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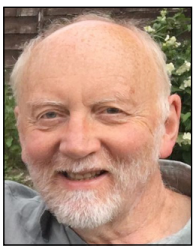
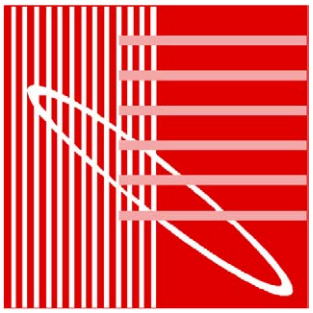


> ***"Building performance simulation has come a long way in terms of modelling capability and its human-computer interface. That said, it still has a way to go if we are to deliver a technology that is easy to access, appropriately aligned with reality, unambiguous in its application, and delivers outcomes that are readily understood by all parties."***
>
> ... Joe Clarke



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President's message

Dear IBPSA Colleagues and Friends

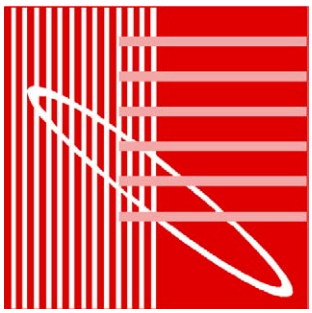
And so it continues, with COVID-19 never far from our minds, but at least we have some brightness on the horizon as the vaccination programmes get underway. I hope that you and your families remain well and that things begin to improve soon.

Despite some progress on reducing the spread of the virus, as some countries enter a third wave, we are no closer to knowing if the IBPSA conference in September will take place, but the organisers remain optimistic and will make that decision in May. The situation is looking promising but everything will depend on getting variants of COVID-19 under control and the pace of the vaccination roll out.

Come what may, the intention is that BS2021 will be a live conference and will not be a fully virtual or hybrid event. Everything is proceeding on the basis of the September 2021 dates, but if for any reason there is a need to move to Plan B – due to ongoing travel restrictions, for example – the conference will be postponed until August 2022. There is advice on what will happen with already accepted papers on the website: **https://bs2021.org** .

I am sure that, like me, you are all desperate to get out in the world and see friends and family again; this whole pandemic has taken its toll on everyone's sense of 'normal'. I hope that everyone's physical and mental health is holding up and that you are all coping with working from home. For me, the main problems are the Scottish weather and my two dogs who interrupt meetings when the postman arrives, and when they are hungry, so I can't really complain. I know that for others, things will be much more difficult: from home schooling to lack of contact with family and loved ones to losing loved ones. This pandemic has no conscience, and so until we get things under control, we all just have to do as we are advised. In Scotland our rules are FACTS:

Perhaps for the next newsletter (which will hopefully be after lockdown) we could all share some of our lighter moments of this strange new world we have inhabited for a year. It would be good to see something to make us smile rather than hearing a version of the same news every day. I'll leave that one with the editor to contemplate!



Hopefully by the time I write again we will already have had the opportunity to meet in person. If not, we will all have made a significant commitment to reducing our Carbon footprints!

In the meantime, take good care, stay well and look after your loved ones.

Lori McElroy
President IBPSA

Best of 'Ask a Modeler': Head in the Clouds, Feet on the Ground

'Ask a Modeler' is an advice column for the building simulation community. Each month, committee chair Nathaniel Jones and members of the Emerging Simulation Technology subcommittee pose a question submitted by an IBPSA member to recognized experts to get their unique perspectives. Through this column, we hope to expand communication and create a sense of community among practitioners, researchers, and academics at all points in their building simulation careers. Below, we are reprinting some expert advice from the past few months. We hope that sharing these questions and insights will bring value to your work and possibly make you think about building performance modeling from a new point of view.

What possibilities are unlocked by doing energy and environmental simulation on the cloud, and where do we stand today?

— Head in the Clouds

Dear Head in the Clouds,,

Simulation on the cloud introduces two major opportunities: The first is scalability, which means that simulations can be run much faster, and the second is that simulation becomes much more accessible, which opens the gateway to better collaboration.

It used to be simply too hard to access cloud computing or to build a cloud service, but with recent improvements in web technologies and the cloud computing toolchain, it is now much easier for us to build a cloud-based solution or access an existing one. Several large and small companies are using this opportunity to offer a better version of what used to be available in desktop applications for different types of building simulation. The common theme has been making things more accessible, easier, and faster. But not every company has managed to make simulations more accessible as widening the audience comes with several new questions and challenges.

Using the "browser" as the common interface was a response to a continuous challenge to find a cross-platform, easy-to-use interface. Browser-based interfaces made the proliferation of cloud services possible. We now have more automated solutions and more platforms to collaborate with one another. We can run more simulations in a shorter amount of time. We can deploy our solutions to a wider range of applications and audience, all thanks to the magic of the cloud. Using some of the available web-based platforms, we can collaborate on preparing simulation inputs, quality check inputs and outputs, and discuss results. But a key question remains: How do scaling and collaboration affect the outcome of our projects? And how will they change the way we work together in the long term?

As different web-based solutions emerge, I recognize two distinct themes that we will see in the near future:

- Mass automation of the common denominator (aka "single-click" solution)
- "Mass customization" of expertise

The single-click automated solution comes with the promise of making building simulation very easy and widely accessible by using automation and assigning default inputs to your model. Most recently you will see an "AI" tag next to these solutions too. The promise is to bring the power of the simulation to non-simulation-experts, who are usually architects. These solutions promise that, when architects use simulation early on, they will be able to make better design decisions sooner in the process. The main criticisms for single-click applications are the reliability of their results and their limited ability to model the complexity of real world problems. Most single-click applications limit input flexibility so they can deliver high quality results for a very limited range of possibilities. Because these platforms rely on simplified inputs and interfaces, they usually fail to reflect the real complexity of design problems. This is, of course, not a new phenomenon and not limited to the web-based solutions, but because of the wider reach of the web-based solutions, it affects a larger audience than was ever possible before.

The "Mass customization" of expertise tries to build a platform for bringing professionals together in order to amplify the wisdom of the crowd. Here, the role of automation is to deal with the real complexities of the problem at hand rather than creating a one-for-all automated solution. There have been several successful examples of such platforms in other industries, but I think we have yet to see such a platform for building simulation. Software developers use GitHub and graphic designers use Figma to collaborate on projects and build custom solutions that can be deployed at scale. The main challenge for these platforms is appealing to non-experts while keeping the experts satisfied. Depending on how well they keep the non-experts involved in the process, they can become expert-only platforms. This means that they build reliable solutions but are used only too late during the design process. Again, this is not a new phenomenon, but web-based interfaces provide a new level of flexibility that has not been available before. The right interface might become the key parameter for success of these platforms.

Of course, I have my own preference on this matter, but I would like to ask you, the reader who has your head in the clouds, to think how our choices as individuals will determine the future of cloud solutions for the building industry. I personally think we are still climbing up a hype cycle, and we need some more time before the hype goes away and we will be able to think straight. I would like to imagine that we will build platforms that can bring people with different backgrounds together without compromising the complexity of real world problems. Are we going to be one of the industries who will use this opportunity to provide a higher level of services to a larger audience? Are we going to take the responsibility to do the right thing and build platforms that educate users even if it is harder to do? Or are we just going to focus on market adoption by making tools simpler? Is there a mature solution to do both? This will be up to our choices, and only time will tell.

Mostapha Sadeghipour Roudsari, MEBD, MSc Arch
Co-founder, Ladybug Tools LLC

HVAC units are often oversized to deal with full load, which rarely occurs. Are there strategies to save cost and energy by changing the way load is calculated?
— Mr. Right Size

Dear Right-Size,
Rejoice, as gone are the days of boasting about the biggest kit in town. Now is the time of the kit that is just the right size to do the right job right.

It's obvious: good engineering strives for a working solution with ever higher efficiency by designing out waste. Coincidentally, not paying for waste also tends to make things cheaper. Great, but what's the right size then, I hear you ask, and this is indeed where things get murky.

Pressure to Go Big

Historically (and cynically), the "right size" for an HVAC unit has been the one that fits the budget whilst promising the fewest complaints in use. After all, aren't the HVAC services there simply to keep the building users happy? With enough money in the project purse, the path of least resistance (and lowest professional liability) leads to size-inflation, with an uncertainty here, a margin there, and a few conservative estimates both here and there. The resulting race to the top remains unchecked as most building owners with limited technical competence can only pick a value engineered option and rarely a smaller capacity. Lack of complaints in operation remains their only measure for success, and the easiest way to avoid complaints is to secure plenty of spare capacity to deal with all eventualities, real or imaginary. This preemptive risk aversion can also be cheaper in the long run, if the alternative is a costly retrofit.

Nevertheless, things start to look different as the priorities of the building industry shift. In addition to picking the largest just-affordable HVAC units, we now also need to reduce their energy cost and environmental footprint. Today we can estimate these impacts with increasing confidence. We know that most oversized units are not only expensive to install, but also expensive to run as their efficiency drops with declining utilisation. While some equipment uses the same amount of energy regardless of their duty, others use even more energy if they do much less work than they are sized to do. Even so, risk aversion continues to trump over such considerations. Despite increasing energy prices, and because carbon is too damn cheap, the perceived value of high efficiency pales in comparison to the risk of affecting building users' happiness (and productivity). As a result, oversizing remains common practice.

To complicate things further, there are also instances when oversized is the right size even after the energy, cost and environmental considerations. Certain HVAC equipment can reward operation at a reasonable part-load with higher performance, while also affording greater flexibility (for example when a pandemic requires higher ventilation rates). In such cases, looking at the whole life footprint of the HVAC systems becomes necessary, which might justify a large size as the best value option for optimal life-cycle performance.

What do we do then? At a minimum, we need to combine the emerging data from the newest generation of hyper-connected buildings with the expanding capabilities of the contemporary design tools to drive diversity, flexibility, storage and whole-life considerations in HVAC sizing exercises.

Understanding Data and Risk

We need data to tame our risk aversion. Design criteria, for example, need to stand up to scrutiny based on data from buildings in operation. We need to learn lessons from this data to establish sound diversity ranges over design criteria. Without such data, we at least have to address coincidence of loads and the benefit of storage with greater courage to inform load diversity. This makes a robust dynamic energy model a precondition for right sizing.

A sure way to oversize an HVAC system is to design it for infinite flexibility. A speculative development may need an energy intensive server room in an unknown location, and its design must be sufficiently flexible to accommodate this. This, however, does not make the building a data centre with server rooms throughout, and we should not design for such a scenario under the disguise of flexibility. Flexibility allowances should therefore also be checked against the data from the field.

Finding the Balance

We must exploit the benefit of storage to the best extent. Where demand for use is intermittent and the loads are dynamic, well-designed storage systems can deliver miracles to avoid oversizing. This is as applicable to thermal mass in architecture, as it is to buffer vessels in mechanical systems and batteries in electrical systems.

Finally, for true optimization of the system size, we need to look at the full picture. This requires a balance between the upfront, operational and the end-of-life considerations from the perspectives of fitness for purpose, cost and holistic environmental impact. Oversizing may feel like a risk-averse and future-proof strategy, yet is it really so for the 20-year life-cycle of the kit we are installing today?

Decisions informed by data on these aspects are essential to streamline HVAC systems and deliver the right size for the job at hand. Such custom tailoring takes time, diligence and experience as there is rarely an off-the-shelf, one-size-fits-all solution. The alternative is business as usual where size matters and the biggest denominator with the largest safety margin trumps.

Volkan Doda
Associate Environmental Designer, Atelier Ten

We want to hear your interesting, entertaining, or just plain odd questions about life and building performance simulation. Submit your questions at **www.ibpsa.us/ask-modeler** *to be answered by prominent building performance simulation experts. Note that questions requiring an immediate response should be submitted to the community of experts at* **unmethours.com**. *Read our other past columns at* **www.ibpsa.us/ask-modeler-column-archive**. *If you are interested in replying to a question as a featured expert or have any other feedback about* Ask a Modeler, *please email* **askamodeler@ibpsa.us**. ■

BauSIM 2020 Roundtable Discussion

The Austro-German Chapter of the International Building Performance Simulation Association (IBPSA) has held a biennial conference since 2006. The University of Technology (TU) Graz was proud to be hosting the 8th BauSIM conference last year, on 23-25 September 2020, the second such conference to be organized by an Austrian institution.

With greater awareness of accelerating global change there is still much to do in order to tackle the challenges this poses for building simulation: more so when we consider the time-horizon of these challenges in the context of a predominantly static building stock.

With this in mind, the conference included a roundtable discussion with leading experts in the field of building performance simulation on the topic of ''challenges and future endeavors''. Participants for this discussion were Professor Joe Clarke (Professor Emeritus, University of Strathclyde, FIBPSA), Professor John Grunewald (Professor and Chair of Building Physics, TU Dresden), Dr Per Sahlin (CEO EQUA Simulation AB, FIBPSA), Dr Michael Wetter (Deputy Leader Simulation Research Group, Lawrence Berkeley National Laboratory (LBNL), FIBPSA), and Andrew Corney (Product Manager at Trimble - SketchUp and Sefaira, UK; FIBPSA).

This article is the first part of an extract of the discussion that took place at BauSIM 2020 last September. The second part will be published in the next newsletter, October 2021.

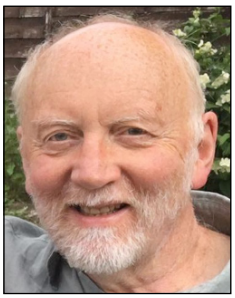
Each of the participants was asked to provide a short statement in advance of the discussion, and Christina Hopfe (TU Graz, FIBPSA), the moderator, used these as the basis for the questions which she put to the panel.

> ***"Building performance simulation has come a long way in terms of modelling capability and its human-computer interface. That said, it still has a way to go if we are to deliver a technology that is easy to access, appropriately aligned with reality, unambiguous in its application, and delivers outcomes that are readily understood by all parties"*** (Joe Clarke)

Christina Hopfe (Christina): Joe, you are imagining a future with easy to access building simulation that incorporates a public data set, is unambiguous in its application, and delivers outcomes that are understood by engineers and architects alike.

- Is this even possible in a free market/ competitive economy or would this simulation become redundant before it was built?
- Would it be possible for everyone to agree on one approach?
- What would the level of detail look like and who would own and maintain it?
- As with CFD, where mesh tolerance is used to understand the credibility of results, would we introduce different model granularity predicated on the specific purpose and uncertainty inherent in the model?
- You state that 'outcomes' need to be 'readily understood by all parties'. This implies that building designers and stakeholders need a minimum level of training and understanding of building physics, building services and simulation. Do they have this and is it really necessary?

Joe Clarke (Joe): Ok. Off the top of my head then, I don't think we'll ever get to an endpoint, because building simulation has to hit a moving target and that target is evolving all the time.



There are many evolving agendas, they require new modelling and simulation functionality and that will continue to happen in the future. At the moment the new agendas relate to things like smart control or embedded renewables or changing the scale to the community or the city level and a lot more emphasis on occupant interactions and well-being and environmental impacts, and that will continue. I don't see an endpoint where we all sit back and say that's it.

However, the evolution still has to continue and for me is two-sided. One aspect is the need to continue to develop functionality. Let me be categoric here. When I talk about developing functionality, I make a huge distinction between calculating some system parameter and simulating a system in a way that is well-aligned with the reality. Reality emulation for me is the holy grail of simulation, not calculating something. To better align our simulation tools to that reality, not to predict the future, but to be able to emulate the reality to see if our designs are robust and resilient, we've got a long way to go.

But on the other hand - and this is where my interests lie at the moment - we need to pay more attention to the application of simulation. And in that regard, there is huge potential to move away from competing programs and more towards agreeing standards of application - moving away from licensing to accessing services and close service. There are huge potentials on the application side. So, finally what I would say, and this is my challenge to the industry, is that in order to make progress, the industry, the users of modelling and simulation, must become more proactive in saying what it is they want to do. And that would translate at least from the research base to standard performance assessments, standard acceptability criteria, and automation of the application of simulation which will then get us back to where we started, which is a focus on good quality design. So maybe I should pause there and let my colleagues add in a few of their views.

Christina: Yes. Per, what do you think about what Joe suggests?

Per Sahlin (Per): I absolutely agree about the evolution. I sometimes say that a lifetime is not enough for developing what's needed in this field. DOE2 is still the most used tool in the States and was largely developed in the 70s. So many of these tools are very old and I'm looking forward to people doing absolutely new things, but there doesn't seem to be much of this happening. Perhaps with the exception of Michael and of John Grunewald's group who *are* doing totally new things there is not a lot of new work around. And that is a problem, I think. I guess it is a very daunting undertaking, starting to develop something totally new for this field. Another thing I felt we could bring to the table here is the fact that in IBPSA we often discuss simulation in broad and general terms as if it was used in a similar way all over the world, but as I see it now, having tried to peddle these tools on different markets for several years, it's completely different in different countries.

Christina: Thank you Per. John, what do you think about this future of easy to access building simulation with public datasets?

John Grunewald (John): Per, you said we are doing some new things. But, it's actually not new work. We too have been developing our models for several years already. I totally agree that it takes a long time to develop fundamental and high-quality simulation models. And, of course, we are not satisfied with developing something just for academics; we want to bring these things into practice too, which is another challenge. Our situation in Germany is like this: we are driven by projects - by applications; we have to strive for funding; we have to pay our collaborators. But the research topics are not focused on simulation itself. They are application driven and we always have to write research proposals according to certain topics which are "in" today. And we do the software development and modelling as a side-track of our activities.

Christina: Isn't that exactly what Joe wanted? more applications?

John: Yes. But if we could focus more on our modelling activities and if we could connect better with other modelling teams, then we would probably be a bit faster. At the moment I think that the relevant speed is not just related to modelling; it is to bring models to practice and to make a real impact in practice. The speed in this field is not satisfying, at least to me. We are too slow compared to the changes in society, the change of everything, digitisation in society. These things are going on at a very high speed and we are not in the same situation, right now.

Christina: Let me change my question slightly before Michael and Andrew respond to this. Joe also mentioned outcomes. So, if you have an application, you need outcomes and they need to be readily understood by all parties. But this implies that designers and stakeholders need a minimum level of training and understanding of building physics, services, simulation, etc. Do they have this? Is it really necessary?

Andrew Corney (Andrew): Well, I guess you could try to look at other industries where these things have changed quickly. The building simulation industry is a bit like a cottage industry, where people make things almost by hand and crank everything out one by one. Other industries that started out like that subsequently changed into more of a mass production industry. Maybe if we look at the drivers of those changes, we could understand better how that would happen in our industry.

One example that we use when we're thinking about software development is taxation. Taxation is really complicated, and for a very long time many people had to rely on accountants who were very knowledgeable about the rules and the standards to complete their tax return; but over the past decade or more, software tools have been developed that make it much easier for people to be able to do their own tax returns, even if they are quite complicated. I think that could potentially be an example of how our industry could change. And the key to that would probably be stronger drivers.

I've often joked that if people were designing a building and they had a button that they could push at any time to check whether they were still passing the code this would be so much faster and more effective at cutting through the noise they would push the button all day. As soon as you made a change, you could just push the button and it would tell you straight away. The drivers for seeking out and using this sort of solution would be the anxiety about whether the designs are on track, the importance of meeting codes, and the strength of the codes themselves.

But I think the requirement for that is, probably, better BIM software and better knowledge about buildings, as that's being developed as well, which ties back to a lot of the things that were said earlier about not keeping up with the industry.

Christina: Do you agree with that, Michael?

Michael Wetter (Michael): I agree with most of the things that have been said by the others; certainly, the building simulation industry is about 20 years behind simulation technology that's routinely used in other industrial sectors like the powerplant, aerospace, and chemical industries. All those are areas where you have big assets that really have to work properly. Buildings certainly have to work properly from the climate change point of view but it is much less obvious if something goes wrong.

I think the way forward is to develop nimble simulation engines to suit the standard use case which forms about 80% of buildings, and make them easily accessible by the typical designers who make a kind of cookie cutter building, all the way from the user input to the visualisation,

providing insight into the simulation results and enabling them to understand why certain systems work better than others. At the same time, we also need to provide flexibility for those who don't have a standard building or standard district heating and cooling systems. We often find that innovation is stifled by the limitations of the simulation engine or by the framework that makes the simulation easy to use. So, I think we really need to have an approach that allows us to simplify the use of simulation for the standard application, but to go under the hood and add flexibility which can then be exploited in terms of new system architecture, new control sequences, etc. where these are appropriate.

But what we often see instead is a shift towards more and more emphasis on controls and, of course, the usage of storage and renewable energy systems. All of a sudden, the second law efficiency becomes much more efficient. So, temperature difference, thermal heat transfer and energies for pumps and fans become much more efficient. And in most simulation engines, they are overly simplified and they don't really provide a good means to test how to control the operation of that equipment other than some rudimentary supervisory controls. And earlier we heard about integration with BIM. I think Andrew mentioned that point, which is certainly very important, but what's completely lacking is a standard for expressing the control logic, and we have now started working with ASHRAE on the development of such a standard. So, we should not only use simulation for performance assessments and to inform the design, but integrate that into a digitised workflow that allows us to include BIM data, add controls, using for example reconfigured control sequences, possibly customise them for the building if needed, and then export those controls or machine-to-machine translations, so that you can run them on proprietary control platforms. So, the simulation becomes the ''digital twin'' of the control software and they look the same to the building operator, but we have been able to test performance in simulation and have end-to-end quality control of both the simulation and the real building systems from the design phase to commission, whether the HVAC system works as specified, the control sequences are as specified. This would contribute one element towards closing the performance gap that we see in today's buildings and really also streamline the deployment of buildings, hopefully at the faster time scale and also at lower costs with digitisation. I think that is, from my point of view, a huge gap.

Christina: Thank you Michael, this leads me on to your initial statement:

> ''Economic integration of renewables often requires energy systems to integrate and optimize renewables and storage across multiple prosumers and energy carriers. This provides opportunities for our community to establish co-design of energy and control systems, digital building delivery that can meet this increased complexity, and digital twins to support operational optimization.'' (Michael Wetter)

You're talking about operational optimisation and digital twins, but who would own these? What if these were, for example, owned and controlled by large energy companies? How can we ensure that corporate politics and economic greed and the control of individual prosumers' data does not jeopardize the outputs of such models?

Michael: These are all very valid questions, and we don't have a good answer to how to set up some of those energy trading markets in particular when it comes to, for example, fifth generation district heating and cooling value, trade very low exergy content of energy. You basically provide storage capability and waste heat and waste cool near ambient temperature. So, it's not quite clear how to set up business models around that. But if you look from a system level point of view, those systems have the potential to be operated at much lower cost than today's systems, which provide heating and cooling at high temperatures and are much easier to set up business models around. So, I think we are probably moving more and more towards energy supply companies that serve whole communities and aim to maximise efficiency at that level. In terms of who owns the digital twin, I think it really depends whether you are a campus owner or operator and then you may be in control of that, or if you just own an individual building; we certainly have to figure out how to maintain the digital twin

and how to further develop it and adapt it as the building evolves. But I think, in terms of the progress of the control, that's an area where we really need to get to, that we have some kind of digital twin and I see really as multiple versions or instances of that. For example, if you do predictive control, you don't need all the level of details that you have today in a typical building simulation software, the tools like ENERGYPLUS, EPSR, IDAICE or any of those tools, you need a simplified model that can be trained based on data streams that come from the real building. And then there might be more detailed digital twins for fault detection and diagnostics. Some of them may be owned by equipment operators who provide that as a service, together with the fault detection and diagnostics of the chiller plant. So, it really depends on the size of the installation who owns those assets and how they are further being trained and maintained.

Joe: I'll make a little attempt to respond to Michael's argument. At the moment, almost all the applications of simulation we are involved with are concerned with hybrid systems. These will typically be at the community level or will be smart grids and so on, and they'll be working with utilities. So that's why I say that the most important thing at the moment on the functionality side of simulation is to open up more the debate about how we model all these different new complexities, which stem from the fact that we're bringing in renewables: the electrification of heating in the UK is big business, we're bringing in electrification of transport, we're linking transport to buildings. So, all the algorithm developments that we'd be doing are focused on those things. But whatever the algorithmic developments, I am not in any sense interested in simplified tools. What I'm talking about today is simulation and the evolution of simulation. Simplified tools have a role to play, but I'm not sure that is what are talking about in this roundtable: should we be developing more simplified tools or are we talking about the evolution of simulation? That's what I'm talking about. There are lots and lots of theoretical developments still needed and they are underway. However, when we move to the application of simulation, we must listen to the utilities, we must listen to the policymakers, because the questions they are asking have hitherto not really been on our radar.

The real questions they are asking are about sustainable energy systems development and evolution going into the future. And that's not just simplifyable. Everything is complex and we need to get to grips with this complexity. To go back to one thing that Michael says, our industry is behind some other industries in applying simulation and, unlike other industries, we can't make progress by simplifying. We can only get it by making our industry understand the complexity of energy in buildings. And maybe later on I'll come back on that and say a few words about what I think we should be doing to make it easier for practising engineers and architects to use simulation.

Christina: We'll come to simplified in a minute, Joe, and you can say something about that, too. But for the moment, you know, speaking still about Michael's proposition, could these sort of models be used for more social ends, such as, for example, to support smaller community energy supply companies or peer to peer energy trading or to help minimise energy costs in social housing contexts? Andrew, you're nodding, so I'll hand over to you.

Andrew: I was going to answer. I will answer the very first question that you asked first and then I'll jump onto that. So, I was lucky enough this year to buy an electric car for the first time, which was really exciting. And one of the things that I found really interesting once I did that was that I was able to switch my power scheme onto a process that changed the tariff I paid for electricity based on when I use it. And I'm giving that example because I think the pricing and the evolution of pricing in the electricity grid is probably the way that providers will try to signal how they want people to change their use of electricity rather than having all of these digital twins so that they are able to understand everything that's going on. I don't think they'd be interested in doing that. I think they're much more interested in just using pricing to drive change. And I think that would be much more typical of the way we observe that the energy industry behaves. And it's just a question of whether they can break down barriers for different people, around how people pay for electricity

and what's acceptable in terms of variation on the electricity price. So that was just a thought on your first question.

And for your second question, I think it's still the same answer. So, if you have a community energy scheme that's trying to build up something to provide to a local community, then yes, they probably need tools to try to work out whether what they're proposing is viable or not and the right type of framework to use. But ultimately, for that to be attractive, I think the way that they price their solution and the way that they offer that service to the local community is going to have to be more attractive to those people than if it was provided by a bigger organization. I think it's the economics of the solution that's going to drive it more than anything else. So how do we help those sorts of organisations to work that out and decide where the best opportunities are, based on the people that they're trying to serve? Probably simulation is a great way to help them do that. But then ultimately, I don't imagine that they're going to be trying to have digital twins of all of the things that they're supplying, either, in that context, I might be wrong, but that's just my impression of what would be likely.

To be continued.. ■

Forthcoming events

Date(s)	Event	Further information
2021		
15-17 April 2021	**SimAUD** online	**www.simaud.org/2021/index.php**
14-16 June 2021	**eSIM 2021** online	**http://esim2020.sala.ubc.ca**
28-30 June 2021	**ASHRAE Annual Conference** online	**www.ashrae.org/conferences/ashrae-conferences**
01-03 September 2021	**BS2021** Bruges, Belgium	**www.bs2021.org**
2022		
29 January - 02 February 2022	**ASHRAE Winter conference** Las Vegas, Nevada, USA	**www.ashrae.org/conferences/ashrae-conferences**
25-29 June 2022	**ASHRAE Annual Conference** Toronto, Ontario, Canada	**www.ashrae.org/conferences/ashrae-conferences**
05-06 July 2022	**IBPSA France hybrid webinar** online	**tba**
20-23 August 2022	**BuildSim Nordic 2022** Kongens Lyngby (near Copenhagen), Denmark	**http://ibpsa-nordic.org**

Note that the dates in this calendar may, but do not necessarily, include pre and/or post-conference workshop days

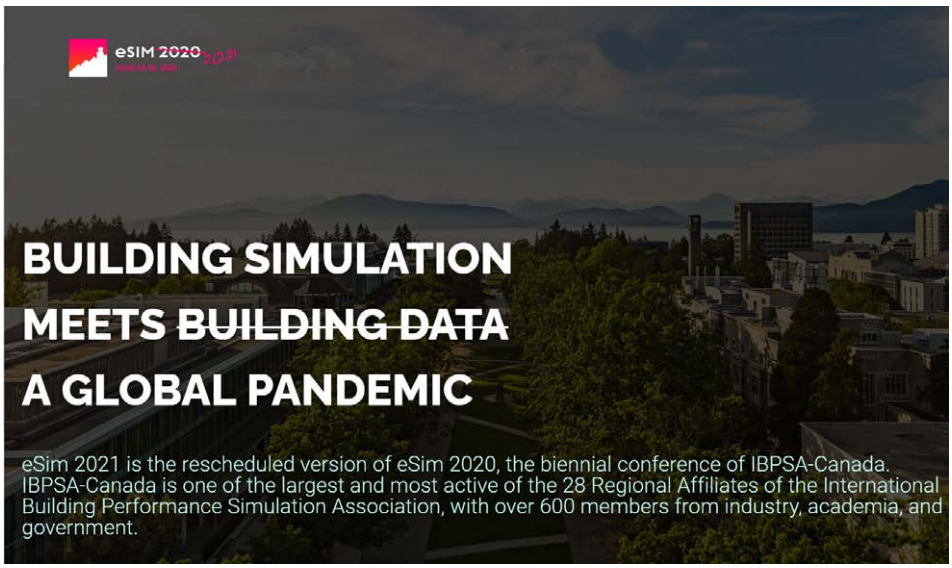
15-17 April 2021
online
www.simaud.org/2021/index.php

Register *NOW* for SimAUD 2021! All papers are already available online to registered participants. Topics include:

- Simulation-based Generative Design
- Simulation-Based Collaborative Design
- Simulation-Based Design Tools & Methods
- Multidisciplinary Design Optimization
- Simulation Performance & Scalability
- Building Comfort & Energy Performance
- Simulation of Occupant Behavior
- Simulation of Building Controls
- Physics-Based Simulation in Design
- Whole Building Energy Simulation
- Thermal Comfort & Occupant Satisfaction
- Lighting and Daylighting
- Airflow In & Around Buildings
- Acoustics Modeling, Simulation & Design

- Visualization of Simulation Data
- Urban-Scale Modeling
- Uncertainty, Validation and Risk Management
- Augmented and Virtual Reality
- Design Agency & Multi-Agent Systems
- Intelligent Buildings & Building Lifecycle Management
- Sensor Networks & Building Performance Monitoring
- Interactive Environments
- Responsive Facades
- Robotic Fabrication in Design

14-16 June 2021
online
http://esim2020.sala.ubc.ca



MESSAGE FROM THE CONFERENCE CHAIR An apology & outlook on the conference ahead

March 14, 2021

Dear authors of eSim papers and visitors,

Exactly one year ago today, we had looked forward to opening the registration portal for the eSim 2020 conference, to be held in June (2020) here in beautiful Vancouver.

Instead, we ultimately wrote you an e-mail to postpone our conference as a result of the pandemic. Ultimately, eSim 2020 was added to the long list of academic conferences that were immediately postponed or revised as a result of the COVID-19 pandemic. Our initial hope was to wait a modest amount of time, and reflect on whether a live conference in Vancouver would at all be possible over 2020/2021. Towards the end of the summer of 2020, as it became clear that the pandemic would not end anytime soon, we decided to push forward with a rescheduled conference in the spring of 2021 alongside a new call for papers. The hope at the time (perhaps naively) was that the pandemic might be over by this Spring and free travel within Canada would be possible once again, let alone in-person conferences.

As of today, it remains unlikely that live academic conferences in Canada will be possible before the end of this summer.

It's with this in mind that I would like to give you an update on our plan regarding eSim 2021 (previously 2020).

Let me first start with an apology. I am absolutely certain that it is frustrating to you that I have been out of contact this long on conference matters. This issue is my fault, and I cannot offer excuses that might make up for keeping unpublished conference papers in limbo – particularly for the graduate students among you. I can only state that I underestimated the workload that would confront an early-career academic at the start of the pandemic. Off the back of the original 1+ year effort to host eSim here at UBC, I had a workload that had piled up, a completely different world of 'online teaching' ahead of me, and a small (and extended) family affected by the pandemic in different ways. Of course, many of you are on the same boat, and some of you have been affected even more profoundly. As the conference host, I am very sorry for being out of touch and for letting the conference planning linger far longer than it should have. I hope I can work towards remediating this over the coming weeks.

With that, here is our plan:

One year ago, the original eSim 2020 was to be held on June 15-16, 2020. The revised conference date is June 14-16, 2021. The conference will be held entirely online.

We have revised our website to provide some detail on the rescheduled conference, including the format of proceedings, the schedule, and the registration fee. In the coming days, we'll continue to update the website with further detail and information, news of our keynote speakers, and other featured events of our conference such as our panel discussions.

I thank you very much for your patience, and look forward to greeting you at this year's conference.

Sincerely,
Dr. Adam Rysanek
eSim 2020 Conference Co-Chair on behalf of the Organizing Committee ■

BS 2021

17th IBPSA International Conference & Exhibition

01-03 September 2021
Bruges, Belgium
https://bs2021.org

Following the successful BS 2019 in Rome, Bruges — 'the Venice of the North' — is hosting our next world building simulation conference — pandemic permitting! BS 2021 is scheduled for 1-3 September 2021, so save the date in your calendars now.

Bruges, a UNESCO world heritage city in Belgium, has flourished since the middle ages, and has kept its original and charming atmosphere ever since. A network of canals connects the numerous historical buildings in the center. The Belfry halls, located at the central market place, will be the heart of our conference. Bruges is a short 20 km distance from the coastline, and only 60 minutes by train from Brussels and two and a half hours from London, Paris and Amsterdam.

BS 2021 is being organized by a team of very enthusiastic people drawn from two universities (Leuven and Ghent) and two companies (Boydens Engineering and Daidalos-Peutz), assisted by the regional affiliate IBPSA-NVL.

As ever, the key to a great conference will be a good mix of academics, R&D people, practitioners and policy makers, and the conference is being planned to appeal to them all from day 1.

The social side of conferences is important, too. Amongst other events, BS 2021 will include a competition to compose a BS 2021 Bruges belfry theme. Musician members of our community are invited to write an original and exiting polyphonic song for the 47 bells of the impressive carillon in the Bruges Belfry, which will wake up the city every day, while we make our way to the conference sessions beneath the tower. If the challenge of composing the belfry theme appeals to you please email **music@bs2021.org** for more information.

Practical organisation of BS 2021 is in the hands of the KU Leuven Conference Office, who will help you wherever they can; please send any questions to **info@bs2021.org**.

For an update from the conference chairs, keep reading ...

To all dedicated IBPSA members and sympathizers,

We are happy to announce that the **registrations for Building Simulation 2021 are open!** We invite you all to register for an unforgettable conference in beautiful Bruges – which we will organize as a face to face event. We will ensure a safe event and will take all necessary measures so that the event can take place in a covid-secure way.

We know there has never been such an important time to connect and be social, and we want to emphasize the importance of a live and face to face conference, where the work of everyone in our community is validated. We are looking forward to work and discuss together, and to the commitment of all of you to a memorable Building Simulation Conference!

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©www.concertgebouw.be

©www.concertgebouw.be

©www.visitbruges.be

A few weeks ago the notifications letters were sent out to all authors who submitted a research paper, or a project and valorization sheet. The most popular themes this year are:

- Ensuring high quality building simulations
- Buildings paving the way for the energy transition
- Improving indoor environmental quality

The most popular topics within these themes are:

- Developments in simulation
- Heating, Ventilation and Air Conditioning (HVAC)
- Optimization

Can't wait to register? The link for registration is here: **https://bs2021.org/registration**.

Your SPOC is Marie-Laure Bettens (PCO BS2021): **info@bs2021.org** ■

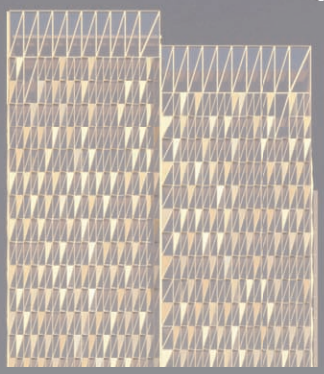
DTU

BuildSim Nordic 2022
22-23rd August
Copenhagen, Denmark

The 2nd International
Nordic Conference of IBPSA Nordic

IBPSA NORDIC

International Building Performance Simulation Association



OTHER KEY DATES

1 Dec 2021	Acceptance of abstracts
1 Feb 2022	Submission of full paper
15 April 2022	Acceptance of full paper
1 June 2022	Submission of final paper

CALL FOR ABSTRACTS
Deadline 1st of October 2021

English written abstracts are welcome

The 10th BuildSim Nordic 2022 conference and the 2nd in-ternational Nordic conference for IBPSA is to be held on the 22-23rd August 2022 hosted by Technical University of Den-mark, Department of Civil Engineering, Denmark, organized in cooperation between the Danish chapter of IBPSA. The confer-ence programme includes a technical tour and a dinner at a secret place. The purpose of the event beyond a platform for ex-changing ideas, issues and research findings, is to facilitate na-tional & international collaborations.The event is open for mem-bers and non-members of IBPSA-Nordic.

Additional information at:
http://ibpsa-nordic.org/
Contact info.:
masak@byg.dtu.dk
jerik@byg.dtu.dk

Background Image: Cockle Bay Park, Sydney Australia
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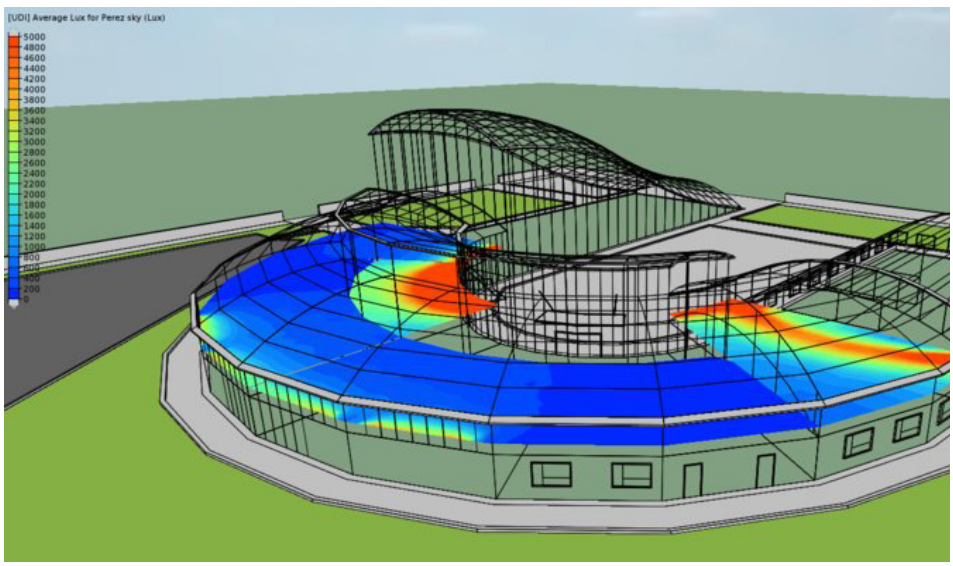
Software news

IES launch latest release VE 2021

IESVE 2021

IES has launched IESVE 2021, with new features extending energy code compliance offerings and strengthened tools to aid the drive for decarbonisation. Users can upgrade via the IESVE download centre.

This release includes new methods and a new flexible approach to setting up and analysing thermal comfort, as well as enhancements to heat pump methods, fan control updates and daylighting enhancements.



Latest features include:

- New comfort settings in Apache and ASHRAE 55 comfort outputs in VistaPro
- Blind operation state now shown in VistaPro
- Advanced air to air heat pump model in ApacheHVAC
- Visualisation of dynamic lighting simulation results for multiple rooms in RadianceIES
- New navigator for ASHRAE 90.1 2016
- Now certified by the Florida Building Commission for the 2020 Florida Energy Code
- Free Convection: Cooling Towers/Fluid Coolers
- New Fan Control updates and Daylighting enhancements

For full details on all the new features please visit **www.iesve.com/ve2021**.

Intelligent Communities Lifecycle (ICL) product updates

We're delighted to announce the latest releases of our iCD and iVN tools, which include several new feature updates.

iCD (intelligent Community Design)

New and updated features include:

- New object types (Trees, EV chargers, street lights)
- View change in geometry and object attributes over time (Multi-year)
- Basic operational cost analysis
- Basic operational carbon analysis
- Updated scenario visualisation
- Ability to undertake custom calculations (E.g. socio-economic indicators)
- Auto generation of PV's for rooftop solar potential
- Ability to use custom weather files (Current and future)

You can find full details in the release notes at **https://iesve-news.co.uk/WN3-79IVS-HTEDLJ-4D3UUY-1/c.aspx**, and the latest version of the software is available to download at **https://iesve-news.co.uk/WN3-79IVS-HTEDLJ-4D7DZP-1/c.aspx**.

iVN (intelligent Virtual Network)

New and updated features include:

- Potable and waste water networks and installations
- Site-wide geographic layout for electricity infrastructure with streamlined input for cable properties.
- Customisable icon sizes across iVN networks and infrastructure view
- Customisable installations with python scripts
- Basic cost analysis at network level
- Improved chiller model and control strategy
- Improved import from iCIM; including updates to inform users of changes to previously imported iSCAN/iCIM data
- Performance and speed improvements for large models

You can find full details in the release notes at **https://iesve-news.co.uk/WN3-79QOG-HTEDLJ-4D9RPF-1/c.aspx** and download the latest version of the software at **https://iesve-news.co.uk/WN3-79QOG-HTEDLJ-4D9ROO-1/c.aspx**.

IES VE User of the Year Awards

We're pleased to announce that we have selected the prize winners for our brand-new competition VE User of the Year, which was launched in September 2020. The competition sought to find the most innovative use of the VE on a project, either commercial or academic, and we're delighted that it's achieved just that.

With so many fantastic entries it was tough to find just one winner, so after careful deliberation our judges selected the top ten to receive prizes:

Global Winner	Mike Radio, Ballinger
Academic Global Winner	Osama Hasan, San Francisco State University
North American Winner	Miles Martschink, RMF

European Winner	Pedro Marques, Boydens
Runners-Up	Cory Duggin & Anthony Scaccia, TLC; Harry Sharples, AECOM; Quynh Xuan Tran, Waterford Inst. of Technology
Awards of Merit	Alexander Tansowny, Dialog and Simona Vasinton, Cundall

For full details please visit **https://www.iesve.com/discoveries/news/14489/ve-user-award-winners** .

New technical articles

Impact of diversity factors on HVAC load calculations
https://www.iesve.com/discoveries/blog/3647/diversity-factors

TEN Key Daylight & Electric Light Metrics
https://www.iesve.com/discoveries/article/3813/ten-key-daylight-and-electric-metrics

CFD Simulation for Hospital Operating Rooms (ORs)
https://www.iesve.com/discoveries/article/13699/cfd-operating-room ■

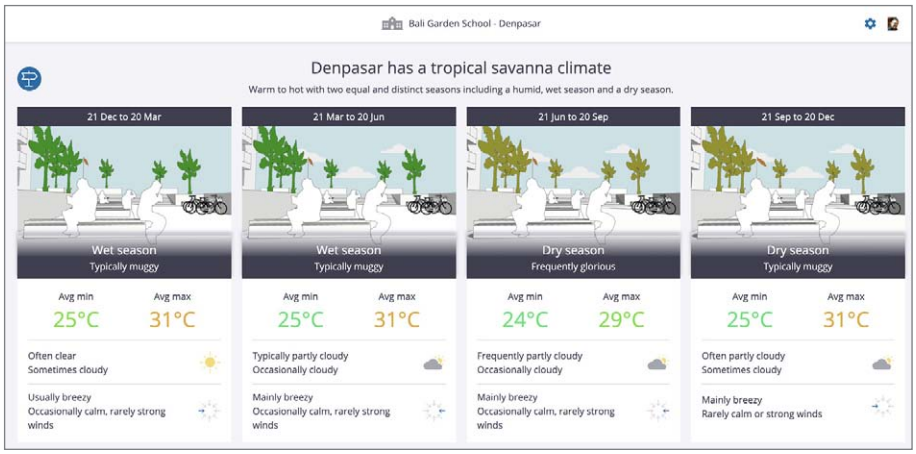
Trimble releases PreDesign as part of SketchUp Pro & SketchUp Studio

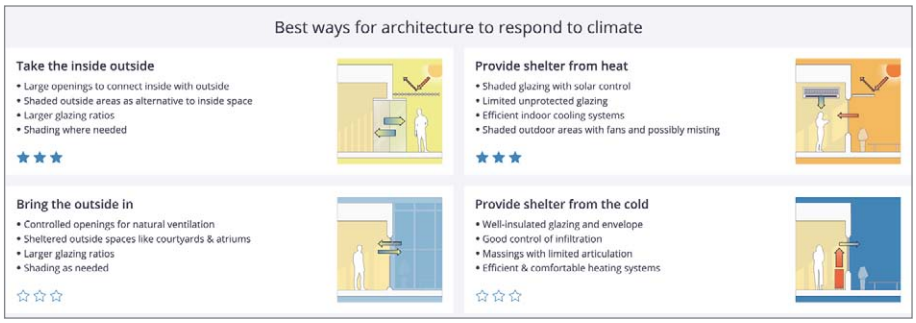
On 17 November 2020 Trimble released PreDesign, a new service for SketchUp's professional & student subscribers, which enables architects and designers to test design strategies and understand how a site's climate and environment will impact design proposals. Created to help better prepare designers for the conceptual phase, PreDesign also provides the data and graphics needed to articulate and build a narrative around early-stage climate-related design decisions.

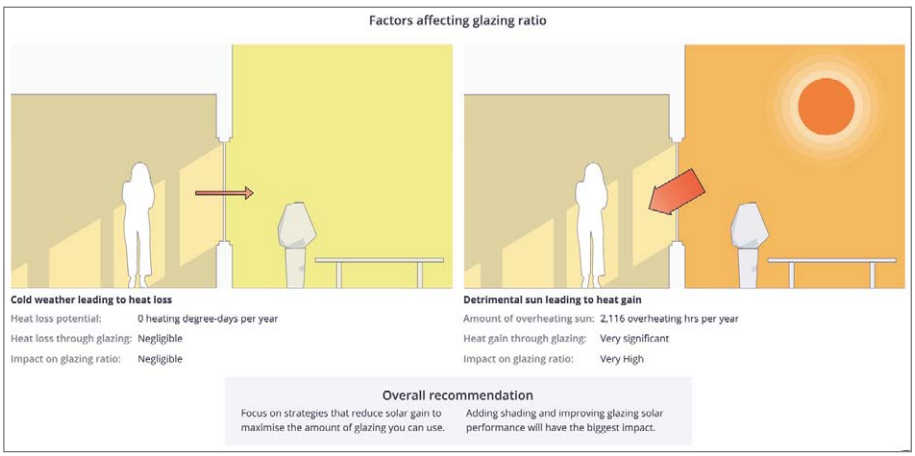
Nowadays it is relatively common for architects and consultants to run analysis on weather data as part of the research process at the start of the design. A challenge with this process has been converting this data into useful information that can push the initial design in a more sustainable direction. PreDesign tries to do this by converting the weather into design guidance, and including easy-to-interpret graphics that can be added to presentations and reports.

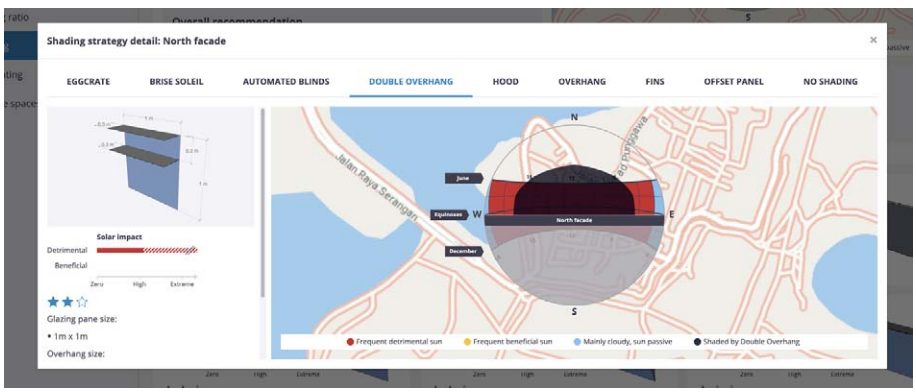
The app generates results with a location and building type. It then analyses weather sourced from climate.onebuilding.org to present guidance across 6 categories:

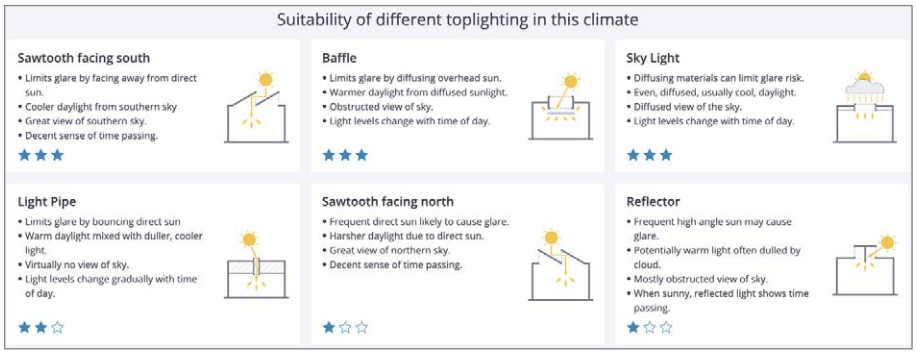
- Seasons
- Architectural Response
- Glazing Ratio
- Shading
- Toplighting
- Outside Spaces

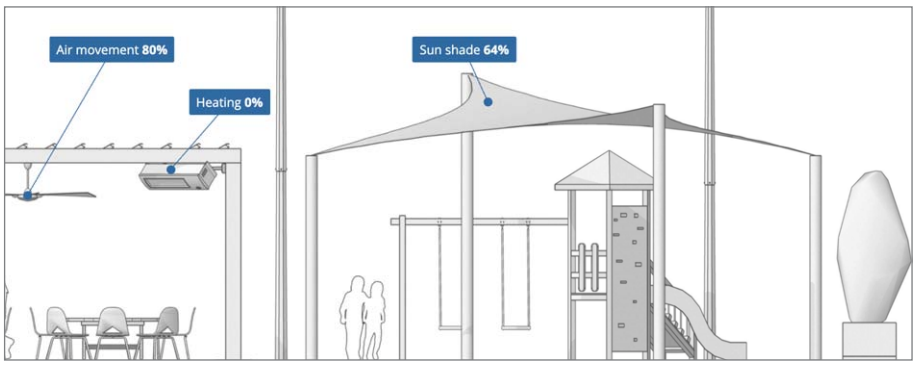

Bali Garden School - Denpasar
Denpasar has a tropical savanna climate
Warm to hot with two equal and distinct seasons including a humid, wet season and a dry season.
21 Dec to 20 Mar
Wet season
Typically muggy
Avg min 25°C
Avg max 31°C
Often clear
Sometimes cloudy
Usually breezy
Occasionally calm, rarely strong winds
21 Mar to 20 Jun
Wet season
Typically muggy
Avg min 25°C
Avg max 31°C
Typically partly cloudy
Occasionally cloudy
Mainly breezy
Occasionally calm, rarely strong winds
21 Jun to 20 Sep
Dry season
Frequently glorious
Avg min 24°C
Avg max 29°C
Frequently partly cloudy
Occasionally cloudy
Mainly breezy
Occasionally calm, rarely strong winds
21 Sep to 20 Dec
Dry season
Typically muggy
Avg min 25°C
Avg max 31°C
Often partly cloudy
Sometimes cloudy
Mainly breezy
Rarely calm or strong winds


Best ways for architecture to respond to climate
Take the inside outside
• Large openings to connect inside with outside
• Shaded outside areas as alternative to inside space
• Larger glazing ratios
• Shading where needed
Provide shelter from heat
• Shaded glazing with solar control
• Limited unprotected glazing
• Efficient indoor cooling systems
• Shaded outdoor areas with fans and possibly misting
Bring the outside in
• Controlled openings for natural ventilation
• Sheltered outside spaces like courtyards & atriums
• Larger glazing ratios
• Shading as needed
Provide shelter from the cold
• Well-insulated glazing and envelope
• Good control of infiltration
• Massings with limited articulation
• Efficient & comfortable heating systems


Factors affecting glazing ratio
Cold weather leading to heat loss
Heat loss potential: 0 heating degree-days per year
Heat loss through glazing: Negligible
Impact on glazing ratio: Negligible
Detrimental sun leading to heat gain
Amount of overheating sun: 2,116 overheating hrs per year
Heat gain through glazing: Very significant
Impact on glazing ratio: Very High
Overall recommendation
Focus on strategies that reduce solar gain to maximise the amount of glazing you can use.
Adding shading and improving glazing solar performance will have the biggest impact.


Shading strategy detail: North facade
EGGCRATE
BRISE SOLEIL
AUTOMATED BLINDS
DOUBLE OVERHANG
HOOD
OVERHANG
FINS
OFFSET PANEL
NO SHADING
Solar impact
Detrimental
Beneficial
Glazing pane size:
• 1m x 1m
Overhang size:
Jalan Raya Serangan
June
Equinoxes
December
North facade
Frequent detrimental sun
Frequent beneficial sun
Mainly cloudy, sun passive
Shaded by Double Overhang





Experienced consultants and academics may see results from PreDesign and think "well of course, that's obvious". However the point for experienced practitioners is that PreDesign can help join the dots when explaining the implications of climate research to clients, designers and students with less building physics knowledge. If you're in an architecture firm, it's a great way to get designers, who may not be thinking about these issues at all, to incorporate climate into their design research.

The app is accessed at predesign.sketchup.com and is included if you have a SketchUp Pro, Studio (Student or Professional) or Enterprise license.

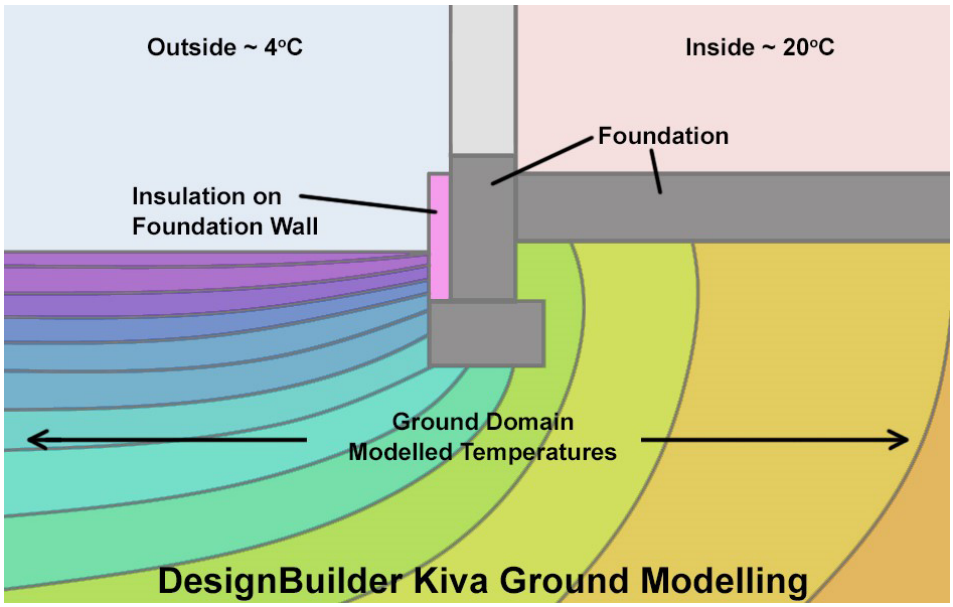
Additional reading / information

- How strong design narratives lead to great designs, **https://blog.sketchup.com/article/how-strong-design-narratives-lead-to-great-designs**
- Sunny with a chance of better design, **https://blog.sketchup.com/article/predesign-sunny-with-a-chance-of-better-design**
- Architosh Review, **https://architosh.com/2021/01/new-sketchup-2021-offers-predesign-climate-studies-features**
- Architect's Newspaper announcement, **www.archpaper.com/2021/01/sketchup-launches-predesign-for-built-in-environmental-modeling** ■

DesignBuilder v7.0 is here!

DesignBuilder Version 7 is now available, adding powerful new features that both extend DesignBuilder's capabilities and improve modelling workflow and productivity. The main new v7 features and improvements are summarised below.

Simulation Engine and User Interface



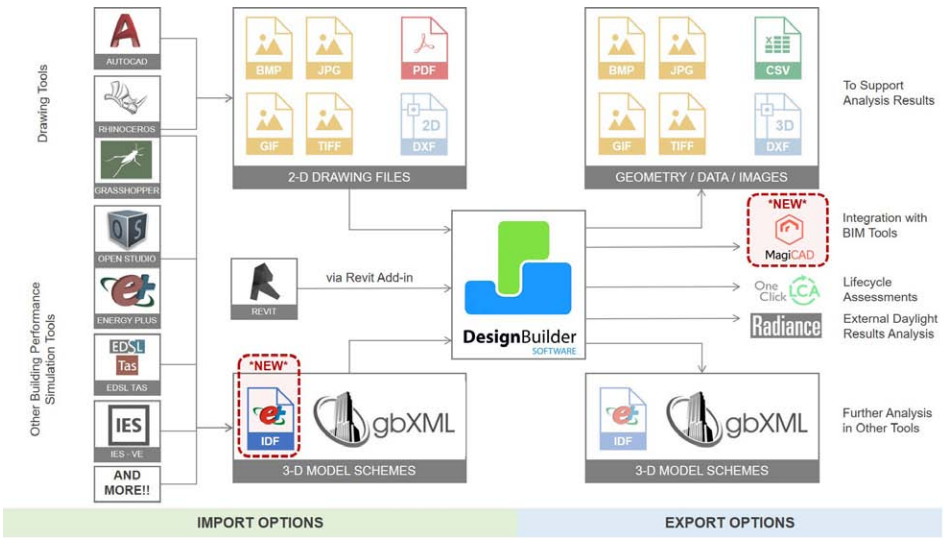
Full 2D/3D Kiva ground modelling for better assessment of surface temperatures

The modeller and visualisation tools sit at the heart of the DesignBuilder workflow, and v7 includes some significant improvements in this area with several new functionality improvements and data management tools enhanced:

- DesignBuilder is the most capable and mature graphical user interface for EnergyPlus v7 includes the latest **EnergyPlus v9.4** and the performance and feature enhancements that brings.
- The Model data grid tool has been updated to allow HVAC data to be read and edited in a data grid form. The **model data grid view** data management tool enables you to define your own data views, optionally export the data to spreadsheet, modify it and then import it back to your DesignBuilder model. The tool is ideal for fast bulk editing of data and QA processes.
- A new '**Follow Path**' tool is included to help generate complex block shapes, building on the capabilities already provided by our 'stretch', 'drag face', and 'add surface' tools.
- DesignBuilder v7 comes with **Full Kiva ground modelling** for more accurate building-ground heat transfer calculations. Kiva is a validated state of the art ground modelling component used by EnergyPlus to calculate key 2D ground temperature profiles through the 3D ground domain at runtime. These profiles

connect with the building ground adjacent surfaces to improve the accuracy of the ground heat transfer calculations. Only a small amount of extra data is required to drive Kiva and there is little noticeable effect on simulation times.

Unlike the constant temperature approach used in most energy models, it is not necessary to enter ground temperature data, which is rarely (if ever) available in practice. Instead, deep ground temperatures calculated from the hourly weather data are used as the lower boundary condition in the simulations. There is even a "Kiva Basic" option which provides the extra accuracy but with only a few additional input parameters.

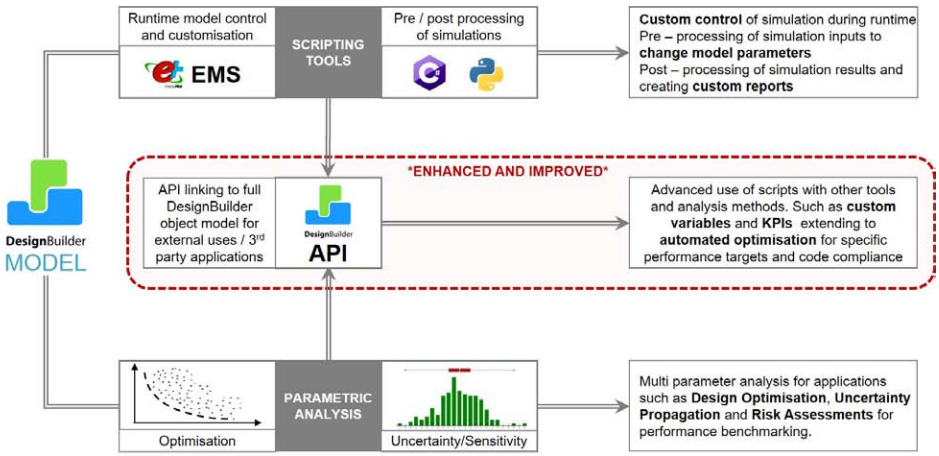


A wide range of interoperability options provided by DesignBuilder.

- The core concept of DesignBuilder is different to other "mainstream" commercial simulation tools. DesignBuilder is an interface that makes using the best available open-source engines (EnergyPlus, Radiance and soon OpenFOAM) as fast and easy as possible. As our industry continues to develop fantastic tools with new capabilities, being able to transfer data between tools without having to rebuild entire models is becoming increasingly important.

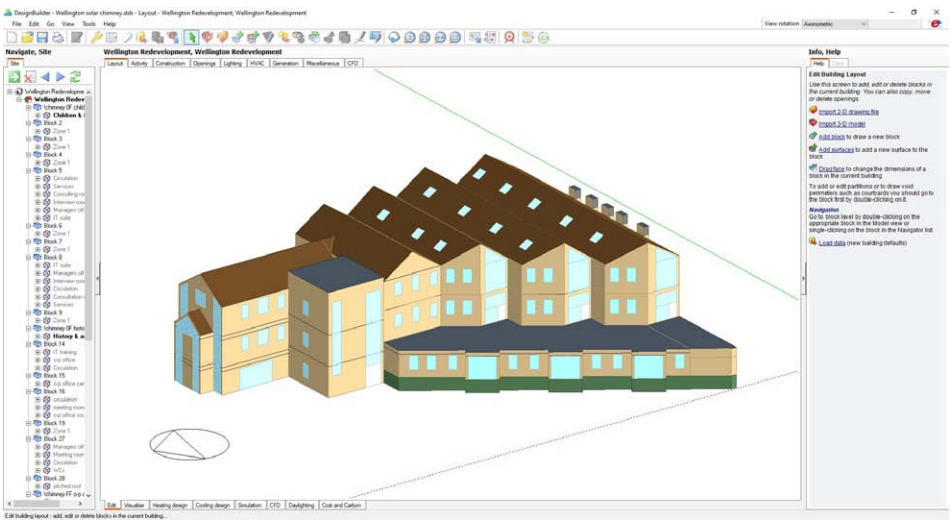
  DesignBuilder provides multiple import and export options in a variety of formats to maximise interoperability with other tools, and v7 adds two new interoperability options: **importing EnergyPlus IDF files** and **direct export to MagiCAD** to provide HVAC loads data for use with BIM tools including Revit.

- And finally, **new display colour themes** have been added so you can select from one of the refreshed looks supplied with the software… or you can create your own custom theme.



One of the new customisable User Interface colour themes

Enhanced Extensibility



DesignBuilder extensibility tools and their links to API and other modules

DesignBuilder has always provided a relatively open platform with full access to simulation inputs, outputs, EMS runtime scripting tools and EnergyPlus source code. Our latest Python and C# scripting tools enable simulation inputs and outputs to be further processed before and after simulations. The API and Python scripting tools, released in the last version have now been significantly improved by:

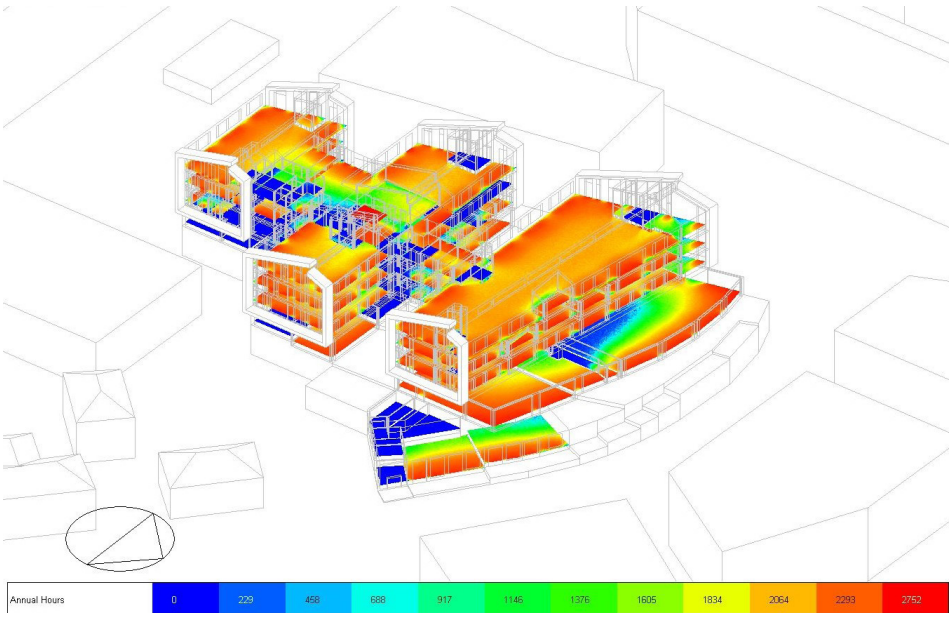
- Python scripting access to our API to enable plugins and scripts for an unlimited range of custom calculations, reports and model processing by users and 3rd party developers.
- Linking scripting to DesignBuilder Parametric analysis tools including optimisation, parametric and uncertainty and sensitivity analysis. This link enables use of any input parameter as a design variable and any EnergyPlus

output or custom calculated output as a KPI. This opens opportunities for users to use DesignBuilder's optimisation engine to automatically search for the best solutions to meet performance targets and compliance requirements.

Daylighting

DesignBuilder v7 includes a major upgrade of our daylighting tools. The most important new daylighting features included with v7.0 are:

- Climate Based Daylight Modelling (CBDM) simulations are now run directly in Radiance replacing our previous Daysim implementation. As part of that dynamic blinds are simulated as specified in LM-83-12 for sDA 300/50 calculations.
- A report is provided for the BREEAM HEA 01 Option b annual daylighting credits.
- Translucent Component blocks can now be simulated in daylighting simulations making it easier to accurately include objects such as trees in your model.
- Daylight distribution maps are now displayed in the modeller with options for numeric labels to be displayed in each cell and for colour palettes to be used. The new display helps make the context of the daylighting results clearer and your reports more impactful.



Daylight results in 3D view

LEED/ASHRAE 90.1

DesignBuilder V7 supports ASHRAE 90.1 App G 2013 and 2016 modelling including the latest baseline HVAC systems. Also, you can now generate the LEED v4 Minimum Energy Performance Calculator reports directly from DesignBuilder with all the key data items filled out.

Webinar on New v7 Features

DesignBuilder will be running a live webinar to illustrate the most important new features described above. We will announce that webinar in our upcoming newsletter, so please keep any eye out for that. If you don't already receive our free monthly newsletters, you can subscribe here: **https://designbuilder.co.uk/about-us/newsletter** . ■

Open-source Building Energy Models from the SBS Lab at University of Colorado

The Sustainable Buildings and Societies (SBS) Laboratory at University of Colorado Boulder has recently released open-source building energy models for commercial buildings based on the Commercial Buildings Energy Consumption Survey (CBECS) data.

The result of a 4-year research project supported by ASHRAE, the 540 EnergyPlus models for 18 building types include three new models for Religious Worship, College/University, and Auto Repair Service, 2 vintage (pre-1980 and post-1980) and 15 climate zones. The models are available at **www.colorado.edu/lab/sbs/BEM**. The SBS lab also contributes to other open-source model releases, including Modelica Buildings Library, Fast Fluid Dynamics Models, Modelica Smart and Connected Community Library, and Modelica Net Zero Energy Community Library. ■

BS2021 student modelling challenge & competition

Introduction

As part of the 17th IBPSA International Conference and Exhibition, IBPSA is organizing a student modelling competition. The aim is to encourage wider participation in the conference by providing a competitive forum for MSc and PhD students to explore the use of building performance simulation.

In this special edition of the IBPSA competition, we encourage participants to use the IBPSA network to share information, ask questions and provide solutions as well as to collaborate and learn from each other. Hence, this year's modelling competition is extended to include a challenge.

The Modelling Competition

Subject

The subject of the challenge & competition is the low-tech building 2226 of Baumslager & Eberle in Lustenau (currently located in Austria, but virtually moved to Belgium for this challenge & competition).

Building 2226 is operating without any HVAC equipment. The design of this building raises a lot of interesting questions on indoor air quality, visual and thermal comfort, artificial lighting and daylighting, acoustics and control systems. It is too much for one student to explore all of these issues; however, this challenge provides an opportunity for different students to explore different topics while at the same time they can learn from each other.

Main Mandatory Question

The main modelling competition question is as follows: How would you adapt the concept of the low-tech building 2226 if you were to build it in Belgium? Can you improve the indoor air quality, thermal, visual and acoustical comfort with minimal impact on energy use?

A number of sub questions for specific topics, on difference levels (e.g., BSc, MSc, PhD) will all lead to a better answer on this main mandatory competition question.

Challenging Sub Questions

The challenge that is part of the competition is divided into 5 categories: building envelope, visual comfort (light), thermal comfort, indoor air quality, and acoustic comfort. Not all participating teams are addressing all sub questions of all categories. Each team has selected at least two of the categories.

Collaboration

As in previous years, most teams are formed within one organisation. However, this years' challenge provides a great opportunity for students and teachers with different backgrounds to meet and discuss relevant issues, by using the online collaboration platform Slack.

At the Building Simulation 2021 Conference, Lars Junghans will discuss the overall findings of the student competition investigations with his own insights during a keynote presentation. Lars Junghans performed the simulations and calculations during the design stage of the building.

The candidates and competition panel

56 student candidates, divided into different (multidisciplinary) teams will give the best of themselves in this modelling competition & challenge.

The modelling competition panel consists of Eleonora Brembilla (IBPSA NVL), Francesca Cappelletti (IBPSA Italy), Christina Hopfe (IBPSA Germany/ Austria), Axel Seerig (IBPSA Switzerland), Veronica Soebarto (IBPSA Australasia), Friedl Decock (Organizing committee BS2021) and Elisa Van Kenhove (Organizing committee BS2021).

Further information

If you require any further information, please visit: **https://bs2021.org/student-modelling-competition** or contact us at the following e-mail: **students@bs2021.org**.

Key dates

- 15 June 2021: Deadline for completed entries
- 10 July 2021: Finalists notification
- 1-3 September 2021: Presentation of results at BS2021 Conference in Bruges, Belgium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News from IBPSA affiliates

IBPSA affiliates are asked to submit a report to the IBPSA Board each year to keep Board members informed about their activities and membership. These are too detailed to include in ibpsaNEWS, so affiliates have been asked to make their latest annual report available through their web sites, and this section includes only selected, recent news. Other news from affiliates may be available from their websites; the URLs for these are available on the IBPSA Central web site at www.ibpsa.org/?page_id=29.

IBPSA-Australasia

IBPSA Australasia is excited to announce that we have elected a new board for 2020-2022 led by long time IBPSA board member and champion Quentin Jackson as president. He's joined by Priya Gandhi (vice president), Jack Blackwell (secretary), and Nicki Parker (treasurer and past-president). Noni Nuriani heads up Marketing & Industry Engagement, Tatiana Schönhöbel leads Events, and PC Thomas is in charge of Education.

During the lockdowns of 2020 we kept our members engaged with lunchtime webinars on life cycle assessments, future weather files, and operational net zero. We also launched a "digital coffee roulette" program to randomly pair up interested members for virtual coffees to get in some socially distant socialising. Our affiliate has been re-appointed to the NABERS Steering Committee and has recently been invited to join the Advisory Group for the National Construction Code's Low Energy Trajectory for the 2025 code update. These activities are aligned with our new two-year strategy to partner with industry organisations and government in order to increase our ability to make a meaningful impact within the industry.

Lastly, we have relaunched our website and will be adding more engaging content, videos, and articles in the coming months. Please check it out and get in touch if you would like to collaborate with us in the future. ■

IBPSA-France

IBPSA France organized its national conference on 12 and 13 November 2020. The conference was organized by the University of Reims Champagne Ardennes in co-operation with the Condorcet Research Federation (**www.sfr-condorcet.fr**). The conference topics included heat and mass transfer in buildings, thermal comfort, air quality, uncertainty and sensitivity analysis, with a special theme on "green materials in buildings". Due to the covid-19 global pandemic, the event was held in the form of a webinar, 100% digital, and it was attended by more than 90 participants, PhD students and scientists. It allowed PhD students to present their research work.

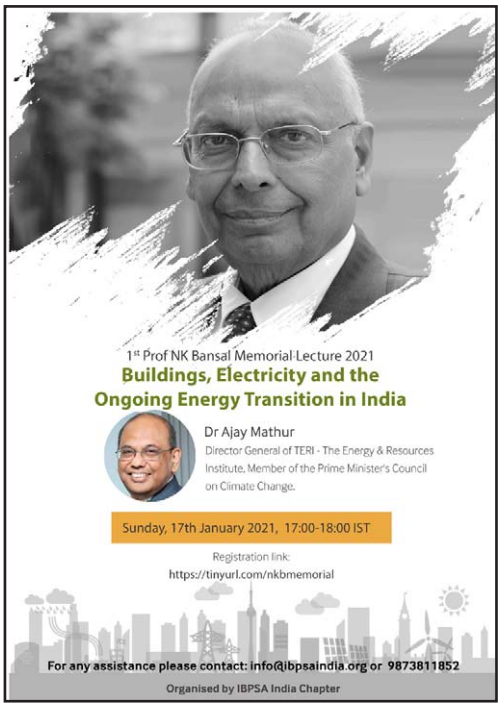
The conference will be completed on the 5 and 6 July 2021 with a hybrid webinar in Reims (combined online and physical attendance), at which additional papers that could not be presented in the November session will be presented.

For more information, visit **http://conference2018.ibpsa.fr/index.php** (not updated yet) and **https://sfr-condorcet.fr/spip.php?article2336&var_mode=calcul** . ■

IBPSA-India

Professor N K Bansal Memorial Lecture

IBPSA-India organized the first Professor NK Bansal Memorial Lecture on "Buildings, Electricity, and the ongoing Energy Transition in India", which was presented online on 17 January 2021. Professor Bansal was the father of building energy simulation in India and he alone introduced the use of simulation in teaching, research, and design practice. He was the author and the editor of more than 20 books and more than 300 publications. He guided more than 35 PhDs and 40 Masters degrees with a number of international students. Professor Bansal was regarded as being one of the top 2% of scientists in the world and his research work and projects speak volumes for his extensive contribution to the field of energy.



The memorial lecture was given by Dr Ajay Mathur, Director General of The Energy and Resources Institute (TERI). More than 100 participants including academics, researchers, and building simulation practitioners from India, Germany, the United States, and Canada attended the lecture. Dr Mathur gave a deep insight into the future of urban transport, energy storage, and key thought processes for the future, which is the "grid of everything". He also described how electricity demand and consumers are increasing. Renewable energy has a big role to play in the future and hydrogen will play a big role in meeting energy needs that cannot be directly met by electricity.

Professors of IIT Delhi shared some of their experiences and memories of Professor Bansal. A recording of the lecture is available at **https://youtu.be/WDw3Z3N0yUs** . ■

IBPSA-Nordic

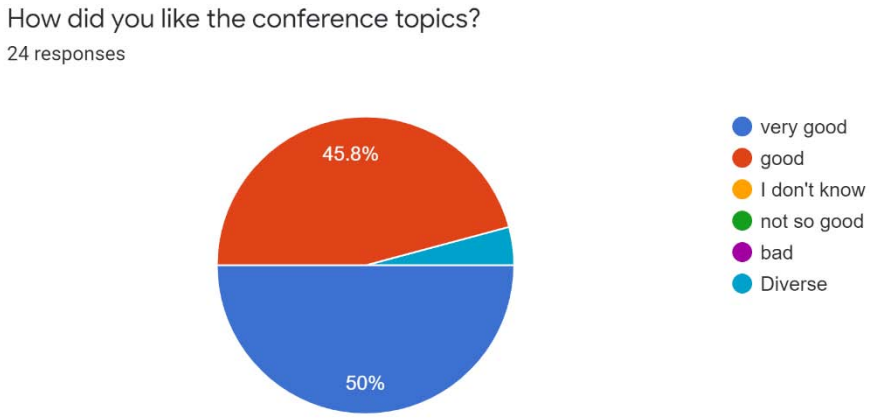
IBPSA-Nordic 9th BuildSim-Nordic conference on 13–14 October 2020 was VIRTUAL!

IBPSA-Nordic's 9th BuildSim-Nordic conference was a cooperative effort by IBPSA-Nordic, OsloMet University in Oslo and the Norwegian Society of HVAC Engineers (Nemitek), open to members and non-members of IBPSA-Nordic. We received more than 80 abstracts, and the 55 full papers subsequently submitted formed the basis of a great programme.

Due to Covid-19 The Organizing Committee decided to hold BSN2020 as a virtual conference. There were parallel sessions, break-out sessions, and even virtual coffee breaks and virtual bars (after the session). We see this conference as part of the 'new normal' and are very happy that we were able to welcome 115 participants to this exciting event.

We organized the conference in a way that ensured a good scientific exchange of new and interesting research work, and we also allowed room and time for interesting discussions, and social networking.

It was certainly a hit with participants, as the post-conference feedback shows:



A big Thank You to all hard-working members of the Organizing Committee as well as of the Scientific Committee! Without dedicated reviewers we would not have been able to make this conference happen!

Registered participants got direct access to the presentations, the book of abstracts and the papers. A selection of papers has been published here: Georges, Laurent; Haase, Matthias; Novakovic, Vojislav; Schild, Peter G., (Eds.), 2020. BuildSIM-Nordic 2020 : Selected papers. BuildSim-Nordic, Oslo / online, 13-14 October 2020. Oslo: SINTEF Academic Press. ISBN 978-82-536-1679-7. Access: **https://doi.org/10.21256/zhaw-21514 .**

The programme consisted of 8 dedicated sessions, 3 workshops, a keynote speech and two awards (given to the best papers) over two stimulating days:

Session Overview

Date: Tuesday, 13/Oct/2020	
9:00am - 10:30am	Opening Session: BSN2020 Opening Session and Keynote Lecture Session Chair: Matthias Haase Session Chair: Peter G. Schild Session Chair: Vojislav Novakovic
10:30am - 12:00pm	Session 1: UBEM, District Heating and Large Buildings Session Chair: Santeri Siren Session Chair: Matthias Haase
1:00pm - 2:30pm	Workshop 1: Workshop IDA ICE Session Chair: Mika Vuolle
2:30pm - 4:00pm	Session 2: Airflows and Computational Fluid Dynamics (CFD) Session Chair: Eusébio Z. E. Conceição Session Chair: Peter G. Schild
2:30pm - 4:00pm	Session 3: Energy Flexibility, Control and Energy Storage Session Chair: Igor Sartori Session Chair: Kim B Wittchen
4:30pm - 6:00pm	Session 4: Building Envelope, Daylighting and Thermal Design Session Chair: Steffen Petersen Session Chair: Petter Wallentén
Date: Wednesday, 14/Oct/2020	
9:00am - 10:30am	Session 5: Heat Pumps and Air-Conditioning Systems Session Chair: Nelson Sommerfeldt Session Chair: Habtamu Bayera Madessa
10:30am - 12:00pm	Session 6: HVAC general, IEQ and ZEB Session Chair: Janne Petteri Hirvonen Session Chair: Jørgen Erik Christensen
10:30am - 12:00pm	Session 7: Data-driven Models and BPS education Session Chair: Hicham Johra Session Chair: Laurent Georges
1:00pm - 2:30pm	Workshop 2: Master planning based on NZEB for Positive Energy Districts Session Chair: Matthias Haase
1:00pm - 2:30pm	Workshop 3: Building Performance Simulation Accuracy and High-Resolution Session Chair: Jon William Hand Session Chair: Petter Wallentén
2:30pm - 4:00pm	Session 8: Input data workflow, boundary conditions, user interface, BIM Session Chair: Jon William Hand Session Chair: Vojislav Novakovic
4:00pm - 4:30pm	Closing Session: BSN2020 Closing Session and Best Paper Awards Session Chair: Matthias Haase Session Chair: Peter G. Schild Session Chair: Vojislav Novakovic

Keynote

The Keynote speaker during the opening session on 13 October was Dr Clayton Miller, Assistant Professor at the National University of Singapore. His talk, *The Great Energy Predictor III Kaggle Competition - How can we bridge physics-based and data-driven modeling?* discussed machine learning solutions, models, and winning techniques from the Great Energy Predictor III Kaggle Competition (**www.kaggle.com/c/ashrae-energy-prediction**) held in Oct-Dec. 2019. This machine learning competition was hosted by the ASHRAE organization and supported by the SinBerBest2 Lab and the National University of Singapore (NUS). Over 3,600 teams from around the world competed for US$25k in prize money to create the most accurate data-driven hourly building energy models for over 2,300 energy meters collected from 1,448 buildings. Dr Miller overviewed the potential applications of these crowd-sourced winning solutions and discussed their common attributes, such as the use of large ensembles of various types of gradient boosting trees. He described the lessons learned from the experience and winning modeling techniques and how these insights can be used to bridge the conceptual and practical gaps between physics-based and data-driven modeling techniques for building performance analysis. Finally, he discussed how and where the top five winning models and two-thirds of the competition data set have been released as an open data set for building energy research and industry professionals to use.

Workshops

We had 3 dedicated workshops:

Workshop 1	Workshop 2	Workshop 3
New features in IDA ICE v5	Master planning based on NZEB for Positive Energy Districts	Building Performance Simulation Accuracy and High-Resolution
Session Chair: Mika Vuolle	Session Chairs: Matthias Haase and Xingxing Zhang	Session Chairs: Jon Hand and Petter Wallentén

Award winners

Congratulations to the two award winners of the IBPSA-Nordic Simulation Award 2020:

Xingji Yu, Department of Energy and Process Engineering, Faculty of Engineering, NTNU – Norwegian University of Science and Technology, Trondheim, Norway, for *Influence of Data Pre-Processing Techniques and Data Quality for Low-Order Stochastic Grey-Box Models of Residential Buildings*.
Pei Huang, Energy Technology, Dalarna University, Borlänge, Sweden, for *A coordinated control to improve energy performance for a building cluster with energy storage, EVs, and energy sharing*.

Sponsors

We thank our **Gold sponsor Equa** for their support, and we are grateful for the support of the endorsers of BuildSim-Nordic 2020, ASHRAE, REHVA, Scanvac and Finvac.

Stay tuned for future news from IBPSA-Nordic **https://ibpsa-nordic.org**, and please look at the flyer for **BuildSim-Nordic 2022** on page 20 of this *ibpsa*NEWS. This will be held in Copenhagen, Denmark on 22-23 August 2022. ■

IBPSA-Scotland

Dr David Jenkins (Heriot-Watt University) & Dr Peter McCallum (Heriot-Watt University)

IBPSA-Scotland uSIM 2020 conference

In November 2020, the IBPSA-Scotland group launched the 2nd uSIM conference on Urban and Community Energy Modelling. Hosted by Heriot-Watt University, the event had to move online from the intended location of Edinburgh but that did not dampen the quality of papers presented and the interest they generated.

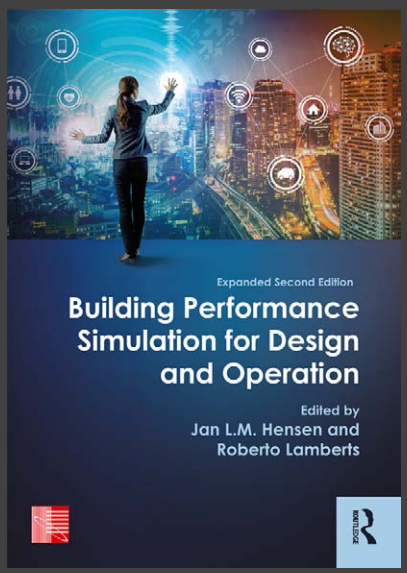
The key theme of the conference was to understand how expertise, tools and methods relating to individual building assessment can be translated to the scale of communities and wider stock modelling. Under this overarching aim, the conference was organised into topics of Community Energy Modelling, Future Forms of Stock Modelling, Big Data in Urban Energy, Software Developments in Dynamic Simulation, Multi-building Energy Performance Assessments and Applications of Energy Modelling.

With 220 registered attendees and 27 papers presented across the above topics, a wide range of work was described across a particularly fertile area of research, in both industry and academia. The day began with excellent keynote presentations from Prof Lori McElroy (University of Strathclyde and IBPSA) and Veda Baliga (IES). One clear message emanating from those keynotes and the rest of the day was the sheer volume of tools and methods that are available for bringing together a rich data landscape, with state-of-the art simulation, for dealing with the challenges of making our buildings low-carbon at scale.

A particular note of thanks must go to those chairing the sessions: Daniel Friedrich (University of Edinburgh), Nick Kelly (University of Strathclyde), Julio-Bros Williamson (Edinburgh Napier University), Sophie Simpson (Cundall) and Sandhya Patidar (Heriot-Watt University).

The conference was made free to attend due to the kind support of our sponsors: IES, CIBSE-Scotland, the UK Centre of Energy Systems Integration, and the Scottish Energy Technology Partnership. We express our gratitude to all these organisations.

Papers will soon be available via the IBPSA website and we encourage all building modellers interested in the work of IBPSA-Scotland to get in contact and be part of our growing network. ■



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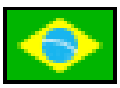

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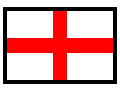

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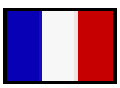

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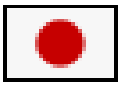

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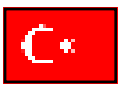

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For any other purposes, please use the BLDG-SIM list. BLDG-SIM is a mailing list for users of building energy simulation programs worldwide, including weather data and other software support resources. BLDG-SIM is intended to foster the development of a community of those users. Experienced and inexperienced users of building energy simulation programs are welcome and are expected to share their questions and insights about these programs.

If you have any questions with respect to the BLDG-SIM, please contact the list owner:
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