



Using Space Analytics to Support the Decarbonisation of Buildings

Webinar Transcript

SL

Good afternoon to the latest in a series of decarbonisation webinars from SSE. This webinar is going to be about space analytics, and how space analytics supports the decarbonisation of buildings.

And we've got a group of people here, a group of experts, that couldn't really talk on this subject and give us some information on how using space analytics can make a difference to the way we run buildings. A big welcome for myself, my name is Steve Lockney, and I'm the technical director at SSE. What I'd like to do is get each of our experts to give a little bit of background on themselves before we start looking at this subject in a bit more depth.

So first, Niko, did you want to give us a bit of background to yourself, and how you link to analytics?

NK

Good afternoon, everybody, Niko Kavakiotis, I'm heading Enlighted in Europe.

Enlighted is a Siemens business in the IOT sphere, and its goal is to turn buildings into sensing and thinking entities with one intention in mind; to make our lives easier, better, faster, and more beautiful.

SL

So, over to Michelle, because you could give us your background in space analytics.

MF

Good afternoon, everybody. My name is Michelle Facer, and I've been working at the University of Surrey for the last six years, almost, and prior to that, I worked for Unilever, and prior to that, I worked for Barclays.

In every organisation, I've had a role which is roughly the same in terms of looking at the wider organisation's use of space, and how that space could be used more efficiently. So lots of data analytics involved over the years in those three roles.

SL

And over to Gareth. How's your background influencing space analytics?

GR

Gareth Rutter, Trend Controls. Electromechanical engineer working in the HVAC and BMS industry for the last 15 years and working with a variety of customers, generally

helping them achieve their goals of managing sustainability and improving the environment for the occupants.

SL

And lastly, Paul, what's your background in Space Analytics?

PK

Paul Kraus, Product Development Manager for SSE Digital Services Business.

And I'm really interested in space analytics. Well, I'm interested in data analytics more broadly, but I think it's an interesting area of development.

I've come from a controls, energy management background, BEMS, and we're looking at what we can do with the data we are gathering for buildings, and how we can use that to optimise our use of space, and how that ties in with the decarbonisation journey of our customers.

SL

So, I think we'd all agree, we've got a good panel of experts here looking at the topic from a number of different angles.

We've got a number of questions that we want to answer in this session.

- Why do we need to look at how this space in buildings is being used?
- Is space analytics just about technology and equipment that we put into buildings, or is it something more than that?
- How can it specifically help with the decarbonisation of buildings?
- How does it impact how spaces are used and how people behave?
- Look at some of the tech technologies
- What are the practical steps for using these types of systems?

And as always, we have a chance for you to ask questions. There is a chat area where you can enter your questions, and we'll try and get the panellists to answer later.

Also, as always, the session is recorded, so we can come back to it later. Or if you've got colleagues that you think it would be useful to, they will be able to see us as well.

Let's look at this first question: why do we need space analytics?

From your side, Michelle, you've come from a background of looking at space analytics, what are the areas that you're using space for?

MF

At the University of Surrey, it falls into three categories. It's partly financial. So our space analytics, how we use our space, directly relates to the money that we're spending, either creating that space or maintaining that space.

It's partly about carbon footprint. So, we're looking to join most other organisations in terms of trying to be carbon neutral by 2030, and how we use our space has an impact on that carbon footprint.

And then, partly it's cultural, as well. So especially in the university, there are certain expectations that both the staff and students have. And those expectations relate directly to the amount of space that they have, and the type of space that they have.

So, that's why we need space analytics, in a nutshell.

SL

And in terms of the challenges you faced so far in trying to achieve them?

MF

The biggest challenge that I think we have on the university campus, which isn't necessarily true if the experiences I had in other organisations that I've worked for, is that the university is a bit like a small town really and has so many different space types.

To run through a few for those who aren't aware, we have teaching spaces. Some of those can be generic, and some of those can be very specific in terms of laboratories or dance studios, or mocked-up [operating] theatres for either veterinary practice or health sciences. We have lots of different working environments, so our academic staff, if they're actively researching, might need to slightly different workspace from an academic who isn't actively researching. And that again, is different from the type of space that somebody perhaps working in HR or IT, might need. We have social spaces. We have residences, Sports Halls, and event spaces.

And at the University of Surrey, like a lot of other universities, we also have a research park that we look after, as well, which has a beneficial impact on the whole University, by having start-up businesses and businesses that are linked to some of our areas of expertise, in terms of subject areas. So it's a huge variety of different types of space used by different people for different purposes, at different times of the day and different days of the week. So the complexity really of managing something akin to a small town means that you do have to be able to look at that through some sensible, collectable and manageable data.

SL

You need to be able to understand the usage of those different spaces in more detail because it is so vastly different in different types of building settings.

MF

It's different all the time. I did a walk around some space yesterday, and it was completely empty, but that's because it's the middle of July and everybody's on holiday, and because there is a rhythm and a pattern to the way that university, certainly, from its

teaching perspective; we have semesters, so, we are either in semester or out of semester, and out of semester, people take the opportunity to say “Oh, it's quiet. There's not many people around so I'll go away now”. There's a real rhythm, to the use of spaces, and when we are thinking about deploying any kind of measure to understand the utilisation of space, we've got to think about that in terms of what time of year is it?

SL

So it's not like a one-off activity that you can do, it's a dynamic, ever-changing situation.

And that has to be then taken into account when you're using that data. How are you going to use it, to change how you work in the university, or might be how you even heat or cool university? You've got to take that rhythm into account, as well.

MF

Yes, you do. The more data that we could collect, the easier it's going to be for us to manage that situation. At the moment we don't have enough data and our systems, our ability to control things like heating and lighting is varied across the campus, so if we could predict in advance that only a certain amount of space is needed out of semester and that that space was generically applicable to a large degree, for a large group of people, we could actually direct people. “We're going to close this building during July, and we want you to work in this building instead.” But that doesn't always work, depending on the type of role of the people involved, and the type of facilities that they need access. So, for some active researchers, we might not be able to ask them to work anywhere other than the space that has got all of the equipment that they need to do the research.

So it's a very complex picture and data, on the one side helps us to be able to manage it, but also you have to be able to implement the controls as well. If we can't turn off heating or cooling to one floor of a building, rather than the entire building, it doesn't help us to know that we could reduce occupancy.

SL

I guess that it highlights where you might have gaps in your ability to control. If you see, using those analytics, you can actually say that the building's not being used in this area, therefore, we need some more control, for example.

And so, moving on to that; Paul I believe you've been involved in some work at Surrey. What's your experience there?

PK

We've been working with Michelle to deploy some sensors into the spaces to gather a bit more information about how those spaces are being used in the real world. I think, one of the most striking things, we've identified through the data that we've seen and observed, has been the difference in the expected space use, to the reality. Identifying areas where

rooms have been booked, and, we were finding that the spaces weren't actually occupied. I think that was an interesting lesson there, which has obviously come from having access to that additional layer of data.

What we do with that data, as, Michelle alluded to there, is the big challenge because, is it a case of changing practices, optimising the way that the university asks people to book spaces, and use spaces.

Again, as Michelle pointed out, if you can steer people in a better direction, somehow, that's sort of the next thing of doing something useful with that data. It was really interesting to see the level of variance between the expected utilisation and the reality.

SL

And if you don't have that level of information, coming back to something that was said earlier, the issue that you call then predict accurately, can you?

MF

No, you can't.

SL

So predicting the future you need no knowledge of whether the space was actually occupied or not; just working on a booking system doesn't sound like it worked.

MF

No, for a very long time at the University of Surrey, we've had the ability to understand what is booked, particularly across teaching spaces, but not necessarily the ability to understand clearly whether or not those bookings are translating into the actual use of the space.

The way that we used to do it, pre-COVID, was to choose the busiest week of each semester and then employ a whole load of uni. temps to come in and actually physically go and count how many people were in each room that was supposed to have been booked. That gave us a bit of a picture as to what was going on, but nothing like what we could have with the sensors that we've been deploying. And nothing like what we really need to be able to understand the full picture, and then progress on to [ask] what can we do about it? What controls do we have, and how quickly can we deploy those controls in order to minimise the impact of expecting a space to be used and then that space not being used?

SL

In terms of trying to analyse a space, there is a rhythm to buildings, and to spaces, and to be able to predict what you're going to need in the future, you have to have good data. Just relying on static data, or data taken at one time, or systems that are not actively checking this space, is not going to be good enough to make those accurate predictions.

So I think it's interesting that there is a real need to understand the user space. But what about the technologies that are used to analyse space? One of the approaches that the university took was a one-off exercise using people to count, but that's not something that's sustainable that can help you gather the data that you need to do that long-term predictive analysis.

Gareth, do you want to expand on the idea of the technology used in space analytics?

GR

The technology used within space analytics has become a crucial part of the way in which the building is now designed, and the way in which it functions.

Modern buildings, over many years, have an increase in demand for the volume of data they've collected, with an objective of trying to present the data in a meaningful way for the individual persona, so that they can get the best value from the information collected. But it's important to recognise that whichever technology we use is just an enabler to gather the information to help people start digesting and understanding, how the performance of the building can be developed. [Thus] the software analytical tools which support the data become the engine of how, how that information is used.

SL

And there are quite a lot of different technologies out there that are going to look at where the spaces are being used. Are they all useful for the types of technology we're talking about today? Which is things like decarbonisation? We've got simple people counters, camera technologies and so on. Are those technologies applicable in all cases?

GR

I think there's such a wide array of technologies available in the marketplace. It is key to understand first what the client's objectives are, and what they're trying to achieve. At the early stages, the more data, you can collect, and if you structure it in a clear and concise way, using elements of naming conventions and tagging, and storing the data so it can be used meaningfully in the future. That would allow people to start using the information to drive the building's performance, which can actually drive sustainability and energy improvements.

SL

So, what you're saying really comes down to what the customer want to use, or what the building owner wants to use that data for, which affects what technology then you might put forward.

GR

There's a range of technologies, whether they are hard-wired sensors which collect data into a central system, onto the network, or one of a wide range of wireless integration

IOT-type technologies. There is such an array out there that it really comes down to what the client's, building owner or manager's objectives are. What are they trying to achieve?

SL

So, building upon that, you've got these different technologies out there, so, Niko, you've got these sensors gathering data, what analysis can you do? What's possible?

NK

Human beings are one of the most complex things in this world, so, maybe, the question is what is it that we cannot do with data?

It's a long list of things, and I'll just share a few as I have experienced them.

Gathering data, and having the space analytics filter in mind, we can use them in order to take decisions that have to do with understanding space and avoid real estate expansion.

So, it goes to the financial reasons that Michele mentioned. Changing space in order to accommodate for better comfort conditions, for instance; I have an example later to share. It's about taking decisions about downsizing, or upsizing because you need more or less space. It's about productivity, enhancing productivity, by the styling through space analytics and identifying efficient and efficient workflows.

It's about revenue generation. If you are able to identify areas of high traffic, there's a higher likelihood we can negotiate [with] premium vending machine providers, with advertisements, or providing cleaning schedule optimisation. It's about safety and security when you don't have CCTV by the system: geofencing would allow you to give alerts, et cetera. It's about Speed to facilitate bookings we find in big areas like Food.

It's about locating expensive equipment that might be lost, misplaced, stolen, or put somewhere and forgotten.

It's about identifying areas of high use and expected failure. So it goes into the whole area of predictive maintenance, I don't want to make it more complex or too fancy.

The key message is the following: The moment I have data, the conversation changes from whatever it is one can do, is there anything we cannot do?

I would say it's about doing more with less, it's about being able to address challenges. We never thought we would one, day by having the data, we're able to have it when the time comes.

SL

So in terms of space analytics, as was said earlier by Gareth, it depends on what the client, what the building owner, wants to use the building for. It seems Niko there is no limit to how that data then can be used, it's just deciding what the particular focus is for that building and client.

NK

This is true.

SL

So, the key thing we want to know, as these are decarbonisation webinars, How does the space analytics actually help? We do decarbonisation, we want to reduce our energy consumption, and we want to reduce our impact on the environment. There's a lot of data there, but what can we do to help it with our target of reducing energy consumption? Gareth, any thoughts on that?

GR

When the space analytics data is collected, structured, and used accordingly, if that is presented it's got a wide array of uses. Depending on which person is looking at the data from a controls and the HVAC or a BEMS perspective, if that data is shared with the BMS or the HVAC control system, it allows the client to start structuring a really demand-led and key-driven energy sustainability focus within the building environment. That helps customers start identifying and achieving the key objectives, whether that's related to maintenance costs or where they can turn off plant. If, you know, the indoor conditions are, are appropriate, or if they need to run it more. If they're looking at energy costs, maybe the way in which space is utilised is by turning off floors of the building.

I'm really looking at how you can future-proof the building from a design perspective moving forward. One of the big value, parts of decarbonisation, which is sometimes overlooked, is by having the data, I think Nico touched on it earlier, you can then analyse if you need to build that new building, or if you need to build that extension when actually you could downsize and start using your space more efficiently or start using it in a more structured way.

SL

And actually, that's quite important, because building a building has carbon associated with it. If you can utilise your existing buildings in a better way, then that helps eliminate the carbon from building new buildings. So it's making better use of what we've got.

Michelle, from your side in Surrey, how do you see space analytics helping with the decarbonisation agenda that you've got?

MF

So it's, it's very much what Gareth has already said and what you just reiterated really, in terms of looking at your demand for space and understanding that demand, then looking to see if that's reasonable. And then having that conversation to ask people if they think that demand for space for that particular activity, for the duration of the activity, particularly in higher education, where you have this rhythm of modules taking 10 weeks out of 52. And so with your space analytics, you can kind of have conversations with

people about the demands that they're making for space and help them understand what impact that demand is having on the university and its consumption of energy. Then, having had those conversations, you can look to try and solve any issues that are arising in a way that for us, Surrey, avoids building new buildings. We're definitely trying to utilise our existing building stock, much of which is, is quite old now, so we have probably 80% of building stock that is non-residential and was built in the 1960s. , So, we're looking at that infrastructure, and understanding how we can modify that to meet the demands of 21st-century organisation because we don't want to be building new buildings every single time we have a demand for space. It's just not realistic from a sustainability perspective, and it's not realistic from a financial perspective at the moment with the way in which universities are funded.

So space analytics helps us understand what it is people are asking for, whether or not that's reasonable, and then, hopefully, what you're having are conversations to work out how can you reduce that demand for space. Then I think on the flip side of that, once you have really had all those conversations and tried to look at what is reasonable, what is going to work in terms of how much space you're allocating to people, then then you look at the ways in which you're able to make that space work more efficiently from an energy consumption perspective. So how are you buying your energy? How are you using it? How much control do you have over it? I think that those are the ways in which we want it to help us at the university. We're at the very early stages of trying to work in that way. But it comes back to what Niko was saying earlier about using data to make decisions.

And that's really what we want to be able to do, to use data to make good decisions, because if space is such an emotive subject, as soon as you start to talk to people about their space and how they're using it, immediately, people get very scared that you're going to take it off them, And then they're going to need it one day, and it won't be there.

I think having a conversation, which is backed up by data, and sometimes that can be partly data which is about how much of an impact are you having, in terms of your energy draw, which is not just costing the university money, but it's also costing the world's vital resources, and also, from the point of view of "Is this actually efficient?" If you are using this particular space for this number of weeks in a whole year, is it efficient? Is it sensible that you get that space permanently? When you're actually only using it 10 weeks of the year?

So, it's about decision-making, it's about informing conversations, and trying to take some of the emotion out of those conversations.

SL

We'll definitely come back to the impact on behaviour; that's a really important topic.

Finishing with the decarbonisation Niko, how do you think looking at the usage of space helps with decarbonisation?

NK

I recall the thoughts shared earlier, I have similar experiences with the work we do with the University of Birmingham. But I want to go back to something you said, Steve, when you said, building a building has carbon associated with it, and it's true.

I'm gonna throw a figure out there, though. Only 1% of building projects completed every year qualify and are categorised as new construction. But, the carbon impact for this 1% is the equivalent, listen to this, of building a New New York City, every month, for the next 40 years. That's how big the carbon impact of new construction is.

So before we, clients, everybody takes a decision, if we are really true about our net zero mission, we will need to think hard and take decisions or whether we really need this extension or this new place, or not.

SL

It's a sobering thought. What we've heard so far is that there is technology out there that gives us that data. We can get the data, analyse it, and it can help us understand the rhythms of buildings and predict those rhythms in the future. It sounds like the challenge is not necessarily the technology, it's more, as Michelle was saying earlier, is having the conversation with people to say, we're going to have to change. So, really, the next sort of question is "How can we use space analytics in that behavioural change?" And I think a question for you, Michelle: you talked about the rhythm of a university. Do you see, actually, the space analytics going back and not just mapping out the rhythm and predicting the rhythm, but actually using it to go back and say, "Let's change the rhythm"? Maybe the rhythm isn't right from a decarbonisation point of view.

MF

Yeah, I mean, I think we can have all those sorts of conversations, and sometimes it's not the data that you're sharing, but sometimes it's the technology that provides the data that can help as well. An example that I'd really like to share, is that the university doesn't currently have a single meeting room booking system. It has a way of booking teaching spaces, but not meeting spaces. Historically, that's been done on a local level with departments being very protective over their meeting space. Again, it's, I think the emotive subject of space. What if I need to have a meeting, and I haven't got my own meeting room to have it in? The Sky would fall in, obviously. One of the tools that we are starting to use is a single meeting room booking process and system. Not only does that help us to gather data on utilisation so we can understand whether we are providing the right number of spaces at the right capacity, but it also helps the people in the university understand that there are more meeting rooms in the university than the ones they just regularly use. So when you use the tool and you know, you need to become a meeting next Tuesday at two o'clock in the afternoon. You can just say to that tool "Is there a room available at two o'clock next Tuesday afternoon", it brings back to you all the rooms that are available, the right size for your meeting. At that time, then it broadens your own

view of the facilities that you have available to you. So it reduces the panic that you might have in terms of, oh, my goodness, we haven't got enough meeting rooms on the floor in which I work. But it also helps you to kind of see that.

it helps us to get people to use space more, more of the space that's available to them more of the time.

So sometimes it's not just the data that you're using to help you to modify people's behaviour, sometimes. It's the tool itself. And I think that's also true.

If you have got, and we do have the capability of doing this in some of our buildings, where you've got data on how much energy you're consuming, that you can also show on large screens. So, we refurbished one teaching block last summer, where we installed large screens so that we can show people the energy consumption of that building during the course of the day in a very pictorial way. So, reflecting back at people, data, but also encouraging them to use tools that are going to make their working life more efficient and their use of the space, more efficient are all really, really good ways to help people change their behaviour.

SL

And in terms of using one tool, and maybe having a meeting in a different part of the University, does that have any other benefits?

MF

It does. We're trying to link it. We haven't quite got there yet, but we're trying to. We have something called, Surrey Moves which are points that you can get. You can link your smart, watch or step counter to an app within the university. So, you can record how many steps you've done. And if you've done a certain amount of steps, you get points on a card, which ultimately, adds up to you being able to have a free cup of coffee. So actually, what we want, to be able to do, is to link the meeting room, and booking system to Surrey Moves, so that people, who are regularly walking around campus, to go to meetings in various different buildings on campus, There'll be clocking up more steps than other people so they should get more rewards as well, in terms of, free coffee. It's not something we've been able to do just yet, but it is something we definitely want to pursue.

SL

So it's definitely looking at other behavioural changes as well. Separate, really to the decarbonisation is about getting people moving, maybe even meeting other people within the university.

MF

Definitely, there's a big move at probably many universities now starting to think much more broadly about solving the real-world problems that our academics are researching

into and that, it's all about collaboration. That's all about interdisciplinary research, and bringing people together. In my previous organisations, I never worked on a campus, so I'm not quite sure how it works in somewhere like Unilever, if that was on a campus, like Microsoft's campus, but, certainly, at the university, people get very used to just going from the Carpark to the building that they work in, and they get quite bamboozled, really by the fact that they might have to walk across campus to go and do something, meet a colleague, or go and find a meeting room. Or even get a cup of coffee.

We do get people sometimes feeding back to us that if we're moving people around campus and we're moving them further away from the coffee shop that they enjoy going to, then that's a big problem for them, where am I going to get my coffee? So I think it's perhaps quite peculiar to working in a campus environment, getting people moving around the estate is actually quite hard.

And I think one of the things we talk to IT about is, whether or not by default on Microsoft Office could have all of its meetings. You can set this up personally, to have your meeting default, to 25 minutes, if it's a half-hour block, or 45 minutes, if it's an hour block, you can, you can set those settings individually. But what we've talked to IT about is, could we do that? Universally, Could that be a setting we set for everybody so that you're giving people time to walk between buildings, and between facilities, between scheduled meetings that they've put into their diary? It's not only good for people's making full use of the facilities that we have available, but it's also good for people. It was good for people's well-being moving and taking time between meetings to have literally have a breather. And on our campus, that will probably mean going outside as well, so it's all in interwoven benefits that help us to encourage behaviour change on a number of different levels. We're not just asking people to help us financially, we're saying, we want your help to reach our carbon-neutral goals, and we're also saying that we want that to benefit you as well in terms of your own well-being and the pattern of your day.

SL

So now that you're getting that information, it's starting to bring other benefits that you didn't necessarily think about to begin with.

MF

Absolutely. And I think the link-in to well-being is a really important one. When we think about the overall goals linked to sustainability and decarbonisation, we're also thinking about more people living better lives, healthier lives. And I think that that's a really good link to exploit when you're trying to get people to change their behaviour.

SL

Paul, in terms of the data that you can get from these systems, does that tell us some things about how we can help with positive behavioural change?

PK

First of all, I just wanted to just quickly comment on something that Michelle mentioned there the idea of almost gamifying people's behaviours. I think that's absolutely fantastic and I think it sits right at the heart of the question you just asked, Steve, if you're taking data, how do you make it relevant? How do you make it something that's actually going to drive some kind of change, and that's a really, really smart way of approaching it.

Dashboards, data, numbers, figures; to the untrained eye, a lot of it is just noise, So turning it into something meaningful. How you visualise data, and how you turn it into a meaningful data point, are really, really important if you want to actually have an impact on the way people are behaving. We've looked at doing things for some of our customers, and potentially, we might look at it and support Michelle where this is actually trying to work out the carbon cost of an hours teaching, or a ticket, or a widget, or whatever it is to actually understand, and then because of the data and the availability of that data, now, it allows us to have a bit more granular view on that. So we could say, Well, what's the carbon cost of an hours teaching, in this room, at three o'clock, versus another group at ten am, and actually start to allow people to take ownership of making good decisions and perhaps get over that emotive element of trying to do the right thing, so you sort of getting that buy-in from the people who may otherwise be giving some pushback.

So it's interesting how we actually turn raw data into meaningful insights but also, hopeful nudges, something that's going to give people motivation to do the right thing.

And, again, having a little look back at the decarbonisation point, if you think about, this as being a means of controlling demand within the building, that building sits within a broader energy system and by having access to that data, we've got it gives us flexibility. It might be that we could actually divert people or resources to areas that are going to be less carbon-intensive.

You might have a proportion of the campus, as well, served by solar PV, and another proportion isn't, so, you move everyone over there because the sun shining. And you can do more for less. It's a very, very sort of, simple way of looking at it, but that level of data provides the flexibility. And then if you've got the way of turning that data into a meaningful driver, either through something really clever like gamification or through turning it into understanding what the positive impact of that behavioural change could be. You can then take advantage of that flexibility as well. I think that's something to think about. The key thing is how can you give a positive steer.

SL

It's interesting, you're talking about turning that data into something that's relevant to the audience you're giving it to. There is a temptation that, as engineers, we provide data in a format that we're comfortable with, but actually what you were saying there is actually turning into something that's relevant to the individuals in that space.

PK

Relevant, and also simple to understand, as well, universal. There are some really simple things that you can do. None of it is new: the idea of giving things a red, amber, green ratings. It's a clear visual cue as to whether something is performing, as you'd want it to, or whether it's not. Rather than telling somebody the percentage or how many people are there, you go, There are 50 people in the room, is it a good thing, or a bad thing? Unless you know the room, unless you know what the occupancy is, is that what was expected then, it doesn't tell you anything. Once you start to have those different data points, you can start to score things, and you can actually say "OK, this looks good to me, or, this, is not what we're looking for, and you can make it visually clear and understandable to anyone who is looking at it.

And again, for somebody like Michelle who understands that data at the granular level, she gets that, but the challenge of then, steering behaviour, change, and others, by having that data representative, an easily digestible format.

Rather than telling somebody of a particular percentage or bamboozling with numbers, presenting something fairly straightforward and understandable is another step in overcoming the challenge of steering people to better behaviours.

SL

Niko, in terms of the behavioural changes that you've seen, what insights have you been able to get,

NK

I've got two examples I can give you that we're experiencing at Enlightened and Siemens.

Example number one is Post-COVID from what you might remember all of you had social distancing. So, every component came up with a plan. Very straightforward: you get from this door, you go straight, and you get out from the other go the other way around. Fantastic. Pat on the back, we made it

Then we said, OK, hold on a second, let's have a look at the data, what the data is telling us. We do not use anything fancy, we just took one of the visualisations of our technology, heat maps that show the most popular path humans take. It was very interesting, you have the proper route come in, straight, get out of the other way. But human beings are always trying to find the best, fastest way. You could see there was a path that nobody had planned for that quite a few people were taking that was practically breaching the social distancing. Fast forward COVID is behind us, but at that moment, it allowed us to make a couple of changes in the space allowing us to cut these more efficient routes that were breaching [rules]. Again, here's an example of changing behaviour.

But the other interesting thing will be the other way around. How does the technology allow allowed us to identify behaviour that we're not aware of?

Here's a story. It took place a few years ago before COVID at our headquarters in Sunnyvale, California. What do we notice by analysing data in our own office? Drinking our own medicine or our own champagne whichever expression we want to use, depending on the time of the day.

We realise an unknown; that there was a peak in a specific boardroom that could not be explained by other data. By inquiring we realised that what was happening was the following. During lunchtime, quite a few of the employees, instead of having their lunch at the restaurant, they prefer the specific boardroom to take lunch and socialise due to the combination of comfortable furnishings and distance from their office. So we decided to change the restaurant space accordingly and designate that [boardroom] space as an employee recreational space because, again, attracting talent and maintaining talent is linked to satisfaction in the office. Here was something that we were never aware of until we had the data and make the right change based on behaviour.

So I hope you'll find these things interesting. These are real cases.

SL

So that well-being comes up again, doesn't it? We start off with decarbonisation and want to make use of space better but we come back to actually how can we make people more productive and more comfortable in space.

We've heard a lot about the technology and there's a lot of data that can be gathered with the systems. I guess there's a risk that too much data, as Paul was talking about earlier becomes a bit meaningless. What are your views on things like dashboards?

NK

Dashboard is one of my favourite topics. Dashboards are great, but we move very easily, from a dashboard to what is called the failed promise of the Dashboard. Here's what I mean.

We all need data. We stated it. We don't doubt it. There's so much truth and information in data. One of the first things we do, when we gather them, is to create a visualisation.

Here's a dashboard. Fantastic. But now, let's be honest. I don't know many people who wake up every day saying "Fantastic. Today, Wednesday, Tuesday, I'm going to spend my whole day diving into data. We make some assumptions that there are people who have plenty of time to be sitting in front of screens, loading visualisations, and dashboards. Making decisions, thinking, et cetera.

There are some people who do it, but the reality is that we're moving into a world where all of us have to be doing more with less. As a result, there are two thoughts I want to put out there from experience.

These data are important, no doubt, visualisations and dashboards are important. But more importantly, clients and everybody who takes a decision on the deployment type of these technologies, in my opinion they need to be thinking, is the system going to make any recommendations? Can we move from just data visualisations to recommendations to make our life easier?

One additional thought on this that might sound heresy, but I'm going to say it, with decisions of high impact and low risk, can we leave in the system? The platform, the building, so that actions can be taken. Because, at the end of the day, it's not about me, or you are sitting in front of screens. It's about making our life easier, better, faster, and less expensive. How about enabling the system to take some actions on our behalf, rather than having all of us sitting in front of dashboards trying to make sense of the world?

One more thought that's important. It was mentioned earlier, or it was alluded to earlier, that when we found out, when customers start this journey on space analytics, there's a high chance they will forget, which is the following.

The whole process requires some change management thinking. Most likely what's going to happen, is that somebody's going to install in your system, space analytics and data will be collected. Most likely, this is going to be an additional task on somebody's existing workload, and I have plenty of cases where I went from the best technology for the best reason, at the right time and then six months later, the conversations with our clients were not as advanced as they should have been because the client designated somebody who had a day job, with many other things to do. Eventually, change management didn't happen: think of change management as well.

SL

Going now to practical steps. What we've heard of initially was, it comes back to where we look at the technology that we will use to analyse the space, what's the plan, what's the vision, what we're going to use it for.

What we heard from, Michelle and Paul, for example, is that data can be used in many different ways, and for many different purposes, so, restricting yourself at an early stage to one reason for that data is actually limiting what you could achieve across the board with the system. So understanding, the range of ways it can help with the running and operation of the building. Michele was talking about the changing behaviours, and it's quite clear from what she was saying is that it's important to engage with the people using this information, to educate and inform, but also help to get them to behave differently.

And actually, what we heard from Niko as well with some of the things to do with using that information to then influence the well-being of people and help them be more productive.

There are a lot of different topics that we've covered today, what I'd like to do is go around the room with everybody so, what would you say were the most practical steps going forward, in your opinion, to identify what you need and how to implement it, and maybe start with you, Michelle, in terms of your experience.

MF

I'd just like to share something that the university did last year in terms of trying to reduce the amount of water consumption. We have 6000 bedrooms on campus for our students. So you can imagine that 6000 students having showers, even if they only do it once a week, is still a lot of water. So we did a little campaign to get people to. I think this has been quite widely used, where you have a shower for the length of time of your favourite song, or to sing, happy birthday twice, or whatever the timeframe is. Basically, we did a campaign to say to people, we want you to take less time in the shower. We want you to use less water, and, at the same time, deployed sensors, and the real-time feedback that you get from your sensor, which tells you how much water that you've used in your shower, actually did change people's behaviour.

We saw a 30% reduction in the shower times that the students, what are the time the overall our students were using in the shower, and that equated to saving of about nearly 30,000 litres a year of water, so It's that combination of the technology, in terms of the sensor, the real-time feedback to the user, and the campaign that says, hey. This is something we all want to do together. Let's move forward, Let's capture your imagination and motivate you in order to get on board with this and to listen to the real-time feedback that you're getting from the sensors that we've installed.

And so I think my message would be don't underestimate what you can do and what you can do starting in a very small way as well. So I think we didn't deploy sensors in every single bedroom. We did a small subset of veterans and proved what was possible and then went on to deploy more sensors. And we're taking the same approach with sensors in teaching spaces and ultimately, we'll do the same thing with sensors in other types of space that we've got around campus.

So, I think the combination of having the technology, using the right analytics for the people that you're trying to communicate with, but also trying to motivate them in a very human, way, engaging them in that personal way.

I think those three things combined together can see some really good changes in the way that people do things, as Niko said earlier, we've got to get used to doing things very differently, going forward. And I think those are the key things that we've, we've discovered so far in our journey at Surrey.

SL

Very much a holistic change management process as Nico was saying earlier.

Gareth, from your perspective, what are the practical steps that you see?

GR

Just re-iterate what some of the other panellists have said already, as an industry we've got a significant challenge in trying to enable building owners, occupiers and so on, to get the best out of the building, and ultimately, driving towards the building making its own decisions. To get to that stage it is fundamental that we start guiding and helping clients, during refurbishments, design changes, updates, and so on, and help, inform, a specification, documentation, and guidance in a clear and concise way, what they want to achieve, and get it into a format that cannot just be value-engineered out, during some contractual discussions, without any real consideration of what the impact will have. Because if the customer has really got the vision to try and improve how the building is used and reduce the carbon footprint, and the energy sustainability using data and analytics. We have to get the right datasets in the right places, in the first place.

SL

You've got to get the sensors in, as Michelle was talking earlier, and what you're saying is really pretty important is that if you're going to do any significant changes to existing buildings is to actually have it as part of the program.

GR

So it's important that it's designed in, and truly built into the whole design ethos, rather than just bolted on at a later date without any thought of what you're trying to achieve.

SL

Because that could lead you down, almost a technology cul-de-sac where you might be able to do a certain type of analytics, but you wouldn't actually be able to expand how you could use that information.

Going over to Paul. Any last thoughts from your side in terms of the practical implementation?

PK

I completely agree with Gareth's point about making sure that specification is around the technology are well established, so we don't see a shortfall in wants delivered in buildings. I think we need to recognise the challenge that we need to enable this technology in existing building stock as well, saying that 80% of the buildings will have in 2050 have already been built, so a retrofit solution is going to be critical.

I also think it's really important not to look at this in isolation. If I was talking to anyone about data analytics, I would be asking them about what their bigger picture is, and how does this fall within the overall energy system? What we're looking at here is managing demand effectively, as far as the decarbonisation question goes. How does that fit in with the broader picture for that energy system? How does it balance off against demand generation, import, and energy storage, potentially, and are you factoring in the capacity

to change and drive behaviour change to change the way that space is being used in relation to that broader energy system as well? So I just think sometimes just lift your head up, think bigger, and just make sure that's in your mind as well.

SL

Lastly, Niko. Any last practical steps for implementing?

Before you embark on any type of investment in this space, ask yourself relentlessly, again, and again, and again, is the investment I'm about to do future-proof? In other words, is it helping me solve apart from the one or two problems that I have defined, the additional two or three that I haven't thought of, and five more that I haven't even experienced yet?

If you are thinking "How can we prepare for things that haven't happened yet?" Talk. Talk to companies which are in the industry, talk to SSE, talk to people like the panellists. Try to see what's the view of the world, what are the challenges they see the industry is facing?

The last thing you want is to phase the lethal combination of time and budget pressure and sign up for the investment. That will end up in a substandard system that will allow you to solve some of the problems today, partially, and hinder you in the future

SL

I think one of the things that has really resonated with me today is what Michelle was talking about, the rhythms of a building, and understanding the real rhythms of the building, not what you think it's doing, but what it's actually doing, to be able to predict how it is going to behave in the future.

The next step from that is, rather than predicting how it's going to be in the future

How can we shape what it looks like that rhythm is going to be like in the future, back into the people that occupy the spaces and engage with those people?

It's been quite enlightening. You know, I thought, was going to be about technology. It's about actually, how do you approach and implement space analytics, far more important than just technology on its own. So hopefully that was useful to you.

And if you do have any questions, please just drop us a line and we'll be able to pass them to one of the members of the team panellists here.

Thank you.