

# Building Innovation

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**Greg Dalton:** Welcome to Climate One at the Commonwealth Club, I'm Greg Dalton. Many office buildings and homes in the United States are energy hogs. And part of that is because home owners don't buy a house primarily based on energy usage. Contractors building homes don't foot the utility bill and commercial land lords pass on energy cost to their tenants. Furthermore or less, electricity prices in this country are regulated to be low and stable. But the era of climate disruption is promoting a new generation of energy entrepreneurs who rethink the way buildings are constructed and how they use power.

The market for energy efficiency is growing and analyst at McKinsey & Company say, that the built environment is one of the most promising and economic areas for reducing carbon pollution. In the next hour, we'll discuss innovation and entrepreneurialism in the building sector with our live audience at the Commonwealth Club and three executives trying to disrupt business as usual in the construction industry. Gary Dillabough is the managing partner at the Westly Group and a former eBay executive. Ann Hand is CEO of Project Frog and a former executive at British Petroleum and Kevin Surace - did I get -

**Kevin Surace:** Surace is long --.

**Greg Dalton:** Surace. Uh, founder of Serious Energy and Chairman of ZETA Communities.

Please welcome them to Climate One.

[Applause]

**Greg Dalton:** Um, welcome all. Ann, let's begin with you. How did you get from an oil company to building modular constructions?

**Ann Hand:** I'm still trying to figure it out.

**Greg Dalton:** [Laughter]

**Ann Hand:** I started at 21 in a large, kind of oil and gas companies and there, they really groom you to be a generalist so you do a lot of different jobs. And at times, I ran petrol stations, I built them, worked in chemicals. And at the end, I was running all of our global brands and marketing and I was also the natural aggregator inside the company for the sustainability agenda. And this is kind of around the 2006, '07 time-frame under a wonderful leader we had, Lord Brown, who is our CEO, who really was the vision behind, 'Beyond Petroleum' and as well to push to put material investment into alternative energy. And with that, one of the things I needed to look at was the built environment. And we were spending so much time thinking about solar and wind and biofuels and it was actually after I went through a bit of a period of feeling shameful for how little attention we were spending thinking about 25,000 retail sites, refineries, pipelines, truck -- all those other assets, heavy infrastructure assets and the facilities attached to them that we were disregarding. So I did a little bit of fun on my own, had some skunk works going inside the company and just got behind the cause of the built environment. I'm not an architect. So I say that with a big bucket of humility on my head that it's been quite a learning curve for me but I think I've sat on the other side as a buyer of buildings and so I hope I bring that lens.

**Greg Dalton:** And we'll learn more about Project Frog in a minute. Garry Dillabough, eBay to - you're doing investing but building's not sexy in Silicon Valley. I mean, you used to work at e-Bay, a famous entrepreneurial company and now, you're investing in building. Is that, is that boring?

**Gary Dillabough:** [Laughter] Not for me. My background - I was actually in civil engineering school and wanted to find a way to get into the civil engineering field and really couldn't find any opportunity. I ended up being at a number of different uh start-ups - the internet start-ups and the last one being e-Bay. I was there for a number of years and I was merely doing strategic partnerships. But as I was getting ready to leave, our CEO said, "You know, we need to develop an environmental strategy." It was something I was convicted about personally and so I got the opportunity to work for her for a few years doing that. It became the most meaningful job that I ever had. So we look at the construction of new buildings and data centers and we start to recognize the loads that they create. It's actually - it's quite concerning. Once you start to get into the details of it. So I really enjoyed it and then Steve West is a friend of mine and he said, "Hey, Gary. Do you want to sit in the other side of the table and start to invest in some of these technologies and I kinda jumped at that opportunity. But I found, it's very difficult. You know, and we'll talk more about it today but this is a tough space. It's an important space and it needs some conviction, fortitude and I think that's what—we're hoping and we'll see here over the next you know, four or five years as this technology starts to mature because there's some very exciting things, I think on the horizon for us all.

**Greg Dalton:** So I heard that the environmental program at e-Bay began under Meg Whitman --

**Gary Dillabough:** Correct.

**Greg Dalton:** --who then campaigned against AB 32. That's whole another program --

**Gary Dillabough:** [Laughter]

**Greg Dalton:** Kevin, let's talk about how you got from communications and software companies into building materials and energy.

**Kevin Surace:** Well, it's - there's many ways to address that question. To some extent, it was by accident as a lot of things are. I think if you look at, when we started the Serious Materials, which became Serious Energy back in 2001, 2002 to the end of 2002, it was very hard for anyone to say, "I know. The built environment is the problem. Where do you gonna get -" People would have said, "You're crazy." Frankly, a friend of mine had a polymer company, handed it to me and he said, "Can you do something with this?" And within a few years, we realized that all the play in material science and in fact, in other technologies would be in the built environment. And for those I think, much of this audience already knows, the built environment worldwide is responsible for about 40% of overall CO2, 52% if you include the making of the materials, that go into the built environment which is the largest sector of industrial manufacturing simply because of their weight. Building's weigh a lot. And so, you know, sort of 50% is a pretty big play. There's a lot to be done and everything that all of us are doing are just starting to scratch the surface. At Serious, several years ago, we introduce software that manages buildings like this where we could save 10% or 15%. So I was back in the software business which I had been in before and as Gary will tell you, software's certainly involved in a lot of his investments. There's technology involved in everything that we're doing here and it's getting more and more so. So you know, I think what we need, and I'm sure we'll touch on this is better policy worldwide and you know, and a better investment environment that includes exit strategies for the investors because the public markets have not been kind too much to, to companies in the Clean Tech arena and that's an overall challenge to the entire space.

**Greg Dalton:** And on the impact of housing, you said, I saw in your TED talk that it takes eight - the equivalent of 8,000 gallons of gas to build a house?

**Kevin Surace:** That's right.

**Greg Dalton:** It's like driving around the world six times. If we think about it, your house is - while they're building it, it's the equivalent of 6,000 gallons. Is that right?

**Kevin Surace:** That's—the energy from the trucks going back and forth and the people showing up as well as the materials themselves is the equivalent of about 8,000 gallons of gas and people don't think about that in building a house. So when you step back, you go, "How do I—how do I rethink the materials we use? How do we use more recycled materials? How do we reduce the energy usage over the life of the house? The energy usage in a house over its life far exceeds the 8,000 gallons of gas except as we've been bringing that down and bringing that down as you approach net zero energy homes which we build at ZETA and you build—not homes, but you build other structures that are net zero energy or close to net zero energy, then all of a sudden, that 8,000 gallons is the big knot because you're running your building on virtually, no energy going forward.

**Greg Dalton:** Some other statistics, I want to get the others in here, on buildings, that Americans are living in larger houses, fewer people with more air-conditioning. So while, we can talk about more efficient homes, they are bigger and there are fewer people in them. So is size the problem on hand? You know, we can say, "Oh, this is green. My 8,000 square foot house in Aspen is green but -"

**Ann Hand:** Well, we don't do residential for exactly that reason.

[Laughter]

**Ann Hand:** I would say that you know, just a commercial comparison, you know, a big tentative of Frog is, is that we deliver a bundled solution. We don't just deliver our envelope. We pre-fabricate all of the systems, the interior components as well. And that's pretty important to us because if you, if you just pre-fabricate parts of it and with all best intentions, spec the other stuff in, inevitably, like every other construction project, time and budget gets away from you and the best parts are value engineered out. And a big part of our value prop to our large customers is that we can guarantee a price per square foot, no change orders, a schedule, usually about 50% faster than traditional construction, and a very specific energy performance. As far as the changing landscape of size of buildings, one of our most important customers is Kaiser Permanente. And we've just been verbally awarded, a very large project with them in SoCal, we've won one in Hawaii with them, and another place where they're really thinking about energy and the interesting twist is just in those few months period, between those two projects, how they're already starting to think about, not just the flexibility change of the space they need, but also as healthcare reform comes into play, the role of telepresence and the importance of actually reducing the number of visits people make even for basic wellness, so while you have a lot of uninsured coming into the system, you also are gonna change the way people interact with their doctors. So, we're having to design smaller buildings for them that are actually much more flexible than traditional flexibility means in the construction world.

**Greg Dalton:** And let's talk about how you get those lower costs. Is that by—that has to come from somewhere. So you're either squeezing, labor on site, I mean, somebody who got money would normally go to somebody, you're taking it—was it the unions or where's that money coming from that you're--

**Ann Hand:** Yeah. I mean, it's a great question we get asked a lot. We did a beautiful building at Hunters Point and because it was a low-bid design build, public job, we were—had access afterwards to the bids we beat. And what's fascinating about when you do the analysis is, is on average, only 18% of the bid was materials, 30% was labor and 38% was overhead and risk. And so, if you just look at overhead and risk alone, the way that all of those staffs, stakeholders and players, all the way down to the sub-contractor layer, layer contingency, you know, and risk on top of each other, that's just one way, in a bundled solution, all those players will still participate in, in erecting a Frog building. But the fact that we're able to control that bundled solution stripped out a lot of that really fat that doesn't need to be there in a building, is an easy way right off the bat for us to be able to hit price points. I mean, the building that we're doing now in SoCal for Kaiser that I mentioned earlier, were beating their construction benchmark by \$30 a square foot. That's not what they're really delivering for, that's what they want to. And on top of it, it's going to use 30% less energy than their traditional SoCal structure.

**Kevin Surace:** Wait. Can I—can I—

**Greg Dalton:** Sure.

**Kevin Surace:** --can I add real quickly to that, in a modular space at ZETA, we build modular, primarily, residential. But a very similar finding is that you know, we are collapsing all of those risks, basically, into a factory that is very controlled, highly controlled. So, highly controlled design, highly controlled factory, everything that goes into the product is highly controlled. And it reduces the risk, reduces the time, reduces the costs, we're coming in, you know, 10% to 30% cheaper than site build. We're coming in 50% to 100% less energy than they would have used on an ongoing basis than site build. We just finished the project at 38 Harriet right down the street here in San Francisco. It's a multi-family project, 300-square feet per unit. So these are meant to be really tight, little—sort of studios, which are actually gonna rent for an awful lot of money because of their location here in San Francisco, of probably, you know, a couple of grand a month or some crazy number for 300-square feet. They are gorgeous. I mean, they're beautiful, really tight, really well-made, couldn't have made it that way on sight and it assembled on-site in about two days. And you know, with the crane putting it all together, and you can't tell that it was modular that these modular were all designed in a factory to literally, just screw together on site. It's absolutely amazing.

**Greg Dalton:** So people have this image, I've been in some beautiful modular homes as well in Lake Tahoe. People have this image of trailer parks, that sort of thing.

**Kevin Surace:** This is four-story building. It looks like a four-story building like any other four-story building but you cannot tell this was built in a factory.

**Greg Dalton:** Gary Dillabough, where do you see as some of the real promising areas for innovation and building. Ann says that it hasn't change since Roman times. You know--

**Gary Dillabough:** (Laughter)

**Greg Dalton:** --innovation opportunity?

**Gary Dillabough:** Well you know, I think some innovations actually go back to Roman times. I think a lot of ways that buildings were built in the past were much smarter than they are built today. And I was just at a beautiful building that was built in Los Altos by the Packard Foundation. I mean, when you walk into that building, the materials, the natural light, the air from outside, it feels right as rain. And you go I'd love to work in a facility like this. I then, later that day, had to go down to

another building in Silicon Valley where I was in the bowels of the building in a person's office, no access to natural light, you can tell the air there, it just wasn't fresh air and you go, how does this person work in this facility and be as productive as that person could be? So--

**Greg Dalton:** And what were they thinking when they built that place?

**Gary Dillabough:** Well you know, it was low cost. I mean, when you look at the American landscape of construction over the last 45 years, it's all about low-bid wins. And they—there's lots of compromise when you go down that path and unfortunately, you know, when you look at the overall operating expenses, low cost upfront doesn't equate to an efficient, good place to work and lower cost overtime. So, you know, a lot of very poor decisions have been made on the front end of some of these projects.

**Greg Dalton:** But doesn't it cost more to be green? It's in their premium?

**Gary Dillabough:** You know--

**Greg Dalton:** For such consumer products, if you want green products, whether consumer products, lots of cars, is it green premium?

**Gary Dillabough:** I think that's been true. I think that's changing. And I think any new kind of marketplace, when you see a—you know, things coming to scale and production cost coming down, they were finally getting to these points where it's almost on parity with existing or traditional construction processes and materials. I think we're very close and my concern is that, it feels like we're kind of running out of gas, and a point in time where some of those, those things are really starting to change. You know, I'll give you one example. You know, LED lights are—we have been--

**Greg Dalton:** These lights are terrible. Don't look at those.

**Gary Dillabough:** Yeah. We not - these are bad lights. But you know, a great light is, if you open up these curtains and you went outside, that's the kind of light we all want to work in. Now, LED lights, they are—our company sells these 2x2 LED lights, two foot by two foot, and about three years ago, they sold for close to \$400. Those lights will sell for in about 12 months, closer to \$125 to \$150. So that's nearing the price points of fluorescence. But the great thing is, that's a digital platform now in your ceiling. And once you're the digital platform, you could actually start to change the color of the light throughout the course of the day. So when you walk into your office, it might feel like the morning time and when you walk outside, you know, light changes all day long and in your office place that can change as well. There are still relatively expensive costs in that color shifting but those are the kind of environments that I think we'll be able to create with some of these new technologies and as a semi-conductor industry has done for the computer marketplace, it's beginning to do that for the lighting sector and that's when I talk about exciting things on the horizon. If we can just hold on and just have a little more fortitude, I think you'll see some great things like this to start to come to the scale.

**Ann Hand:** But I would add, I mean, one of the things that we've had to learn the hard way at Frog is you know, we need to bring the greater industry with us. You know, you talked about union. Most of our jobs are union jobs. I mean, we still need people to erect that set of parts on site. And we've never had any material push back from the unions because there's work to be done on the site for all the unions there. We know--

**Greg Dalton:** Are the factories—the factories union?

**Ann Hand:** Yeah. I mean we use, we use distributed manufacturing so we have large scale

suppliers like YKK and other companies that manufacture different parts that we've designed, the parts arrive just in time on site, we think it's important that's flat-pack construction, not only does that make shipping more affordable and more energy efficient but it also allows you to achieve kind of big ceiling heights, big flexible spaces and things that we think humans are more productive and thrive better in environments than the dimensions of the back of a semi-truck. But why I say it's important too is we have to learn the hard way is that you know, we need the architecture community to embrace this. We need to give enough flexibility in the kits so they can bring their craft and their art to the kit and help people feel they're getting a very distinctive building. We've also had to really bring the construction and contractor trades with us to understand that, how important their role is. There might be less scope to do on the job site but our goal is to have more volume across multiple sites with them.

**Greg Dalton:** But don't—some of them see this as a threat that you're taking some of their business away.

**Ann Hand:** Yeah. I mean, early on for sure, I think tides turn when you know, a couple of things happen. I mean, you know, we keep hearing around about differ stats coming out of the industry like 10 years, all commercial construction, 70% will be pre-fab. You know, if you've been sitting in this space a long time in construction, you start to feel that the wave is shifting and then also, you know, you look at big customers like, that we have like 7-11 or Kaiser and you say, you know, if I'm sitting in the chair of a big CM firm, I'd rather do 10 jobs with those large firms or 20 or 50 and do them with Frog than when one at a time. And so I think for us, those strategic partnerships are vital but I think people just realize it as the right thing to do. So if they can figure out a way that's a flexible enough solution with no trade-offs, I think that you can bring the industry along.

**Greg Dalton:** Kevin Surace, will people pay a premium for green products or is it--

**Kevin Surace:** Well you know, I'll just give you my opinion. I think you know, there was a time in this country for the longest time, for hundreds of years, where the answer was no and then there was a time, I think after, roughly after Al Gore's movie where the answer was yes. And you know, and speaking around the country, you'd see the psyche of the country was, give me more greens, I want it recycled, I want it, cradle-to-cradle, I want to save energy. I mean, there was just this big push. And then there was the—you know, economic downfall closer to 2008, so, a couple of years into it. And you know, the old adage of economic trumps all in elections and what people do in their lives is absolutely true. So you know, you go to Detroit today and start talking about green, you know, either you're talking about their wallet or they're gonna throw something at you. Because, they're worried about putting food on their table, they're not worried about the energy usage in their building or anything else. So I've seen the tide shift. I mean, that's just, and I think all of us really in the business have moved away from even that as the leading indicators or the leading marketing message. So at ZETA, well, we make net zero energy properties and half, half, you know, net less properties. We now don't use that as the front. The front is, look, save 30% over any other way or 15% or 10% or 20%, and do it in less than half the time, than you would have any other way, by the way, for no additional charge.

**Greg Dalton:** Yeah. [Laughter]

**Kevin Surace:** You're probably gonna meet the highest LEED standards that you've ever seen.

**Ann Hand:** Yeah. It's the icing on the cake. I mean, when we were spec'ing Kevin's windows into the Golden Gate Bridge, 75th anniversary building, we don't sit, spend time with Golden Gate Park saying, "See this line item? See this very lovely, you know, energy efficient glazing?" We give them a bundled answer. They—all they get is a beautiful building, it's meeting the energy spec, we've taken

all of the complexity of the decision making process out of it. I think that's the key.

**Kevin Surace:** It's very the key in this modular space. You know, a great example is the Empire State Building. The owner of the Empire State Building and his wife are one of the larger donors to the NRDC and they're very, very big in the environmental chase-

**Greg Dalton:** Natural Resource Defense Council.

**Kevin Surace:** Yes, yes.

**Greg Dalton:** So they're big environmentalists.

**Kevin Surace:** Very big environmentalists and really, and yet, when it came to doing his own building, he basically said, "Until someone can show me a three-year payback, I'm not gonna do it. What I do in my personal life, because I personally feel this one thing, but I'm not gonna wreck my business by having no payback." They eventually did look at 68 items in the Empire State Building and eventually choose eight windows were one of the largest parts of that in that particular case, they already have dual-pane windows. This is very interesting. They already have dual-pane because some of you, of course, I see some of my architect friends in the audience, they know that dual-pane is not very energy efficient but most people think I've got dual-pane energy efficient windows. That's a marketing thing, not actual results. And so he replaced these dual-pane windows in the entire building which was over 6,000 windows and 26,000 panes of glass, with high R-Value glass systems from Serious Energy.

**Greg Dalton:** And R-Value is an indication of--

**Kevin Surace:** Of resistance to heat flows, so the higher the number, the better. You know, R-0 is an open hole in the wall. R-1 is a single pane window, roughly R2 to R3 is dual-pane and at Serious, we have products all the way up to R-20. So you could do just crazy things. But not that R20 would necessarily payback very well but R8, R9, R10, those numbers pay back in a lot of situations. The net result is, in the overall situation of the Empire State Building, they were replacing their chillers and a whole bunch of other things. And they could, if they put in these windows in the entire building, they could take out one entire chiller which is worth \$17.6 million that no longer had to come back into the building. Well, that 17.6 million gave them, depending on how you calculate it, either an instant payback or better than three-year payback. But in either case, nobody was gonna lose money on this. This was a good deal and his rents went up. So, they did very, very well but he wouldn't do it until he saw it was a three-year payback. In our software, we saw people that we really, I mean, most building owners said, if I can't get a one to one-and-a-half year payback, in fact, in the same budget cycle ideally, one-year payback, forget it. It's out. So this is the kind of marketplace that we all face today. So it's very difficult.

**Greg Dalton:** So how, how can you explain that? Because building owners own buildings, especially if you're an institution, hospital, university, you own that building for its lifetime, why do they need to make, get their money back in a year or two when their time-frame is--

**Kevin Surace:** First of all, the CapEx budget is different than the OpEx budget and there often two different people who deal with them and sometimes, not even the same company who deals with it. And sometimes, it's the renters who were paying, you know, the OpEx and CapEx was paid by someone else. It's very difficult, very difficult field.

**Ann Hand:** Yeah. They're, they're, even inside a corporation that funds its own buildings, it's still two separate economics as Kevin says and even though they do consider the operating PNO, they've

already made the decision on the set of assumptions they use for different regions. So trying to get into the bowels of a big organization and get them to fundamentally change their you know, utility bills assumptions for SoCal versus Connecticut, is, a long slog for a start-up that's on you know, ticking clock. So, we just decided to put our focus and our time more on, how do we drive down.

Win on first cost, up the quality spec, up the product spec and make it a no brainer sell. Like Kevin said, we tell people all the time, you're gonna get a very beautiful building, you're gonna get it in a fraction of the time, and oh by the way, you know, it's icing on the cake, that your utility bills can be lower.

**Greg Dalton:** One of my favorite stories from people who've been here recently was, Microsoft recently had people who operate the data centers now have to pay for the energy for those data centers kinda of the--

**Ann Hand:** Yeah. Private enterprise.

**Greg Dalton:** --organizational fabrication, you're talking about because before, the IT guys, "Yeah, look at the biggest servers we can get. Who cares how much energy it costs?" Now, they have to pay the bill they're like, "Oh, okay." So, it's a whole different deal. We're talking about clean energy with a group of some experts. We have Gary Dillabough, managing partner at the Westly Group.

Ann Hand, CEO of Project Frog and Kevin Surace, the Chairman of ZETA Communities, I'm Greg Dalton. So it takes a long time to do these things. It doesn't scale like software. So Gary Dillabough, is this a place for venture capital for Silicon Valley kind of investing if it's so slow and so difficult as we've been hearing?

**Gary Dillabough:** It doesn't feel that way right now.

[Laughter]

**Gary Dillabough:** I think it's been tough for the venture community. I haven't been in the venture community very long but it feels like, you know, given that the sector's a bit out of favor in general, that they're looking at the sector like, a sub-sector like this even a, you know, a sharper pencil. And looking for you know, show us some success. And there hasn't been a lot success. In the public market, even private companies growing with a lot of scale. So I think it's tougher these days, and you see a lot of firms like, we're a small kind of boutique firm and a lot of firms that are ill are actually having a very difficult time raising money right now. So we're seeing some of those you know, kind of partners, because we look at them as partners because it's important for us to come together, syndicates to fund these companies, they're really not getting the money they deserve and they need. So I think it's a very tough time. But I do believe that you know, if you look at the economics evaluations, the companies are coming down right now and as people moving away from it, it's a bit counter-cyclic but I think now is the time to actually double down and that's why we're more convicted than ever that this is the right space, at the right time and they, you know, we're hoping that some of these companies will finally start to break through and I think we're closer than some people realize.

**Ann Hand:** I mean, one thing that changed the tide in our fund raising last year at Project Frog was you know, on one hand we were creating some stickiness with the end users that were going to pull their channel partners along with us and that was quite helpful. But I think another kind of light bulb moment was when people started to say, it's not about construction. Think of the building as a technology platform. And if Project Frog can figure out how to integrate the most advance VRF HVAC System, the Lunera Light fixtures, the Adura or LED, you know, lighting controls, you know, the Serious Windows into that, and guarantee that type of result, then that all of a sudden becomes a distribution channel to market for all these wonderful materials and technologies and their portfolios



that right now, has really been struggling. You know, you've got the same lighting rap carrying all your competitors in his back as he goes out and tries to fill your light fixtures in. And by the time you go through those messy distribution channels, your margins drop and change so much, there's nothing left in the end. And so you know, for us, we're just using the building as a vehicle, as a platform really.

**Greg Dalton:** And now you're speaking Silicon Valley's language. Kevin Surace?

**Kevin Surace:** Yeah, I mean, you know, the truth of the matter is the space has been challenged with solid exits. Across the clean tech space and depending on how you define the clean tech, three hundred, five hundred, eight hundred companies were funded over, sort of a five, six, seven year period, it became --it became a little challenging about a year ago because the social mobile space is heated up. And when you're a limited partner, see, a limited partner, when you're a limited partner in these funds, you have a choice of you know, putting your money in a variety of places and it's hard for people in this audience to understand why you know, a Facebook exit actually competes with or things like Facebook, as you compete for the same dollars ultimately. As green building does or energy efficiency does or biofuels or any of that, but it does. Well--

**Greg Dalton:** Well, light bulbs might have been a better bet than Facebook but--

[Laughter]

**Kevin Surace:** It maybe but Facebook even at \$30 billion market cap, it's a lot bigger than all of clean tech put together. So, so the net result is that, the nail in the coffin was really Solyndra going under. That was not a huge surprise to a lot of us because hundreds of solar deals were funded and only a few will survive and that's the natural course of thing but it was so big in the news and people made it a political issue that that was the sort of the nail in the coffin and going, "I'm not investing anything in clean tech. There's no exits and I don't see--". Now, of course that's an overstatement and venture community has over reacted by virtually running from the space, save a few funds.

Westly has an outstanding funds, there's Vantage Points, there's a few people who are still focus on the space but 95%, 98% of the tech investors have abandoned, completely abandoned the space. At Serious, we grew a company to 420 people, six plants and earlier this year, you know, the investors decided, you know, that's uninteresting. We don't care about growth. Peel it all back and they sold up some plants and did some other things and hence I'm not involved in those decisions, they can make those decisions themselves but basically, a lot of those, some of those investors, had already back their funds on other things. So all Serious and 25 other clean tech investments that they had in that fund, all we could do is hurt their returns. Now, this is not bad or good. It's just is. You know, they're running a financial game. There's an old story of you know, in the KP fund that had Google that went public. If you were some other company other than Google, you sort of got abandoned off to this side a little bit because they already returned their fund. But that's the game that you're playing in venture and everybody's gonna know that and unfortunately, the clean tech companies take a lot longer than two or three years to get public. They can take 10 or 15 and that's challenging for the venture model. But I agree with Gary. There's gonna be some big wins, not sure where they are but he's got some wins in his fund for sure. I think Ann's company is doing just amazing work. So there's some wins in the space.

**Greg Dalton:** Ann, you mentioned fund raising and one way that companies were getting money is through strategic partners. Large incumbent companies, you went with General Electric rather than funds from the Westly Group right here. I mean, part of that--

**Ann Hand:** I tried to get them but--

[Laughter]

**Ann Hand:** He's difficult.

**Greg Dalton:** But part of that is --

[Laughter]

**Greg Dalton:** -- is a big partner like General Electric offers you something that just a VC fund can't, that there's path to market and they're scaled. So, talk a little bit --

**Ann Hand:** Yeah.

**Greg Dalton:** -- about that kind of part.

**Ann Hand:** And, you know, given -- you know, they call them Strategics, these big corporate, which given, I was in one; I didn't know that was our title. And I will say, as I went out, you know, I was hearing a lot of the views of Strategics like, "Oh, they're good because they can help with some business development along the way, but boy they're slow and they don't always follow on with the next investment." But here, I'm wearing my old kind of corporate hat and thinking, "Yeah," but I mean there's that machine there. And if you can get that machine in the door and leverage PR, all the access to their business units, I just -- you know, for me, it just felt so right and it made sense for the stage we're at. But I will tell you that I knew a lot of people pretty senior MG, from my former job and it took me a while to convince them this was not a construction company and this was a tech platform. And it wasn't until two big events happened. The first one is, is when they found out that their industrial solutions business unit had come to meet us because they want to get GE lighting and control spec into our buildings. So, I was in there like, "Wait. Wait, you've actually got one of our big business units talking to you." And then the second one, which is just pure serendipity, is they needed the building really fast at their Crotonville campus, which is their executive leadership retreat and they bought a Frog. So --

**Greg Dalton:** Name for this is the Jack Welch legendary CEO.

**Ann Hand:** This is the Jack Welch. Yeah, Jack Welch Leadership Training Center, I'm proud to say, it's the first bar we've ever deployed.

[Laughter]

**Ann Hand:** It's got pool tables. It's good looking. There's no doubt about it. And -- but it was great. We were able to call the GE venture guys up and say, "Come on." Like, you know, "You're components are on our buildings. You're buying buildings from us like do you now see that we really are a technology immigration."

**Greg Dalton:** Well, and it's an energy-efficient bar --

**Ann Hand:** That's right.

**Greg Dalton:** -- and that's really, really critical.

**Ann Hand:** And that is key, yeah.

**Greg Dalton:** Solar-powered blender. Yeah, okay.

**Ann Hand:** Yeah.

**Greg Dalton:** So --

**Ann Hand:** But I will say this, what is exciting is, you know, they have big strategic accounts like Kaiser, who are thinking about, "How do I get our heavy molecular advanced imaging equipment into buildings." It often takes new structures. It's easier to deploy the imaging equipment that costs several million dollars with the building all around it. They need innovation hubs, sales centers to attract people. So, you know, it may not be their core business to deploy buildings, but we've certainly been able to find lots of points of connection.

**Greg Dalton:** Kevin mentioned earlier that the -- that some of these issues became political and large machines are often very -

**Ann Hand:** Yes.

**Greg Dalton:** -- weary of a political controversy. Is that an issue that there's an element out there that says, "Climate change doesn't exist. Energy efficiency is un-American." Does that ever play into --

[Laughter]

**Greg Dalton:** -- remember the light bulbs? Would that mean the whole incandescent light bulb was banned and the industry was on it?

**Ann Hand:** Yeah.

**Greg Dalton:** And that it got rolled back by Congress which was --

**Ann Hand:** Yeah.

**Greg Dalton:** -- seemed crazy. So, is that -- is politicization ever an act of issue for these large organizations?

**Ann Hand:** Well, I mean, you have to remember that I sat inside a company that gave itself the logo of a flower and called itself "Beyond Petroleum." And then I built green gas stations, which in itself is, you know, a paradox. So, my whole thing is, is I think that you just -- I don't like it the conversation about climate change when I'm used to serving real consumers who have real financial concerns making it polarizing. And so, we do the same thing when we're working with big B-to-B customers. We try to be sensitive that every decision is an intersection of economics, design, and for us, manufacturing. And inside economics, one big piece of that is energy and, you know, so far we haven't found it to be overly political, but we try to be smart about how we interact with these companies and really understand. It's one thing that they've made an announcement about a carbon footprint reduction. It's very different how that message actually changes the operational decisions. And so, we feel like we have such a compelling value prop on speed and cost and other factors that, you know, we don't have to push it in as we spoke about earlier today. We don't have to force it in so heavily.

**Greg Dalton:** So you don't talk about climate change. You might talk about carbon. I mean, carbon accounting is starting -- a lot of companies are starting to measure their car -- measure their carbon footprint. It's now is gradually becoming a -- an issue with the Securities Exchange Commission to disclose carbon risks.

**Ann Hand:** Yeah.

**Greg Dalton:** So that -- was that a factor?

**Ann Hand:** Well, what we do is we show people how much reduction we're offering them. For example, on the SoCal Kaiser building that I spoke about earlier, if you use their model of how they calculate energy pay back as a 25-year NPV, it equates to about an \$11 square foot reduction for them on that specific site. We give them that information. We share it openly. We just -- but we don't politicize it.

**Kevin Surace:** Yeah. And I think that's where the world is today. And again, you're going to sell on economics, you're going to sell on other value points. By the way, isn't it great that you'll also be able to claim this kind of energy reduction, this kind of footprint reduction, et cetera, and those were all positives but they really cannot be upfront? Number two, you get yourself in a -- in big political heat if you start saying, "Buy this because of climate change." You know what, that's not of interest to most CEOs and most anything today, unfortunately because --

**Greg Dalton:** Carbon accounting is different. I mean --

**Kevin Surace:** Well, carbon accounting [crosstalk] --

**Greg Dalton:** There is going to be a price on carbon? And if you're going to buy a building that's going to be around for 30 years, you never think about the cost.

**Kevin Surace:** Yeah. I mean, it's hard to find too many CEO's of Fortune 1000 to think there will really be a price on carbon. But because of the SEC mandates, are too strong of word, but recommendations of most Fortune 1000 are publishing some level of their carbon footprint, and then trying to show some reduction. And clearly, for most of them, it's either manufacturing, transportation or the building. But for most of them, it's their buildings that are using up the majority of their -- or generating majority of the carbon.

**Greg Dalton:** More than their supply chain. You hear so much about supply chains; it's actually the buildings that are...

**Kevin Surace:** It's often the buildings.

**Greg Dalton:** Let's look to the future. Where is this going? I mean, we -- and obviously, both of you believe, Gary -- I'm sorry, Kevin and Ann believed that modular constructions going. Let's look at the future. Where is this going to go? We talked about sort of a fad or a bubble of investing, the investors pulling back, is that going to come back? So, let's talk about the future and then we'll go to the audience questions.

**Gary Dillabough:** Yeah. I think that Kevin and Ann have said it correctly. I mean, they -- the modular construction is something that has done, you know, a lot of it that's been done in Europe. And I think the Europeans are much more sensitive to this whole issue and so I think that we're slowly but surely learning from them and you'll see it continue to, you know, work its way into the marketplace. But, you know, the thing -- I think we need some kind of big momentum shift. And to me, I don't think we've done a great job of telling the story, but it's really around productivity. When you look at companies like Apple and Google, they have wonderful facilities. They recognize that they want to bring in this highly paid people, one of these environments, and make sure that they are as productive and as healthy and as -- and feels good as they can.

**Greg Dalton:** Well, there's a New York Times story about how a low people in Apple stores are

paid, they make less than Home Depot, you're not saying they're highly paid. The engineers are highly paid.

**Gary Dillabough:** Well, I'm actually talking more about the corporate offices --

**Greg Dalton:** All right.

**Gary Dillabough:** -- you know, office buildings. When you -- these guys are really in the cutting edge. They are the ones who consume a lot of these new products. And unfortunately, they are these leaders but it's hard to scale a new technology. You can get into Google but you can't get into AMD. And so, what I'm hoping is when you actually look at the cost of energy and operating expenses, it is such a small number in comparison to the HR budget that they -- that's where I think that the fight has to be fought. The ROI is actually, you know, as Kevin said, "Getting down to a year is relatively difficult for these technologies." When you look at making these people more productive, you know, this seems to payoff in three or four months in some circumstances.

**Greg Dalton:** Kevin Surace?

**Kevin Surace:** There's an old adage I'll give you real quickly, exactly what Gary said. Energy cost, you guys will use this in the future. It's very interesting. Energy cost in a building like this might be a couple bucks a square foot. So just for round numbers, we'll call it \$2 a square foot. You know, the rent might be \$20 a square foot.

**Greg Dalton:** I wish. Yeah.

**Kevin Surace:** Well, it depends on where you are but maybe not this building but, for you know, sort of average across America, the -- so ten times, okay? The cost of your people, the actual salary cost maybe a couple of hundred bucks a square foot, depending on the density on this and there. But the productivity and the output of what your people do might be \$2,000 a square foot. So, in fact, all you really want to swing, if you really want to convince people to buy your product, is that \$2,000 number. If you swing that just one percent and it eats up all of the energy cost, you know, times ten. So that's the swing. The swing is in the people's productivity. So, if the lighting is better and it feels better and the air is better and there's no out gassing and you're using less energy and everything just feels more natural and you're a little more productive, people stay three minutes more a day, it pays for -- as if all the energy was free. And in fact, you've reduced the energy too. So, that reduction of energy, swinging those other numbers, is very, very big for a corporation.

**Greg Dalton:** We're going to put a microphone out here and invite your participation. Again, if you're on this side, please, the line starts over there and we invite you to come up with one part question or comment. And I'm here for you to keep it brief and this is often the most engaging part. So, please come on up. Let's have our first audience question. Welcome.

**Male Participant 1:** First, I'm big a fan of ZETA and Project Frog. Since you said that you all are focusing on low energy and zero energy, and then now you don't really have the waste that's there anymore. How are you incorporating digital fabrication into your prefab, so that way you're leveraging, as Gary said, these technologies that have been developed in these other countries, how are you bringing that here to help construction and the actual process be less wasteful in your prefab?

**Greg Dalton:** Ann Hand?

**Ann Hand:** Well, that's really kind of core to us. It's probably one of the things that, you know, as you said some of the things that we don't get messages out well enough is we consider ourselves just

as much manufacturers as we do designers or helping people make a smart building decision. A proof point is, is that yesterday, we had 36 the top executives globally from Boeing in our office from the military division. It's one-fourth of all of Boeing's revenues because they wanted to come learn from us the Frog approach about the intersection of design manufacturing and kind of smart economics. We only have 34 people in our whole firm.

[Laughter]

**Ann Hand:** So, you know, a very humbling day. But, you know, for us, we really believe in the importance of our manufacturing partners and people who use very heavy automated processes and to your point, leverage the digital fabrication methodologies because, you know, for us, it is about repetition. Repetition is a core tenant of what we do. And if we can design very smart, flexible, repetitive, creative parts we can drive up the quality and drive down the cost. And it's only really through that that we can. And so, for us, it's really -- the labor that still needs to be involved, the manual labor on a job site, we want to keep it there and keep those jobs there and it's really about all the stuff that's smarter to do in a very high precision fabrication environment, we do that. And by relying on our manufacturing partners, not only do they give us the assurance they can scale with us and have all the good quality controls of a sophisticated company, but it also means that as these is an industry that's moving so fast, we can continually high grade and flex the kit with the advancements in technology.

**Greg Dalton:** Ann Hand is CEO of Project Frog, a modular construction company. Ann, are the fabrication of factories in the U.S., are they going to be in China?

**Ann Hand:** Right now, our factories are in Canada or United States. We have really for mostly because of being venture-backed tried to really say, "Look, there's enough business to be done in the U.S. even in a tough economy. We have a compelling value prop. Let's stay focus in the U.S. and let's obviously have North America-based manufacturing partners." I will say that we've just won an international job that I tried very hard to lose because I was worried about it being a distraction but we'll have our First International Frog is the Nelson Mandela Cultural Arts Center in Johannesburg.

**Greg Dalton:** And will that be made in Africa or will it be made here?

**Ann Hand:** It will. Because it's the first deployment and it's actually part of a wider program to deploy healthcare clinics and education facilities, we just need to make sure that, first, very small humble building gets done right so we're going to do it with our kind of trusted manufacturers. And then as we build the case for expansion there, explore what aspects of the system we can actually bring jobs to Africa in the process.

**Greg Dalton:** So actually, manufacturing jobs in the U.S. and exporting. That's very interesting. Let's have our next audience question please. Welcome.

**Male Participant 2:** Hi. I'm Jim Caldwell from E3 Regenesys and US-China Green Energy Council. I notice a paradox in the discussion about, even people who are doing green and clean and more efficient are saying, "It costs more money to do that." And yet Par Tech and ZETA building buildings that are 30 percent cheaper.

**Ann Hand:** Okay.

**Male Participant 2:** So, how do we solve that paradox --

**Ann Hand:** Yeah.

**Male Participant 2:** -- with system integration and of course Frog?

**Kevin Surace:** And there's a green problem (crosstalk).

**Greg Dalton:** A lot of other executives from other industry went up here and there's a green premium and they say how people don't want to pay, maybe you're sort of a rare example of a real true green, lower cost alternative but --

**Kevin Surace:** Well look, I mean, it depends on what you're comparing. It is true that both ZETA and Frog are producing a world-class, low energy product at a lower price, but what we're not comparing is, "Could you make that product even lower price by using more energy." Well, you know, yes, but that's not what we're offering. It's not what she's offering.

**Ann Hand:** Or worse materials.

**Kevin Surace:** Or worse materials. It's not what we're offering. It's not part of the offering. So, you know, we're a little bit trying to compare apples to oranges, but we're still delivering an incredible value to our customers, our GCs, our builders. But I'll give you a great example. You know, at Serious, we made higher value glass and regular dual-pane glass and a large -- a high rise might be \$6 or \$7 a square foot and ours might be \$8 or \$9 a square foot. And so, it increased the, you know, the building cost by 0.5 percent to some number like that, less than 1 percent. We would give them the money back in a year and a half, across that \$3 or \$4 difference and yet we'd be value-engineered out over 80 percent of the time. Over 80 percent of the time, value-engineered out because like that's too expensive. And part of it was, they were given a budget from a bank that said, "We're going to give you \$65 million to build your building and there it's 78, they start pulling out everything." By the way, the thing that's the last to go is the marble or the granite in the lobby. That's not going to go but you start pulling out everything else, and my friend from Gensler is here and she's laughing because she knows I'm right. I mean, she designs amazing things to save energy, drive the thing to zero and that's the first thing it gets value-engineered out, which is terrible so -- or we call it value elimination because that's in essence, what it is. So, there are some costs to doing this. But on the other hand, when done right, you know, we're offering at ZETA and at Frog a lower cost, better built, higher quality, faster time to finish and better use of your money product than you can get anywhere else.

**Greg Dalton:** If you're just joining us, you can listen to this and other podcasts of Climate One in the iTunes store. Let's have our next audience question. Yes.

**Male Participant 3:** Gary Malasian. It sounds like America has a lot of growing up to do. I recently toured a building on Larkin in Golden Gate, a PUC building, that's probably the most sustainable building in the city of San Francisco. Have any of you toured that building?

**Kevin Surace:** No.

**Ann Hand:** No.

**Male Participant 3:** I suggest you do that.

**Greg Dalton:** Pushing the edge. Let's have our next audience question.

**Male Participant 3:** Hello. Joshua Kagan from the Carbon War Room. Energy efficiency has been the low-hanging fruit for 30 years and yet adaptation has been miniscule compared to its potential.

How much of this lack of adaptation is because of access -- lack of access to finance? And what do you think the opportunities are for Energy Savings Agreements and phase commercial and on bill

repayment to break that?

**Kevin Surace:** Let me start with an answer --

**Greg Dalton:** Kevin Surace?

**Kevin Surace:** -- about almost two years ago, a year and a half ago, we launched at Serious, we recognized the number one issue with getting efficiency in the hands of more building owner operators was a lack of ability to finance it. The great example is solar. You know, solar didn't take off in a lot of markets until the PPA, the Power Purchase Agreement worked. And once that worked, basically, you could get solar in essence for free because you'll be paying just for the electricity, and it was about the same cost or less. And so, you didn't even worry about the cost of solar. To the extent, we can offer phase or other kinds of efficiency service agreements. That's the same plan which is you get all your efficiency upgrades in your building for free, we carry the cost and now you pay us your electricity bill, and we make the money on the spread, and pay back the cost of doing those things. So we offer that at Serious. A very successful program, huge pipeline, I already booked customers very, very well. It was not to the liking of our investors who killed the program. So, it also has to be loved by your investors as well as the marketplace.

**Greg Dalton:** And why they didn't like it?

**Kevin Surace:** Well, you know, you're taking on a lot of risk as a company, what you're really doing is taking that debt on your books, okay, instead of all those companies taking it on. So you end up potentially with, you know, several billion dollars of debt on your books, not being paid for by these monthly payments. But if you're not accustomed to investing in a business that has a \$2 billion debt line, you know, you might not like that sitting on the board, you might say, "Can they come after me?" And say, "Gee, I don't have that kind of money. Well, some of my board members do but some don't." And so, I can see how it's challenging and scary. Gary, I think you've got a company that's doing a little bit of this, right?

**Gary Dillabough:** Yeah.

**Kevin Surace:** Yeah.

**Gary Dillabough:** Yeah, but...

**Kevin Surace:** That's a segue.

**Gary Dillabough:** I'm trying to --

**Ann Hand:** Good luck Gary.

**Gary Dillabough:** Yeah. You know, actually, I'm going to kind of view a little bit away from the financing because, you know, I think, again, sometimes we got caught in the weeds, and I do think that that financing can unleash some of these activities, but it just hasn't worked as well as we like. I mean, what I want people to start to realize is, when you think about this phone, you know, a few years ago, this is just a communication device and this has changed so much. You could do so much more with this device now. And I try to talk to facilities managers and building owners to help them realize that these buildings can be so much more than just a building. And once you start to make these digital platforms, like Ann talks about, you know, whether it's the lighting or it's the windows, I mean I was driving in today, I see some beautiful new structures here. And you look at the 20th story and the blinds are all closed because the wind -- that the sun is heating those buildings and that beautiful view is now lost because of the heat and the glare. You know, those are things that



can be overcome if you have a window that's smart and starts to react to that, starts to tap the lights, starts to tap the HVAC system. These are not all that complex. I mean, this is far more complex than that, but I think a lot of people are just unfamiliar with that and so therefore, bringing money in financing to the marketplace just hasn't happened as a -- as comfortably and as confidently as we like to see. But we got to shift people to productivity and health, and this is a digital platform that we can really take advantage of and we couldn't do that three or four years ago, now we can.

**Kevin Surace:** I do know that efficiency financing -

**Greg Dalton:** Kevin Surace?

**Kevin Surace:** -- is a platform of the Carbon War Room so thank you bringing it up. I know it's a big push that you're doing and I -- we thank you for doing that. It's excellent.

**Greg Dalton:** But what's the big obstacle for buildings to be seen as technology platforms like the iPhone you're holding? Is it just the building owners -- is it a cultural behavior? We've been talking a lot about thinking change.

**Kevin Surace:** One set in budget.

**Gary Dillabough:** Yeah, I --

**Greg Dalton:** Budget?

**Kevin Surace:** Yeah.

**Greg Dalton:** Budget, budget.

**Kevin Surace:** Well, when you think about a lot of facilities teams are asset managers, they are not engineers and sometimes they're called building engineers but they're truly aren't engineers. When we look at these things, they're actually very sophisticated when you want to optimize performance. And so, I think you need a different person in some of these seats, to help ownership realize because I think a lot of general contractors now really do believe this is the right direction to go. But the value engineering starts to hurt them at the end of their project and that gets pulled out. And once you start to pull one or two of the threads on this, everything crumbles because the windows do need to tap the lights and the lights do need to tap the HVAC system. And when people are out, the occupancy sensors need to say, "Hey. Don't turn that floor on when the janitors are in." The building needs to run differently. It really is not difficult, it's just different.

**Ann Hand:** Yeah.

**Kevin Surace:** And so, we have to get people more comfortable in that environment.

**Ann Hand:** And that's why it's been so, you know, core to our value prop about the notion that we don't allow. We understand the relationship of all those components and, you know, once we've locked in on the price, we don't change order our way out of a job. We lock into a price and schedule, and then we guarantee that result. I think it's critical for us. I would just say too the -- to add a bit on some of the financing funds as it relates. I mean, one of probably the most freeing things for us at Frog when I started was the fact that, what most of the regulation that came about and the subsidies, none of it really applied to new construction. First, it was a little bit of a crushing blow, but then it just became like, "Let's just get on with it. We have to get to make this product cost the same or less." And in a way, it stopped us building up a business model that was going to become too reliant on kind of alternative money. So, in a strange way, I can look back now, even

though it hurt at the time and say, "It just freed us up to get on with, how do we make this a really efficient business and an efficient offer?"

**Kevin Surace:** And new construction is really separate the way it's handled from --

**Ann Hand:** Yeah.

**Kevin Surace:** -- a retrofitted building to argue with the five million commercial buildings already in the U.S. that, you know, the retrofit opportunity, which is really what he brought up, from what Joshua brought up --

**Ann Hand:** Yeah.

**Kevin Surace:** -- from Carbon War Room is a huge opportunity hence that one that's been a challenge to tap because of lack of -- I mean Smart Windows are an excellent example. Gary is an investor in a great Smart window company, you know, the challenge is, does someone have a budget to put in a \$10, \$20, \$30, \$40, \$50 square foot window when they could just put in nothing and just leave it, or put in blinds for \$2 a square foot? I mean, these are the budget issues there. When we do new construction, they've arranged for financing, however they got it from the city, the state, the fed, the bank, it's not our problem, of course, there's already financing, you know, to put that up. But in a building like this, if you come in and say, "I want to change all your windows. I want to change your glass. I want to change your lighting. I want to change this, I want to change that." They go, "Listen." The facility guy goes, "I haven't had a new budget in 28 years --"

**Ann Hand:** Yeah.

**Kevin Surace:** -- my budget is barely enough to change the light bulbs that go out and I've just been told I got to leave 5% of them out for at least two months because blah, blah, blah." I mean, it's really tight budgets.

**Ann Hand:** Yeah.

**Kevin Surace:** So, it's a whole different paradigm --

**Ann Hand:** Yeah.

**Kevin Surace:** -- to deal with.

**Ann Hand:** And I'll just build on that a bit like, I never tell my customers, "You're buying a digital platform." I mean, it's kind of like, we really shouldn't try to get, you know, we -- this is what we believe and we feel is happening. But, you know, if I look at some of the early sales pitches that I did at Frog a few years back, I mean you feel like you needed three PhDs to work through those slides. I didn't even understand what half of them said. And so, we just also tried -- started to adapt the attitude of, "Let's not outsmart them here. You know, give them a great offer. Just give them a great offer." If they are a real kind of visionary that is going to secretly think that it is a digital platform, great. But I still bet he's not running through the hallways of Kaiser Permanente saying, "Buildings are digital platforms," you know, his career path would stop. So --

**Kevin Surace:** He's saying, "I save \$30 of square foot --

**Ann Hand:** That's right.

**Kevin Surace:** -- and save energy."

**Ann Hand:** That's right.

**Greg Dalton:** Let's go to our next audience question. Welcome.

**Female Participant 4:** So I have a manufacturing question for you. I come from the world of solar where somehow we have moved from China is burning way too much coal to China is making way too many solar panels.

[Laughter]

**Female Participant 4:** They're also installing a lot of solar panels too.

**Ann Hand:** Yeah.

**Female Participant 4:** And I wanted to know, when you look 5, 10 years ahead, where do you see manufacturing? I mean, people are probably giving you lots of positive reports right now for doing a lot of manufacturing in the U.S.

**Kevin Surace:** Serious had six factories in the U.S., none in China, and we and ZETA has one factory in the U.S., and several factory partners in the U.S. so all of that is 100% U.S. There are some components that get made around the world in a variety of places but our factories are new. One thing about the build environment that's interesting is, most of the things certainly that both of us make, they have to be made reasonably close to where they're going to be used.

**Ann Hand:** That's right.

**Kevin Surace:** Hundreds of miles maybe but you don't put this stuff on ships, the cost would be ridiculous. And so, the good news is that, we certainly can make things in the U.S., that are large and heavy because the transport cost would just be overwhelming and we'll continue to make those. By the way, there is a little bit of other good news is that in the last year or two, more manufacturing has been coming back to the U.S. across the board and it is -- it's a little platform of mine but it is absolutely crucial that we bring manufacturing in all of these areas back to the U.S. Lastly, of course Arizona and a few other areas in Canada was another one that had a number of rules about solar panels being made in the country in order to get the rebate dollars. You don't get the rebate if they're not made here Arizona did that for a while, et cetera. It then actually attracted even China manufacturers to build factories in the U.S. So, it shows you with some very simple rules and regulations, you can attract people from all over the world to build their factories here and employ our underemployed population in this country.

**Greg Dalton:** Re-selling is something we'll be talking about more. Let's have our next audience question.

**Male Participant 5:** Hi. Thank you very much. This is Dave at Jacob's. I'd like to get the biggest success and biggest failure and what we can do about those in terms of takeaways?

**Gary Dillabough:** Well, yeah, I'll give you one. One of our portfolio companies is Tesla and that's not part of the built environment, but I think it has taken in a whole model and changing it. But you didn't sacrifice design. I think Elon Musk was like, "I can make an electric car that looks beautiful that people want to drive as opposed to a box with four wheels." Most cars to me, electric cars are terrible but we thought that was a really important sector and we see similar and this created digital platform. When you go inside that car, it's really a fascinating place to be, from what they have done. I think buildings, you know, need to kind of follow a similar path and the reality is we just don't have any. And listen, what I see right now, any wonderful stories to tell, either some

momentum being built likely the company that Kevin and I were referring to, it's called Soladigm.

They're building a 300,000 square foot facility in Mississippi right now. But if they're able to really do what Serious Windows had been doing, is helping to react to the environment and make smarter decisions within the building envelope, that's a company worth billions of dollars. It really could change the envelope. And when you think about how you optimize performance in the building, the very first part of the fight has to start with the environment. So, if you can work with the sun or the wind or the clouds and you can make smart decisions there, everything inside of that becomes much easier. But if you look at a weather forecaster, they can't, you know, tell you what's going to happen tomorrow. So a building engineer, there's no way that they're going to be able to work, you know, real time with that kind of information so we need to start allowing technology into a forum and really making it easy to use.

**Greg Dalton:** We got just a few minutes left but let's get at failure. You guys are not getting off the hook about the failure.

**Ann Hand:** No, I -- yeah. The biggest failure I'd say is, I feel like I lost about a year of the three years, trying too hard to push customers into the original Frog system, kind of our Frog classic building. Shoe horn in their program, not understand the importance of flexibility for the architect and the end-user. And also during that time, I think I also put in a box a lot of my big corporate training. I kept thinking, "You know, don't bring that stuff here. This is a startup. You're going to stamp out innovation." And you know what? Just smart business is smart business so I think that was a failure. I'd say the biggest success is, maybe because of that valley we went through and that pain, by the time the money came in, we actually really had listened enough to what customers wanted. And so, we got our biggest PO of our history, it was more than our whole revenues last year, in May. And then we today submit a proposal for a purchase order that's twice that. So, you know, I almost feel like we had to go through that valley to know what was right.

**Greg Dalton:** And you know success by having some failure. Kevin.

**Kevin Surace:** So, yeah, I mean, clearly at Serious, we did 70,000 projects, both residential and commercial, Empire State building, New York Stock Exchange and, you know, lots and lots and lots of hundred buildings that a lot of people and even some in this room were involved in. Clearly, the biggest success, I think, is a company in the built environment took nine years to build it. Like I said, 420 employees, six plants, 63 percent CAGR, so accompanying a growth rate so there's very successful by all stretches of the imagination, very close to breakeven and yet, that run wasn't fast enough to get to an exit that some of the investors needed to get to. And so in the end, to the investors, it was a complete failure. Even though the company is an absolute success, and many of you in this room, probably most of you, have used our products. And, you know, brand-wise, technology-wise, 52 patents, there's nothing you could say that was wrong and yet, it wasn't good enough for the venture community to get the returns that they needed and the timeframe that they needed it.

**Ann Hand:** Yeah.

**Kevin Surace:** And so, in a way, you know, you miss a window and that window closed about a year ago at least in the public offering space, maybe it will open again but it's pretty challenging.

**Ann Hand:** Yeah.

**Greg Dalton:** The VCs setting up the bar high. Let's go to our next audience question. We have to wrap it up pretty quickly. Yes, sir.

**Male Participant 6:** Arthur Young, Communication Management for Climate Reality Project.

Thank you all for contributing your time today. Abraham Lincoln said, "If you call the tail a leg, how many legs does a dog have?" Five? No, calling a tail a leg, don't make it a leg. My frustration in hearing you talked today is that Kevin you're talking dollars and cents. You're talking summing a project whole. You're talking about comparing a building to a platform. I think our real problem is behavior change. It's not about financing. We have a very hard time convincing people to do what's in their best interest because we don't seem to -- we haven't developed the language. And I'm curious if you can talk about direct the conversation to changing behavior more than the dollars and cents sensibility of what all of us in this room know is the most sensible thing to do?

**Ann Hand:** Yeah. No, I'll --

**Greg Dalton:** Ann Hand.

**Ann Hand:** -- I'll jump on that. I think what we have tried to do is just practically understand that the -- getting a building involves a lot of stakeholders. And so, when you hear me talking about a bundled solution, I'm talking to a handful of stakeholders that are very important in that initial transaction. But, you know, for Frog again, people are saying like, "God, why is your name Project Frog, that's a little unconventional." And we embrace it because we feel like we are trying to define a new category of building. We are trying to create brand equity in an industry that doesn't have it. We pride ourselves on the fact that our customers call us "froggers", they call their buildings "frogs", and they -- and the building does live with them. We provide living dashboards inside the building curriculum guides. We want them to understand the choices we made, what are the smart strategies they can employ in the building on kind of extremely hot or cold days. So, I think you're right. We're not running away from that piece, but I think the reality is, it's such a fragmented set of stakeholders who are involved in the whole life cycle of the building, that what we have been focusing on mostly here today is that initial transaction, which unfortunately tends to be more economic than behavioral. But if we can then create the lock-in with the users, we feel like it will mean that the doctors at Kaiser will say, "I want that building again because I have more daylight and I have -- I get daylight in my exam room and what have you."

**Greg Dalton:** We got to wrap this up, but Gary Dillabough on the human dimension.

**Gary Dillabough:** Well, I was just going to say real quickly that, you know, that the reason that you hear us talking about three or four different messages here, and I think that's one of the biggest failures is we haven't learned how to market this sector correctly. But when you're talking to a procurement person, does he give a crap at productivity? Does he -- his or her bonus is based upon how cheap they get that price to, so we have to market it to numerous, you know, folks --

**Ann Hand:** Yes.

**Gary Dillabough:** -- and so we have to take these different messages into different places. The board room is one place. The procurement department is completely different. So those are some things that we struggle with.

**Greg Dalton:** So many degrees of thinking within large organizations that are making this.

**Gary Dillabough:** Exactly.

**Greg Dalton:** We're at the end of our time. Our thanks to Gary Dillabough, managing partner at The Westly Group; Ann Hand, CEO of Project Frog; and Kevin Surace, founder of Serious Energy. I'm Greg Dalton. Thank you, all, for coming. Again, you can listen to a podcast of this and other

Climate One programs in the iTunes store. Thanks for coming today.

[Applause]

**Ann Hand:** Thank you.

[END]