New York Data Center Focus Group One – March 17, 2015 @11:28 AM

[TRANSCRIPTIONIST’S NOTE: At times, the participants were challenging to hear, and quite often, the presence of simultaneous conversation obscured the dialogue.]

MOD: So can you just quickly introduce yourself and say what type of data center you -- data centers your company operates and the industries that you serve which is -- and you filled out a questionnaire?

MALE: I did. So that is the second.

MOD: Yeah, that is just for reference. We might reference some of those questions, but your answer is right there. So he's another one I think is good because it matches his name and we have his questionnaire. Right?

MALE: Did you fill it out?

MALE: No, I didn’t.

MOD: Oh, you didn’t fill out a questionnaire?

MALE: You can fill that out.

MALE: Sure, I'd be happy to.

MOD: Okay, thank you. Sorry I heard you wrong. And this is David.

MALE: I’m David. I work for a company called Abt Associates. We're helping put on these focus groups.

MALE: Okay.

MOD: And I work for a different company, but that would be very confusing.

So do you want to start, Alan? Just say a little bit about yourself, the type of data center your company operates, your role in the company, and for how many data centers do you make purchase and investment decisions.

MALE: Right, right. And I have been this through this, so I'm actually, I'm an architect by training.

MOD: You look like an architect.

[Laughter]

MALE: And I have been in the data center world for a long time, but I had been working with a hedge fund that had invested in the data center start-up company and they brought me on board to manage the rollout of that.

And I was mentioning to Bruce, actually that assignment came to an end recently, so I’m actually right now a consultant. I just want to be clear that I am no longer with that company. But you know, I was executive vice president over there for development.

MOD: Okay. And you were, in particular, working with data centers?

MALE: Right. Right. So this was a development at [company address]. It's bringing in, for instance, 24 megawatts of medium volt power to support four floors of data center, about a quarter-million square foot of data center.

The developer that I worked for on this is actually, pretty much leases to wholesalers and retailers to come in. So what the company did was build-out the infrastructure, provide three or four megawatts of utility power per floor at about a 1.4 PUE. And then also build-out the white space.

And then the company would come in. So, for example, [a particular company] took 60,000 square feet and they came in and they installed their servers and did everything downstream from that. So it's a company that did everything from incoming service down to the PDUs and then hand it over to a retailer or a wholesaler. So it's really more of a retail environment. We build it out in advance, then customers start to migrate to it.

MOD: John, do you want to tell us about your job and what you do for the company?

MALE2: Today, I have been working with [company name] for the last year. Prior to that I worked with [different company name] for close to 35 years. And most of my background will be related to previous experience, but what I am doing today -- I have been involved with many different types of data centers worldwide. I did a few audits for about 45 data centers from 2,000 to 65,000 square feet. My role was energy consultant, energy engineers, senior energy engineer, and my position today consulting.

Let's see, my background, also I have a background in smarter buildings and SCADA systems and stuff like that.

MOD: Okay, Janice?

FEMALE: I am the media director for [company name], in charge of the data center with very large portfolio data centers. I operate three enterprise data centers in a country in Europe, but four co-lo data centers, plus we are building a modular data center in São José dos Campos Brazil and [a continuum of 10:19] data centers in [inaudible 10:25] and we have about 300 other server rooms globally of various sizes. The Enterprise Data Center is about 40,000 square feet. Four-and-a-half blocks.

MALE: Whose container are you guys using? Want to share? I’m just curious.

MALE: I'm pretty sure it’s Schneider, I think.

MALE: Oh, really? Okay.

MOD: Okay. Well, we obviously have a range. So we can be generous with each other and learn from each other hopefully; quite a range of experience here and specialties.

So my first question is, aside from finding out about you is what are the top three factors you consider when setting up a new data center or doing a major renovation of an existing data center?

So you had the experience of setting up a new one. I am sure this happens all the time. You are refining and rejuvenating and also building new ones and sounds like you also have this experience. So if you can tell me the top three factors you consider when setting up a new data center or refurbishing an existing one.

Who wants to start? Janice?

FEMALE: There's a lot of factors. It has to do with location, the criticality of the site. The current initiative is to move away from more localized and consolidate them to co-los so there is no capital expense and we can expand and contract and we need to be.

Enterprise data centers is still seen as the flagship, and so there is capital invested in that constantly; both here and in Belgium. So it really depends on a variety of assets; where it is, the nature of what is going on in that site, the investment portfolio for that region, a cost to build. All capital expense.

MOD: Okay. And are those close, the ones you named, are close to the top ones?

FEMALE: That’s it. Those are the factors that go in. Right now we have some co-los that, up until a year ago, [company] had a single floor where you have to have a co-lo [built on a 13:02] single floor. It was a rule to do that, now they’re going to do that gung-ho going --

MOD: [Enough to change 13:11.]

FEMALE: [Inaudible].

MOD: What about you, John? How about the top three factors? Well, some things you've worked for.

MALE2: Well, since I have been doing a lot of things for – outside of [previous company], because most of my role was for clients. The things, I think, in my case was business requirements. Those were the first key things. And based on that, was how to locate the right data centers for the specific location and mostly cost of energy was one of the key factors of that. And after that was basically, to provide and override business requirement kinds of things. That was the three big.

MOD: And when you say business requirements, was that the type of work that is going to be done there? Is this what Janice was talking about?

MALE2: Well, it is enterprise and different thing of what they are doing, right? They are building cars or their bank or something, looking at what kind of business envelope you try to cover, and based on that you make a decision of how to design architect and so forth, and decide where the solution should be, where it is located. And after that, the cost of things would be another key factor.

MOD: And what happened to you, Alan, when you were making this?

MALE: Well, and then to both Janice and Jeff, it depends on what hats you’re wearing.

So if you are an enterprise user and your job is to support the business lines, right, then it is a very different answer than if you are developer and you are doing this to generate revenue. So those are very different positions.

So speaking from the enterprise perspective, and I think that Jeff said it, the number one is the business units come out you serve this product and support it, and it can’t be supported on your current platform, then you got an issue. So that is especially true, like, in the clients and service sector.

They're coming out with a whole new product and it can’t be supported, you have decisions to make. And so I think the decisions are made there relative to – and they’re all been hit; location, cost, and the liability. But speaking from the developer perspective, I've been on that side so long, you know it's really on the customer. But a lot of it is a crapshoot because you are trying to decide what is the next hot markets, right, and what's the next hot product.

So in today’s environment, to Janice’s point, the enterprise data center that's kind of taken a nosedive and it's really cloud, or especially private clouds and the co-location factors that are really taking center stage and are driving what's happening in the data center world.

So a developer would look for, you know, where are holes and things. And that gets back to where can I get free cooling because -- so what's the environment like, I would say is number one. So, I mean, certainly free cooling is a big deal.

There's data centers in Oregon that have 100 percent free cooling and have a--

MOD: I am from Oregon.

[Laughter]

MALE: Oh, really?

MOD: I'm revealing.

MALE: Oh, wow. Okay. Yeah, so--

MOD: We do have data centers.

MALE: Yeah, so I would say the environments, cost of cloud, and reliability of the infrastructure. Is there connectivity and the ability to do dual source from different substations.

MOD: Great. Well, some convergence and some divergence which is to be expected here.

Okay, let’s start with the idea that you want to set-up a new data center or you're going to do a major upgrade, okay, it could be either -- although it may not, I understand it may not be exactly the same thing.

Where do you go and get information about new equipment and new technologies and also ways to manage the facility?

MALE2: Well, hopefully they constantly keep abreast of the industry trends and the information from technical publications. Source of, like, data center dynamics and places like that--

MOD: So conferences --

MALE2: Yeah.

MOD: -- and you [inaudible due to loss of audio 17:30-17:40].

MALE: -- open source data center which Facebook kind of started. There's a tremendous amount of great technical detail available on the internet through open source sharing which I think is a new trend.

MOD: Well, it is pretty new in terms of Facebook coming out with that. I know it's relatively new. I do know a little bit, I do, really, myself.

But anyone else in terms of anywhere else you go?

MALE2: Well, you know, the green grid would be one that I use a lot for information.

MOD: Is that an online source?

MALE2: Up time.

FEMALE: Professional organizations, I mean.

MALE2: Yeah, I mean, basically that is where I read. Good example for standards and [material 18:26].

MALE: And there has been lots of great consultants out there, of course, the whole world of consultants that--

MOD: Like you?

[Laughter]

FEMALE: And then we have sales people constantly ringing our front doorbells with the latest and the greatest.

MOD: Yeah, well that makes sense.

MALE: I like to call my friends over at the engineering firms. Call somebody and pick their brain.

MOD: All right, so which one do you trust the most; is it the people sources? Is it the online sources? Is it a mixture? Do you like to have [inaudible due to simultaneous dialogue 19:01] information?

MALE2: I think a presence across all the platforms then it--

MOD: Then that’s a good bet.

MALE2: It’s a good bet.

MOD: How about you, John?

MALE: That's a hard one. I believe in standards and I am pretty much open-systems-type of applications, and therefore my role has been to integrate multiple platforms, environments, and things like that that usually stand alone; island formations or whatever and put it all together.

And therefore when I look at how to solutions something, architect something, I look at how much standards between collaboration, between equipments form the cooling aspect to the ITS specs and how to integrate that like a DCIM system, for example, and to me that is a key thing.

I strongly believe in standards. I have been involved with the ASHRAE Standard, BACnet. I have been a member there for two-and-a-half years when that came up out and now DCIM is another aspect of it.

FEMALE: Everybody agrees DCIM is a wonderful thing. You have to have it, but particular tool has to do with what you already have in-house and how everything is great. So the specific tools that you use is really subjective. The objective thing is that you should use one.

MALE: Right. And again, the standard is physically when you order something, let's say you order it a new server and you look at the interface that exists with this particular server to see if you can connect later on to your existing building management or PCI system or whatever and you go to integrate as easy as possible. Now, it's easy to say because the argument was for over 30 years doing this kind of things and sometimes it's very complex, but we are getting there slowly. Slowly. I think.

MOD: Anything to add, Alan?

MALE: My focus more is more on the infrastructure, the physical side. There is a lot of new trends that are happening there. So whether that is rotary UPS or water-based cooling or containments or pre-cooling, I mean, those are all the buzzwords that are out there now that you have to embrace them in full.

MOD: So the sources that you use and I know, John, you mentioned you are very involved with the energy side of this, but do they provide reliable estimates of energy use in your selection of equipment?

MALE: Well, yes. What you have to do is get a clear analysis; research and analysis.

I mean, let’s say you are looking for a chiller for cooling. Then you are going to look at different manufacturers and read their specs and figure out which the best one is; contact them; talk to them; have them to come, maybe, to do a walkthrough when they have some information to make sure what they say is pretty close to what the machine is supposed to be doing and so forth and so on.

Then that is the aspect of the environment, the infrastructure; that the IP is another thing.

And again, because I have been involved with that, there is a lot of information that people are not aware of in the IP environment. For example, how to optimize a server. People look at you and say, what do you mean you have to mind the chiller?

You can optimize the chiller, maybe, but they have a lot of features and functions manufacturers do a lot of tests for. They have the time to do that; to prove to some customers how much you can save based on some features that are introduced that are inherent to the boxes that they are buying.

MOD: So that's, if I’m interpreting it correctly, that they provide estimates that you have to do more research to make sure that those estimates are reliable about energy use? Or am I reading something into that?

MALE: Have you bought a car that has a sticker that says that they usually get 25 miles to the gallon, but when you take it out on the road, you drive it, and you only get 18 to 20 or whatever it is? The sticker value isn't how it actually runs.

MOD: The application.

FEMALE: Generally, things like servers, the faceplate is actually these, but they say the utilization is higher than your actual run times, which you use the faceplate to calculate your back-end MAC. You have no idea what I just said.

MOD: No, I do. [Laughter] Fortunately, I do. Most of it, I mean, there might have been a few words in there I didn't understand.

MALE: If I translate my interpretation on what she said, basically, they are not [inaudible], like I said, you--

MOD: I'm not sure what, I don't remember what MAC is, but--

MALE: A calculation.

MOD: Okay, so I do--

MALE: The generators and the cooling.

MOD: So basically I actually know some things about energy, but not too much about data centers.

MALE: Then there is this program to do, like, the analysis tools to see where the hotspots are and what have you.

So there are some pretty good programs where you can plug-in that data. But to Janice’s point, it is always good to talk to the manufacturer and say, can you direct me to an installation that you have done in the past and then I'd like to be contacted with the operation manager of that facility, you know, to see what's really happening.

MOD: And so they do, do you feel like they do the best you can to provide you with some guidance, but it's always worth checking?

FEMALE: I don't think they're dishonest. I think the probably overstate their --

MALE: They're selling, right.

MOD: They're selling, right.

I mean, most of the people you contact, they are not technical. Because I like to talk to technical guys. I don't, you know, the staff guy is good, but yeah, and the sales guy will send you in when you talk to the technical people where you start to ask very specific questions about how this particular equipment runs and how, what is the--

FEMALE: The maintenance of it, you know.

MOD : Right, so it's a combo of some. You get some basic information and then you go check it out with other sources. Okay. That’s great.

I know that, Alan, you didn’t fill out your online questionnaire, but it looks like I think someone mentioned that what you were doing is leasing-out data centers.

MALE: Yeah, yeah. That's right.

MOD: Does anyone else lease out data centers?

MALE: Well, when I was with [previous company], yes. I mean--

FEMALE: We're just the consumers.

MOD: You're just the consumers, you're not doing the leasing.

MALE: Yeah, we're doing everything.

MOD: So I'm just going to, I have to ask a moment about leasing here of the two who have experience with that.

Is this leased equipment or staged, do you pay based on the space alone, like the racks or the square-footage, number of racks or square-footage? Or are there charges based on other factors, such as power use.

I hope this is making sense.

MALE: Yeah.

FEMALE: Depends on where you go.

MALE: There are all kinds of different metrics for this.

MOD: So it could be just the racks or storage; or do you always, well, on power-use usually?

MALE: Well, in the past they used to be by square foot; how much square foot a rack will take and therefore usually cost you per kilowatts or something like that.

But because the square-footage is getting, in my opinion, in a sense, I don't study it, but it seems like you are getting away from that approach and now you are looking more at the kilowatt per square feet because you have now scientific computers.

For example, in the past you used to have a rack like the two-by-three and you use five KW.

Now, you can have a rack that is two-by-three and use 50 KW. Therefore, the person at the time is spending the same amount of money for five KW and now 50 KW.

MOD: And so you see that changing?

MALE: And the change is gained more toward the actual cost of the energy and [inaudible 27:36] factor and--

FEMALE: When I was in my last job we rented space from an outfit and we paid rent per square footage and we also the suite was 740 KW. We also paid the pass-through utility cost on the actual utilities.

Now, we’re renting space at this job and we pay on the basis of a rack. And the average loading of the rack is six KW. And what we pay, this is in Asia, it's a big deal, and we can't get any more in Asia.

In Virginia, they'll stack it. They'll charge us more, more than twice, but the utility costs are [unpreventable 28:24] with that, so it's an all-in cost.

So it depends on where you go that what the model is, that's the old company.

MOD: Because it sounds like this energy use is getting factored-in and you are aware that it is getting factored-in; is that right?

If you lease from somebody else. I had this a little bit wrong. So you lease from other people. You lease out or--

MALE: [Inaudible due to simultaneous dialogue 28:47] .

MOD: Okay, and then you, did you lease from someone or you were building something to lease?

MALE: So it also depends on what you're talking about; wholesale or retail, whichever you do for qualification approaches.

MOD: Okay, and what are the differences?

MALE: So wholesale, if you are wholesale, you are going to lease a pod and maybe the megawatts to somebody. And then you can work it. And this is generally, but you can work out a deal to represent a KW of one, two, or three megawatts and you can actually translate that into a monthly payment because that is fixed.

If you are the co-lo vendor who is retail, you may just be renting one or two servers. And that charge is whatever your metrics are which, as John said, is moving more towards per KW.

So you can add 250 a K, whatever that number is, per KW. And then if you want to expand that, you simple pay more as you grow. There is a lot of co-lo vendors that leave you with all kinds of other hidden goodies that are built into it, whether it is cable management or they have all kinds of little gotchas that they love to bury into it.

So because the folks that are driving the purchase are often, are brokers and brokers are used to looking at what is the cost per kilowatt or per square foot. They get a great deal and they realize there is all kinds of other little things that are bubbled into that.

MOD: So you were building something to lease to other people. You two actually leased from other people or however.

MALE: Right, that's true.

MOD: Okay, I just wanted to make sure. John and Janice, I had my mind slip a little bit here.

But I think we covered both situations in terms of how the energy use is factored-in. And it seems like it is a fairly obvious, it changes how they might do it, but you know you are paying for it. Okay.

So for those who, so for either situation now; leasing to or from other companies, are you billed based on actual measured electricity use or estimated use, generally speaking.

MALE: If it’s a wholesale, it’s based on what is being provided to you. If you going to take a one megawatt pod, you are going to pay for that megawatt whether you are using it or not. That’s the wholesale client.

Does that make sense?

MOD: Yes.

MALE: On the retail side it is based on, it is usually based on -- a lot of co-lo vendors, what they will do is they'll charge you for this number and they're going to fluctuate between it. You'll have a range of fluctuation that you can stay within.

MOD: So it could be an estimate based on use of our time or it sounds like it could also be actual use.

MALE: That's correct. It depends on the set up you have.

If it is a co-lo place, you may be able to manage to read, for each rack, the consumption or at even a theoretical level depending on what you have. Then you can actually have a better fine tune of what you use and therefore come up with a billing related to that batch computer or rack.

But if you don’t have that, then somebody has to come up with maybe a nameplate and say, this is a nameplate and this is what we assume it is going to take and therefore we are going to charge you based on what the nameplate is all about.

MOD: Janice, is what they are talking about true?

You definitely mentioned situation where it looks like they looked at the actual use.

FEMALE: Right. There is a meter.

MOD: There is a meter that's attached to--

FEMALE: We monitor our own power use. We have power bundled in with our co-los. We have a smart power strip that do that.

MOD: And you pay demand charges as well as direct, just energy use charges?

FEMALE: What do you mean by demand charges?

MOD: Well demand charges are usually, for instance, something when you are turning on this equipment during a certain time period, you might get charged extra.

FEMALE: It runs all the time.

MOD: You are running 24/7, so they might change how much you are being charged based on something they call the demand level on electricity.

MALE: It depends. Again, if it's a co-lo, that may involve a demand charge for that per computer rack, but in most cases what I have been saying is it is not related to demand --

MOD: Just the actual energy use.

MALE: -- because the demand is not really a direct level. The demand is -- usually the company coming to see your data centers. And therefore it will be very difficult, I think, to, at the rack level, to charge it. I mean, you can, but--

MOD: It's [inaudible due to low volume 33:58].

MALE: Well, they also differentiate between do they do it at, do they meter it at the utility or at the UPS.

MALE: Right, right.

MALE: So you are paying X. Maybe that is what you are referring to. Are you paying for the amount of incoming service, which actually gets degraded as it moves through the system or are you paying for use at the UPS?

And those are different models also.

MOD: Does your data center run as a single organization? So again, this is going to be [inaudible 34:33] probably. What I am trying to get at here, is there one budget, one team, one boss who sort of oversees the data centers or are they broken into different, separate budgets; different teams that have different budgets; and they are operating in kind of a separate siloes?

Does that make sense?

FEMALE: All of the above.

MOD: All of the above, okay.

FEMALE: All of the above.

The strategy, globally, I've been responsible directly for running the budgeting the PTCs and co-los. And for building, I set the engineering standards and we do the design work for the building of all the data centers.

But there are 350 server rooms out there. So I could stipulate what the requirements should be for them, but the budget is not mine, and so if the business unit decides that yeah, it would be nice to have a generator, but we don’t want to spend the money; or the political situation in the country says that you have to run the cafeteria takes precedence over everything.

So for everything on campus, so that we have had the data center crash hard over making coffee basically.

MOD: There is something to that.

FEMALE: The local ordinance says that food service must be preserved over everything, so I can’t control that. I can’t control budgets that are not mine.

MOD: How about you, John? Is it different silos of management and decisions?

MALE: Based on the 45 data centers that I've personally audited, I would say in 95 percent they are separate. The IT organization is not involved with the energy cost.

MOD: So that's a separate--

MALE: It's under the technology and the facility engineering group or department or whatever you want to call it, is responsible to provide power and therefore pay for the power.

Like I say, only three or four of them were integrated into one group out of 45 data centers that I did.

MOD: So a lot of people are involved in the decision-making?

MALE: Right.

MOD: And are not necessarily paying the bills or they may be paying the bills.

MALE: That is correct.

MOD: How about you, Alan?

MALE: There are so many stakeholders in these data centers and I’ve seen a lot of different models. I mean, I have worked with most of the major banks over the last 30 years and they keep trying different models because they know none of them work and they change them to something even worse. And they go, why did we change them in the first place?

But I think we are moving towards an integration, and I think Janice kind of holds this position which -- because it used to be you had the facilities guys and they would put the design standards. And you had the IT guys, but they couldn’t talk because they didn’t talk the same language and they didn’t understand what each other wanted.

So a lot of times you will have a guy who, like JP Morgan has -- or Morgan Stanley, rather, there is a guy who kind of has expertise in both and everything reports up to him. And then he becomes the choke, the neck-choke, but he's integrating both of those centers. I think we are seeing kind of data center as a saddle by itself.

MOD: So at least in some cases it is what we would call a split incentive problem in my world, which is the people who use the energy don’t pay for the energy. So it sounds like that still exists, but you think it is getting more integrated than not?

MALE: More and more, though, the people who use it are becoming responsible.

MOD: For what they use?

MALE: Yeah, yeah.

MALE: Well, usually this is what we do when I do this energy audit, for example, if I see this was not completed by the group, one of the suggestions is, and the process is to integrate both of these organizations to be responsible for the cost of energy as well.

MOD: So you worked--

MALE: And I was saying, system ability; that means it's actually hard to maintain the quality of the voltage and--

MOD: The budget.

[Laughter]

MOD: I think to do that, and the key is to provide that to the client and say integrate.

MOD: Right. And so is that true also with you, Janice, that you both--

FEMALE: I have, in the primary data center in New Jersey, a 40,000 square foot data center, I am facilities as well, and that is the best both worlds.

MOD: Okay, so you would like--

FEMALE: I run the building. I run the data center. I run the boilers and the generators --

MOD: And you pay the bills.

FEMALE: -- and when the toilet backs-up, they come to my office, but I’d rather deal -- I'm serious.

I'd rather deal with that so that I can stipulate exactly what kind of PM that will get and how it will get done.

MOD: So it sounds like you all think that it's preferred; that it be working together.

FEMALE: Oh, yeah.

MOD: All right. So some of you at the beginning of this mentioned energy efficiency as fairly important. Maybe I didn’t ask this question, but how important do you think energy efficiency is in data center management? Would you say it's -- how important? Very important? Somewhat important?

MALE: On a one-to-ten, it's ten..

MOD: It’s a ten on very important. Very important. Well, you're pretty invested.

[Laughter]

MALE: Again, depending on the business you are in, if you have an enterprise or, let’s say you are in the government and you are tracking missiles, your thought of energy is not an impact on you because you want to have a lot of redundancy in your systems. You want to have a lot of support and everything else. Therefore the cost of energy is irrelevant than other kinds of businesses.

FEMALE: But that is only true to some extent. We make drugs and the FDA is pretty stringent about any kind of down time. So we have had some serious redundancy in some of our systems, and yet we look for efficiency. We may have to run —I mean, what’s the most efficient? But reliability is the top. But energy efficiency is very, is the next one.

MOD: It is always good to consider. It may not be you can’t do--

FEMALE: I think reliability would be the first.

MOD: Okay, everybody is nodding to that.

MALE: Yeah, reliability for sure.

MOD: So anyway, it’s important it sounds like.

How many of you have recently made recent investments that improved the energy efficiency in these facilities?

FEMALE: Well, if you count server virtualization, we are doing -- we've always done it, but we're now in the middle of an initiative to get to that 80 percent in the next three years.

MOD: Okay, server virtualization. Okay.

Others have been involved with making investments, major investments that improved?

MALE: Yeah, all of the projects have been involved.

MOD: All the audits that you've been doing?

MALE: Customization, virtualization is an aspect of it and then optimization on your specialty infrastructures. And integration, all of that, to optimize to the maximum. Okay, great, that's our role, I mean.

MOD: All right, and how about you, Alan, is that--

MALE: Ours was a brand new project, but we use medium volt power. We use [13.2] on this thing, because when you are bringing in 24 megawatts and you want to distribute it at 480, you can’t find enough vertical shafts to bring up that amount of cable.

So we spend a lot of money having this massive, massive transformer, six megawatt transformers, but ultimately it saves us money in the long-term. It is a more efficient power source.

MOD: So what other technologies or the virtualization isn’t exactly a technology, well, it's a technology, but it is sort of a, well, tell me what it is. [Laughter]

FEMALE: [Inaudible 43:12], we are going to get a thousand virtual machines and 12 racks. That's a lot of compute power [in] a very small [equipment].

MOD: Any specifics you can tell me about in terms of what you’ve done to make your facilities more efficient?

MALE2: Well, in the efficiency environment, infrastructure, you've got free cooling. You've got --

MALE: Economizers.

MALE2: You've got economizers. You got to apply new standards.

For example, ASHRAE TC 9.9 will allow you to get the [inaudible 43:48] temperature and you can [actual go up] to 80 degrees. I have been personally involved with that and not to 80.6 degrees but to 78 degrees because a customer didn’t want to go beyond that, but at least some settings were performed that way. Monitoring and controlling all the [inaudible 44:05]; changing the big fan motors on the central speed on the track or tray units.

FEMALE: Cost containment, panels on the server rack. All of those things.

MOD: You're using all of these, basically all of these?

MALE: Oh, yeah.

MOD: Are there any that you aren't using?

MALE: Oh, yeah.

MALE: Well, in one place or another you're using them all.

MALE: And raising temperature set points, John, that’s a big one. That keeps going on all the time.

MALE: Yeah, we've seen all of those.

MOD: Do you have any really favorite ones on this list that you use all the time?

FEMALE: Hot and cold dials and containing on or the other. I used to do cold I/O containment, now I'm doing hot. It doesn't really matter, just as long as you--

MALE: It's cost-effective. The key here is all of these things can be applicable, but the customer usually or the client is looking to if you have a good return on investment or simple payback, in that case most of our clients were looking at five years or less for the payback. And actually most of them are three years or less.

MOD: So that’s a big factor in what you choose?

MALE: You have all different Extra Care and stuff and energy efficiency conservation programs, and you present everything that you think can be applicable to some particular data center and say, if you put more efficient tasks on your eighth floor, you can improve this. If you change your motor from single speed to variable speed, you can save so much money and here is your return on investment, right?

Based on all the different factors, the clients will decide, okay, I want to apply this one. I want to apply this one. And when it's expensive, they're going to say I want the one that is free or low cost. And therefore everything is applicable.

MALE: Most of this just seems, to me, to be good, sound practice.

MOD: So, really – everything on this list. I mean, is there anything -- so, let's just look at this top section. So Janice, you do it all. How about you, John? Again, not that we do everything all at the same time, I understand, but--

MALE: But you do. You do. We do hot and cold dials with blanking panels and containment; we do it all.

MOD: So that is kind of standard practice on the top?

MALE: Yes. Yeah.

MOD: Would you agree, John?

MALE: Yeah. One thing here, okay, I keep going back to software, okay. On the idea of [inaudible 46:45] it is one thing that nobody or very little amount of people are doing is energy management system within a server or storage something like that. It is not very well-known.

But I do workshops on data centers for the Association of Energy Engineers and stuff like that and most people end up aware of that.

MOD: And that’s not on this list?

MALE: It's, well, it can be a key part of management software. Maybe it improves, you see, you have to have a feature that it runs to the server or the IT equipment to be able to apply it. It needs a combination of buying any equipment that has a feature for energy management systems and applications. And therefore you got the software usually that is applicable to that particularly box and integrate them and so forth.

MALE: Right. I mean, I think the other things that are missing are some of the more kind of future ones. I think one is water cools, water cool cabins. That's not here and I just, enterprises have a hard time with that, but there are a lot of industries that use that. We don't have, you don't have DC power.

MALE: Yeah, AC/DC power is another big thing.

MALE: I think another one would be rotary, purge the static from UPS, to get rid of the batteries.

MALE: Right, we do that, yeah. Flywheel, right?

MALE: Yeah.

MALE: Yeah, I mean again, it depends on your application. And the flywheel is good if you have [numerous errors 48:19] -- it will come up right away because it doesn’t allow you to -- it is a very powerful power storage, but for a very short time.

Therefore if you have an environment that allows you to run and be able to lose power and have this flywheel to support you for the next 30 seconds to allow you to, allow your emergency generator to come online, it is the best application and I recommend that 99 percent of the time because you don’t have battery. You don’t have to worry about the chemicals and the plant running and--

FEMALE: I like being old school. I like to know that 15 minutes left on the battery just in case I have to do a shutdown for whatever reason. So while those are greener, they are effective, it's a bridge to the generator, but those batteries give you 15 to a half hour of I could do something else if I think my generator is –

MOD: It’s not going to make –

FEMALE: In Venezuela there is no natural gas flux because they had a party and drank a lot of coffee. [Laughter] So, I have time to go around and turn off the servers so they don’t crash.

MALE: Right. You can't do work if you're shut down by the flywheel, but--

FEMALE: Right, that's what I'm saying--

MALE: It depends on the application.

MALE: 15 seconds, but I’m trying to think of some other--

MOD: Can you think while I ask this question for a second?

I know you talked about simple payback as being one of the things that -- one of the reasons some of these might get selected.

Are there other attributes of these things that are commonly used that makes them compelling? Why do you use them basically? Why do you like these things?

Aside from, I assume, they all save energy in one form or the other.

MALE: [Inaudible 50:21].

MALE: Also, it will help you to reduce your carbon footprint, therefore it is nice as a PR company if you say so-and-so come from [company] or wherever, it is doing these kinds of things that is good for the public. It is good for the environment. It is a good PR thing. So that is another aspect of it that is indirectly as well. It's an indirect particular, I mean--

MALE: It is like Bank of America put the CHP plants. They put Progen at One Bryant Park. Couldn't do anything, but it got them big points and it sounds good. As far as I’m concerned, it’s a terrible back-up system for a data center because there is no redundancy.

MOD: So it sounds like the simple payback is a common driver for you.

Do you look at simple payback or do you consider other things when you are making these investments, that they are a little more complicated than usually what we understand to be simple?

MALE: It all drives from reliability as well, because I can keep my temperatures more stable in the data center. I can increase the density of the racks and keep the cooling better.

MOD: All right. And again, I mean, ROI, I mean, people have a lot of different definitions of payback and ROI and what gets considered in those calculations.

MALE: Besides trade on ROI it could just be CAPEX. But there is also OPEX.

MALE: But there's very little--

MOD: CAPEX and OPEX are--

MALE: Considering your hot and cold dials [inaudible due to audio distortion 51:58] switching pipes. It's like any kind of--

MALE: Yeah, it's nothing. Right, right. No, but the CAPEX is your capital expenditures.

MALE: Right, okay.

MALE: But that after that, Janice has to maintain and run the facility.

MOD: So the operation, OPEX is the operation?

MALE: You've got the OPEX side as well, so you may have a product that has, from a CAPEX, a quick ROI, but it is going to kill you when it comes to operating.

MOD: Do they consider operations also in the--

MALE: Yes.

MALE: No, a simple payback is nothing like that. The ROIs is where we impact and calculate the increase of incentive that the federal or --

MOD: Utilities.

MALE: -- or ConEd or something that always can say, this isn't included in the ROI, but is not included in the simple payback.

Simple payback is how much have I estimated I’m going to save and how much it is going to cost to install it and implement the thing. That's why it is called simple payback, right, and it is very simple. And usually the people I deal with look at the thing and if the numbers, like I said, if it's not between three and five years, thank you very much.

MOD: Do they ever consider more than five years?

MALE: Well, in some incentives, well, if you work for the government you are saying yes. Federal, state projects are usually more flexible.

MOD: That three-to-five years, I mean, I've heard that for years. So is that still pretty much the--

MALE: Well, for--

MOD: For your situation?

MALE: For commercial industrial customers in my experience.

MOD: How about you, Janice, was that the payback range that you’re looking for or -- ?

FEMALE: When you [inaudible due to audio distortion 53:44] for payback because you’re not renting it out it’s not a business cost.

MOD: So you're looking at it wider? Or are you even looking at it at all is what you're saying?

FEMALE: We look for where we billed for our own selves for operating efficiently. So if you take a look at the generators and the [inaudible due to audio distortion 54:05], and all of the above and [inaudible due to audio distortion 54:08] for optimization of the cooling and the electrical functions.

MOD: How many of you have made major investments and improved the server utilization? So we have this top list, right, that has to do with facility.

How about servers?

FEMALE: We're major. Major.

MOD: So yes for Janice. And John?

MALE: Yes. As a matter of fact, I was involved with in Casablanca, Morocco, with this location and three data centers we integrated and consolidated and virtualized a lot of servers and so forth for a client there.

And yeah, so that's very common. As a matter of fact, I think in most cases it is one of the first things a large companies do. And the server virtualization.

MOD: I know you mentioned virtualization to begin with as something that you are very involved with.

And Alan, as an architect are you more involved with facility management and not so much with the server?

MALE: Right, right, right. Yeah, I--

MOD: I don’t want to put any words in your mouth, but--

MALE: Well, yeah. No, downstream of electrical distribution, I don’t get very involved.

MOD: And I see the last point was adjust pricing models to incentivize energy efficiency, multi-tenant data centers. There is one last category in here. I think we talked about this in terms of how the pricing was for -- am I correct?

MALE: It's co-lo.

MOD: Yeah, co-lo and how the pricing goes. Okay. Thank you.

Now, I just want to talk for a second about the things that you don’t like.

So I think you have been telling me mostly about the things that you do like, but there was one example of why you didn’t choose something. Is there anything else on here that you don’t choose or anything that is maybe not on here that you don’t choose and the reasons why that you might.

Not like you are talking about John, any specific situation you might not choose any of these because it doesn’t fit the situation, but something that you don’t like that you just wouldn’t go near with a ten-foot pole kind of thing.

No? Janice?

MALE: I don’t like rotary. We talked about that.

MOD: We talked about that. Yeah.

MALE: Not that I don’t like, but something that is not used too often or not allowed by the state or something like that. Usually it's to use maybe, like here in New York you have the Hudson River and during the cold season you can use water to cool your cooling cooler.

MOD: Business frozen?

[Laughter]

MALE: Well, it goes down as much as it will, I mean, you still have water circulation. I mean that is a good aspect of it. It is not, I wasn't thinking about to use it or go down and around --

MALE: Geothermal.

MALE: -- several feet and thermal [approach 57:20] of water or something like that that is another thing that can be used.

Most of the cases if you use something, they do not allow that anymore or other option of hot water.

MOD: Anything that you would stay away from?

MALE: Not from this list. Nothing.

MOD: Anything not on the list that you would stay away from? Or that you don’t know, or that you're uncertain about in terms of the fruit is on the horizon, but you’re not sure whether you would use it or not?

We're just trying to get at why you think these things are reliable and work for you and why some of those things might not. That is the overall question here, but it's not like we -- the flywheel we identified.

Anything else?

MALE: I mentioned water. Water cooling.

MOD: And the water cool.

MALE: I don’t know who is using it, but because I think there was a prediction that we went from half a kilowatt to three kilowatts to five kilowatts to 12 kilowatts to 50 kilowatts a rack. Someday we're going to have 200 kilowatts a rack and how you're ever going to cool that, and it’s not happening, actually. It's not happening.

So I think that super-high-density, I don't know what your experience is. We are not seeing people wanting a 1000 kilowatts per square foot. We're just not seeing it, although there was a lot of talk about it recently.

MOD: So do you always monitor your equipment utilization? Is that something ongoing?

FEMALE: We have real-time temperature and humidity monitoring.

MOD: How about you, John?

MALE: Yes.

MOD: For servers and storage and cooling.

MALE: DCN Systems for customers and for [previous company].

MALE: Yeah, but it is very granular.

MOD: And do you use all the energy efficiency technologies that are built into your servers?

MALE: Well, that's what I was talking earlier, most people don’t.

MOD: That’s right you did mention that most people don’t. So that’s -- sometimes yes, sometimes no. Or mostly don't in your opinion?

MALE: Well, it took me many years to try to educate a customer, like I said, I did personally a test on that for client because they ordered a lot of equipment and they went from a five KW rack to a 25 KW rack and say, well, why and so forth and so on and we have to do some tests to prove to them that, yes, you are using more energy, but you get ten times more power output from the system and so forth and show them so you can save 25 percent of the total energy on the--

MOD: So you have to demonstrate that.

MALE: Yeah, you have to kind of prove that it is effective.

MOD: Janice, do you see energy efficiency?

FEMALE: I’m not responsible for setting the server set points.

MOD: So you don't? You're not sure?

FEMALE: So I’m not aware of what they’re doing with the capabilities that HP provides.

MOD: This probably wasn’t part of your purview.

If you have any investment in new cutting-edge technology that affects energy efficiency, how do you do that?

I have talked to some folks who actually have a testing area where they test out new things. Others are just doing that to kind of research we talked about before.

So you heard about something and it was a cutting-edge efficiency thing, what would you do to try to vet it, I guess?

MALE: In most cases, well, in my case it was a client would ask for proof of concept or proof of technology. Basically, what it is, is a subset of the total solution that we say we should have and to prove to them that, yeah, this works the way they say. They will save so much.

And based on that it will go to a full implementation phase.

MALE: For some of the specific equipment we can’t set up a sandbox because the sandbox is not going to be relevant to when you roll in the real budget. So you have to just do your research.

MOD: Any insight on this? Alan?

MALE: I think if they sent me to Belgium for a week to look at your factory and put me in a four-star hotel.

MOD: You would do it?

[Laughter]

MALE: Then I would consider it.

FEMALE: The Hilton in Antwerp.

[Laughter]

MALE: And I’m only half-joking. You would be surprised how many offers like that come because most it's lab experience, and now it's, you know, so you have to go there, but we always like to go to the factory; go to the factor and see it.

MALE: It would kind of be like, again, that's what I think, as both Janice and John said, is to see it in action, prove the concept in an actual installation is the best thing you can do.

MALE: Also what we do, for example, for chillers and boilers and so forth, when I recommend equipment or something like this, I ask the manufacturer to give us actual curve of the equipment efficiency based on the actual machine. But they did have the equipment at the factory, and based on that you have, you did nine curves of particular equipment efficiency and that is what I use to put on the VMS systems and compare the actually, the translation and see how far away from and tracking that.

Then, it is very important when you write the spec, which I used to do a lot, for equipment is to specify that you want these particular characteristics to pick up at 25, 50, 75, 100 percent load. You get a curve like this. You know where you are when you actually have that installed.

MALE: To John’s point there is something called a factor witness test where you go out and actually put real loads at the factory to make sure it actually works before they ship it. You can have your manufacturer send you the results of the factor witness test and see what that, what the real curve is in real-time with a load on it.

MOD: Great. That’s very interesting.

How about maintenance and training people, even some equipment? Is that something that is integrated say, Janice, in your operation?

FEMALE: Yes.

MOD: And what is in training--

FEMALE: Well, let's assume we really don't use contracts. We bring experts in. We don’t do the maintenance on the generators. They come and someone --

MOD: So they would be looking at making sure that it is operating according to the specification and its energy efficiency level --

FEMALE: Yes.

MOD: -- is stipulated and so on? Okay.

As you know, I mean, this is the big problem with efficiency that things slip and people don’t maintain things.

So is that something, John, that you've been involved with at all in terms of maintenance and--

MALE: I used to have a department with 15 engineers and technicians who do this kind of work. Again, like, with the chillers and the boilers and stuff like that, to change the bearing on the chiller, for example, there is not going to be a group with that if we have a 4,000-pound chiller. Therefore, yes, exactly, but we did have training. And because it was mentioned earlier, standards, when you use the standards you know you have a set of specific instrumentation control system. You have programs and so forth.

They are very similar. I used to have 55 buildings and five campuses doing, responsible to maintain and support for information systems, and the people who go to any places because they had the same kind of training, they were using the same standards and we had, for example, core temperature sensors. We only had three types of sensors that were approved by, for the thing, and therefore they knew how to calibrate them and change it or whatever. And training is very important. And again, if you have the standards, it's a life-saver because it is cost-effective to do that.

MOD: Right. Okay, how about, Alan? Is that thought of maintenance factored into anything?

MALE: Oh, yeah. Oh, for sure. Of course.

MOD: So just to return now to, remember in the beginning I asked you what factors might be the most important for choosing technologies or strategies to reduce energy use is what we are focused on right now.

And I've heard pretty much some similar things. I just want to make sure I got it right, so for our sponsors that we know about the most important things and also any tradeoffs between factors that you mentioned.

So what I heard really clearly was that reliability tends to be the number one. And are there any tradeoffs in anything else or basically that has to be achieved?

Does that make sense? Is there any other--

MALE: There is no tradeoff for reliability. It must be reliable.

MOD: Okay. Janice?

FEMALE: We look at the integration of all of the different components. We like to make sure we are able to integrate.

MALE: Yeah, I would the only tradeoff is to be sure that you set the right level of reliability.

So a lot of folks set a higher level of reliability and, in fact, they need it operationally.

MALE: They all need it.

MALE: Yeah, so a lot of times what happens is they will set a high level for the infrastructure and not look at the reliability of the applications network. And the applications network might be able to pick up some of the hits that infrastructure doesn’t provide reliability-wise.

So you don’t want to have to build a whole 2N Tier 4, two substation platform if you have some ability for all tolerance within the system.

So I think it's to be sure you set the high level of reliability. And a lot of that is enterprises simply set-up, we do Tier 3 data centers. And then you have to challenge those. Why? What happens if there is an outage? Where is your nearest date center and what do you do for disaster recovery? What do you do for business continuity? How often are there outages to the system? How much diesel can you get, how quickly? And all of that kind of stuff.

So you have to look at the whole thing. So I think a lot of enterprises too quickly simply say, this is the reliability we need and that may not be the case. They could save a lot of money on a data center that works at a lower level of reliability.

MALE: Yeah, I agree. I mean, the key to me, again, I come back to the same thing; business requirements.

What is the business? What are you doing?

Like you say, are you are doing chemical stuff and everything else? You tracking the a metal or the guy is making the bullets or, I mean, that data standard breakdown, he doesn't care too much, maybe.

It's different than if you have a life issue or an impact likely. What's the impact?

And that is why, to me, key is the business requirements. That is what defines the key levels and what else is behind it.

MOD: Right, and do you have pretty standard business requirements given what your company does or does it change some?

FEMALE: We have, for the past couple of years, tried to, you know, we are working towards the idea of critical sites. And those critical sites are big sites that manufacture, they are manufacturing critical pharmaceuticals or things that are heavily-regulated by the FDA as opposed to [inaudible 1:09:22].

MOD: This is a great example.

FEMALE: Without a problem. Certain call centers. You start taking medicine and your ears fall off, [Laughter] you need to be able or someone in your facility needs to be able to call the, what's called an adverse reaction hotline and say, Linda’s ears just fell off and she is taking this particular drug.

So we can’t afford any downtime, those kinds of call centers. There are other call centers where I can’t get my Word document to open up. Well, that is something else.

MOD: You are trying to consolidate the more critical--

FEMALE: Differentiate and the key area, the criticality of the sites. We have 600 sites with a server systems to one degree or another. But out of 300, about 175 critical sites. So we are trying to get some enforcement, some funding to bring them up to standard. So right now we are working on that.

They need Jim. They need him here. They need batteries. They need Tier 2. Maybe not Tier 3.

MOD: So it is something you're considering. There are the levels of reliability and trying to sort that by what the business requirements are.

FEMALE: Yes, we’re working on it. By the business requirements.

MOD: Great. Anyways, that is still at the top of the list it sounds like in general.

And then the next thing I heard about were kind of site considerations, like climate and location specific things.

MALE: It depends on whether you are building a new data center.

FEMALE: Whether you're building it in New York City or you are building it in São José dos Campos Brazil or whether you are building it in Europe.

If we have a place, if we have a field, a literal field that we can drop a container on accurately and stuff like that rather than build up; if we can place a cement slab and build the modular units that we can add onto it, we are doing that so that we only build what we need for today rather than to build three or four megawatts or one megawatt; more than what we need today, but we can add on to it. And that's really the trend there.

And some places you can’t do that based on physical constraints, but in a place where you have fields and stuff like that, you can start dropping containers there.

MOD: So site.

Any comments on, as I had it written down here various site locations. I think you all mentioned that as important.

FEMALE: If you have a temperate climate you can use outside air. You don’t have to depend so much on chillers and track it and things like that. The best is that the air comes in and you are good to go most of the year.

MALE: We go to Iceland and built a data center you don’t need any more chillers.

[Laughter]

MALE: Everybody is focused on PUE; power utilization effectiveness, so everybody is in this adoption phase must be very proud that this is 1.03.

FEMALE: If only you measured it the same way.

[Laughter]

MALE: Yeah, that's a problem. Yeah, so everybody brags about their PUE. I would say reliability is efficient. You don’t want to have to bring in four megawatts and only distribute two. [Inaudible 01:12:57]. But to Janice's point, there is no industry standards for how you actually measure that. It's going to take a lot of work reviews for bragging rights. I bet if you we looked at that 1.03 it’s probably 1.2.

MALE: Yeah.

[Laughter]

MALE: Measure it at 2:00 in the afternoon.

MALE: Yeah, exactly.

[Laughter]

MALE: Or on the weekend when there are a lot of people out of the office and whatever.

MOD: Well, everyone wants to look their best, don't they?

Okay, so there is -- it is really great. You are talking about these kind of tradeoffs that exists between these various factors.

How about are there other factors I had on my list, your investment portfolio, is that -- I think you might have mentioned that to begin with.

FEMALE: That's why you have capital expense. So if you don’t want to spend a lot of capital and you want to only grow in small increments, you go to a co-lo and engage a cage for 25 racks or 15 racks.

MOD: Engage a cage. I like that.

FEMALE: And then do another one if that is what your business model is. If you only want to carry the CAPEX rather than OPEX.

MOD: Does financing every come into decisions about this?

MALE: The simple payback and the ROI that is basically the financing aspect of it, right?

MALE: Well, a lot of the equipment manufacturers will have financing plans. I mean, especially if you go to CHP, cooling and heating plant or Cogen. They will throw all kinds of incentives at you to do it.

So yeah, there is a lot of financing available from manufacturers these days.

MOD: And does that relate to energy, what level of energy efficiency you adopt or is that sort of a separate, not really this?

FEMALE: The technical decisions are generally apart from the financial ones. You make sound engineering decisions and then you work to the best financial solution based on the engineering requirements. That is the way we do it.

MOD: John, you agree? So you start with what?

MALE: Because you have to base it on the requirements. You cannot just base it on the cost because you don't know what you're saying. You have to design first, and after based on the design you find out which one is the best, efficient way to--

MALE: And usually you end up, you end up putting some kind of paper to send to the CFO that says, here is what happens if we lease; here is what happens if we build; here is what happens if we finance, and then he can make that decision.

MOD: Right, but the decisions are basically technical decisions.

FEMALE: Business requirements, technical requirements, financial constraints.

MOD: And I think how about energy policy; does that ever enter into the decisions?

MALE: I think it's all commitment, very serious commitment to environment and energy conservation. Very, very serious.

MALE: I agree. I even lead that issue for elite status.

FEMALE: Some of the buildings are. My building is not but we are probably going to work towards it this -- every site has solar panel farms and cell-backed grids, and everything we do within the facility is green and energy efficient. [Laughter] The elevators --

MOD: That was just a summer phase.

FEMALE: You could stand at the garbage for 10 minutes trying to figure out –

MOD: We’re proud of you.

MALE: I don’t think that, are there LEEDs? I don't think there is -- they keep looking at doing a LEED category for data centers. I don’t know if that's been rolled back.

MALE: No, it's just the buildings right now.

MALE: Right, the buildings, but I know they keep talking about it.

MALE: Yeah, they are working on that and as a matter of fact, I think--

MALE: For the last ten years, I think.

MOD: Nobody else say energy efficiency requirements of LEED? They used to be a pretty small factor.

MALE: Well, there's different LEEDs. There is LEED renovation. LEED move. And there's a LEED commercial; but they are looking at the LEED category for data centers and how you can get from silver to gold to platinum.

MALE: They have that, I mean, it's new stuff.

Also you got the co-lo 87 in New York, for example, that would be applicable all to commercial and industrial sites; over -- for data, I did a couple of them. I forget all the details. Then you have to follow, also, the law in certain areas.

But the key here is when I go to a customer and say, we are going to have a carbon footprint that costs, taxing impact is very sorely needed in this country, and therefore get prepared to do that. And therefore we have an additional incentive in a sense where the customer can look forward and said well maybe we should start to seriously look at that.

MOD: So I'm going to go to my last topic and we talked about this a little bit already. That is a very -- I didn’t miss what you were saying. Uh-oh, that'll be interesting.

Thinking about all the factors that you’ve mentioned about your investment decisions, do you weight them against the up-front cost and incorporate any of them into an ROI or payback calculation?

I think you do -- not on a simple payback side, but on the sort of investment decision side there is a lot of different factors that you are factoring-in.

I’m sorry, I just had to read it to make sure that we had covered it before.

MALE: Based on the life-cycle of your equipment and everything else. I mean, that is basically, I mean, that’s the way it is done usually.

MOD: And you weigh-in the energy costs; you weigh-in the potential savings and all of these things go into this calculation of ROI.

People are nodding their head around the table, by the way. We usually videotape these, but I have to make sure that your nods are recorded.

MALE: I think the one thing you have to build into it if you have an existing substation data center and there is a really great new technology, whether it is an economizers or cracks or enviro-cooling or whatever it is and you want to implement it, you have to also look at the risks to the possible downtime of the data center implement that and add upgrades.

That is not a direct straight line ROI, but it is a risk still that they have.

MALE: Right. Are you going to have to migrate everything to a data center while you upgrade this one? How do you actually do that?

MOD: Right. So it is a complicated decision. Even though you might have a simple payback, that’s not, that doesn't incorporate the whole decision?

I want to make sure I am interpreting what you said right. You might have that simple payback, but the return on investment is a much bigger sort of thing.

MALE: The risk may kill it dead in the water. I mean, these are the most risk-averse human beings you'll ever meet in the data center industry.

MOD: I actually have that impression, too. And the with good reason.

MALE: Yeah, that's right. That's right.

MOD: I keep thinking about those missiles. I wouldn't want them to go down in the middle of -- and also, Janice, your example. If my ears were falling off I’d really, really want that line to be up. Somebody else has to call for me, though.

Some of the companies we have talked to in other industries have told us about their payback periods and I think we've talked about that three-to-five-year payback which is a common number of years. And I just want to make sure we fully investigated.

Is that pretty much a common thing? Is it three-to-five? One-to-three?

You said three-to-five John.

How about you, Janice?

FEMALE: You just don’t know. Payback, this is, oh, this is the cost of doing business. There is no payback. That’s the answer of the people not recouping any of this money, in terms of being able to continue bigger.

MOD: So you are not even considering that?

MALE: I think the what you're referring to in Janice's case would be to implement some kind of energy saving technology in an operating data center.

FEMALE: For operating costs, yeah.

MOD: What would it be for operating costs?

FEMALE: Anything that I can get, you know?

MOD: Is there a limit? Is it five years too much? Is it three years?

FEMALE: I don’t think in terms of years. I mean, if I am going to implement something to reduce my operating costs, I want to implement that right away. I want to see my bills go down right away. I am not looking for it three years from now or five years from now.

MALE: But you've got your CAPEX, so you have to expand in order to balance those two.

FEMALE: Right. But you see, I would do it only in terms of regular technology life-cycle management so that when, for instance, I am replacing three generators this year. I will be buying more energy efficient generators with lower sound volumes for my neighbors and things like that.

So I would be spending that money anyway. It still would be thrown away, so I don’t see it as a return on investment even if the operating costs don’t follow.

MOD: So you are saying this has to give you this amount of energy savings or reduction in costs over a particular time?

FEMALE: No, and I am looking for, yes, I'm looking to do that if I replace these high-ticket items.

MOD: Right, but do you have a timeframe that you --

FEMALE: No.

MOD: No? That they need to pay for themselves in terms of the energy saved?

FEMALE: No.

MOD: Okay, I just want to make sure.

FEMALE: They would never pay for themselves.

MOD: Never. All right.

FEMALE: A generator will never pay for itself.

MOD: Okay, in that way, okay. All right. Well, the incremental costs between a less efficient and a more efficient one.

FEMALE: The cost of the fuel and [inaudible 01:23:00], my monthly testing and I spend a lot of fuel. Fuel is [inaudible 1:23:01] again on running on generators for three days solid.

MOD: Okay, and you said three-to-five years, though, John. In the simple playback are there any--

MALE: For new implementation stuff like that.

If you are talking about operational, if any equipment has to be replaced, right? I mean, it is irrelevant, right?

If you have a chiller on the last leg, you have to replace it, okay? When you replace it obviously, you are going to, hopefully, look at a more efficient chiller and have to control and manage this chiller.

So it's two different topics. And operation is one aspect of it. We were talking about data center, how do you improve efficiency has nothing to do with supporting the operation because that is something you have to do irrelevant of the cost of the original investment and so forth.

MOD: But if you were making buying a big piece of equipment. Let’s say it is not abandoned, I mean, I am just trying to make sure I understand your comments about payback and what Janice is talking about which is she is putting in new ones and she is going to take the most efficient one that she can get, it sounds like, and not really worry about how long whether that investment is ever going to pay back basically.

You want to make sure that you see there is savings going on commensurate with what's invested in.

MALE: For a company like [company name] this is not their core business. Their core business is making and selling drugs and supporting them.

If you are a co-lo operator, you are going to look at that ROI really, really carefully. That is a different story. That is where you make your money.

So if it is a realty trust and you are doing a data center and you want to look at some kind of new technology that costs more than a traditional technology, you're going to definitely look at that payback because that's your business.

MOD: And is that a three-to-five year or is that a one-to-three year? Could you stretch it out to ten years --

MALE: I've seen ten.

MOD: -- given the life of the servers?

MALE: It also depends -- yeah, yeah. Life of equipment and the length of the lease and demands of the tenant. There's a lot of things to look into, so I think it depends on whether this is a support or it's their core business.

MOD: Okay. That is very helpful for me, too.

You all are in such different situations here in some ways.

So if you are looking to make money off of your data centers, then that is something you are going to consider much more closely. And you could stretch it depending on the piece of equipment beyond that three-to-five years that John is saying; is that fair to say? You ever stretch it beyond?

MALE: I mean, I have some customers that you know, yes. Can you go farther than that?

But again, if you have to replace equipment versus if you have to just look at the return on investment to be more efficient, and they are going to look at that. After that, the simple payback, for example, doesn’t come up within what they expect.

So you can say well we put this equipment in your co-lo place until when we expand more maybe we can re-evaluate that. It is just a decision kind of thing.

MALE: Right, and there is -- there are all kinds of data credits you can get.

MOD: I just want to make sure, so those incentives then become an important consideration in the data centers.

Do you go after incentives, Janice, when you are putting in new equipment from utilities or utility--

FEMALE: We don't get a lot from PSE&G. We come for whatever there may be. It's not like they serve us.

MOD: I know that sort of well, actually, the PSE&G.

So they aren't the same companies, but out on the West Coast, where I come from, they are a pretty well-established in terms of providing incentives.

One more question and you are out of here. And it really is nice. I want to thank you for all of your input in straightening me out when I got confused. I really appreciate that all of you to understand your particular situations. And I just want to say your time and your input here is really valuable and we really appreciate the time that you took today to help out our clients.

Any last questions or comments before you go to lunch? I don’t want to keep you. I think we are exactly at 1:00 as promised. So anything else?

MALE: No. The only thing for me if I could get a copy of the report whenever it come out.

MOD: Would everybody here like to know?

Do we have their email addresses?

MALE: Through Bruce, yeah.

MOD: Through Bruce? Okay, so we'll make sure -- I am pretty sure everybody will get notification, but we will definitely have you on the list and, yeah, I’ll be looking forward to that myself with all of this research.

Thank you very much. Really appreciate it. Nice to meet you all.

[END OF FOCUS GROUP]