# CRE Tech Talks

Episode #5: CRE & Big Data: Finally Some Practical Applications

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**Scott**: Thank you again for that warm introduction and welcome to this episode of the "CRE Tech Talks Program." Again, I'm your host Scott Sidman. Today's topic is "Commercial Real Estate and Big Data: Finally Some Practical Applications."

While Big Data and commercial real estate has been a hot topic at every industry conference that I've attended for the past couple of years, one of the takeaways from it has been a noticeable lack of, "While this sounds great, what does it mean for us and what do we do? And what are the applications and products that we can use that apply Big Data principles to them?"

We have with us today, fortunately, perhaps our most academically accomplished guest and a terrific and passionate speaker on the topic. Lindsay Baker is Vice President of Business Development for Building Robotics and their very interesting product called Comfy as well as a Ph.D. candidate in Building Science at UC Berkeley. Welcome, Lindsay, and thank you for joining us today.

**Lindsay**: Absolutely, happy to be here.

**Scott**: Great. Let's start as we always do by having you tell us a little bit about yourself and your background in real estate and, as always, share one unique or unusual fact about yourself for our listeners.

**Lindsay**: Sure. I've been working in commercial real estate for probably about 12 years now. I came straight out of school and went to the US Green Building Council, at a time when LEED was just getting off the ground.

It was an interesting time to be there, an interesting time to get to see the industry changing and moving towards more of a sustainability focus, and people really understanding that there's ways to change what we do without really compromising too much of the bottom line. It was a really fun time.

It also happened to be around the time that I took up bluegrass music. I'm a bluegrass musician and my family is, so we all play together and go to bluegrass festivals and that kind of thing, little known fact about me.

I spend a lot of time with music and that old-time thing where people sit on the porch, have a glass of whisky, and play a few tunes. It's a pretty good way to take some stress off at the end of the day.

**Scott**: That sounds really good. If this whole Building technology thing doesn't work out, at least you have a secondary career ready to...

**Lindsay**: Yeah. I'm looking forward to that secondary career. I have to tell you working on a startup definitely takes a lot out of you. Maybe my next gig will be just having a little venue somewhere out in the middle of nowhere, hang out, and play music all day.

**Scott**: Completely relate to that. Sounds like a good plan. It's interesting, your USGBC background and leed in general reminds me of the early days of that, and how there was a lot of conversation but not a lot of practical applications out there in the energy and sustainability side, so it's really interesting your transition.

Kind of a good time to tell us a little bit about Building Robotics and Comfy, and the team there and what your mission is, what you do.

**Lindsay**: Absolutely. Building Robotics was started as a collaboration between computer science and building science. Our founders are computer scientists who are doing their Ph.D.'s at Berkeley, and I met them actually both through doing my Ph.D. at Berkeley, and building science, and also through working with Google's real estate team on, essentially, how do we make Google's facilities really stellar… How do we make them the best possible environments for people to go to work there, and how do we reduce their environmental footprint.

We met because people were interested in this idea of this product that these guys made at Berkeley, on the side during their research. They actually had learned how to hack into buildings. They figured out how all of these building management systems worked. They had gotten, obviously, some permission from various people on campus there that take a look at these things and understand how we might be able to optimize them.

We met a couple of years ago, and raised a couple of rounds of funding over the past couple of years for 17 people now here in downtown Oakland. We've really just been growing and building out really a very exciting business. It's a team that works on this piece of software that's essentially looking to make people much more comfortable at work, along with saving a bunch of energy.

We're having a lot of fun, and it's so far been a wild ride. This whole software startup world is everything they make it out to be, and the Silicon Valley television show, hopefully we'll be in it.

**Scott**: [l*aughs*] That's enough...

**Lindsay**: We have a lot of those kinds of adventures. Really, our passion is to try to make buildings more people-centric and make them more intelligent, and we think that the two go really well, and that's what the market is demanding of buildings into the future. Everything's getting smarter, right? People are going to want their buildings to do the same things.

**Scott**: Tell me a little bit about what does the product actually does? How do people use Comfy?

**Lindsay**: Sure. Comfy is essentially a piece of software that sits on top of the building management system. It allows people to go in and have a friendlier interface for the temperature in their space. If you were an occupant in a building, you would basically come in one day, see a bunch of friendly people with some balloons and some donuts and they'd say, "Hey, there's a new way to control the temperature in your space."

That would be our customer success team and they're doing their launch day thing. You would go to your desk and you'd log in using your corporate email address and you'd essentially get access to the COMFY interface. You choose your location on a map. We make that map.

Then you have three simple buttons -- Warm My Space, I'm Comfy, Cool My Space. If you push, say, Cool My Space, it's going to do two things. It's actually going to send you 10 minutes of cool air on demand. Then it's also going to use machine learning to influence the set points over time for that particular area at that particular time.

So over time what we're doing is really tuning the building to what people need, no more and no less. But by giving that immediate reaction, we also manage to get them excited about this thing that they have access to that makes them feel much more connected to the building. It also helps them deal with issues around sharing and temperature, which happen a lot in the office.

We tackle all those issues and try to bring them into a really elegant and fun way for people to interact with temperature.

**Scott**: That's really interesting. That's a unique way of doing this. How would you describe the correlation between big data and what you're doing, which also seems to fit in somewhere between the smart building concept and building automation space, as you're kind of using both of those in what you do, it seems.

**Lindsay**: Yeah, exactly, it's exactly between those two. That's right. What it is is that we are looking at a lot of data. It's not super-big data. It's not at the scale of what I think a lot of companies do, where there are billions of points of data.

But we're looking at the data and building. We're looking at all the building management system data. We're looking at data that people are giving us for when they are warm

and when they're cool. We're analyzing that data to prove an outcome so that we can control the building better.

So it's a lot of data [*laughs*]. We have a lot of different tools to keep track of it, both to monitor our buildings and see what's going on and then also to actually do the automatic controls. That's, I think, the coolest thing about where we are today, is that when we look at the landscape of how buildings are starting to use data, one of these issues is that you get so much data you can't possibly know what to do with it and you end up looking at the three pieces you understand really well.

We think that there's really an opportunity to help with that, both through machine learning and then also through just better visualization of data, better helping people understand it and helping be a bit of a human face to that stuff, so that everyone's not just staring at line graphs all day. For those of us who are academics, we love that stuff, but it's probably not what everyone else [*laughs*] wants to do with their time.

**Scott**: Right. For the end user I think that visualization piece is super-important and it sounds like you've understood that and you're applying what you do to that well. Also interesting, in that in terms of the data you're looking at, you have two types of data. You have the machine-based data and then crowdsourced data and you're blending those together. What's the mix there and how do you apply both of those things to the algorithms you're using to adjust the building temperature and make the decisions you do?

**Lindsay**: It's a good question and it gets to, I think, one of the big questions that our clients have when they start out with us, which is basically, "How are you going to balance people's preferences and what they're telling you they want with the way the building should work?" There's a lot to that.

The first thing that we're doing is when we go into a building the building manager is actually going to tell us the bookends of temperature that they want to allow their spaces to float within. It's essentially like what you do with a thermostat that has a toggle switch of plus-or-minus two degrees or something like that. But we're going to give them more width on that. We're going to say plus-or-minus five degrees, because the occupants then get to pick where they want it to be through Comfy. That actually ends up being a much happier, much better environment. People really love that ability to customize within there.

But the key is it's never going to be someone can click so many times that they get their space to be 80 degrees in the wintertime or something along those lines. There are very particular bounds. It's also worth saying that over the years -- at this point I guess the product's been in development for five years or so -- there's been a lot of learning and a lot of expertise spent on making sure that the building systems perform well when we go in there and make sure that everything...that all the different kinds of building management systems are well tuned to what we're doing. All of that kind of stuff.

You really have to pay attention to a great amount of detail about how mechanical systems work when you're trying to do this. It's not that simple. But it is simple for the occupant. Complicated on the back end. Now we've kind of balanced that.

So really, in the end, we are tuning in, and ultimately the occupants are very much being heard. We have zones that we service with Comfy that like to be between 76 degrees and 80 degrees, in Phoenix, Arizona. That's where they like it. Those guys get to have what they want and they're actually saving a lot of energy there, but they want it to be a little bit closer to the outdoors.

**Scott**: Alright.

**Lindsay**: In other spaces, in colder climates, a lot of times people end up on the cold end of the spectrum because that's what they like.

Not everybody, but again, that's sort of the nice thing about Comfy. You can do what people want when they want it and you don't have to worry about the lowest common denominator problem that has been nagging us all for a few decades.

**Scott**: Right. Well, if you were in any Boston buildings this winter we would have all wanted 76 to 80, for sure, for about two months.

You've mentioned a couple of times the term "machine learning." Can you define that a little bit for us and tell me what that means?

**Lindsay**: Sure! Yes, so machine learning is also known as artificial intelligence.

So really, what it is, it's just math. It's pretty complicated math, but essentially what it's doing is, it's taking a whole bunch of input, all of our votes, people voting that they want to be warmer and cooler, it's taking the outside temperature, the temperature of the zone, the time of the day, the day of the week.

It's going to take all of those and it's going to run an equation and it's going to find out what's the best temperature for this town at this time.

And then it's going to control it at that point. But then the thing that's necessary to think about machine learning is that then it's going to re-run that all the time. It's going to re-run that equation and it's going to find out, "OK, what's optimal now?"

And then it's going to learn based on what it sees over time and gradually it will skip three, four, five times away in the past. It'll gradually forget them.

And the ones that happened more recently, it will weigh more heavily. So there's a lot about it that's just really basic math, but then it gets more and more complicated as you're adding more and more data so that eventually the building is...has all sorts of things going on differently and over time, you see that if you come in at 9:00 AM every morning, for example, but the system turns on at 7:00 AM then your zone is going to have a wider dead band until 9:00 AM if no-one's there.

**Scott**: Sure!

**Lindsay**: And then, when people start clicking and they want it to be a little warmer, typically, in the morning, that's a very, very common thing for people.

Then you actually...you'll see that the dead band, that the minimum set point, the heating set point will go up, so that it starts to actually turn the heat on a little bit more. And then it sort of does that over the course of the day. So if you think about what a Comfy dead band will look like it's really...that it's very dynamic, that it looks a little bit like there's a little curve in it and things, for people want it cooler in the afternoon. And people want it warmer in the morning.

So you get to achieve that without them having to go back in and enter it all the time. The big trend, obviously, in software and in the technology world today is that things are going to start remembering, "Oh, yes, you go to this grocery store all the time and this is what you always buy."

Or to the kinds of things that you typically buy on Amazon, and it will recommend that maybe you want to buy it again. All that kind of stuff. So this is just another way of doing something along those lines.

**Scott**: Wow, that's really interesting. It was great statement because it leads me into my next question in just, do you get concerns about privacy with regard to the data you collect and analyze? And how would you address that?

**Lindsay**: Absolutely. It's something you have to pay a ton of attention to in a field like this, way more than any other technology or innovation in the workplace that we've had to deal with to date. We have a lot of things.

We have a privacy policy for the occupants and we have a privacy policy for the building management. Those things have all sorts of information, and just like Amazon has to, just like Apple has to about what we will and won't use your data for. All of that stuff. It's pretty elaborate.

It's also something that people don't look at as much, and you have to be upfront with people to make sure that they know roughly what this is. For us, I think when we're first selling it, the building management folks tend to be the ones that speak for the building and want to find out more about how the hell it works.

We've typically been able to do lots of different layers of security depending on what people need. There are corporate firewalls and there's obviously a lot of Internet security in terms of data encryption, that kind of thing.

But I will say it is one of those things, if you're in commercial real estate, and you're thinking about software and you're thinking about technology tools. It's really important to have folks on your team who know about data security, who know about encryption and a lot of those kinds of very technical subjects.

I certainly don't know that personally as much as I could [chuckles], but you really need that. It's something that we've been very lucky to have a team that's pretty experienced in that realm. So we can do whatever the IT folks need us to do, I guess, is one way of putting it.

**Scott**: Absolutely, and if nothing else, know the right questions to ask. You've provided some insight into that right here, which is great. Obviously, so much of this is tenant-focused. Are there any things you've learned that have been interesting about tenant behavior or how what you're doing impacts the tenant experience and their overall satisfaction?

Which we all think about in terms of being comfortable in our space, but what have you learned?

**Lindsay**: We've learned so much. We're actually just getting ready to start a little blog series where we're going to talk about some of these larger trends -- anonymously, of course -- that we see and how people's temperature preferences work and how they come and go.

One of the ones we're excited about is to talk about how, I guess we've done some analysis based on men and women and have not in fact found any difference, statistically speaking, between men and women. I think it's pretty amazing just because there isn't.

**Scott**: Just dispelling a lot of myths.

**Lindsay**: [*laughs*] That was surprising to me, to be honest. But it's apparently true, at least from what we're seeing so far in our data. I mentioned a couple of the other ones that I think are really important.

One is that people always wonder how Comfy manages to make people happy when you have to share some picture with other folks. One of the things that we found is that people who run cold, the kinds of people who...we all know that we're on a bit of the spectrum. There are types of people who ran cold tend to be warmer in the morning and they don't actually have a lot of needs in the afternoon whereas people who ran hot tend to need to be a little cooler in the afternoon.

You actually can make both groups happy because they tend to be at the sort of peak of their discomfort at different times. We're able to really tune a lot of those zones when that happens. Also there are things like the sun coming in in the afternoon, kinda warms up the stakes a little, people to anticipate our standard things. It's a ton of really interesting information that has been really validating for us because it's shown us that stuff is complicated, comfort is unpredictable, all of that. But when you start to see the trends, it's something that's really, there's just so much we've been able to do to make people happier in their state.

We all do these surveys that people have been using Comfy for a while. The last one we did I think it was 83 percent of people who were much more satisfied with their comfort than before Comfy had been put in place. It's really working and very satisfying to see that however complex you can still tackle these things. It's not too much to handle.

**Scott**: That's terrific to having just those insights alone. They're just so incredibly valuable to a property management team, when you think about what they can do to make their tenants happier and their experience better in their buildings. That's great to know you can do that and that will be really interesting to read your blogs as soon as you guys start publishing some of that data.

I'm going to pause here a quick second, Lindsay, and we'll edit this out obviously but I'm going to skip a couple of the next questions because I'm just looking at the time. I want to make sure we stay focus but I'm going to go towards the ideal customer profiling building and deployment stuff.

Sure some of that...Let's talk about the kind of buildings you're working in and where this works best. Do you have an ideal building profile that makes sense where Comfy would work best?

**Lindsay**: Sure. Obviously, our hope is that we're getting much building all over the place and we built comfy to be applicable to as many different types of building as we can. But like any good business owner will tell you, you have to start somewhere. We've started with owner occupied building because it's typically a little bit easier. For us and the value of adding to people's comfort and the space and also the value of energy.

They are now contained within the same person. If you heard of a landlord/tenant situation and leases can be different, it could be a little more complicated. Our focus has been on owner occupied building. It's also been focused on the kinds of building that have VAV's (Variable Air Volume) boxes as the primary way to get air in and out of the building.

That has been a pretty good fit for us for a lot of reason like provides a little bit that our immediate responsibility, that we find that's so critical. But others have not...we've work with the major building management system now. A lot of different climate zones who are now going into India, which is so exciting but we're all over the states.

It's really office spaces have been primarily where people used it, but we're interested in talking to folks about using it in other spaces well.

There's a lot of interesting ideas that we can...a lot of different places we can take it but that's where we're starting. It generally our clients tend to be the types of folks who are looking to do something really nice for their tenants, maybe because people are a little more uncomfortable than average, or maybe just because they want to do something to really highlight the awesomeness of their facilities team. Sometimes it's just for energy. It really runs the spectrum, I guess.

**Scott**: Maybe then talk a little bit about typical deployment. How you charge for the service, as well is there a payback period or ROI model for this system as well that people can look towards?

**Lindsay**: Yes. In typical deployment, we're a software as a service company. It's a pure software with no installation charge and it's pretty quick shaking of the hands. We typically have about three to four weeks ramp-up time to get the little things we need and just to plan the launch stage to be honest to figure out which donuts are we going to buy and all that. Little things like that.

Yes, it's pretty basic, and then people just have a month-to-month service that they pay for. It's by square footage so that's...there's a little bit of a minimum, but it's 25,000 square feet, and we go into lots of small spaces where people get to try it out just to see how it works before they go into a larger building, which is fun and nice that we can do that scalably.

Then we basically do price it based on what we're seeing the energy savings to be. We don't actually price in a savings-based model or an ESCO model or anything like that, but we've gathered a lot of data from our early clients to understand how much they're saving, and that's where we've established our price line.

We do anticipate that people should in many cases break even. The whole thing should be free for them, essentially, and then you have...obviously, if you want to add any value to the fact you're making folks more productive at work and saving a bunch of hassle on hot and cold calls should come out pretty positively for you.

That's the current model, but it really does vary, because it depends on where your set points were before, and how your building was run before, and what you're interested in doing as you roll out Comfy.

**Scott**: Wow, that's a really good story, and you weren't kidding about the doughnuts, and the balloons, and the whole party thing, right? You really do that.

**Lindsay**: Yes, we really do that. Buildings and facilities and stuff don't get enough love so we like to try to make sure everyone knows.

**Scott**: Wow, that's a great launch. That's terrific.

Before we wrap things up we like our guest to give our audience some takeaways, some things that they can think about, and maybe you can share with us three to five things that you would suggest to anybody considering Comfy to come prepared with or ready to discuss to see if they're a good fit for you.

**Lindsay**: Absolutely. I think the first thing is to really think about what you're doing to stay competitive in a marketplace in commercial real estate that's just continuing to be more and more demanding of technology, and of the amenities and interesting things that are offered to us in the rest of our lives.

How are you staying equipped for that, and how are you really innovating on that front so that you're ahead? I find that's a big one that we see.

I think for us it's also get ready to try something new. Comfy is a new thing. A lot of these technologies are new, and the folks we work with, our clients, have really benefited a lot from saying, "You know, there might be a way that we can improve our operations here. These computers are still in the 1990s so maybe it's time to bring them 20 years up to speed with the rest of the world." It requires sometimes a little bit of spanning the horizon. That's another big one.

I think also for us we really want to know in going into a building that we're working with that...we love working with building facility management teams who are looking to improve their building, and we work on that a lot with folks.

So if you're considering, "How am I going to start to find more faults, and find more opportunities to save, and really understand how to excel in my realm of responsibility here in managing the building and HVAC systems and lighting and all of that?" and you're ready to open up to new ideas and to new information about how your building's working, then we're a great fit.

We love doing that. We spend a lot of time with our clients just trying to make ways for them to do their jobs easier and really be the heroes in the building that we think they are. If that's something that's interesting to you, and if it sounds like something you'd enjoying doing then we'd love to hear from you.

**Scott**: Those are some really good thoughts, and thank you again for the great insights, Lindsay. Tremendously interesting stuff you guys are doing, and as I said at the beginning, it's really interesting to see some practical applications coming out for the things that the market's been talking about for several years now.

I think you guys are a terrific example, and we wish you all the best. We'll be watching for the Comfy app everywhere and hopefully coming to our building soon, certainly by next winter. We'll also keep an out for you on your upcoming CD and tour if that happens.

**Lindsay**: Yes [*laughs*].

**Scott**: Thank you again for Lindsay Baker joining us today. You'll find contact information for Lindsay in Building Robotics on our podcast page as always with the downloadable takeaway and transcript of the broadcast.

Thank you for joining us on this episode of CRE Tech Talks, and I hope you continue to listen in.