions have to relate to that. You do both? And how about you?

MALE: Do both.

MOD: Both, and Dave, do you just own?

MALE2: We primarily own.

MOD: Primarily own.

MALE2: We will lease equipment periodically.

MALE: We only own, we’re not allowed to lease.

MOD: So we have both, and the owners here. When you lease equipment, we’ll focus on that first.

MALE1: Well, I should qualify, we don’t lease equipment, we own it. We lease it out.

MOD: You lease it out. Well, that’s also fine – this all applies, either you’re leasing it to or leasing it from, okay? So when you lease out your equipment, so we can concentrate on that, are the charges that you make to those that are leasing the equipment, about energy, are they based – do you charge based on just the rack base or do you charge on energy costs? Or what do you structure those charges on, is what I’m trying to get at.

MALE1: Okay, so there is a PUE metric that takes the overhead and distributes it out. And this is an interesting one because when the facility is not full, the initial customer probably bears the brunt of the load, right? And so I think there is – we have some accommodations for that contractually until we get to a steady state where you could then allocate it across everybody in a more fair share way.

MOD: I see.

MALE1: In terms of the actual metering for power, we have customers that either do actual usage of power consumption, and then we also have situations for smaller ones where we’ll just give them a flat rate.

MOD: Flat rate, okay. And how about you, Jim, similar?

MALE2: We’ll do watts per square foot primarily but we’ll also do metered power, and the watts per square foot would be based on what the actual building design is configured for.

MOD: And in terms of who decides on upgrades and so on, then are you the one to decide if a facility needs new equipment or an upgrade in some form?

MALE2: We do different major entities within the corporation. We have CRE, which would be corporate real estate, would make those upgrades to the physical structure of the building, the grounds, infrastructure, backup generators. We have what we call the GTSO side which is the IT side, so it’s like two different entities which would make an upgrade to server racks.

MOD: So the specific data center equipment?

MALE2: Right.

MOD: How about you, Sam, who designs?

MALE1: Yeah, similarly we have various functional units, whether it’s security real estate and so on that have input into what gets upgraded and when. But if you draw the line between provider and tenant, as a provider we’re making a majority of the upgrade decisions. There are certain tenant improvements that some customers are entitled to and in that case, they would determine the schedule for those.

MALE3: I’d like to go back to that, we also have two different operations. We have, in the web hosting site and industry, we have managed services, we have client services, client managed services, so depending on what the client wants to come in at, if he wants to manage his own equipment one hundred percent and upgrade it, that’s up to him, that’s how we write his agreement. Or we’ll pay [for] an enterprise service, which is fully managed by the corporation and everything is taken care of from soup to nuts, they don’t have to come near the place. So that upgrade –

MOD: Hands-on, okay. You have both of those arrangements, as well?

MALE3: Yes.

MOD: As well – I know which one I would take.

[Laughter]

MALE3: Very hands on every day, right?

MOD: Every day there with my rack. Is your data, for all of you, so is the data center run as a single organization with one budget? It sounds like maybe not, from what you were saying, Jim. One team, one boss, or do you have separate budgets, teams, bosses? I’m trying to get at you know, are there silos, separation of who’s responsible for various things? Or is it all housed one place?

MALE3: Our data center is owned and operated by the facilities and engineering group and IT pays money into the bucket [inaudible 33:09]

MOD: So are you for instance aware of how much money that is in your position?

[Laughter]

MALE3: We have the electric bill, it’s almost like a direct path to cost but the accounting part is all done, the facilities side.

MOD: So you’re well aware of what it costs. How about you?

MALE2: We’re more of a single entity from the management standpoint but because we’re trying to pull in all of these other devices, like we have a high performance computing center and they’re their own little entity even though they’re part of CIS. Their hardware, their team managers that will keep an eye on it. We’ve told them if it goes up in flames, we’ll power it off, stuff like that. But for the most part they’ll manage their gear and their own little silo within the data center. But more and more of the departmental stuff is falling under our control. And academic as well, which is the big change for us because we were primarily administrative originally.

MOD: But now that would be –

[Laughter]

MALE2: It’s a big challenge.

MOD: How about on your side?

MALE4: It’s huge, it’s as big as the federal government, we have east coast, Midwest, west coast, we have rural. We have various different budgets within the organization for EDH&S as it has its own budget, created its budget west coast versus east coast. Everybody’s working on a different budget, varied numbers. From my standpoint, particularly with my operation here, I get to see site specific budgets for overall operations, on the facilities side, not necessarily the IT side. Lots of different budgets, different organizations, different managers, so it’s big.

MOD: It’s big and it’s complicated.

MALE3: We have a relatively straightforward process, the data center is a business line for us, the colocation service, so it falls under a single P&L, there are allocations for real estate, for land that we may take from the corporate entity and so on. So those are internal vendors and then we have external vendors, where we [inaudible 35:17].

MOD: So you’re pretty aware of what’s being spent?

MALE3: Oh, down to the penny.

MOD: Okay, how many of you have recently made major investments that improved facilities, your facilities’ energy efficiency? Have you all done this fairly recent.

MALE: Yeah.

MOD: Yeah?

MALE: Yes.

MOD: Yes?

MALE: Huge, big time.

MOD: Somewhat, it sounds like. Just reach back as recently as –

MALE3: It was built as an energy efficient data center so that was like criteria number one was energy efficiency, so there has been tweaking of the system to get closer to the design goals, is what has happened, so the engineers and the architects they said – the design goal for this data center was a PUE of 1.2, we’re actually running on 1.4, so there’s been tweaking, as we understand, of the system and trying to understand where the losses are to get closer to that goal.

MOD: What else have you guys been doing in terms of improving facility energy efficiency? Can you tell me one story.

MALE4: We did, just recently about a year ago, actually a program I started about five years ago, looking for energy reduction money everywhere I could, working with – it was End Star, it’s now Ever Source. I like working directly with the local energy suppliers as much as I can. Being a large company, the corporate operation likes to do things on a national scale. Sometimes it’s more effective to do it locally with some worker. I opt out for that. I introduced a lighting program to reduce energy costs for lighting in the building. Eventually that evolved because of technology changes in the last three years with how we do lighting. And the company as a whole adopted a program that I launched here in Massachusetts with a major manufacturer who wanted their distributors to retrofit every piece of real estate in the continental United States. It’s a company which is vast, the LED lighting program is phenomenal. Huge cost savings, I can disclose part of the program which is that we can give back one half of the total watt savings to the company. They actually take ownership of every lighting fixture that’s owned by the corporation and all the facilities that are retrofitted so there’s no managing, there’s no preventive maintenance involved for the company. We actually turn over ownership of every lighting fixture in every facility to this company so they own them, they maintain them and they service them as required. The interesting thing about it is we can adjust the lighting intensity throughout the entire facility, with just one phone call to an observation center, any given light, a single light, whatever in the facility we can have adjusted to our needs or our clients needs as required. We’re basically running this giant facility in the Watertown case here in Massachusetts at 20 percent of what its original lighting scheme would be, and actually getting the same coolings as we would from [inaudible due to low volume 38:28]. So, we’re saving huge amounts of money.

MOD: And primarily, well it sounds like there are a couple of reasons, certainly saving money, but also the maintenance part which probably also saves money, but also is convenient.

MALE4: And the program to kick back the cost of one half a kilowatt through the parent company [inaudible due to low volume 38:50]

MOD: Sam, give me an example of something you’ve done, some technology you’ve installed and why you did it.

MALE1: Yeah, so lead and getting lead goal type certification is a differentiator for us as a business, so our North Brook facility’s lead goal, some of the features we’ve done with lighting, very similar, use the power over Ethernet for example and then use that kind of cable mechanism to consolidate how we power the lighting, variable sensor-based, occupancy-based, so very highly efficient. There’s things we did with our retrofit, we have an underground bunker facility in Pittsburgh. We retrofit that with geothermal chilled water closed loop cooling mechanism and that is a highly energy efficient stocking but a PUE design, that design is a 1.08 PUE. And all it runs on is a single pump with [one for 39:50] redundancy. And so things like that around energy efficiency make it very, very – that was a big capital investment goal, run the entire closed chilled water, closed loop.

MALE2: Can I ask, what is the source of the –

MALE1: Yeah, it’s ground table, underground aquafer and water table below the surface so we just take that from a constant ambient temperature. It has a slight grade to it so it slopes and we manage that [with barbs and dams and so forth 40:20].

MALE2: [Weston Properties] just built a 700 thousand square foot facility up here in Western Massachusetts, [up here near the quarry 40:29], at a depth of 35 feet year round, it’s phenomenal. I mean they have some concerns, they have some chemical treatment class in Southwick.

MALE1: Sure.

MALE2: I’m sure you run into that with the ground water, there’s some obstacles, nothing’s a hundred percent.

MALE1: Yeah, we do filtration, we don’t do treatment. Because it’s 220 feet underground, highly insulated, a rural area, nobody else is out there doing anything, so that’s a pretty easy system to go around. That was one example of a major investment. We’re also looking at other things.

MALE2: Can I ask you what the ROI was on that, research to commissioning? You got a free source of chill water there so you could get the return on investment in what, three years?

MALE1: So I have the numbers. I can tell you that in a couple months because we’re putting in for some awards and I want to get that all set before we come in and talk about it publically.

MALE2: Great.

MOD: Let’s here from Dave here.

MALE2: So I inherited a 25-year-old CRAC units, 25-year-old PDUs, 20-year UPS system.

MALE: What’s the UPS?

MALE2: It was APC. And my operators actually operated in the data center with all that.

MALE: Wow.

MALE2: So we’ve done quite a bit to isolate them. Yeah, 30kVA was the original UPS that we had, and that’s in to support the whole data center.

MALE2: We didn’t even have a generator when I first went down there. Okay, so we now –

[Laughter]

MOD: Steps in refurbishing it then?

MALE2: Correct, so we’ve got all new CRAC units, like I said earlier, we just bumped all of our 20-year-old CRAC units and for what it’s worth, those old CRAC units they ran and ran and ran and ran, you’d just have to change the belts. But from an energy efficiency standpoint they were horrendous.

MOD: And so you chose some high efficiency CRAC units?

MALE2: Correct, and they’re all communicating and [inaudible due to audio interference 42:37]. Yup.

MOD: And the reason was money savings, what else?

MALE2: Just 25-year-old technology, I mean, that was a bang for the buck for us, very easy to –

MALE4: My experience with that and I’ve converted a lot of static driven 10 horsepower, CRAC units, 30-ton units, [BFDs 42:56], and of course with a huge savings in kw, 24/7 operation, but the maintenance also goes up tremendously. I mean you’re not changing out belts, changing out filters, minimum hertz without – they’re not cranked up to full horse power. So the curve is energy, maintenance curve is phenomenal when you start to do that. I’d like to point out one thing in discussions. All of these energy conservation methods and procedures and initiatives that particular, personally, that I launch. I launch, as I said earlier, I try to keep it focused locally with my energy supplier. I find that working with them one on one is the best way to get the best ROI, best return on investment and get the corporation to agree to do it rather than going on with a big company, you always have these people up here who want to do things on a national level, ever get done, talk to the grass roots guys. Doing it at the grass roots level, things get done. I’ve actually seen it work in reverse where I started at a grass roots level and the corporation adopts it, like they did our lighting program.

MOD: So, do others --

MALE1: I think that the grass roots has more boots on the ground.

MALE4: Yes, you do.

MOD: -- agree that your local utility or whoever supplies your energy is a good partner to work with?

MALE4: One hundred percent.

MOD: So I see Dave nodding and David, Sam and I’m not sure about you, David.

MALE4: So our data center is supplied by the local utility, municipal, which we don’t consider them a partner now.

MOD: So now I guess it does change.

MALE4: We’d much rather have a regional partner.

MALE4: Yeah, I think the reality is that you can find a local partnership and campaign that’ll work and you may be able to just give it up. The opposite is true where you have a national idea that doesn’t quite work for you locally and then you can’t improvise.

MALE: Exactly.

MALE4: So you can have the best idea but have no way to put it in. Much better to have a workable idea at your level than just give it up.

MALE2: I’ve got programs where I’ve initiated locally and got corporation to fund and before I can get it kicked off, the corporation will pull back the funds and I’m sitting there like – stock is on the loading dock ready to ship, where’s my money, you know?

[Laughter]

MOD: Can you turn your questionnaire over to the back, you remember this long list of things. I just want to talk for a minute about anything that’s – a couple of things, and I’m not looking at them. Have most of you used most of these?

MALE: I think so. I had one question.

MOD: Technologies.

MALE4: I had one question for David 1.

[Laughter]

MALE4: On your high density racks, the storage area there, you talked about how your density ability was not high enough and so you’re taking more space than you had with the quote, unquote, the phantom rack situation. Why would you think that you’re densing up your servers?

MALE2: It’s storage. Researchers. Research data.

MALE4: You’re right, I mean, sure. You could sort of make that more distributive, right? I mean, does your rack have to be – the question I’m asking is – historically what it seems like, my customers, when they come in and they say can you do 20 kw a rack? You’d be like – yes, we can but the average rack is two or three kw, right? So the question is what is driving that requirement and historically they’ve gotten pricing by the square foot. So they’re saying – if I’m paying by the square foot, I’m going to load up the square foot as much as I can, and that’s driven the density of the rack. But if you’re metering by power and if you’re metering by licensed kilowatts used, it doesn’t really matter.

MALE2: Right.

MALE4: So with our new power model, when we explain that to customers we see them spreading things out a little bit more.

MALE3: And that’s good as long as you’ve got the space to expand. As soon as you run out of space to expand, what happens then to that model?

MALE4: Well, we keep building, right.

[Laughter]

MOD: That’s one solution.

MALE4: I mean, if you have that luxury, you know.

MOD: Right, right.

MALE4: And that’s where I think that over time the whole premise is that the buffer capacity in a colo kind of environment can offset the ups and down spikes in your enterprise growth or variability versus trying to do senior planning and enterprise data center, and that gets you there.

MALE3: So a lot of what we see in the research environment is the researchers, they just work with massive data sets. They go out and buy storage, they’ll buy two, three petabyte storage. So it’s sold as a rack solution, a solid wall of storage and it’s like – can you break this up? No, it’s sold as a rack solution. So it’s not unlike the computing stuff. It’s not on the VM side, VM is all over the data side, it’s actually just on the research storage side.

MALE4: And I think this even if it’s awkward to find storage is going to change that model.

MALE3: It definitely is changing that.

MALE4: Right.

MOD: So let me retreat to the back page of your questionnaire and what I’m interested in finding out here is about anything that you don’t use or you wouldn’t use again, and why. And what are your favorite things that you have used? So those two questions, you can start with the positive or negative. Let’s start with the positive things you just think are the best things since sliced bread that you have used in these technologies or that are just so standard you never even think about it, I guess. Like you’ve checked everything.

MALE4: You know, this is so across the wide spectrum of things, we employ just about everything you can think of in the industry as far as standards. Isolating hot aisle, cold aisles, applications, definitely. Blanking panels are a hundred percent, it’s a big push in IT to make sure that they’re in. It’s a huge energy savings. I realize that closed server racks, you have strip curtains, yeah, we comply to what we call BTS build conditions usually. So we want to stay as flexible in those structures as we can. Do we see map software, absolutely, we probably invented that.

MALE: I invented that.

MALE4: Temperature set points, we’ve come a long way in ten years with raising temperature set points, so today we’re pushing the envelope on space temperatures because the technology is changing in servers to that extent. We have VFDs everywhere, everywhere you can incorporate a VFD absolutely, hanging units, CRAC units, heat exchange for energy efficient air handling units, we employ that when we can in climate zones where we can do it. Modular facilities design, absolutely --

MOD: It sounds like, these are pretty much –

MALE: Your got to have that, pretty much.

MALE4: -- all the way across the board.

MOD: -- all things that you use or maybe never have used that you might consider using? Is there anything on here, let’s just take the first facilities management part. Is there anything on here that you would never consider using or you used and you said – I will never use it again?

MALE3: As far as aisle container, we said we would never use strip curtains, from the aesthetic factor, so literally regardless of how much energy savings there is, you cannot bring people into the data center and see meat locker curtains. It’s just aesthetically.

MALE2: I would say we have the same value between our high performance computing and the rest of the data center because it’s a shared space and initially our concern was – they put in row cooling, we don’t deploy any in row cooling in the rest of the data center. So should we isolate that or not? And ultimately, we didn’t and with the new CRAC units we brought in, I’m not even sure we need the in row cooling.

MOD: Any other things you would never do, based on experience or just because of other reasons? I’ve actually heard the aesthetic reason before, for the curtains.

MALE2: One thing that’s not on here that we did do, is we switched the directional floor tiles which we thought were kind of a gimmick at first but we actually tested them and they work exactly as designed.

MOD: Directional floor tile; what does that mean?

[Laughter]

MALE2: The directional floor tile -- a typical floor tile will just exhaust straight out, so directional floor tiles point towards the rack.

MOD: Oh, I see.

MALE: They have an adjustable mover in them.

MALE2: These aren’t adjustable, these are fixed, 25 percent – the cost per tile is 40 dollars more, so it was like the biggest no brainer, we saw rack temperatures go down by two degrees, just by swapping out the floor tile to the same air flow.

MOD: Well, yes, I’m also open to anything that’s not on this list.

MALE4: So we’re doing that, doing adjustable things on floor tiles, where you adjust –

MALE2: But your floor is obstructed underneath, mine’s not.

MALE4: So you’ve got six inches, I’ve got a full 30.

[Laughter]

MOD: Okay, guys.

MALE2: I told you he wanted to be argumentative.

MALE4: No, no.

MOD: Anything that should be on this list that’s not on here?

MALE2: Floor tiles.

MOD: Floor tiles, okay. Anybody else have any additions to make on the management?

MALE4: Yeah, with the cooling mechanism, right? There’s a lot of talk about water cooled, in rack coolant things, so that’s emerging stuff. We saw some of that with like the Bitcoin guys and some of that works, some of that flamed out spectacularly but I think the ecology’s here so we ought to think about that.

MALE3: I’m not sure it fits into energy efficiency, but I don’t see anything about security on here at all.

MALE4: Yeah, that was one thing I was going to bring up and also control technology, building management systems, I don’t see that anywhere under facilities management, and where that’s going, that’s huge, especially when it comes to cost saving dollars and energy efficiency, it’s huge in control systems. We’re pushing the envelope, as I said, with the lighting that we just did. It’s all wireless based and it’s going out on IP to a bunker somewhere in the country that’s managed a lot of the technology today when it comes down to motor control systems, when it comes down to just simple electrical distribution gear, metering and everything else, it’s going over wireless networks and it’s all part of the BMS system, building management system. I think it would be good to have.

MALE2: We just have redone that as part of our upgrade, not completely, but I will say you need partnerships with [inaudible 53:58] and we’re a separate entity where I am so this is a challenge for us, whereas some data center facilities, it is a department in some areas whereas –

MALE4: That’s a good point that you brought up, probably outside the scope of this conversation [inaudible due to audio interference 54:18] one of my pet peeves in this industry. We always look for the single point of failure and in my world, in a large corporation, a large scale operation, okay, that one single point of failure that always bugs me is the breakdown of communication between operations and engineering and IT and it was always that divide, conquer, divide, conquer and that’s a major point of failure in any critical operation. Not only that – and it’s huge in this industry. I’ve given a lot of presentations about Uptime and 7x24. And everyone concurs with me that you better build that bridge, you got to bridge the two of them together. I interviewed John McCasey, which I’m a big one for training and giving career exposure to IT techs. I tell these guys, young men coming up in the IT industry – if you want to be a true manager, effectively, efficiently operate a data center, I don’t care what scale, you need to know the infrastructure that’s supporting it. You have to be part of that.

MALE3: At least get involved in the discussion, in the sharing of knowledge, which is a huge challenge.

MALE4: I think, David you agree with me on that.

MALE3: Well, the way I explain it, I work for the IT side but my role is to work with facilities. And the way I explain it is that we are codependent because all of facilities control systems are housed inside our data center. The data center relies on our facilities control systems.

MOD: You really are truly in charge.

[Laughter]

MALE3: Absolutely, I think a lot of these facilities, especially the colocation facilities, they’re built with the control systems outside of the data center, so [you’re got your knob and your control 55:59].

MALE4: And it’s designed specifically, when it comes down to the daily operations, any critical environment, whether it’s research and development, whether it’s a hospital or a data center. You have to bridge those two disciplines together and have a unified work force because you can’t have a successful partnership [inaudible 56:21].

MALE: No.

MOD: Can we talk a little bit about the server side. I think we’ve been mostly staying on the facilities management.

MALE4: The side we love so much.

[Laughter]

MOD: The server technologies that are listed down here, I’m assuming they’re familiar to you. Are they ones that you use?

MALE4: Yes, so we found that there’s no real cost benefit to going with platinum level power suppliers and servers. So you buy a server, you can buy the power supplies and server that are rated at different efficiencies, and platinum is the top of the line in both of them but costs – the energy savings from going with the platinum power supplier, regular gold level power suppliers, there’s no savings for us. So we don’t do that. We also don’t use energy management on any of the servers. So if you look at the power profile of our IT loads, it’s pretty much flat. There’s only like a three percent difference between daytime full operations and nighttime and that’s because with a lot of the power management on the server side, it basically puts the server to sleep. We don’t want email servers or data base servers going to sleep. There’s that initial split second where they got to speed up again. So we actually don’t use power management features on the servers. Very, very heavily into virtualization, virtualization is pretty much taking over everything.

MOD: Why is virtualization so great?

MALE4: It gets rid of – most servers will – you sped up the physical server and the end user, the application running on it. They may only use it a couple of times a day or most of the time servers sit idle doing nothing, so virtualization is taking one piece of hardware and input 10, 12, 20, 100 virtual servers on it. So you can decommission all those physical servers. So over the past year we saw 30 kw savings just by getting rid of physical servers and making them virtual.

MOD: Is virtualization a big part of what Dave and Sam use?

MALE: Ongoing.

MOD: Ongoing? Is it a central thing?

MALE2: We had a big push last year and I think we eliminated 80 servers within the first six months. That was interesting.

MOD: Can somebody tell me what underclocking is?

MALE: Overclocking and underclocking.

MOD: Overclocking and underclocking?

MALE: It’s what I was talking about –

MALE: I actually checked --

MOD: Did you? Okay –

MALE: I don’t do the server work.

[Laughter]

MALE2: Dave’s probably more qualified than I am but I would say it’s when you take any type of processor and push it beyond its design capabilities --

MALE: That’s overclocking.

MALE2: -- 10%, 20%.

MOD: Okay, that’s overclocking.

MALE2: So underclocking would be underutilizing the server.

MOD: I see.

MALE4: Why would you want to do that?

MALE2: Because most people do.

MALE4: There’s a reason for that, this is something that even goes back to the efficiency levels of the CPUs so when they do their calculations, they find out they need like a four ghz course CPU they’ve actually found that like a 4.5 ghz course CPU is more energy efficient than a 4 so they buy a 4.5 and they’ll underclock it to 4.

MOD: Oh, okay.

MALE4: Some of the major, major institutions will do it, kind of part of their economy to scale. It gives them room that later on they can put the CPU back at its original clock level.

MALE2: That’s an excellent point when you’re looking at hundreds of thousands of servers and take a quarter of a million –

MALE4: The Facebooks of the world, the Googles.

MALE2: And you start employing those practices you’re looking at huge, huge reduction in energy consumption, as well as cost.

MALE3: Well, what happens down the road when they need to put them back to normal? You’re going to lose all your savings then in the relatively same period of time, right?

MALE2: The beauty of it is that the people who do this usually have three –

MALE3: Out the door, right?

MALE4: I have servers that have been there for ten years.

MALE2: That’s another good point, because the cycle is going to be every other year on major, major applications.

MALE4: We are trying to reduce our life cycle and any of the equipment that we’re bringing in from satellite locations now, if it’s not under warranty still, it’s out the door.

MALE3: Getting them to do that is a big, big challenge.

MALE4: We have to get a researcher’s blessing to allow the server to go away and most don’t want to do it.

MALE2: I cannot imagine how attached these people are to the servers.

[Laughter]

MALE4: We have that issue to with –

MOD: Is it going to the physical?

MALE4: The physical server –

MOD: [Inaudible due to simultaneous dialogue 1:01:13].

MALE4: There is a lot of that, they feel that they’re giving up control of their box so they want to keep it.

MALE2: David, when you say you get into, even in a private application as your data center is versus a web posting, colo facility, more so probably in a colo facility, the underutilization of the servers that are racked, I would say if we looked at 80 percent of the clients in a massive data center, it probably is running at 40 percent utilization. And that’s where virtualization is a big advantage.

MALE: It’s huge.

MALE2: Because we can manage that, we can see what’s happening.

MOD: So you can adjust.

MALE2: So we can adjust, it gives us much better control at it, we need one blade server to take care of three hundred places.

MALE: I would say, five years from now 75, 80 percent will reach the cloud base because of this. People are going to start realizing where they’re wasting money, where they’re wasting service, face time, utilization – it’s going to start going to the cloud.

MOD: So if you’re going to invest in new cutting edge technology that could improve energy efficiency, how do you test it out? How do you find out if it’s a good – so you wait for somebody over here to test them out?

MALE4: It’s always good to let the end user be the Beta. Bill Gates established that years ago and just put it out there and let the end user be the Beta tester.

MALE2: We have done several Beta tests with different server types, green bytes, we brought in a random, it did not go well but we did try it.

MALE4: We’ve done it and we’re still doing it with room energy cells and it’s proving out to be a very valuable thing.

MOD: So you try it out in one facility and you see how it works.

MALE4: We try it out in several facilities regionally to see how it reacts.

MALE2: Then when we get together like ABCOM World or Gartner or one of those, somebody will do a presentation on something, we’ll hear the feedback and the word will spread.

MALE4: If you save money, you can prove that you’re saving money.

MALE3: Some of the other larger conferences I’ve gone to, the larger companies like IBM with massive operations out there, they’re actually – it’s kind of bad for us, whatever – but they’re actually moving to building tier one data centers, they’re building in triplicate. So the redundancy of the operation is no longer on the facility side, it’s on the IT side.

MALE4: The energy savings is coming from eliminating the mechanical equipment. They’re triplicating their data in geographic locations throughout the country. And they can lose two facilities at once.

MOD: And they still have one left to do it.

MALE2: We’re also moving away from the fall tolerant design, [four 9s] facility with all the generators, backup and UPS systems and dual redundancy, and plus [inaudible 1:04:20] design and moving away to a regional source on separate – build two different data centers in two different regions with two different power sources. One is to adapt recovery to the other so you don’t have to build an extensive infrastructure, as we’ve done in the past. So the technology is changing all the time.

MOD: Now, this is a non-technology type question. How important is it to – training with your maintenance people, training with people who are using the facility? Do you do that, number one? And how important is it?

MALE4: No.

MOD: It’s not enough?

MALE4: Not enough. As I just mentioned earlier, there has been some since IT came into the industry, there’s divide between what’s mine is mine, what’s yours is yours, it’s my data center, my data center, my data center. So I’ve always cited the point of failure and we’re all looking for that most critical point of failure, it starts right in house between the operational staff on the engineering side and the IT staff on their side and without the two of them communicating effectively together you have a major point of failure in a data center, which leads to – can lead to anything. So we get over that by cross training, cross disciplining both sides of the house. Bringing in the IT people into how to operate and maintain their data center, as he said – our data center. But yet if they don’t understand how to use the structure, build, operate it and maintain, then they’re at a loss. So if you take a world class data center director or manager, he doesn’t know the infrastructure that’s supporting that operation, he’s not a world class data center manager.

MOD: Others on this point, on the people side?

MALE3: Every single new IT hire that comes through gets a full tour and overview of the full facilities operation and everything that is behind the scenes to support them, [inaudible 1:06:20]. Every IT person has to understand everything that is behind and supporting that critical role.

MALE3: The breakdown that Jim’s talking about happens at the management level because I have a very funny story. We rolled out the new CRAC unit, the second day after they were commissioned the facility staff came in to change the belts on the old units that were no longer there.

MALE3: [Showed up, grabbed the belts]. They were on time, they were doing their job but I virtually had to walk these staffers around and show them the new CRAC units.

MALE2: Here’s a good one for you. I had an IT manager who went to a two-day seminar down in Atlanta on HVAC, expert now. He came back to the data center and he couldn’t wait to get up on the data center floor, 70 thousand square feet. He went around with a roll of blue tape, a piece of blue tape on every perforated tile that he thought needed to be removed for cooling efficiency. Then never talked to the chief engineer, never talked to the engineering staff or anyone – so, a directive to his IT staff to go up and remove all the perforated tiles and put in solid tiles throughout the data center floor. So giving a new hire a tour of the chiller plant or tour of the control room is insufficient, it’s not enough. I actually, I don’t mandate this, but what I’ll do, I’ll take a gentleman like you met today, Casey, and he actually did a generator sky test today, went down and touched the gear, actually went down to the parallel gear, an engineer ghosting him and gave him the thrill of starting that equipment. That exposes him to it, gives him a sense of what he’s actually doing. Two, proficiency that’s needed to run this equipment and maintain it and also the idea of his own personal safety and just how serious the industry is. Because a lot of this gear is lethal, a hundred percent lethal. I dress up my engineers in a 40 cal suit, protective suit. I remind them once they get it on, it gives them one thing, it provides their family with the opportunity to have an open casket, that’s all that suit does, it’s not going to protect them. And they have to understand this. IT people taking a shortcut through a parallel room that’s medium voltage, okay with medium voltage, switch gear, anything can happen in an instance. Had an IT tech walk through the chiller plant one day and a five thousand amp switch broke; BOOM, and he turned green. I said [Cell, do you remember Cell 1:08:59], he never went back through that chiller plant again in his life. Awareness, training, safety is all part of not only giving a walk through to a new hire but on occasion bringing them down and letting them touch and feel.

MALE4: Myself and the facilities manager do cross checks on all of our operations.

MOD: Okay, that sounds phenomenal.

MALE4: I’m authorized by the facilities manager to enter the mechanical spaces and I do my cross checks and UPS –

MALE2: I must have trained him.

[Laughter]

MALE: AS a senior, you can authorize --

MOD: Actually, I was involved in somebody getting electrocuted and it brought back.

MALE: I’m sorry to hear that.

MOD: No, no, I mean, it was somebody who was being really stupid.

MALE2: I went in and I understand this is – who do you represent?

MOD: Who do I represent? I’m from a research firm.

MALE2: Okay, so when we’re talking about personal protection and we’re talking about environmental concerns and PA and all that stuff, it starts right there, personal protective equipment and knowledge of the facility. Another thing that’s not on here, I mean, you’re talking electrical power and electrical distribution. I don’t see any question here about does your facility have a coordination study. And that’s very important to a major data center that has medium voltage, switch gear and thousands and thousands of electrical circuits. You need that coordination study to know exactly how that gear is set up. And many, many data centers in operation today do not have coordination study at their plant.

MALE4: I don’t know that we do. I know I have a lot of information at my disposal, it’s just a matter of finding it when I need it. And quite honestly, I’ve found it for a wide variety of people.

MALE2: The other thing I don’t see on here too, and I want to get my point across, is I don’t see any questions about hot flash studies, a hot flash study being done on the electrical gear and switching in data centers, or in any facility.

MOD: I’m going to – these are really important points but I – one, want to get you out of here, and two –

MALE2: I’m comfortable now.

[Laughter]

MOD: And two, the topics we need to cover before I let you out. So the first one is about tradeoffs, this is going back to the beginning when we talked about what are the most important things affecting your decisions about what you would install in your data centers, and so I wanted to just go back to some of these criteria and then kind of have you weigh them off against energy efficiency, so if you had to kind of choose the most important thing here, the first one I have down here is performance versus energy efficiency. How does that –

MALE2: Can you define performance?

MOD: Uptime reliability, how about that? Does that help?

MALE: Reliability is always before –

MOD: So it’s always going to trump?

MALE2: Yeah, uptime is extraordinarily important, especially in our world because we have liability chips, huge amounts of money can shift hands due to liability if we don’t maintain a hundred percent of the time. So uptime is paramount but also I wouldn’t trump on safety for uptime. Safety is –

MOD: The number one thing.

MALE2: The number one thing, personal safety, PPE, life wire safety, and performance all come characterized into that.

MOD: And again, it doesn’t have to be either or but sort of what the tradeoffs are between your choosing efficiency, high efficiency equipment. How about maintenance and repair issues? I know we heard from you about maintenance for repair issues and I think also from the other Dave. If something were high efficiency but it took less to install or it took more to install or it took greater maintenance or lesser maintenance, how does that –

MALE2: I think a lot of that comes down to OEs, I’d rather have an OE who’s more comfortable with the equipment that he has, that is less efficient, than have a brand new piece of equipment come in and have to re-learn it.

MOD: Okay, others on this.

MALE4: I think it’s a very difficult question from my perspective to answer. Some areas you have more flexibility and can have tradeoffs and other expansions. We just had an excellent talk by Caterpillar and Cummings on generation 4 engines, diesel engines, what the tradeoff has been to meet federal and state regulations. So maintenance cost is going to go way up to meet those demands. So you know, it’s really something that is specific to the situation. But technology is going to drive energy costs down and maybe increase efficiency but then you get federal regulatory and state regulatory things that come into play, it’s going to take those efficiencies out and drive up maintenance costs. So it’s a lot that goes into the equation.

MOD: How about the equation for climate and other location specific factors?

MALE3: That’s very interesting. So the largest data centers in the country are all in very, very hot climates. You look at the EBays, the Amazons, they’re all in the hot climates, so they’re doing two things, they’re running hot water loops. The way they look at it is they build to the environment, whatever – we’ve seen a presentation on this. PayPal’s facility is out in Arizona and they said the average ambient air temperature in Arizona is 92 degrees year round. So he builds a hot water loop at 92 degrees. I said – aren’t you worried about that? He goes – no, I get three-year life cycles and a guarantee from all of my vendors that their equipment is going to last at least three years in 92 degrees. I can’t do that. I know he can’t do that. So we had to take advantage of the New England climate.

MALE: Exactly.

MALE3: So that’s where we use the air site economizer. So it depends on your operation.

MALE: Free cooling.

MALE: It’s not so free.

MALE3: Yeah, you’re right. It’s interesting, you can take a plate frame free cool driving the pumps and condensed water fans, in order to achieve that and compare it to a VFD or a turbo coil, oil-free chiller, and the curve is definitely in favor of the turbo coil. And also the VFDs in some cases can run just as efficient as a plate --

MALE2: For just the data center though.

MALE: So, my facilities are cooling multiple buildings.

MOD: How about financing? I’m including here getting utility or state incentives. Talk to me for a second about the tradeoff there. First of all, how important are utility incentives?

MALE2: I think we take advantage of it greatly and it’s pushed at a higher level but at the same token, we’re a nonprofit and every time we turn around they’re trying to tax us. So I mean, there’s a huge process around, politically and economically to try and benefit from energy efficiency, how we co-interact with the local area, you know, city, state and that aspect. It’s a constant give and take.

MALE4: Can I comment on that?

MOD: You will.

MALE4: I’d like to point out specifically working with my corporate account manager with our utility is a one hundred percent necessity. He has proven to me his worth time and time again and saved incalculable amounts of money for the corporation also each year on this account. Without his assistance and his engineering department putting together the calculations and working things locally, a lot of the incentive programs would never come into being. It’s so important to work locally and big companies again, big companies get lost, they want to do things on a national scale, when it can be more effective doing it locally. We retrofitted every single 30-ton CRAC unit from ten horsepower static drive unit to ABBVFDs to control overlay, brought everything back to the front end, turnkey commissioned out, zero cost to the company. And they couldn’t figure out the ROI. They argued with me for months – what’s the ROI? There is no ROI. Well, then we can’t approve it.

[Laughter]

MALE4: So how simple things can be.

MOD: Well, let’s just segue because the last part here is some intensive discussion about ROI. So I want to know about what you figure into your ROI calculations. I’m assuming up-front costs, but what are the other important factors that you figure into ROI, if any?

MALE: Maintenance.

MOD: Maintenance, okay.

MALE: Sorry?

[Laughter[

MOD: How about maintenance over here?

MALE: Absolutely.

MOD: What else gets figured in?

MALE: I think I mentioned that when I talked about how going to the VFDs reduced the maintenance factor on the CRAC units by 70 percent, filter costs, change stack, the whole dynamics of the operation changes by going to energy efficient VFDs or even electronic control motors now which are a big plus over VFDs.

MALE4: I think knowledge base plays into it too but it’s tough to put a dollar figure on it. If it’s something that you have the technicians with the experience, that’s great, but if you have to go out and retrain and reeducate on a totally new technology, you’ve got to add some line item to that.

MOD: On the cost side.

MALE4: Yeah.

MOD: How about any other things on either the cost or benefit side? Do you try to monetize some of the other types of things that you’ve mentioned, like reliability or –

MALE2: I think I do less of this because we’re such a small shop.

MOD: Okay, I mean, I know some entities have very complicated ROIs and others don’t. So just wondering what you do.

MALE2: I think we have one major stumbling block, is that we want three years or less if we’re going to put any capital outlay into it. So they’re going to see a return on investment. If they’ve got to upfront a hundred thousand dollars they want to see that returned within three years. And that’s the hurdle usually.

MOD: No matter what?

MALE4: Yes, corporations do it, even if there’s zero ROI like in the case with my CRAC unit retrofit, they just couldn’t understand how I was getting a utility to cough up the entire cost. So in order to add that ROI in there, I had the DNC director add 30 thousand dollars to tie everything back into the front end. So with the 30 thousand dollar cost factor to the company, we could establish the ROI and get the okay to go ahead with the retrofit. And then the utility cut the check to “moi” – in care of me, it was funny, another thing when a utility is cutting back incentive money to a large corporation. I don’t know if it would be anything in your case. You can’t have them write that back to the company because like the federal government, they can’t take in money. They can’t take that money outside. You would have to apply it to the install as a credit towards the retrofit.

MOD: I understand, interesting.

MALE4: So it’s another block.

MALE: [Inaudible 1:21:19].

MALE4: We have no choice. There’s only one. It’s Shrewsbury Electric Light and Power Company, that’s it, they own the last mile as well. Even our circuits, we’ve got to go through them for the last mile. The infrastructure’s less, I mean, it’s there and they’re not –

MALE: You should get a tour the Bellingham facility. You’re out by there, aren’t you, Bellingham Mass?. Are you out by there?

MALE: What one?

MALE: Bellingham Power Plant -- the gas; cogeneration gas feature.

MALE: We run our own power facility at a different campus, so the hospital campus, because we’re a trauma center, so we have a utility there but we don’t have our data center there. Our data center moved to another location.

MOD: In terms of this one to three year payback which seems to be what everyone always says they need, and yet we also know that the equipment is likely to last longer than that. What are the reasons – what are you told when they say – well, I’m sorry, if it’s more than three years, we can’t justify this. Do they have other ways to spend their money?

MALE: Always.

MOD: Okay, so they’re weighing it off there, just saying it has to be three years or less because we can use this money some other way?

MALE2: Not at that pay grade yet to sit on the board of directors, establish what those are or why it should be. I mean, there would be special case incentives given to projects depending on the magnitude and the impact on the systems whether they would fund it three and a half or even four year ROI. Again, in a lot of cases, it’s who you’re talking with some days, you know, not who you know.

MOD: Is it the same for your organizations, one to three years for the payback?

MALE: We don’t really calculate ROI.

MOD: You don’t calculate ROI?

MALE3: We don’t take depreciation.

MALE2: They do it just to have that number but it’s not at my pay level.

MALE3: Yeah, the same with me. If I want the chances of getting it funded, it better come in at three years or under. And if it’s under three years the better the chance is that corporate is going to approve it, it’s going to get past that.

MALE4: I’m more concerned about operating cost, operational cost, what is the long-term operation costs, maintenance costs on buying this piece of equipment, not as much capital cost, they don’t really care about that.

MOD: But they obviously care about the capital costs, they’re not talking about the operating costs, right, in your case?

MALE: It’s all capital.

MOD: And in your case, you don’t even –

MALE2: More capital costs.

MOD: But you don’t actually calculate an ROI.

MALE2: No, I can’t remember the last time I had to do one.

[Laughter]

MALE2: And I will say I think the last time I did one, I was told why did I waste my time doing the ROI. Yeah, any major retrofit, i.e. like the lighting or converting chills to VFDs, those are going to be capital expenditures and come out of a total different budget, allocation, it’s not going to come out of the operational budget. It’s going to go to that next tier and be approved by somebody in corporate, a much higher pay grade. And they’re looking, they’re not just looking at a major corporation, they’re not just looking at divvying up the money across one, two, three data centers. They’re looking at a global operation where they’re going to start funding different programs. So I can see their ROI being a particular –

MOD: Well, they’re probably, it’s good to have rules.

[Laughter]

MALE4: The other thing too is the availability of these incentive funds. It’s very interesting because you get to a certain point in the year, you’ve got a project that you really want to get in and the company hasn’t funded it, it’s interesting that the utility will come back, because they want to spend those federal dollars. They have an allocated deadline that they have to meet to get that money out. If I start working on them on a hundred thousand dollar project and I’m chasing funding, chasing funding, and approval from the company, come October or November, they want to get that money expended so they’re going to agree the numbers for it. They’ll make that ROI look even better to the longer I hold out.

MALE2: They’ll sweeten the pot.

MALE4: They’ll sweeten the pot. They do because they want to spend those -- .

MOD: I know they have goals.

MALE4: They want to spend those dollars. I’m good at playing that game.

[Laughter]

MOD: You guys have been great and very insightful and we’re at the end of our time and my questions and thank you so much for all your expertise. You offered a lot of different perspectives as it turns out, from your different kinds of organizations that you’re in. So have a good rest of the conference and we all greatly appreciate you taking the time to give your opinions here today.

[END OF FOCUS GROUP]