Data Center Focus Group – One – Dallas

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[Started @ 05:02]

MOD: First, we’re just going to have some introductions, and I’d like you to introduce yourself. Just use your first name, please, and tell me, and the rest of us what type of data centers your company operates, and what industries you serve. That’s the first question: What data centers, what type of data centers, and what industries. What’s your role with your company with regards to data center management, and the number of data centers for which you make purchase, and management decisions? Is that clear? Who wants to go first? I think Steve does. [Laughter]

STEVE: Well, my name is Steve. I work for a managing agent for a large financial firm. I operate just a single, large, enterprise purpose-built data center. I am the facility manager for said data center, and I think I answered your criteria.

MOD: I think you answered everything. Okay, great, and Doug?

DOUG: Yeah. My name is Doug, and it’s kind of hard to tell you what I do without telling you who I work for, but basically we’re the central bank for the United States. [Laughter]

MOD: Okay. [Laughter] I understand what you’re saying.

DOUG: And we have a lot of data centers.

MOD: How many? Can you tell us?

DOUG: [Laughter] Not really, no.

MOD: That’s okay. I know some things are proprietary, and that’s fine.

DOUG: And I’m involved with facility management of those data centers.

MOD: And you make decisions about equipment, and so on?

DOUG: Correct.

MOD: Great. Technologies that are used? Great. Okay, David? We’ll try not to figure out who you are.

DOUG: Yeah. [Laughter]

DAVID: So, these gentleman are o the facilities side, I’m the IT side. So, I manage the portfolios of what consider 42 data centers around the world. I’m managing probably seven or eight of those that can qualify as purpose-built data centers; the rest of them might be more like considered server rooms, what we consider them, because they’re much smaller in profile. And, yes, I make decisions on what kind of IT infrastructure we put into these buildings. When I talk IT infrastructure, we’re talking racks, cables, and power circuits, and these sort of things, no the heavy mechanical-electrical facilities folks do.

MOD: All right. Well, we’re interested in both, so –

DAVID: Consumer technologies.

MOD: Thomas? Tommy, right?

TOMMY: Yes, Thomas or Tommy, either one. I am sort of a director of our global facilities. We have multiple data centers globally; some are of the enterprise class; some are of the smaller expansion class, and some are more server room class. Our business model is one where we take care of our own corporation with these, as well as providing data center posting services for clients.

MOD: And about how many, overall, do you have, data centers?

TOMMY: I’ll just say there’s more than 40 globally.

MOD: Great, and Lindsay?

LINDSAY: So, I’m – was previously with the same company as Tommy, okay, so all of what he said applies to me. However, my role was focused on North American data centers within that corporation, and I was responsible for facilities operations, electrical-mechanical infrastructure for about seven of those data centers in the North American region.

MOD: And are you still working in the States?

LINDSAY: I’m not. Well, I am, but not – I’m on my own recently.

MOD: No, sounds great. Okay. So, the next topics I want to talk about are about how you make investments in your data centers. And just to get it going, can you tell me about the top three factors you consider when you’re setting up a new data center, or doing a major upgrade to an existing data center that involves replacement of major IT, or infrastructure in the building. And I know that that’s not exactly the same situation, but I’m just trying to think about them together on either a major upgrade, or a new data center. What are the top three things you think about when you’re going to invest?

MALE: Well, number one is return on investment is what our client expects is how quick is it going to take to basically pay back the investment?

MOD: What kind of things do you put into the ROI calculation?

MALE: Well, you put in, of course, the cost of whatever the upgrade, or project is, the maintenance, service contracts, and the like, just anything really that goes against the – anything that goes against the capital expense.

MOD: Right. Okay, so ROI was the first thing, and you had two others?

MALE: Well, that’s like –

MOD: So, pretty much wrapped up into that ROI calculation?

MALE: Yeah. That is number one. Certainly, they’re looking at energy efficiency, and how green footprint it’s going to be, but I’ve got to admit 90 percent of their thoughts are really is return on investment. They want to be seen as a green customer, but they also really care about the bottom line.

MOD: And so is energy efficiency factored into that?

MALE: Oh, energy efficiency is, yes.

MOD: So, that’s part of it? Yeah.

MALE: Because energy efficiency would be huge when it comes to return on investment. Yeah, because you save the money on energy, but you don’t buy it, because it’s energy efficient; you buy it because you’re saving money, and yeah you’ve got the energy efficiency on top of it, which is cool. But I think that’s how it factors in. You can correct me if I’m wrong.

MALE: Yeah. No, that is absolutely a fact. It’s all about the [statement 12:12] of the money.

MOD: How about others of you? Is it ROI? Are there other things? Doug?

DOUG: Location, location, location.

MOD: And what does that mean when you say “location”? What’s factored into that?

DOUG: Everything from labor rates to environmental risk to utility costs to acceptable site, and then even the area within the site, if you will.

MOD: So, is that figured into the ROI, those factors, as well? Or is that something separate in terms of location, location, location?

DOUG: Really, we don’t have an ROI. So, when you’re dealing with the nonprofits, if you will, or the government, we really don’t have a –

MOD: Oh, that’s right, I forgot. [Laughter] I’d already put that out of my mind that I knew – know more about you than anybody else.

DOUG: Yeah. There’s no value in money.

MOD: Right, okay. Are there any other factors that come to mind?

DOUG: Well, the service level, or the tier level that you’re seeking to achieve, because – are we building a data center for – as a backup? Are you building a data center for high computing, or what level of service are you expected to provide to your IT customers? They say, “We can take eight hours of outage a year,” then that affects the design, and so – but that tier level and service level is important. And then the third thing is – is how you provision it. How is that data center going to grow over time? Is it going to start off at a certain capacity, and grow into it over ten years, or are you going to hit the ground running with it 70 percent full?

MOD: Yeah.

DOUG: And so you’ve got to know where you’re at now, and where you’re going to be.

MOD: That’s right. I want to welcome Scott. Just take a little break here. I’m glad you made it.

SCOTT: Yes.

MOD: And just I’m going to have him – I’ll tell him a couple of things: We’re being tape-recorded.

SCOTT: Yes.

MOD: Did he get his consent form?

MALE: Yes.

MOD: And this is just a group discussion. I don’t know how many of you have ever been in a focus group before, but – I usually ask that, but we’re just talking about how people who manage, and control various aspects of a data center make their investments, and what’s important, and that’s basically the whole discussion today.

SCOTT: Okay.

MOD: Okay? Do you want to just quickly tell us – let’s see? – what did I ask everybody? What your job entails, and I’ve got to look back.

SCOTT: Well, basically I manage a data center in downtown Dallas for an e-mail encryption software company.

MOD: Okay.

SCOTT: And we have a disaster recovery site in Austin, and in a small collocation in the UK.

MOD: Okay.

SCOTT: For the new standard.

MOD: So, how many data centers do you operate?

SCOTT: Three.

MOD: Three? Okay, great. And right now the question on the table – and you don’t have any questions? – or can we – the question now on the table is what are the top three factors that you consider when you’re setting up a new data center, or doing a major upgrade of an existing data center? I’ll let you ponder that for a second, and go over to David here, and – Dave, you go by Dave, or David, either one?

DAVID: Dave will work.

MOD: Dave? So, tell us about your top three factors.

DAVID: So, when you’re making a decision to build a new data center, or expand an existing? So, the bottom line is the bottom line, and I’m sorry, your name?

STEVE: Steve.

DAVID: Steve. So, at the end of the day, I’ve got to justify my expense as compared to my alternatives, so I’ll echo what Steve says; I also have to echo what Douglas says, because in our business, our data center can only be so far away from our engineers that utilize that data center, so it’s called “latency.” Certain applications simply don’t work if you’re too far away from the data center where you use it. So, location, I generally have a radius of miles that I have to be close to the users. Now, unfortunately, that limits my options when it comes to utility rates, and this, that, and the other thing. I’d love to put a data center up by a dam, and sitting on our [lap 17:22], and pay 2 cents per kilowatt-hour.

MOD: Right by us. That’s where I live.

DAVID: And be more energy efficient, and I’d just win; everybody wins, and it’s just too far away, so the speed of light is a limiting factor when it comes to just how far away you can be. So –

MOD: You’ve answered a question I’ve wondered about. Is that true for the rest of you here that you are – in terms of location, even though it’s important, you’re limited by various factors, like – it sounds like the speed of light limiting that –

DAVID: Well, latency, that itself how fast –

MOD: How far and how fast that the information –

DAVID: Yeah, the data can travel from the user to the data center, and the data center back to the user. So, you can’t hit a key, and then wait five second for your screen to respond. You can’t be productive.

MOD: Okay. So, does –

DAVID: So – but the whole global, Internet, bandwidth technology can, in fact, help us out there, so as we can travel it as circuits, we can get more data on a circuit for less money that will – that will help us, but it’s still – we are constrained by the fundamental speed of light, and that’s how far we can get.

MOD: Is that a common constraint that everybody has? I just –

MALE: On the facility side we don’t –

MOD: You don’t –

MALE: – deal with latency issues.

MOD: Okay.

MALE: But it is an expensive proposition to get fiber from, say, a terminal or a junction into a data center, and so, that is part of a location equation is the distance from your source. It can be very expensive to run fiber through a major city, or around Salt Lake City, or around an ocean.

MALE: Or under. [Laughter]

MALE: Or under – yeah.

MALE: Well, in the case of our firm after 9/11 it was pretty much noted that we had to actually get some distance our previous world headquarters in the northeast.

MOD: Okay.

MALE: Too vulnerable; all of our former data centers were in the tri-state area.

MOD: I see.

MALE: And that one day back on September 11th, it kind of changed, and they actually wanted many miles between their data centers.

MOD: Well, it was sobering, very sobering. Okay. So, I guess we’ll just continue about the top three factors, and we’ll make our way around here. So, how many find similar or different top three factors?

MALE: I would say within our organization we have kind of two clients: One is an internal client that drives our corporate business, and then there are some external clients that rely on us to provide services. So, we look at the data centers that we’re purposing, we would compare and see what part of those would be done. So, part of the data center might be corporate; part of it might be customer facing. So, location is often important for the customer in that they may want to be relatively near where their equipment is located. Latency is also an issue to try to look at how long does it take for the signal and response time? And then, really, do we have the location where we have the right kind of IT supportability, meaning circuits that would be able to handle the bandwidth of the traffic that we would be trying to put over the circuits? Do we have multiple, and diverse routing of those circuits, so we can be sure that that location works well for us? And oftentimes, because we’re supporting an external customer, it may be in an area where people are readily available that are skilled, and talented in the IT area –

MOD: Right.

MALE: – and maybe even in the [SOLTES 21:54] area to be able to support those, so I would say those are the location items that are important to us. Obviously, because any corporation needs to be profitable, cost is an important element, so whether we’re internally looking at it, or selling it to our customers through a process, how we – where we locate would be an important thing, and how we put together a facility, the internal tier classification might be important for not only our corporation, but for our customers that we serve, so some locations might be more strategic, and require higher tier levels for a year beyond. In some locations, the data center is used kind of for internal communications, and for internal purposes, and doesn’t have quite as high a service level need, so those might not be as important for continuous continuity. I would say we’re working where we can, where location permits us to try to find locations that the ambient conditions, the outside air conditions, give us an opportunity to develop cooling systems that complement the overall support need for within the data center, so that would be another consideration. Like you mentioned, cost of power is another, because data centers, even if we didn’t have any cooling need, the data center, itself, just from the IT perspective can be a significant load. It is a significant load in the global market today, US and other markets, so as power consumption through power need is increased, the need to have reliable, but cost effective power is very important to us, as well. So –

MOD: Okay.

MALE: – I would say those three items – three bulk items would be what we would look at.

MOD: Great, great. And Lindsay? And I know you said you worked together, so now I wanted – but you may say whatever – [laughter] – you believe are the top three factors in your decision-making when you were there?

LINDSAY: Well, as Tommy highlighted, what I found [the needs is 24:51] consists of the tracking factor in the corporate decision-making was obviously the initial capital investment that we’ve required. Once the site-specific need was defined, which gave you, let’s say, your set of options, and you’re looking across those options trying to determine which one is the best fit. Capital investment was typically the driving factor, but operational costs, throughout the lives of the facility was obviously another important factor. And I’ll just add to what Tommy said, not necessarily a top three, but perhaps an important factor in that would be potential instant ends or a tax benefit that might be –

MOD: Okay.

LINDSAY: – available across the selections that we were considering.

MOD: Okay, all right, great. And now, Scott? [Laughter]

SCOTT: Well –

MOD: Tell us about your situation.

SCOTT: I guess I’m a little unusual. The top requirement that I would face would be availability. Cost isn’t so much a factor for the company that I work for. They’re going to say, “Locate your data center in a place where the power is most reliable, where the people – the people are most skilled, and there’s no labor shortage.” Location, kind of like Steve, we actually had to spread our data centers apart. Our primary data center is downtown Dallas, and we had a backup data center up close to Galleria, and in order to get certified for several of the certifications we had to spread the disaster recovery site further away from our primary location. So, we moved down to Austin with the backup sites. So, when it comes to making a decision, my boss’s boss, he wants what is the effect of availability of [those tax 26;59]; cost is very, very [concerned to 27:03] account, not as much as other people have [phrased 27:07], but we’ve only had to – I’ve only had experience building one data center since I’ve been there, so maybe things have changed. That was ten years ago.

MOD: Okay. [Laughter] Yeah.

SCOTT: So, I guess it’s been eight years ago.

MOD: All right.

SCOTT: So, we’ve maintained the same three data centers ever since then.

MOD: Great. So, a few of you mentioned energy in various ways; you mentioned power, having available power, and some of you – a couple mentioned energy efficiency. But can you – I’m going to tell you now we’re going to focus a lot on energy efficiency for the rest of this discussion, and so how – where does that consideration fit in to your thinking? And I think I heard Dave say – well, saving – it’s energy efficiency, but it’s really saving money, right?

DAVID: Well, the two are one and the same in many cases, so we buy UPS that delivers 85 percent efficiency faster, so for every watt of power that goes into that UPS I get .85 watts out of it. I’m paying for a watt of power, but I’m only getting .85 out the other end. Now, that UPS might be less expensive than a UPS with 100 percent efficiency, one in, one out, but I got a – I’m paying 15 percent more on my every month power bill for buying that less expensive, lower efficient UPS, which is why I say they’re one and the same. When I’m looking at equipment, I have to look very closely at how efficient it operates, because I’m paying money every single month for the life of the data center if I get less efficient equipment, so it’s the efficiency of the equipment is paramount. It’s a very high concern, because it translates to dollars.

MOD: Right. So, you’d say it’s important?

DAVID: Absolutely.

MOD: I want you to really [speak for it 29:16], like important, somewhat important, or not too important? How about you, Tommy?

TOMMY: I would say efficiency is very important. I think it’s something we have to really look at. You know, for different applications you would have to evaluate things in a different way, kind of following Dave’s example, or some of those. If reliability is extremely important, then it may be that I’ll use the word “overall efficiency” of a data center, where we might have a 2N UPS system that has some losses, whether they be 15 percent, or 2 or 3 percent, or whatever they might be. But if you have to have two of those, just for the reliability, then you’re basically having, let’s say if 3 percent was the norm of the UPS in a very high efficiency system, 3 or 4 percent. Well, then having to have two of them might create something on the order of – instead of three or four, it might be six or eight, or maybe even a little bit more, so – efficiency has to be tempered, and viewed with the customer service level, and the importance of that.

MOD: Great. How about – Scott, how important is energy efficiency?

SCOTT: Somewhat important.

MOD: Somewhat important?

SCOTT: Yeah. I’d say, again, availability, here and now, but fortunately, they don’t run hand in hand. You don’t get less reliable as you get more efficient, so there is some room to go for the efficiency, but if it was one or the other it would definitely be availability in my case.

MOD: Okay. And how about you, Steve?

STEVE: Well, actually, the same as Scott. Efficiency is very important, but reliability at our facility, it is a 2N on the UPS, and as UPS is, okay, if you have to have the 50 percent buffer to be able to fill over to another system, UPSs are less efficient when they’re running less loaded, and because of that, yes, we’re not as efficient as a facility that does not require all that available backup. So, reliability is really paramount, but efficiency is very important.

MOD: How about you, Doug?

DOUG: The same thing. In your 2N technology – well, if you’re in a 2N facility, then you’re going to have what I’ll call the Cadillac of the UPSs anyway, and they come with a cost, and that cost is efficiency. And so if you’re in the 2N, which most major data centers are, or tier four, then you’re going to pay a cost for that technology for that reliability, and it usually comes in the form of efficiency.

MOD: How about you, Lindsay?

MALE: Sorry, but your point, because you’re running it 30-40 percent or lower, as Steve was saying, you don’t get the efficiency that you’d get if you were running at 80-90 percent, so you lose that efficiency, but still when you’re choosing your UPS, you’re going to choose the UPS that is – if you have a choice of a UPS high efficiency, and low efficiency, and you’re definitely going to go for the one with higher efficiency. Obviously, let’s say you break it every three months, and now –

MOD: Yeah. Assuming the reliability –

MALE: Assuming everything that you’re –

LINDSAY: You need to run light?

MALE: So, it’s still – you’re going to save months, and you’re going to get the efficiency, but your design is inherently inefficient.

MOD: Yeah. But do the people --

MALE: And your design is inherently inefficient to achieve the level of reliability that you would normally find – that you would expect, so if you want four nines, right?

MALE: Absolutely. It’s like –

MALE: And so –

MALE: – I understand that.

MOD: And so, Lindsay, how important is energy efficiency?

LINDSAY: I would say very important. I kind of look at this from a micro level of efficiency, and within specific systems, and then you have a macro level, right? So, you’ve got a data center that we often all look at a very broad efficiency measure, PUE, right? And at that level, within the corporation that I’ve worked with, is extremely important in the sense that what is that macro story about the data center, because we – the data centers I supported, we were in the business of selling that data center to our customers as a place that they wanted their equipment to be housed in, and supported in, and they wanted to be able to go back to their bosses, and tell the same really great story about where it was that they had chosen to have their equipment hosted. So, that macro story of efficiency is extremely important, but what you have to do, then, is as you dove into these specific infrastructure systems within the building, if there’s give and take, because in our industry everybody wants to tell that really great macro story, but they’re not going to give up that the bread and butter of it all, which is the reliability.

MOD: Okay.

LINDSAY: So, you have to go through, and say, “Okay, what decisions can I make to try to achieve an overall efficient design?” And so there may be systems where individually they’re not so efficient inherently.

MOD: Right.

LINDSAY: But in other areas you’ve made decisions to really make an investment that brings a high level of efficiency into the town.

MOD: So, when you’re talking about this story to your customers is it the efficiency story? Is it the green story? Or is it both those things?

LINDSAY: Well, both in the sense that they’re somewhat hand-in-hand. But it was definitely something that we saw our company wanting to tell that story of minimizing the footprint, sustainability.

MOD: And also cost, so were a part of that, then?

LINDSAY: Cost was part of it from the internal decision-making.

MOD: But not so much this macro story?

LINDSAY: Right. And somebody’s out there as a customer looking at five or six hosting providers; cost is going to be an issue to them, but everybody has a need to tell that story in our industry right now.

MALE: And that’s – it’s amazingly so. It’s extremely important to my parent company that, yes, we be seen as a green corporation, but internally, when it comes to justifying the capital outlay, the pressure, and then the reliability, and it takes a certain amount of dollars to get that reliability, and so it’s a balancing act.

MOD: Balancing? Is that true for the rest of you? I know --

MALE: I’m a customer; I’m also a customer of the data center providers, and I place my data centers in other facilities. And there’s no such thing as a black provider, if I was to give the opposite of green. [Laughter] There’s nobody out there that runs a –

MOD: In compliance?

MALE: So, if I’m looking at Data Center ABC, the options, as Lindsay says, that are all in my location that provides us, whatever, this guy says, “I’m triple gold league certified green,” and this guy says, “I’m really green,” and this guy says, “I’m pretty green.” That really –

MALE: It’s not going to tell you –

MALE: – there is almost nothing. At the end of the day, if it cost $1 million here, and $950,000 there, am I willing to spend $50,000 a year more to get that triple league grade, because they did that? The answer is no, I’m not. Frankly, none of them are bad operations; they’re all good operations, or I wouldn’t consider them. So, you have the green story, or the nice story, but it doesn’t often translate into me as a customer being willing to pay more for it. You’ve still got to give me – you’ve got to meet me at the bottom line.

MOD: And how about you Doug? How much – how important is it, you having a green light footprint, and all of those things?

MALE: What I see a lot is – is that data center providers show that they can do green, but in fact, don’t operate that way; they operate the safer way, the more reliable way.

MOD: Okay.

MALE: So, you can have a UPS that, in fact, can do green, can do the eco mode, but you’re not going to put it in the eco mode.

MOD: Okay. [Laughter] I want to move us along a little bit faster. This has been a really great discussion, and I’d like to hear more, but I’ve got to move us on to – and maybe we can just quickly go around the table. And how often do you perform a major upgrade at your data centers when they’re – for IT, or infrastructure facility? How often do you do that? Scott?

SCOTT: Major upgrades.

MOD: It doesn’t sound like too often. [Laughter]

SCOTT: Just when we do major upgrades, yeah.

MOD: Oh, okay. How often do you do it?

SCOTT: If you’re considering like a UPS major upgrade, just a whole new row of racks, or I’m not sure exactly what you mean by upgrade.

MOD: Oh, boy. I don’t know the answer to that question.

SCOTT: I would say only once every six month.

MOD: Every six months you do some kind of either IT, or facility –

SCOTT: Correct. It makes me really nervous to have to.

MOD: It makes you really nervous? I’ll bet it does. And what factors will lead to that decision really quickly here? Why do you do it? So, that’s pretty obvious, it seems like. Maybe it’s because – we’ll find out if it’s the norm.

MALE: Sometimes it’s in black. Most of the time it’s in the black virtualization; it has to do with a lot of upgrades –

MOD: Okay.

MALE: – and driving factor on most of our upgrades in the last two years it looks like.

MOD: How about you, Steve?

STEVE: Well, on the facility side not so often. We try to maintain what we have for capacity reasons we are considering a large UPS upgrade, but on the IT side, we have major contracts that have lodged a lot of large technology firms. I guess we’re not supposed to use brand names, but we have to spend a certain amount.

MOD: As long as put your name, I don’t mind you using it.

STEVE: Well, especially with IBM. We have these service level agreements that they’re always coming out with new types of mainframes, or new types of servers, and we’re doing so many tech refreshes, our IT footprint is always changing and evolving, and that is a constant, all the time.

MOD: Sort of all the time? Okay, how about you, Doug?

DOUG: Well, on the facility side that is you’re looking at the earliest would be, say, ten years. UPS is at ten years, and HVAC at 20 years, and unless we’re forced by a code, or standard changes to go in, and do an upgrade, so it’s on a lifecycle, and the facility infrastructure is designed for ten or more years.

MOD: What about the IT side? And it sounds like that’s what you know about, Dave?

DAVID: So, the server refreshes that Steve mentions, that’s the other big piece of the efficiency puzzle. It’s not just the UPSs, and the cooling systems, and what not. It’s – and we refresh servers between three and five years. We will recess through – refresh our entire fleet if you will, so we’re constantly, just say pulling older, less efficient servers out, and putting newer, higher efficient servers in. When I say higher efficiency, it means it provides – it may use the same electricity that the previous server used, but it gives me double the performance, because of the later technology. Those things are changing all the time, so that’s a constant, but the other thing that – a change that I’ve seen over the years – is we’re building our data centers far more modular now. Ten years ago we would build a 10,000 or 20,000 square foot data center, and pretty much build it all out, and then grow into it. If we have that kind of footprint now, we’ll develop the first 2,000 square feet, and just put the UPSs in cooling to support that, and then rather than waiting ten years to build a whole other large facility, we’ll build out this facility over the course of ten years as we have needs, so we’ll kind of not – we’ll build it out in increments.

MOD: And have now this – now is this trend toward a more modular? I see a couple of nods around this table from Steve and Scott, but not Doug, and not you said. [Laughter] But that’s all right. Let’s hear from Tommy quickly about how often do you perform a major upgrade, either for a facility, or IT?

TOMMY: Just as kind of a simple statement the IT is the important element, and it’s the driving element, whether it’s for power, or cooling, and the refresh rate on that may be the single driver for how fast the facility side has to change, and so it – the factors that we would look at for refresh rate would oftentimes be customer driven. So, for internal to our corporation, we may do that at a rate that is three to five years in a refresh cycle. In a customer situation, that refresh rate could be as little as two or three years, and could be as great as more than five years, up to ten years in some situations, some classes of equipment.

MOD: Okay.

TOMMY: So, the efficiency aspect, or the kind of form follows function concept is – is that the data center cooling and power need is the driving the process of cooling and power, and so as data center hardware becomes more efficient, and at the same time perhaps more tolerant of environmental conditions – temperature and humidity – then, those would bring about changes to the data center. The data center might be changes such as change out of elements like UPS cooling elements, or it could be changes of the operational aspect of those, so that maybe not the UPS per se, but maybe the cooling form of temperature or humidity might be augmented or changed to be able to stay consistent with what the equipment tolerance is, or capability would be.

MOD: And Lindsay, how about you finishing up this – the frequency of change of either IT, or the facility, or both?

LINDSAY: I would say that strictly from a facility infrastructure standpoint that the refresh rate would be fairly lengthy, the equipment –

MOD: About how many years?

LINDSAY: Ten years?

MOD: Okay. And it sounds like to me – so, correct me if I’m wrong – there’s not an absolute set cycle; it depends on what you’re always looking at in your facilities and deciding when they need to be refreshed? Is that accurate, or do you have a set cycle?

MALE: I think on the facility side it’s closer to being a set cycle than it is on the IT. Like you said, IT has more factors on it. Most UPSs take ten to fifteen years, so the refreshes have a lot more factors that are included in that decision.

MOD: So, does everybody kind of agree with that, or –

MALE: The [testament 47:37].

MOD: Steve does?

STEVE: Yeah, the capital – if you have a capital investment, then you’ve got to look at depreciation as part of that cycle.

MOD: How about Dave?

DAVID: Oh, yeah, that’s – you’ve got to – we have a fifteen to twenty year life on our major stuff that we look to get out of it, before we have to refresh it, and I’m talking UPSs.

MOD: So, that’s kind of set, and the other tech, IT side is more, “Let’s look at what’s going on, and we’ll see what’s coming out on the market; if something is better, is that –

DAVID: But Tommy raised, again, a really good point, and that is it’s the IT side that drives the facility side.

MOD: Yeah. So, that’s also –

DAVID: The IT stuff keeps advancing; it requires a different facility architecture, and suddenly you’re forced to –

MOD: Whether you want to, or not? [Laughter]

DAVID: – accommodate the new form of that, and that can be pretty –

MOD: Right. So, that’s an interplay there, yeah.

MALE: For instance, right now we just put in water into the data center, again. We spent many years getting water out of there. [Laughter] And now, they’ve come up with –

MOD: Of course.

MALE: – with [water cooling 48:50] mainframes, and so now we have one or two headers of –

MOD: So, starting on the idea you want to set up, or upgrade the data center, where do you go to get information? Where do you gather information about technologies, about operational improvements, equipment? Where do you get your -- ?

MALE: We come to Data Center Dynamics. [Laughter]

MOD: Okay! That’s actually good, good plug for Data Center Dynamics. All right, where else do you go? Where do you find that?

MALE: Internet.

MOD: The internet.

MALE: And the other 20 or 30 events; there’s a plethora of industry events; they’re almost non-stop anymore; there used to be one or two a year, and we had time in the 7 by 24, and now there’s so many players, every other day there’s a new conference, so the information is out there. Certainly the Internet; certainly salesmen are always calling you, trying to tell you the new technology out there.

MOD: Okay.

MALE: It’s amazing how companies I’ve never heard of are calling me every day.

MOD: Okay. So, we’ve got some conferences where they have – I think they’ve a room with people in it telling you about their cool stuff, right? And Internet; you mean just Internet searches of what new stuff is out there, and people calling you with that. What else?

MALE: Well, your consultants, or third party assessments of your facility, and so a big part of what we do is use those assessments from third parties that have no vested interest in the outcome, and that’s a big part of it, where they can come in, and subjectively –

MALE: You mean objectively?

MALE: Huh?

MALE: I think you meant to say objectively.

MALE: Objectively, yeah. [Laughter] Yeah, the other way around.

MALE: Okay, I was just asking. [Laughter]

MALE: You need this.

MOD: So, you interact by consultants; they give you their opinions, and how well things are operating when they could be better, and –

MALE: Yeah. New technology, and talk about what can and can’t be expanded, and what can and can’t upgraded, and beyond that.

MOD: Other places?

MALE: With the data center being a – I’ll just show you with data usage, data retention, all of the elements involved around data, globally, in social media, all the way through health care, and every other financial facet, we’ve become a society that it’s growing at a very high rate, and storage is growing at a – in a huge –

LINDSAY: Everyone is growing, yes, it is. [Laughter]

MALE: So, as a result, I think of the changes in the environment meeting the need, there are more people – technical, and competent consultants beginning to focus on that particular area of need, whether it’s in the IT side to focus on how do we accomplish what your need is in a best way – best practice way, but – maybe even a new way, and then that results in how do you address it from power and cooling aspect, the efficiency elements that drive that?

MOD: Do any of you have – talked directly with manufacturers about technologies? How many of you do that? So, one, two, three, four, five; one, two, three, four, five. [Laughter] And how about in some cases there are people in corporate headquarters who specialize in this, or there are people on staff that specialize in looking at what’s out there? Is that true for any of you?

MALE: You’re looking at them, right around the table.

MOD: Right here? These are my specialists?

MALE: As far as Doug is concerned.

MOD: And that’s your job description?

MALE: And there’s many layers all over the world in our corporations that do the same thing, and it’s – you have a lot of dialogue internal.

MOD: And so that could include maybe everyone from the engineers, and the people on the floor to people at your level, and you’re all – have your radars out there, is that pretty true?

MALE: I guess I would qualify that a little bit. My customers, my IT department, etc., frankly, they’re not very concerned about the efficiencies, and the technologies of the data center. They want a service, and they want it when they want it.

MALE: Available.

MALE: And I’m the one that has to go educate them on why this server, or this system is more appealing than that system, because it has an efficiency, and it fits in our data center of which they have no concern unless I tell them. So, it’s really my team that manages the data centers, that is interested and concerned, and subject matter experts about this, and the financial people on top of me also don’t particularly care –

MOD: Okay.

MALE: – about the latest and greatest are definitely not subject matter experts, but they’re going to make damn sure that I’ve dotted my i’s, and crossed my t’s when I’ve sorted out the options, and I doing the best thing for business.

MOD: And other comments on this before we move to the next –

LINDSAY: I’d say that back to your first question on this topic, that an important stream of information about what is new, and upcoming in the industry technology comes from our vendor partners, and OEMs that we have standing relationships with. Most of us would like to think we’d say we have a short-lived OEM manufacturer’s rep that we work with, and those folks – we have a constant relationship with, because of existing purchases, upcoming expansions, etc., and those folks are always bringing to us what’s new, and what’s cutting edge within their areas of expertise.

MOD: [Scott 55:44]?

MALE: Scott, let me ask a related question: Nobody here has mentioned journals, or mags, or – it used to be many years ago that the PC magazines, and other things are really driving the IT side. That was the source of data. I wonder if you guys have any particular journals?

MALE: I have a bookcase of magazines I don’t have time to read.

MOD: No time to read them?

MALE: Yeah.

MALE: Yeah, I get many of them, and they go on my shelf. I look – I glance through them, “Oh, that’s interesting,” and sometimes I read an article, but –

MALE: Only if it hits you at the right time? Yeah. I just think in – I know in my experience, I spend far less time today reading, and paging through those sorts of material that I used to.

LINDSAY: Yeah. It’s coming at us constantly. Yeah, we don’t have time, and we do keep the stack, because you hope that one day you will.

MALE: As a reference area.

LINDSAY: Do you believe that? And you’ll say, “Ugh.” The hope I will.

MALE: Do you ever look at your stack? I don’t.

LINDSAY: Very rarely.

MALE: Once in a while I throw a pile in the back, and –

MOD: I’ve got to move us along here, I guess, actually the end part of this is even more important than the first part that we’re talking about here. So, and I just wondered quickly, does your decision-making practice differ between older data centers, and if you’re building a new data center, or in terms of what you’re investing in, or how you make those decisions?

LINDSAY: Absolutely.

MALE: I’m not sure I understand – I don’t understand the question.

MOD: Well, the question is does the decision-making process differ between the older data centers, and newer ones, and also between existing data centers, and new data centers? I might not have been clear there. So, the children –

MALE: When you’re dealing with the existing older data centers, and you have a half-forward, some kind of a roadmap that maybe has something out there in your future. What’s planned no one, then you might treat the existing somewhat differently, because of its either planned [absolescence 57:54], or it’s – obsolescence, rather.

MOD: So, you’ve already made decisions about that, and how long things are going to last, that maybe somewhat different than if you’re [getting] a new one.

MOD: Okay. And you were talking about the modular – I mean that’s sort of the new thing that you’re dealing with is – which should be different than old data centers that weren’t built that way.

MALE: And actually, there’s a definition of the modular, that they’re modular systems, modular data centers that come sort of self-built, purposed to a site as an assembly, and then they’re building a data center in such a way that it has modular capabilities, or expandable capabilities in some sort of application of either space, or space and hardware, space in equipment, and that might be another definition of modular.

MOD: So, how many of you lease data center equipment or facilities based from other companies? Anybody? So, over here; I’m going to just give you a rest over here. The three of you on this side, very quickly, for those of you who lease equipment or space, what’s that relationship like, and in particular, you pay based on the space alone, or are there charges for other factors, like power use? How does that –

MALE: Yes.

MOD: Yes? [Laughter] Like someone is going to say.

LINDSAY: They’re both? I’d say volunteer or –

MOD: Yes. And depending on the situation, or – I’m sorry?

MALE: No, it’s – well, I’m a client. I lease data center space.

MOD: Yep.

MALE: And yeah, it’s the business terms are very flexible; there is no one set of business terms, so you have to negotiate those terms. My objective is to pay for what I use, and not a penny more, and their objective is to pay for what they allocate to me, whether I use it or not. And so –

MOD: Okay. [Laughter]

MALE: – they want me to pay a nice big, fat sum, and I only want to pay for what I use, so that’s the – that’s where the negotiation starts, and we end up subordinate.

MOD: So, it includes things like the space, and the power costs, and so on?

MALE: Yeah, the space, and the numbers [of square feet 1:00:16] –

MOD: Is that ICUs? Now, Lindsay?

MALE: – mostly out. When I say pay for what I use, I’m talking about power.

MOD: Okay, yeah. Power is the key factor? And is that true, Lindsay for you, too?

LINDSAY: Yeah, you typically pay for – the typical contracts that I’ve been involved with through a third party design center provider would be; you’re paying for some footprint that you can occupy with your equipment, and then on top of that, you’re paying for utilities typically.

MOD: And who determines if things need to be upgraded? Do you have any input on that, or is that pretty much the owner of that facility?

LINDSAY: That’s true.

MOD: Yeah. Sorry, Dave? The owner?

DAVID: It would be the owner facility that is the subject matter expert there, and I’m paying them to be the subject matter expert.

MOD: Okay.

DAVID: My objective with them is give me 100 percent up time. That’s my contract, and you’re going to pay penalties if you don’t, and it’s their objective; they have to determine things we can get. I’m interested in it. I want to know, but they’re the decision-makers.

MOD: And how about – the same for you [inaudible 1:01:30]?

LINDSAY: From the facility infrastructure standpoint, absolutely, bet on that. The IT side is a different story, but when you talk about all of the infrastructure supporting the data center environment, that’s completely the owner’s discretion.

MOD: How many – how many of you concur with what you’ve been hearing?

MALE: I believe.

MOD: Okay. Thank you. Let’s try this: How many of you have leased data center equipment, or space to other companies? Okay. Just two of you. [Laughter] And so, how’s that relationship structured? Now, you’re the other side of the coin, right? Is it the same factors, or who determines what needs to be fixed, or upgraded in that situation? Do you ask the owner?

MALE: Yes, yes.

LINDSAY: The answers are very similar. As David had mentioned, individual customers are more able to negotiate their contracts, and to meet their specific needs.

MOD: Okay.

LINDSAY: But typically there’s a charge back for space usage, a charge back with some algorithm, perhaps, for power usage, and it’s becoming more and more common as that technology for monitoring power usage at a specific cabinet is becoming more available to deploy.

MOD: And who pays for the electricity cost, then? Is it you as the owner?

LINDSAY: Yes.

MOD: Pay for it? Okay.

LINDSAY: And that might be passed on.

MOD: But you might – it might be passed on? Okay.

MALE: No, I think in the – in the particular case that Lindsay and I are kind of representing in ours is that there’s companies out there that provide collocation space, or space for people to provide a spot for their equipment to be put in, and people like Dave manage that equipment in the element. In our particular case, we provide hosting services, which goes beyond just the customer’s equipment, or equipment for the customer, but actually providing services around that, whether the services might be security related to that; it might be application, consulting; it might be engineering, or writing of applications –

LINDSAY: That could be it, yeah, right, a variety of things.

MALE: – so, providing of hardware; so, it might be beyond that.

MOD: So, now back to everybody. Is your data center run as a single organization with one budget, one team, one boss? Or are they broken up into separate entities, or separate budgets, teams, and bosses? So, it’s – let’s just quickly – how about you, Scott? Is it kind of all the costs, and everything rolled up into one place?

SCOTT: Yes.

MOD: Or –

SCOTT: One place.

MOD: One place? How about you Steve?

STEVE: For us it’s facilities and IT.

MOD: Okay. Divided?

STEVE: Yep.

MOD: How about you Doug?

DOUG: It’s very diversified, lots of bosses, lots of IT departments, lots of – and so, when you get to change management, you may have a dozen different entities being represented there, all wanting a window.

MOD: Yeah, I’m sure that’s never frustrating? [Laughter] Okay. How about you, Lindsay? Is it – was it all rolled up into one specific making structure?

LINDSAY: Facilities had it a separate decision-making structure budget, management budget allocation, and then IT, and then within IT, that became a much more complicated structure, and hence the very unit run groups within IT were involved.

MOD: And Tommy, you were – that sounds like your situation that you ran into again?

TOMMY: Facility, yeah, as Lindsay described it. There’s a fair amount of silo, of cost, or – that is part and parcel. Ultimately, as a corporation, it all rolls up to a single budget, shall we say, at the top level, but as it diversifies, and it goes down to business units, and the like, I think there’s a variety of silos, or paths.

MOD: I had the word “silos” down here. Dave, how about you?

DAVID: Yeah, the facility sides are far more homogenous. The IT side gets very fractured; lots of different IT groups that are customers of the data center with their own individual budgets, and so IT is pretty out of control. [Laughter]

MALE: And always was.

LINDSAY: That’s what I have.

DAVID: Actually, we had a problem.

MOD: So, who pays for electricity costs, then, is that also –

MALE: The facility guys.

MOD: Facilities tend to pay that?

MALE: Oh, that’s a big problem –

MOD: Do you ever –

MALE: [Inaudible 1:06:31].

MOD: Yeah? Okay.

MALE: Yeah. There’s sort of a level where it becomes one budget, like – but it does the same. It depends how high up you go.

MALE: Right.

MOD: Do any of you sell, or buy equipment on the secondary market? So, use equipment?

MALE: I’m sorry, we should not go by that last question.

MOD: Oh?

MALE: In places of who pays for the electricity, because although it’s the facilities team most often that pays for it, there’s a big effort to charge back to the users –

MALE: Um hmm. [Indicates "yes"].

MALE: – and all of us are trying to get that reality check back to our users. It’s not easy to do, but there’s a big effort in the industry to do that.

MOD: So, whether it’s internal or external, but –

MALE: Yeah, more so –

MOD: – you’re finding that internal here; you’re trying to ensure that –

MALE: Yeah. We’re trying to make our user realize what the real cost of their equipment is, and you’ve got to have that utility.

MOD: Thank you for saying – that’s good. And I see some nods around the table. It sounds like it’s a challenge, though, to get that cycling, and some information around a bit. So, do you buy or sell equipment on the secondary market?

MALE: Nope.

MALE: No.

MALE: We do.

MOD: Okay. And what do you – do you sell it, or buy it?

MALE: Buy it.

MOD: Or both? You buy equipment on the secondary market?

MALE: Right.

MOD: And that’s refurbished equipment, or what?

MALE: Refurbished, yeah; it’s usually has to do with replacement of legacy equipment, like I was saying earlier, the lifecycle on some of it is ten, twenty, even thirty years. You could have electrical switchgear, or diesel generators, or other type of equipment that get fairly old, and the manufacturer stopped producing that equipment a long time ago, so you’ve got to go onto the secondary market in order to maintain that equipment.

MOD: Anyone else buy or sell on the second? Yeah, Tommy?

TOMMY: Well, I guess I would agree with Doug on the fact that once we get to that [AS 1:08:40]. Yeah, I mean you’ve got to be able to maintain your asset, and at some point, yeah, you invest, go to a secondary market. We’re not to that point yet, though.

MOD: So, same over here?

LINDSAY: Yes. Um hmm. [Indicates "yes"].

MOD: And Dave, do you?

DAVID: No.

MOD: No? None of that? Okay. So, now we’re going to go even more in-depth into energy efficiency. Are you ready to go?

MALE: Sure. A deep dive.

MOD: So, most of you said that it was important, or very important to your decision-making, but there were these other factors that had to be satisfied in order to choose the most efficient equipment, such as reliability primarily. That’s what I recall. Right? So, how many of you have recently made major investments that improve facility energy efficiency? Can I just see? So, two have recently made that, and was it on the IT side, or the facilities side? Dave?

DAVID: Both.

MOD: So, both? Both. And how about you, Tommy?

TOMMY: Both.

MOD: Okay, both. And what – just quickly, can you tell me what you did? Dave, you want to start?

DAVID: So, we have legacy data centers that are ten plus years old, and we made a decision to abandon that data center, and open up the data centers, so now we’re looking at – we get all of our previous conversation, all the efficiencies, and return on investment, etc., in a full purpose built data center, and so at the same time every month we’re refreshing gear.

MOD: In terms of the IT?

DAVID: IT side; we’re getting rid of legacy servers that are not as efficient, productive, and we’re replacing the servers, so in costs –

MOD: So, those were the – the HVAC, and the cooling, and lighting, and all that?

DAVID: Absolutely.

MOD: And the upgrades in the IT?

DAVID: Yeah.

MOD: How about you, Tommy? Similar, or –

TOMMY: It would be on both sides. Certainly the refresh of equipment, the substitution or change out of equipment of different types, but to meet the different – to meet the same need, but in a better way, more effective, more efficient way, and then I think looking at the facilities side there is – we’ll review sort of constant commissioning, re-commissioning of things, looking at perhaps a precision air cooling unit has a centrifugal fan system in it, and perhaps there’s a newer style fan system today, plug fans, or something similar that gives higher efficiency, and can be retrofitted within the same housing, and so that would be an application of an existing location, where upgrades might have been done for efficiency purposes.

MOD: On the facilities side, did I hear – I’m sorry?

MALE: Well, I was going to say I think it’s important to note, and correct me if I’m wrong. It’s not really efficiency that’s driving the upgrades. You’re upgrading because of some other reason, maybe it applies, and you’re looking for efficiency when you upgrade, but it’s not actually the driver of it.

MALE: Yeah. I think that probably would be a good observation. The – you are looking at the efficiency in a broad way to see how you can improve that, but you may have end of life, or situations where you need to adapt or change, as a result of that.

MALE: And I’d like to change my vote. I forgot about a recent project.

MOD: Okay. [Laughter]

MALE: We put in variable frequency drives on our [cooling unit 1:12:29].

MOD: The facility side?

MOD: Okay.

MALE: But on that same deal, we recently put in a control system on our units that would automatically turn them on and off, and adjust them.

MALE: Can I ask what – was it the JCI product?

MALE: No.

MALE: Or Snyder?

MALE: No, neither.

MALE: Neither of those? Okay. [Laughter]

MALE: But it was actually – they’ve changed their name. It used to be [Inaudible 1:12:57], but the bottom line, one of the reasons we did that was because of the efficiency incentives that the utility company was providing things to reduce our costs. They helped off-set the effects and without that we probably wouldn’t have done it, but that made it cost effective for us, based on the utility company.

MOD: How many of you have worked with utility programs? So, everybody has, or has done that? So, it sounds like – so, correct me if I’m wrong – it sounds like efficiency is a big consideration, but there’s these other factors, like end of life, or that you’re also looking at, and you’re also – in your case you’ve got a utility incentive, so that made it more appealing. So, are there other key factors that drive these decisions?

MALE: There’s one, I think, that has become very, very important, and it has to do with why would make change, and that’s the concurrent maintainability of our data centers, and our data center with the changes in the legal part in the US of the OSHA, and other local authorities, we see this globally in EMEA, or others. So, I think that’s probably another reason why we’ve had to, particularly on the electrical side of things make adjustments to achieve concurrent maintainability.

MOD: And I see some nodding around the table, and I’m also assuming cost savings are –

MALE: We get an efficiency trans-link to costs.

MOD: And it’s a big part of these decisions around efficiency?

MALE: Some of the items, like the latter one would be not a cost savings, but both in conformance to the law, or to what safety would drive, and to try to at the same time make it – insulate the data center from outage conditions, as a result of the new laws, and the like.

MOD: On the facilities side, do you ever try out things in a few facilities, and then see how they work, or in one facility, or is that not –

MALE: Yes.

LINDSAY: Yeah.

MOD: Okay. [Laughter]

LINDSAY: A pilot program.

MOD: Pilot programs? Okay.

MALE: Yeah, pros and cons of that, and all the other questions are kind of ridiculous, because the alternative – no, we’ll just take something new, and use it as classic in everything. [Laughter]

MOD: I have to ask a lot of questions. I told you I wasn’t an expert. [Laughter]

MALE: Well, we knew it was the simple as buying one car, and trying to run it around, versus thousands, or millions. [Laughter]

LINDSAY: And I will say, adding to the previous question that within our corporation, we would at times get requests for submission of energy efficiency projects, because there was a corporate level initiative with X amount of dollars allocated for that fiscal year for energy efficiency upgrades throughout the globe, and so they would come to us, and say, “We have this many dollars allocated for this initiative. Submit your project.”

MOD: Okay.

LINDSAY: So, sometimes it was driven at a corporate level goal to try and improve across the board.

MOD: Okay.

MALE: And it didn’t.

MALE: Another aspect that we haven’t talked about, but when it comes to decisions to upgrade, and that’s an outage, and so the company has a given budget, and you cannot exceed it, and you live within it, and then you have an outage. And you actually impact the business, and suddenly that budget is unlimited. Guess who’s providing that? [Laughter]

MALE: Big upgrades, yeah.

MOD: I see everybody is nodding to that.

LINDSAY: We all love that change.

MOD: In general, that in life it’s that kind of thing that’s a life change? [Laughter]

MALE: You feel the pain. They didn’t feel the pain that much, but when you felt the pain, the money [was ordered]; “Go fix it.”

MOD: So, in terms of the server utilization, is the decision-making similar on that side of proving server utilization, and I guess – and do you measure equipment utilization somewhere like PUE?

MALE: So, now you’re talking most to the IT side?

MOD: Yep. I am talking to the IT side.

MALE: And server utilization, and the answer is yes. And virtualization has been mentioned earlier, which is a huge driver to improve the efficiency of server utilizations by virtualizing.

MOD: And why is that such a big thing? What’s good about server utilization, and visualization – virtualization?

MALE: Well, I could say because it makes me more socially responsible, and gives me a greener [inaudible due to simultaneous conversation 1:18:26]. I used to have 100 servers before, and I am now doing it in ten, and – but the bottom line is ten servers are a lot less expensive to run than 100.

MALE: That’s right.

MOD: Okay. Are others of you doing server virtualization?

MALE: Oh, sure, yeah.

MOD: Yeah?

MALE: Oh, everybody [inaudible due to simultaneous conversation 1:18:42. Absolutely –

MOD: Okay.

MALE: – virtualization.

MOD: And Steve?

STEVE: Specification.

MOD: Oh, thank you. Scott and Doug? Do you do that? Server virtualization?

MALE: Yes.

MALE: I suspect that IT does just about everything that you look at seems to have a V on it, or a V in it. [Laughter]

MALE: Everybody does. [Laughter]

MALE: I think when you look at it kind of top-down, some of the corporations that are represented, and the like governmental, but all of the users within the data center have finite budgets, whether it be governmental, or individual private enterprise, and while they might like to change, refresh, make – do virtualization. All of that comes with a price, and so sometimes that is – change happens perhaps much more slowly; facilities might like to see more efficiency; IT might like to have more efficiency, but the boundary of economics also creates a slowdown, if you will, of getting to a much more accomplished, or higher efficacy.

MOD: Do you usually separate – it’s funny now, I have these two sides of the table, but facility, and IT efficiency from each other, there’s kind of two separate bins?

MALE: Well – go ahead.

LINDSAY: Well, I would say in measurement, yes. In practice, they’re hand in glove.

MOD: Okay. And that’s kind of what Tommy was talking about that, I guess, one thing affecting another?

LINDSAY: Yeah.

MOD: So, some of this is separated, and some of it is together?

LINDSAY: So, I mean, we would measure and talk about, and use metrics separately for those systems, typically, but you can’t have one without the other. They drive each other. You can in certain aspects, but they’re not mutually exclusive.

MALE: And in our firm, basically, there’s a group dedicated just for that called “Data Center Planning,” and that’s their whole –

MOD: So, that where they –

MALE: – that’s their whole role –

MOD: – bring that together?

MALE: – is to pull it together.

MOD: Right. Scott, does it get pulled together and apart?

SCOTT: Yeah. It, again, depends on what level you’re looking at. I think the lower level you’re seeing more separation, but as you go up in the higher levels it kind of merges all together.

MOD: Okay. And how about you Doug?

DOUG: Well, there’s a –

MOD: Well, [inaudible due to simultaneous conversation 1:21:45] many people?

MALE: – most of what I’ve seen in the industry is a huge demarcation between the load on the IT side, and the supply on the facilities side. We monitor up the rack level, but at that point from a facilities standpoint it rolls over to IT, and how much load they’re pulling on their machines. We can’t see that. I can see it at the rack level, at the power strip, if you will, but I can’t see it beyond that, and for the most part, the IT group still wants you to see it. They don’t want your – what’s it called? – a suspect systems, if you will, connecting into their systems. There’s a demarcation between the automation on the facilities side, and the IT side.

MOD: So, I’m going to just move us along really quickly to this next section, because I have a final section that we have to spend some time on. But one more thing I want to assign: If your equipment is either on the facility, or the IT side, built – has a lot of built-in energy efficiency options. Do you use all those options, or do you sometimes decide not to use all those options? Does that make sense? I don’t know if you have equipment that’s like that; you can enable, or disable?

MALE: It depends if it affects availability. If it doesn’t affect availability, then sure, I’ll try it.

MOD: So, as long as your confident that you’ll get the same availability, and reliability? Is that kind of true?

MALE: Yes.

LINDSAY: Yes.

MOD: And so you might not use everything if you’re not sure?

MALE: Right.

MOD: You’re not convinced it’s going to work? Are there any particular things you don’t – that you could tell me that you don’t usually use, even though it’s there? Anything specific?

MALE: I had mentioned earlier about eco mode, and so UPS systems can come with an eco-mode, where you’re operating through the static switch, and it does – it opens up the IT mode to certain exposures that you’re just not going to do, and so, we don’t operate in that eco mode, even though it’s available to us.

MOD: Everybody have sort of a specific example of something that’s available that you don’t use? Okay. I have a list of factors that you might consider in choosing technologies or strategies, and we’ve already talked a lot about this, so I’m just going to go through this really fast about asking you about some of these factors, and how important it is, and maybe we’ll just go – just tell me how important it is. We’ll just go around the table, and performance, which would include a timely liability, peak capacity, and data security. How important are those factors in your decisions related to the reducing energies. Okay? Does that make sense? I want to know how important – when you’re considering what technologies you choose, or versus, or reducing energy use, how do these factors play in, and how important are they? Does that – am I not being clear? You’re looking confused.

MALE: I don’t know how data security affects efficiency, but it is our – one of our primary problems right now.

MOD: Okay. So, let’s just talk about whether these things trump energy efficiency, does that sort of make sense? So, I have heard a lot about performance from you all, and that sounds to me like that’s going to be at the top of – if efficiency affected performance, you’d go for performance? Is that –

LINDSAY: Yes.

MOD: – what I heard around the table?

MALE: Yes. I have that lesson.

MALE: I’m going to say yes; today, absolutely, but there is going to be a point where performance is going to cost. I mean, bringing it back down to the price tag. At some point in time, if that performance has too high of a price tag, efficiency might actually trump it; it comes into business, it might actually be willing to set aside. Now, that’s a hypothetical. I’m just --

MOD: So, that hasn’t happened yet, but you can imagine that happening –

MALE: No, not yet.

MOD: – but for the moment, the performance, and reliability is set in that?

LINDSAY: That’s [in my program 1:26:24].

MOD: Okay.

LINDSAY: At the 10,000-foot level we’re not going to – the pocketbook isn’t in with – to performance.

MALE: Okay. That’s what I’ll get at –

MOD: Right.

MALE: – at some point in time.

MOD: But at the individual system decision making performance will trump efficiency? Okay. And how about climate, and location-specific factors? Does that, for instance, affect cooling choices, and other things? I heard you talk a lot about location, certainly you did, Doug. Does that trump efficiency choices --

MALE: Yeah.

MOD: -- where you were [inaudible due to simultaneous conversation 1:27:09]?

MALE: The location from – as far as risk would trump the efficiency, so if I had a choice between putting something in Phoenix, Arizona, as opposed to Dallas, Texas, because I could be more energy efficient, or more – cheaper rates, if you will, for energy, or more greener, because they got more sustainable power over – that they’ve got 10,000 lightning strikes a year, well, I’m going to take Dallas over Phoenix from that particular –

MOD: Okay, okay. Other things about climate and how important the specific locations are?

MALE: Climate, like somebody had mentioned Pacific-Northwest, great for climate, but one Mount St. Helens going off again would totally change all that. There’s no one perfect location.

MOD: Okay. How about financing? Do you ever finance any of your centers? Is that part of what you do? Some companies just don’t finance anything, so do you find new funding?

MALE: Well, we’re a finance company.

MOD: You’re a finance company? [Laughter] Oh, okay. I guess that [doesn’t affect] you.

MALE: It works out fine. [Laughter]

MOD: So, does that affect any of you following constraints?

MALE: I think all of our – at least from a corporate point of view, ultimately, most corporations aren’t totally self-sufficient in that they have a line of credit, a banking line, maybe the Fed doesn’t, but –

MALE: It’s dispersed a little bit.

MALE: But ultimately, I think it all has to do with the finance of it.

MOD: Okay, okay. And then –

MALE: There’s – on that score there’s two ways that we invest, and build. One is with [capital expense 1:29:06]; COs of operational expense, and it really depends on where the business is at, what they – what expense serves the needs of the business, and more and more in my company we’re moving from a capital to an operational model. And –

MOD: And does this affect energy efficiency in any way, or such as –

MALE: It’s just how we finance what we do.

MOD: And we already targeted – sometimes a lot of you have gotten utility incentives, and also some of you benefited from tax credits and depreciation rules. So, okay.

MALE: Can I ask an off-the-wall question? How much longer are we going to go? I have to determine if my bladder is going to make it?

MOD: We have about – I’m going to ask you to stay about five minutes late. So, 25 minutes. Go ahead.

I don’t want to have you sit here contemplating that for 25 more minutes. Do you have company-wide energy policies that affect you in terms of energy efficiency? No? No for Scott? How about you? The federal government might have? Do you have energy policies that –

MALE: We, well –

MOD: – energy efficiency policies?

MALE: Yeah. The Federal Reserve is technically not a federal agency.

MOD: Oh, okay.

MALE: So, we can selectively decide –

MOD: What you want to [take 1:30:43]. [Laughter]

MALE: What we will and won’t do. It’s kind of nice. Yeah, we don’t have – the Board of Governors is a federal agency, and they have to comply with Presidential Directives, and Presidential Orders, and those kinds of things –

MOD: Okay.

MALE: – and Executive Orders, and sometimes they’ll push those down to us, or –

MOD: Okay. So, there could be federal guidelines that affect you at some point?

MALE: It definitely does from say the security side that –

MOD: How about we’ll ask you if there are other either a [state 1:31:28] – a company, or state, or federal policies that affect your level of energy efficiency?

MALE: I think all of us that operate in different locations – I’ll use California as an example, there are state requirements that are, perhaps, more –

MALE: Onerous? [Laughter]

MALE: There are, yeah.

MALE: – more restrictive, or more specific, and so if you’re going to build and operate within that particular state, then you’re going to do it under that basis, and sometimes that even goes down further into I’ll say a county, or a city, where it, itself, might have specifics that would be perhaps even more targeted for efficiency, or the like.

MOD: And we talked quite a bit about – I’m sorry, Dave, yes?

DAVID: I was going to mention that –

MOD: Since you’re from California, do you want to address that?

DAVID: Yes. Well, sadly those, when they are in state regulations, or what not, they tend to not improve efficiency; they tend to move the business out-of-state protectively. So, but definitely energy efficiency policies are developing, and rather quickly at our company, the company – I can’t point to an energy efficiency policy today, but it’s very clear that the business is highly concerned, and they are developing energy efficiency policies, and they are driving energy efficiency.

MOD: So, they’ve gotten much more involved in it?

DAVID: And it’s not only the bottom line. The guys sitting at the top are very concerned, and so it’s both bottom line, and social responsibility.

MOD: In California?

DAVID: Um hmm. [Indicates "yes"].

MOD: And this is – the policies there are very apparent. [Laughter]

DAVID: Yes.

MOD: I do a lot of work in California, as well. And we’ve talked a lot about reliability issues, obviously, and it sounds like, and that as related to performance, and that is very crucial, and probably is going to overtake efficiency, but hopefully they can go hand in hand, and I see people – I hope I’m summarizing correctly. And how about – and electricity rates, I’m assuming affect what location you choose?

MALE: And one thing we do, and make quite a bit of revenue for being available to curtail the starter generator plant in Texas. If the grid gets over-amped in the summertime, or in the – during a bad ice storm, like during the Super Bowl, yeah, we start our generators, and make a considerable amount of revenue for buildings, so –

MOD: In terms of estimating energy savings, how do you do that? Is that part of – you’re going to buy a piece of equipment, or you’re going to change out your facility structure, do you calculate energy savings as part of that? Yeah?

LINDSAY: Yeah, especially if it’s an efficiency – an energy efficient upgrade. You know, you definitely are looking to capture that metric.

MOD: And do your consultants, and other places you use for information help you do that? Do you consult – it’s like a vendor is selling you something, and they say, “This is highly efficient,” they can help you figure that –

MALE: Sometimes we have a double sector numbers.

MOD: Sometimes you have a double sector?

MALE: Oh, yeah.

MOD: Oh, really?

MALE: Let’s just call a spade a spade.

MALE: Energy – the utility rates are perhaps the biggest [drive 1:35:30] in what we do. Frankly, all of us around this table, ten to fifteen years ago flew way under the radar, and it just didn’t cost that much to run and build a data center, and every year, I know in California 7 percent a year, on average, our utility rates are going up. That’s – it’s become a huge expense, and it’s got the attention of all of our businesses. And we don’t fly under the radar anymore; we’re a big expense item now, and it’s all mostly utility rates that’s been driving that.

MALE: Probably one of the things that is most important to kind of look at, at least in our perspective – my perspective – is the – you have the IT, and it’s somewhat autonomous from the facilities side. One is the process; one is the support to the process. Our benchmark things like PUE assume that whatever this number is it’s the unity number, and everything is percentage off of that, so if you were looking at real efficiency from top to bottom, you would be looking at the entire process of what do you have happening over here, and what do you have to deliver this? And I think that – more of that is beginning to be looked at, but probably it’s still not –

MOD: You mean more holistic?

MALE: More holistic –

MOD: Yep.

MALE: – as opposed to –

MOD: Yeah.

MALE: – siloed, or –

MOD: Or improve kind of the black box?

LINDSAY: Piece of the --

MOD: Piece of the equipment or whatever? Okay. I gotcha. And I think we talked quite a bit about ROI, and paybacks, but – and some of you don’t really use ROI, like Doug – right? – in the same way, but I’m wondering – and some of you said that you had a standardized set of metrics that you factor into return on investment, and I’m just wondering how many of you just have a – do have a standard set of metrics that you look after?

MALE: Well, it’s a guideline –

MOD: Guidelines?

MALE: – to a [three year 1:37:38] payback.

MOD: A three year payback? How about you, Scott?

SCOTT: Pretty standard.

MOD: Okay, three year payback, and how about you, Lindsay?

LINDSAY: I would say ours is pretty specific; it’s going vary, depending on what it is we’re looking to invest in.

MOD: And Tommy?

TOMMY: The same. I would say the same thing.

MOD: So, it’s not just –

TOMMY: It’s not just a finite number, but it may have to do more with a more long-term look, as opposed to a short-term look.

MOD: How about you, Dave?

DAVID: I think we have to look at each opportunity uniquely.

MOD: So, before we have our last part of this discussion, if you can each take one of these questions, and actually I’m going to keep one of them, sorry. [Laughter]

MALE: You can leave one on my chair, I’ll [inaudible due to low volume 1:38:30].

MOD: I know, it’s – [pause] – you all have – I’m sorry. Do you all have something to write with, I think, because – here, if you don’t –

MALE: Yeah.

MOD: Oh, you’ve got one? Now, you’ll see some of these things that we’ve already talked about, and I’m sorry that they’re – we need to have you answer them here, as well. This is the short version, though. [Laughter] [Long Pause]

MALE: How do you quantify a number of server closets? [Laughter]

MALE: One per floor is what –

MALE: What is it?

MALE: A closet.

MALE: Well, this one gets me here: Mega data center, more than 10,000 square feet.

MALE: Okay. [Laughter]

MALE: They’re missing a zero or two. [Laughter]

MALE: Yeah.

MOD: Please correct anything that you haven’t asked directly.

MALE: Oh, man. [Long Pause]

MOD: If you have any questions let me know, and might not be able to help you, but I’ll do my best. So, you’re saying 10,000 square feet is small?

MALE: [Can you have more than one answer 1:40:28] in here?

MOD: Sure, if you explain that –

MALE: Oh.

MOD: Explain it, I don’t know. I think it’s one answer per – if you – oh, not like seven and eight, you can see from the questions some you can answer in multiples. Tommy, is that clear?

TOMMY: Yes. I mean there’s

MOD: Well, some that are only answer one, and others that are multiples. And we’re not going to go through all these, actually it’s the last page we’re going to talk about. So – but you still need to fill it all out.

MALE: Ew, what next?

MOD: I know, because we’re being energy efficient.

MALE: There you go. [Laughter] [Long Pause]

MALE: My gosh, I didn’t realize this was a two hour exam.

MALE: The one observation I’d make is they said it would be about an hour, so this is much shorter than – much longer than I –

MALE: Right.

MOD: Wow. Sorry, I –

MALE: They said we would be able to attend the conference times here, so –

MALE: And we all –

MOD: I apologize, because that wasn’t our – some – there was some disconnect there. I don’t know what happened.

MALE: Yeah. We told them two hours, and I apologize.

MALE: I heard the same.

MOD: Okay.

MALE: The one hour, yeah.

MOD: Oh, boy. Okay, I would say, unfortunately, the big one is where we’re entirely in charge of the conversation, I guess. So, I can only apologize for – and so I think this last part we’ll get out of here pretty soon. [Long Pause] How are you guys doing? Are you in the last – did you reach your last page yet?

MALE: No, I’m still on page three. I’m sorry.

MOD: Okay. That’s okay. [Long Pause to 1:46:24] How many of you are not here?

MALE: I’m done.

MOD: Is everybody done, or finishing the last page? Yeah? Okay, I just want you to look at the last page for me, and normally I would have gotten these ahead of time, so I could see what you answered, so you’re going to have to help me out here. What I want to know overall is these are about – if each of you could look about – look at one technology that you could use and why, and one technology that you haven’t used, and why not? Okay? Overall, have most of you used most of these technologies, or – or you’re nodding? Most? Just in general –

MALE: Most.

MOD: How about you?

MALE: Most of them for sure now.

MOD: How about you?

MALE: Where is this?

MOD: I’m sorry, on the last page, you know? How about you, Doug? Have you used most of the technologies?

DOUG: From a facilities standpoint, I have, and the one that I wouldn’t consider would be, say, waterside economizers, because you’re not going to get any efficiencies in Dallas with waterside economizers.

MOD: Okay.

DOUG: So, or even airside economizers.

MOD: Okay, great. How about – and is there one that you particularly like on here that you would say –

DOUG: The equivocal one from my perspective is the [hot aisle and cold aisle 1:47:59] that when you’re mixing space in a data center, it can be very disruptive when you don’t have proper airflow. So, hot aisle and cold aisle is the one thing that both facilities and IT can focus on that has a lot of return from an energy efficiency standpoint.

MOD: How about you, Steve? So, if you could say –

STEVE: I’d say just double on what Doug just said.

MOD: The same thing –

STEVE: Yeah.

MOD: – for the reason – the what? – the critical one, and why it’s important, and the one that you don’t –

STEVE: Well, and actually any airflow blanking panels go along with that, but certainly efficient airflow is truly important, and I think we probably all concentrate on that, and as far as the economizers, yeah, Dallas-Fort Worth is the ideal location for that.

MOD: How about you, Scott?

SCOTT: I almost see these ranked with importance from top to bottom.

MOD: In terms of facilities?

SCOTT: Yeah. Hot aisle, cold aisle being the most important blanking panels, of course, and as you go down the list it becomes less important to me in my specific situation, airside and waterside economizers, no thanks, but energy efficient lighting -- it’s there, fine --

MOD: You’re not going to fool with it, okay.

SCOTT: Right, right, unless it’s specifically [inaudible 1:49:24], that’s becoming more important to energy efficient air; [handling units 1:49:28]. They’re not driving factors, but they’re considerations when you upgrade.

MOD: Okay.

MALE: I think in ours we look at waterside economizing, but I guess that depends on the definition, but we drive our cooling tower water temperatures down in the cooler times of the year, and achieve significantly higher efficiencies on our water coolant chiller systems, so that’s a very high part of our target level. We use airside economizers through – in our – one of our newest data centers. It’s the largest heat wheel application in the world, and so it’s – it’s very, very productive for us, and so –

MOD: And what – anything that you don’t use that’s on here?

MALE: Nope.

MOD: No? You use them all? You listed all? Okay. How about Lindsay, anything that you have negative –

LINDSAY: No.

MOD: No? Nothing negative?

LINDSAY: Unh unh. [Indicates "no"]. No, now Tommy and I are coming at this from a perspective of having a geographically diverse footprint of data centers. So, some of these things might be a better application, obviously, in certain – different areas, but –

MOD: Yeah.

LINDSAY: – every single one of them is something that we’ve employed, and would employ again, if it was made dense –

MOD: Okay, okay.

LINDSAY: – for that application.

MOD: How about you, Dave?

DAVID: Nothing negative.

MOD: Nothing negative? And any particular thing that’s especially important on the IT side?

DAVID: The – well, the IT side – most of these bridge the IT, and –

MOD: Oh, okay. Sorry, it’s my ignorance. [Laughter]

DAVID: But yeah, as you go down on the facility side, I think that top to bottom I would agree with the other comment; they are both –

MOD: Okay, Tom?

DAVID: – easiest to deploy, and perhaps you get the most bang for your buck, and we’ve talked about all the virtualization.

MOD: Yes, I know, people have mentioned you putting in power management systems, and –

DAVID: Yeah.

MOD: So, mostly things you’re familiar with, and it sounds like most of you are using a lot of them, and a few negatives about – specific to your situation, I think, it sounds like, right?

DAVID: Well, it’s reality, and not necessarily a negative, just –

MOD: It’s not negative; it just doesn’t make – it doesn’t make sense.

DAVID: I probably would consider it in the future if the climate were to change, or something.

MOD: Okay, okay. [Laughter]

DAVID: Well –

LINDSAY: Some say it is. [Laughter]

MOD: Well –

MALE: I think it always has been. [Laughter]

MOD: After all this conversation, I’d be ready for any favorite, right? [Laughter] I heard some people say that – I just have like two more questions – talk about their payback here, and some of you said that it’s preset, like one to three years, or it might be three to five years at the most.

MALE: But it’s corporate, corporate policies do change. At one point it was four, and now it’s kind of gone to three.

MOD: Oh, okay, okay.

MALE: It all depends on the environment.

MOD: Does it change over time for others of you? What I’m interested in here is a lot of times we hear people say, “I have a one to three year payback for energy efficiency investment.” Even though that investment might last ten years, like that piece of equipment, and just trying to understand the difference between that one to three years, say, parameter, and this idea that really you’re going to be saving for ten years, and so what –

MALE: So, in the data center world where the usage, and investment is – investment is high to begin with, and then the target use is longer then, I think, there is a greater propensity to take return on investment to a little longer target than it might be in some applications where the savings is not that significant, and therefore –

MOD: You want it paid off sooner?

MALE: Paid off quicker, yes.

MOD: Yes? Okay, any other comments on that?

MALE: We have this nasty thing called stock price.

MALE: Awww.

MOD: Oh, no! [Laughter]

MALE: Yes, we have that, too.

MOD: No kidding around the table here. Yeah, go ahead, Dave.

DAVID: Just you could spend a million bucks, and get a payback in a year and a half, and enjoy gazillions of savings over ten years, but if that million bucks is the stock price, it can’t tolerate that million dollar capital expense this year you’re not going to do it.

MALE: That’s right.

DAVID: You’ve got to wait until a better financial climate, so that also drives our decision.

MOD: So, it’s not exactly return on investment all the time?

MALE: [Inaudible due to simultaneous conversation 1:54:44] That’s what it is.

MOD: Yes, but in a different sense. It prevents you from –

MALE: Financial picture is a big one.

MOD: Right, yeah, that’s a very good point. Okay. Basically, I’m through. I just want to summarize a few things, and ask you if there are any final comments? I heard a lot today about different forms of return on investment, and how many of you – but not our federal person here. That’s a big driver is how decisions are made about energy efficiency, and everything else, about performance being, and reliability being a really key factor; location seems to factor into a lot of your decisions; problem reliability, counter cost, all these things are part of how you decide about your investments, and how energy efficiency plays into that. So, I wanted to see if you have any last comments, or things we haven’t discussed that you want to – I’m just going to quickly go around the table, so prepare yourself to – if there’s anything else you can say, “Nope, we covered everything I can think of, and you heard everything that I have to say.” Well, clearly that’s not true, but – or if you have a final comment? Do you want to start, Scott, anything on your mind that we haven’t talked about?

SCOTT: I guess given the title of this roundtable, I think I was expecting maybe a little more focus on the EPA, and their effect on our business, like I thought –

MOD: Okay.

SCOTT: – there would be a time to give our opinion a little bit more –

MOD: Okay.

SCOTT: – on how I think the EPA affects our business, and affects our decisions, and their regulations affect our whole industry?

MOD: Well, that’s a very good point, and they will hear that point, so it’s not what the focus was here today, but actually in a few other interviews I’ve heard that same comment, so it’s – it will get back to them. Steve?

STEVE: Well, actually, and to Scott’s point, yeah, one of our big things is about our generator exhaust, the new rules and regulations then deal with that, but that’s certainly nothing to do with energy efficiency; well, I guess it does; it plays in, when we do go to generator –

MOD: Okay.

STEVE: – and I have nothing else profound to say.

MOD: Okay, well, you’ve been profound already. Doug?

DOUG: I’m good. I want to thank everybody. I’ve learned a little bit here today, and that’s always good.

MOD: Okay, and David?

DAVID: I think it would be fascinating if you had – and you probably can’t get it, but if you had our CEOs around this table. I’d be interested in how they answered – how they would define –

MOD: Oh, that’s an interesting thought, isn’t it?

DAVID: – because I know I am interpreting their actions down to my level, and this is the company response at the trench level, but it would be fascinating if you could get the real CEOs and ask these same questions. I wonder how they would respond?

MOD: Um hmm. [Indicates "yes"].

DAVID: That’s it.

MOD: Thank you. Tommy?

TOMMY: I, too, I think for maybe there would be more opportunity on the EPA side, and I think it has tremendously to do with data centers, and the utilization in the future, and so the elements, whether it’s more macro-like energy in total, or whether it’s more micro relative to missions for generators that run a few hundred, or less than a few hundred hours a year, maybe 50 or 60 hours a year, and them having to be so specific California, whether it’s a federal government level, versus trucks that drive everywhere, or non-stationary generation, and so there’s some important elements there that I think need to be looked at, if this is driven by EPA considerations, notwithstanding these other items.

MOD: Okay. And Lindsay, you want to wrap it up for us? [Laughter]

MALE: Bring it all home.

LINDSAY: Yeah.

MOD: Well, I don’t want to put any pressure on you.

LINDSAY: And I don’t want to beat a dead horse, but yeah, echoing that impression on EPA discussion, and that you know the climate that our industry is in that’s going to be something that’s really going to hit hard at an operational level that I think all of us would have a lot of interest in discussing in greater detail. And – but as far as energy efficiency, I think we’ve covered the topic well, and I’m really happy with the additional comments on that.

MOD: Okay, well, I thank you. I’m very sorry about the misunderstanding about the time commitment here. I just want to say, though, you have been fabulous, and all is – just all the points coming; there was a lot of great information that his is more of a research project for EPA. It’s not about regulations; it’s about energy efficiency, and –

MALE: I thought the EPA was nothing but regulations? [Laughter] I guess I had a misconception.

MOD: Yeah. It’s more about potential [substance 2:00:22]; it’s just like you all have the first cards.

MALE: I’m sorry, it’s not signed. [Laughter]

MOD: Well, I’m going to try and do what’s best.

MALE: First of all, and not a very good line. [Laughter]

MOD: Okay. Well, I’m not going to represent them, because it’s not me, I guess, I can’t – I can’t represent them, but it is a research study, and more on the sort of academic side of EPA. So – and they’re focused on energy efficiency, and several different industries, data centers being one of them. So, we’ve done other work with trucking, and actually stores, I think. So, they weren’t going to put out a report about what they find out, given what they’d be learning.

MALE: Some research on the overall affect the EPA has on this industry, which would be more important.

MOD: Yeah, okay. All right. Well, I –

MALE: And some from California –

MALE: Oh, yeah, I can imagine. I’ve heard stories about that.

MOD: Are you ready for –

MALE: I’m going to take a look at that.

MALE: Well, it’s all on tape here. [Laughter]

MALE: That’s good.

MOD: Well, you’ve got a good merchandise. Okay, well, you can be on tape as long as you want, and I’m want to get you out of here, so that you can go and enjoy your conference, and again, I’m sorry you lost some of your conference, because you really had some good input to EPA, even if maybe you it was just side door input, but it’s in one sense, and about their regulations, but they will get those messages, as well.

LINDSAY: Yeah.

MALE: Well, the other flip side of that is – is regulation is an engineer’s Full Employment Act, so depending on what side of the fence you’re on that could be a very good thing.

MOD: I got that. Okay, thank you very much. Please stay, and –

MALE: Thank you very much.

[END OF FOCUS GROUP]