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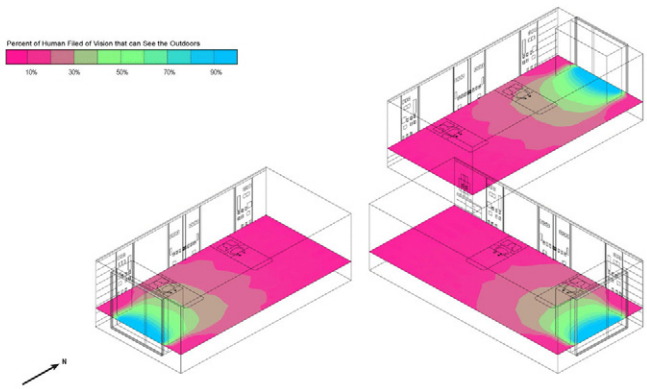
Interview article

Window view quality: What and how to analyse?

by Won Hee Ko



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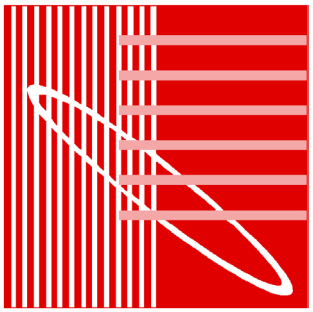

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President's message

Dear IBPSA Colleagues and Friends

That was a quick but intensely hot summer in the northern hemisphere! After a globally hot year last year with records continuing into this year, we're on track for another record-setting climate year.

I want to mention a few things happening at IBPSA:

- First, if you haven't been to our website recently, check it out – **https://ibpsa.org** – updated and reorganized to make finding the information you're looking for easier. We welcome any feedback that you may have.
- IBPSA is now co-sponsoring multiple ASHRAE Standards relating to building performance simulation. More on this in the next *ibpsa*NEWS.
- Thank you to those who voted in this year's election of directors for the IBPSA board. I am pleased to welcome new members to the board:
  - Nathaniel Jones (USA) and Robert McLeod (Austria) are joining as new Directors at Large. Pieter de Wilde (Sweden), Andrea Gasparella (Italy), Matthias Hasse (Switzerland), and Danielle Monfet (Canada) were re-elected as Directors at Large.
  - Many thanks from IBPSA to the two Directors at Large leaving the board this year: Chip Barnaby (USA) and Carrie Brown (USA). They have contributed so much in their many years as Directors at Large and officers.
  - Pavel Ruiz-Torres (Mexico), Alina Galimshina (Russia), Poh Hee Joo (Singapore), Licinio Alfaro Garrido (Spain), Aysegul Tereci (Türkiye) are joining as new Affiliate Directors. PC Thomas (Australasia), Eduardo Grala da Cunha (Brazil), Karine Lavigne (Canada), Massimo Palme (Chile), Martin Barták (Czechia), Christoph Nytsch-Geusen (DACH), Marija Todorović (Danube), Mohammad Fahmy (Egypt), Muhammad Nur Fajri Alfata (Indonesia), Zahra Sadat Zomorodian (Iran), Cheol-Soo Park (Korea), Laurent Georges (Nordic), Piotr Narowski (Poland), Nick Kelly (Scotland), Jakub Čurpek (Slovakia), and Wangda Zuo (USA) were all re-elected as Affiliate Directors.
  - Please join me in welcoming the new and returning member of your IBPSA board.
  - Also, thanks go to those leaving the board after many years of service: Iván Oropeza Pérez (Mexico), Ilya Zavaleev (Russia), Adrian Chong (Singapore), Victor Moreno Solana (Spain), and Gülsu Uulukava Harputlugil (Türkiye).

Membership and participation in our committees is open to all IBPSA members. If you are interested and can participate in regular committee meetings, please contact the committee chair (see the website **https://ibpsa.org/about/contacts** for specific contacts). More detailed information on the Standards Committee and the new Strategic Planning Committee can also be found in the *IBPSA announcements* section.

Are you a member of the IBPSA group on LinkedIn? If not, join the community of more than 12,000 people interested in building performance simulation to keep up on current information **www.linkedin.com/groups/75552 .**

Finally, the BS 2025 organizers report 960 abstract submissions for next year's conference in Brisbane! Watch for more information about registration and travel for Building Simulation 2025 in the next few months. Hope to see you there in Brisbane next August. See more information on **page 15**.

Check out the forthcoming calendar of events on **page 12**. Also of note in this issue of the newsletter, an interview article on view quality performance simulation, the Ask A Modeler column and a call for nominations for IBPSA Awards. Other useful items include software updates, book announcements, and the open call for submissions to the Journal of Building Performance Simulation.

I hope to see you and the IBPSA community this year.

Dru Crawley
President, IBPSA

Best of 'Ask a Modeler':

BEM practitioners share tips and updates

'Ask a Modeler' is an advice column for the building simulation community. Each month, a question posed by the IBPSA community is answered by recognized building professionals to get their expert perspectives. The Ask a Modeler Subcommittee's mission is to disseminate building energy modeling (BEM) ideas and knowledge by bringing world-class BEM experts, practitioners, and enthusiasts to an accessible, curated advice column. Below, we are reprinting a recent column. For everything from updating energy-modeling software to strategic advice for leveling-up your BEM career, you can find it here!

I'm interested in biomimetic design–how can I incorporate biomimicry into a building system model?

— Biophile

Dear Biophile,

To answer this question, the first important step is to understand what biomimicry is and to distinguish between biomimetic and non-biomimetic design practices. Most simply, biomimetics– from bio meaning "relating to life" and mimesis meaning "to imitate" – is the practice of learning from and emulating nature for technological innovation. To a large extent, this is not a new concept. Since the 1950s, model-based biomimicry has been used to design and construct vehicles, including water, air, and land transit. Today, biomimetics is an established scientific practice governed by the international standard ISO 18458,[1] and it is growing in its application domains, from nanoscale to large regional systems. Building systems are included in this, which I'll discuss more shortly.

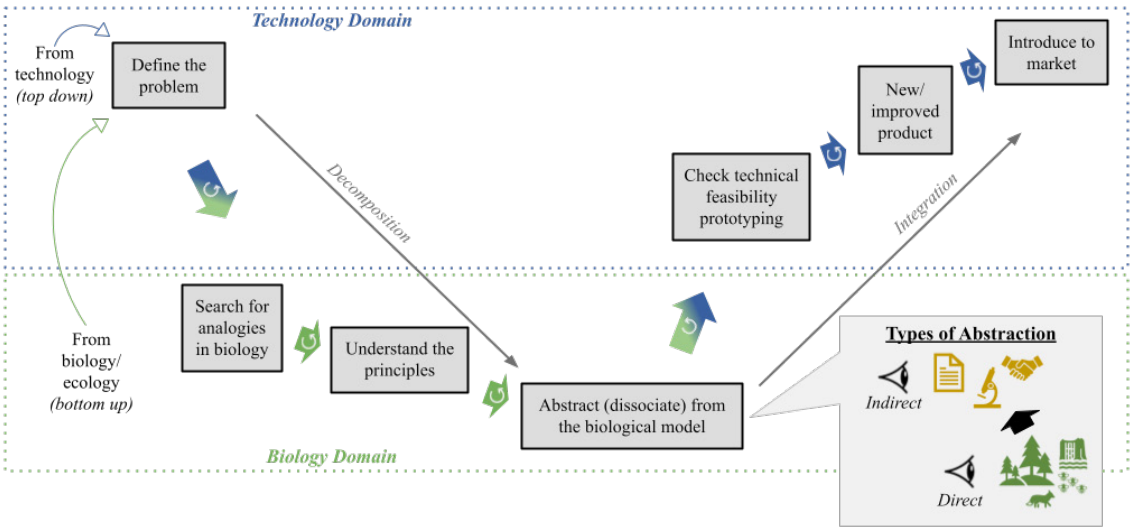
In terms of the methodology, a product, process, or system is biomimetic if three criteria are met:

1. functional analysis of the biological system,
2. abstraction from system to model, and
3. transfer and application without using the biological system.

By these criteria, a green roof uses nature, so this would not be considered biomimetic (instead, this falls under nature-based solutions). On the other hand, adaptive building facades that reduce solar heat gain by mimicking the structure and movement of leaves are biomimetic.[2] Further, a typical biomimetic design process follows seven iterative steps, from defining the problem to introduction to the market, as shown in the schematic below. Through this process, teams decompose the high-level idea into its parts before integrating the detailed design features back into the whole for end use. For biomimicry, this process moves between technology and biology domains, with the design opportunity either originating from technology (ie "top down", most common as engineers) or biology (ie "bottom up"). At the same time, this general framework has synergies with typical model-based systems engineering practices that are familiar for building system modelers (such as the V-model). Within this overall framework, the biomimetic building system model is created, validated, and improved in the abstraction and feasibility stages.

The translation between biological and technological domains always involves a model, which can range from concept models and static mathematical functions to dynamic multi-variate systems of equations. To incorporate

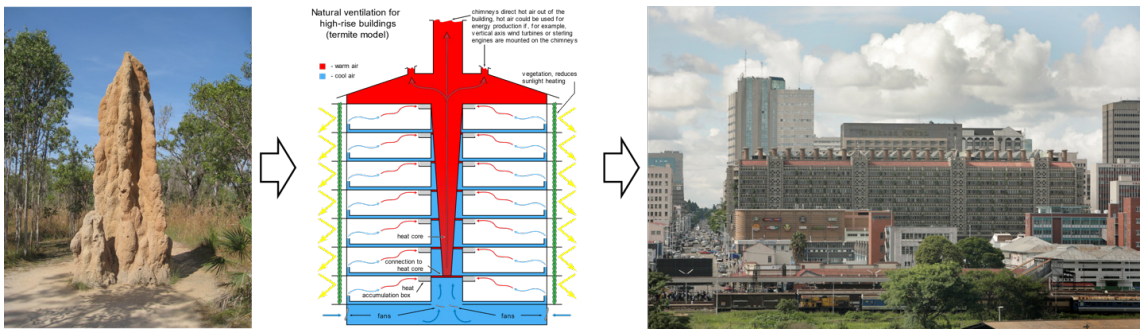
biomimicry into building modeling and simulation, there are many software tools available. Multi-domain modeling languages offer the greatest flexibility, which includes MATLAB/Simulink, Modelica, Python, and Julia, among others. For example, MATLAB has been used for a termite-inspired fault detection algorithm for high-rise concrete structures.[3] In addition, buildings-specific modeling environments can be used. For example, EnergyPlus was used to design and evaluate novel envelope and cooling technologies inspired from animal and plant heat transfer mechanisms.[4] In the energy model, this study adjusted the wall U-values, cooling equipment performance values, and the window reflectance, among others, to represent the biomimetic features, which together reduced annual energy consumption by ~60%.[4] Further, co-simulation platforms (such as FMI, Ladybug Tools, or Grasshopper for Rhino 3D) that integrate typically disparate modeling environments are well-suited for biomimetic modeling and have yet to be thoroughly explored.



A methodological schematic representing the typical seven-stage, iterative biomimetic design process based on ISO 18458 with variants for opportunity recognition (top down, bottom up) and abstraction (direct, indirect)

There are numerous other examples of biomimicry for buildings. Among building applications, biomimicry can be used for materials/structures,[5] energy systems,[4] and control systems (ie structural monitoring,[3] multi-zone temperature control,[6] and bio-inspired optimization algorithms for building energy).[7] Among complete buildings, the Eastgate Center in Harare, Zimbabwe (pictured below) is one of the most well-known examples. This shopping center has a passive cooling design that was inspired by termite mounds, leveraging high thermal mass, large open spaces, and various openings throughout the building to enable natural ventilation and passive cooling.

While biomimicry in building design is as yet a nascent practice, there are resources available to aid success and innovation. For example, **AskNature.org** from The Biomimicry Institute has collections of biological strategies and innovations, many of which are suitable for building applications. Just as with best practices for building modeling, an important first step is to understand the physical principles, from both biological and technical perspectives. Modeling and simulation tool(s) can then be selected based on the principal requirements. When checking technical feasibility, attention should also be paid to the evaluation metrics, which can include both traditional and novel key performance indicators. Lastly, it is important to not misinterpret biophilic biases for educated engineering decisions. Nature can be a source of inspiration for what sustainable buildings look, act, and feel like. Scientifically guided practices such as ISO 18458 can help deliver biomimetic solutions for buildings that move beyond innovation for innovation's sake, and into development for human and ecosystem wellbeing and sustainability.



The Eastgate Center in Harare, Zimbabwe is one of the most famous examples of biomimetic design for buildings. The designers learned how termite mounds (left) modulate temperature to create natural ventilation strategies for high-rise buildings (center). These strategies were implemented in the Eastgate Center (right)

References

1 ISO/TC 266. Biomimetics – Terminology, concepts and methodology. ISO 184582015(E)(2015).
2 Sheikh, W. T. & Asghar, Q. Adaptive biomimetic facades: Enhancing energy efficiency of highly glazed buildings. Front. Archit. Res. 8, 319–331 (2019).
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7 Bamdad, K., et al. Ant colony algorithm for building energy optimisation problems and comparison with benchmark algorithms. Energy Build. 154, 404–414 (2017).

Dr Kathryn Hinkelman is a Postdoctoral Scholar at Pennsylvania State University. She has a BS in Mechanical Engineering (University of Denver), an MS in Mechanical Engineering (University of California at Berkeley), and a PhD in Architectural Engineering (Pennsylvania State University). She is a recipient of the U.S. Department of Energy IBUILD Fellowship, the international P.E.O. Scholar Award, and Phi Beta Kappa. Before her doctoral studies, Kathryn worked at the Boulder Engineering Company, where she designed electrical and mechanical systems for multi-family residential and commercial buildings across the United States. Her research focuses on modeling and simulation of building and district energy systems and controls, to improve active systems deployed today and design innovative biomimetic solutions for future sustainable and resilient communities. She is an expert in Modelica, and over a dozen of her models have been publicly released in LBNL's Modelica Buildings Library and the IBPSA Modelica Library.

We want to hear your interesting, entertaining, or just-plain-odd questions about life and building performance simulation. Submit your questions to **askamodeler@ibpsa.us** *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* **https://unmethours.com**. *Read our other past columns at* **www.ibpsa.us/ask-a-modeler**. *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**. ■

Window view quality: what and how to analyze?

Interviews with computational analysis developers and researchers in the field

Won Hee Ko, New Jersey Institute of Technology, USA

Windows do more than just provide light—they connect us to the outside world, bringing in sound, fresh air, and natural temperature regulation. With people spending 90% of their time indoors, especially following the recent pandemic, the importance of quality views has become increasingly clear. Views through windows aren't just aesthetic—they are vital for occupants' health and well-being.

In recent years, interest in window view quality has grown in the field of building design. This growing focus is highlighted by a position statement signed by 54 experts in the field. The statement identifies three key factors for assessing view quality: content, access, and clarity:

But how do we measure and ensure these views provide their benefits?

While the Building Performance Simulation (BPS) field has made progress in helping designers and engineers assess windows' impact on indoor environmental quality - such as daylight, thermal comfort, and air quality—evaluating the quality of views remains a significant challenge. The computational tools required for this type of analysis are still being developed and aren't yet fully ready for practical use in all stages of building design.

To explore this emerging area further, we spoke to ClimateStudio and Ladybug Tools - two leading developers integrating view analysis into their software. In this article, they share their insights on four key questions about the current state and future of view quality analysis in building design:

1. Can you briefly explain the key components of your tool in relation to view analysis and how it analyzes window view quality?
2. Window view quality is influenced by content (external surroundings), access (window size and placement), and clarity (properties of facade materials). Which computational methods do you believe are most effective for simulating each of these variables, or as a whole, and why?

3 What challenges do you anticipate when developing more advanced tools for evaluating and simulating window view quality?

4 What type of research would be most beneficial in both the short term and long term to refine and improve your tools for assessing window view quality?

All responses highlighted three key aspects:

1 the application of advanced quantitative view processing techniques, such as ray-tracing and solid-angle integrated computational analysis, which are often employed in daylighting and mean radiant temperature calculations to predict thermal comfort;

2 the significance of collaborative efforts in gathering empirical data to develop metrics and thresholds that evaluate how different view factors impact occupant satisfaction; and

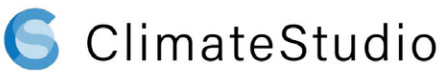
3 the consideration of view with other physical environment factors such as glare and thermal comfort to balance multiple factors.

These insights encourage the IBPSA community to consider integrating view analysis with existing building performance evaluation frameworks and to work together to refine these metrics and thresholds.

Stay tuned to discover how this emerging field might transform the way we design our living and working spaces. The full interviews follow—enjoy!

Timur Dogan and Jon Sargent, Solemma, USA

ClimateStudio, Solemma: www.solemma.com/climatestudio



Can you briefly explain the key components of your tool in relation to view analysis and how it analyzes view quality?

The workflow assesses occupant views and computes eligibility for the LEED v4 Quality Views credit (and, as of ClimateStudio v1.5, the EN 17037 European standard). It can also be used to calculate view factors and view distances to specific model layers or objects of interest.

Window view quality is influenced by content (external surroundings), access (window size and placement), and clarity (properties of facade materials). Which computational methods do you believe are most effective for simulating each of these variables, or as a whole, and why?

The biggest problem with the view certification systems is their refusal to engage in quantitative image processing. This stems from a desire to support hand calculations, which is a fixation the daylight and energy compliance committees have rightly moved beyond in favor of computer calculations. And it results in awkward absolute statements or thresholds, such as "category x is visible," or the view "includes objects 25' away." Why does the viewer care? Are these elements visually prominent, or even noticeable?

If view assessments are to be done with classical rules/algorithms, the research community needs to define solid-angle-integrated value functions for view content and distance, or similar. Without this, well-intentioned prescriptions will yield assessments that don't fit subjective experience (or common sense). The same goes for view clarity/contiguity, or compositional characteristics the research finds to be relevant. The criteria must be precisely quantifiable.

On this last point, I would strongly suggest that researchers developing view metrics team up with CS departments or professional software developers. These folks tend to be good at imagining the worst, including all the ways a proposed algorithm could go wrong. They might also have non-classical approaches (AI) that are well-suited to the fuzzy problem of predicting view satisfaction.

What challenges do you anticipate when developing more advanced tools for evaluating and simulating window view quality?

One of the biggest challenges is data availability on the subject matter. The research community needs to form a consensus on how data should be collected and undergo a similar effort in the thermal comfort standardization field.

What type of research would be most beneficial in both the short term and long term to refine and improve your tools for assessing window view quality?

We need a coordinated, multi-university effort to build a consensus on how to collect empirical evidence that can be used to validate and train predictive models that would allow us to assess and quantify window quality. I want to use this opportunity to advertise a collaboration between NJIT, Berkeley, and Cornell that we initiated about one year ago. This collaboration actively researches data collection methods to standardize scalable view quality assessment experiments. The team has begun collecting a large data pool that aims to provide researchers with large datasets on window view quality perception in the future. I also want to invite everyone who is interested in joining this group to participate in expanding our running data collection experiments to other universities, countries, and cultures.

Mikkel Pedersen and Christopher Mackey, Ladybug Tools, USA
Ladybug Tools: www.ladybug.tools

Ladybug Tools

Can you briefly explain the key components of your tool in relation to view analysis and how it analyzes window view quality?

The components in Ladybug Tools to assess window view quality are rather basic. They rely mostly on ray intersection methods in the CAD environment. It requires a decent amount of manual work to set up an analysis for window view quality, but if you do so you will be able to analyze the visibility percentage from points to context geometry, the percentage of view to the outdoors or sky from input geometry through context, or the view factor from points to specific geometry. It will still require a lot of manual work to do a full-fledged view analysis for e.g. LEED or EN 17037.

By "basic," I mean we don't yet have a dedicated "recipe" for view quality analysis in Ladybug Tools. In our ecosystem, a recipe is a predefined set of tasks that allows for more complex computations and better scalability. A recipe would be a more effective approach for comprehensive view analysis (e.g. for LEED or EN 17037), and we typically develop these when there is significant demand from users.

Window view quality is influenced by content (external surroundings), access (window size and placement), and clarity (properties of facade materials). Which computational methods do you believe are most effective for simulating each of these variables, or as a whole, and why?

Maybe I am biased since I am a Radiance (ray tracing) user and we also use Radiance for a lot of things in Ladybug

Tools, but I can see Radiance being useful. Either by calculating view factors from a set of viewpoints to context geometry or windows. It will allow calculation of how much of the geometry is visible through a window. It also allows layering of context so we can get the results for different types of context (trees, sky, buildings, etc.). Additionally, Radiance's ray-tracing capabilities can simulate ray intersections from viewpoints to context geometry, returning not only the geometry that a ray intersects but also the distance to that geometry.

What challenges do you anticipate when developing more advanced tools for evaluating and simulating window view quality?

One challenge is determining which elements are critical to include in the analysis. For example, how should we handle objects that are barely visible, or are located far away? Establishing a threshold for minimum view angles or solid angles is necessary to ensure the analysis remains computationally efficient while still capturing meaningful details.

Additionally, as we increase the number of view factor calculations or ray intersections, the computational demands grow significantly. Balancing accuracy with performance will be an ongoing challenge as we develop more advanced tools.

What type of research would be most beneficial in both the short term and long term to refine and improve your tools for assessing window view quality?

First of all, I am not up to date on the latest research, but maybe what I mentioned before ties into this question. Research focusing on the relationship between view quality and human well-being would be beneficial. Specifically, studies that quantify how various view factors (e.g., percentage of natural elements visible, distance to obstructions) impact occupant satisfaction. How are visible elements weighted?

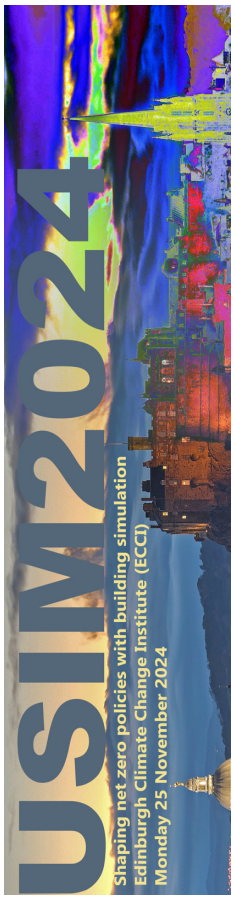
View quality is often one consideration among many (like energy performance, thermal comfort, daylight access etc.). Studies on how different user groups perceive and value views under varying conditions (e.g., under different thermal conditions), would be helpful. Additionally, we believe that view assessment should be conducted in tandem with glare analysis. Frequently, the presence of glare leads to shades being lowered, causing the view to be lost. Without an automated mechanism to raise the shades again, that view may remain obscured for an extended period. As a result, the stunning vistas promised by all-glass facades in renderings often fail to materialize in practice, and technologies designed to preserve views in the presence of glare, such as electrochromic glass, are undervalued. For this reason, at Ladybug Tools, we consistently teach methods for simulating both views and glare, though these often rely on oversimplified rules of thumb. Until standards recognize that overlooking glare also means overlooking views, and until further research clarifies the relationship between them, we will continue meeting standards without truly enhancing the experience for building occupants. ■

Forthcoming events

Date(s)	Event	Further information
2024		
25 November 2024	**uSIM Conference** Edinburgh, Scotland, UK	**https://usim2024.org**
08-10 December 2024	**ASim2024** Osaka, Japan	**www.asim2024.org**
11-13 December 2024	**International HVAC&R Congress and Exhibition** Belgrade, Serbia	**https://kgh-kongres.rs/index.php/en/**
2025		
24-25 April 2025	**CIBSE IBPSA England Technical Symposium 2025** London, UK	**www.cibse.org/what-s-on/cibse-ibpsa-england-technical-symposium**
04-06 June 2025	**CLIMA World Congress 2025** Milan, Italy	**www.climaworldcongress.org**
24-27 August 2025	**BS 2025** **18th IBPSA International Conference & Exhibition** ***Carbon and Climate Responsive*** Brisbane, Australia	**www.BS2025.org**
2026		
19-21 August 2026	**BuildSim Nordic Conference** Umeå, Sweden	TBA

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

25 November 2024
Edinburgh, Scotland, UK
https://usim2024.org



uSIM'24

Shaping net zero policies with building simulation

uSIM is IBPSA-Scotland's biennial conference, which looks 'beyond the building' to the application of building simulation for community and urban energy modelling. The theme of this year's conference is the application of building simulation to help shape net zero policies. With governments everywhere struggling with the immense challenge of meeting mid-century net zero targets, the need for robust modelling and simulation to guide policy development has never been more apparent. The conference will bring together building simulation experts from the realms of academia and industry, along with the policy and standards community to explore key challenges, highlight new developments, and share best practice to help realise our net zero ambitions.

uSIM'24 will be hosted by the University of Edinburgh, Monday 25 November 2024 at the Edinburgh Climate Change Institute (ECCI) **https://edinburghcentre.org** .

In addition to uSIM's usual technical and application-focused papers, highlighted topics include Net Zero built environment policy and social challenges.

A total of 38 abstracts have been received in, or related to, the following areas:

- Building simulation at scale – stock modelling, energy networks, city and regional modelling
- Built environment energy policy landscape
- Calibration, validation and the application of uncertainty at scale
- Case-studies of modelling for policy development and support
- Case studies in urban energy modelling
- Modelling outputs for non-technical audiences
- Data acquisition at scale
- Multi-domain simulation for sustainable cities and communities
- Future energy compliance
- Software developments - new technical and policy support tools, models, and metrics
- Supporting a just transition to net zero
- Characterising urban energy resources

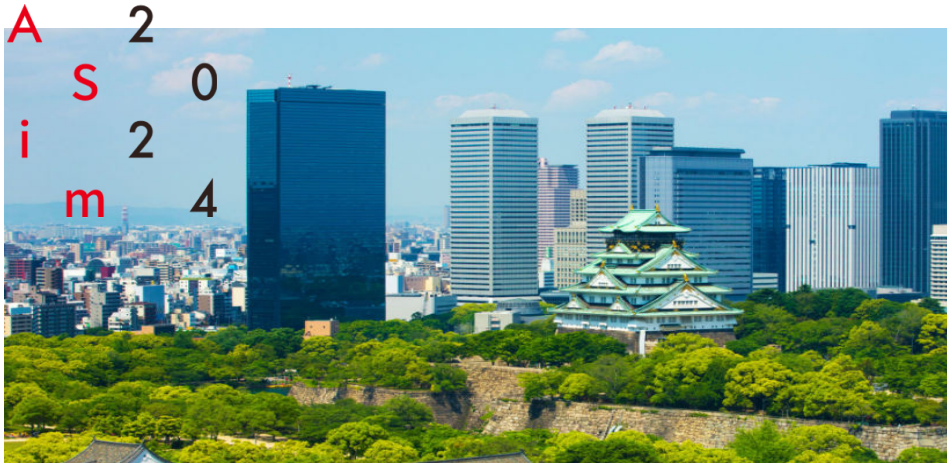
All successfully reviewed papers will be published in the proceedings, which will be available on the IBPSA website. Selected papers will be invited to submit an expanded version to a special issue of the Journal of Building Performance Simulation, published by Taylor and Francis.

The deadline for the £100 Early Bird registration rate is 25 October 2024, after which the cost rises to £150 ((£75 for students).

Further information and updates are available on the uSIM conference website: **https://usim2024.org**. ■

08-10 December 2024
Osaka, Japan
www.asim2024.org

ASim2024



We are excited to announce ASim2024, which will be held as an in-person conference in Osaka, Japan, on 8-10 December 2024. ASim is a regional conference series of IBPSA held in the Asian region in cooperation with the Asian affiliates. ASim2024 will provide a forum for scholars, students, professionals, consultants, designers, and engineers to exchange ideas, knowledge, and information on building performance simulation. We invite you to submit abstracts up to 300 words on your contribution by 10 May 2024.

Highlights

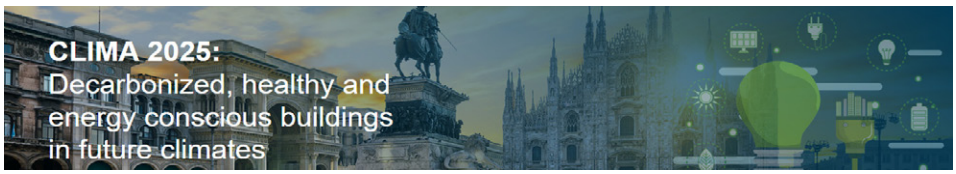
- Between 100 and 150 papers have been presented at the past ASim conferences
- ASim conferences are a place for learning and experiment. They offer opportunities for students and early career researchers in particular to be exposed to an international audience and peers and to try something new.
- They are a place for networking - a good size conference to connect with your peers

Key dates

- Early bird registration 31 October 2024

For updates regarding the conference program and additional details, please visit our conference website at **www.asim2024.org**. In addition, we warmly welcome your proposals and suggestions on activities related to ASim. Please do not hesitate to contact us at **asim2024@conftool.com**. We hope to see you at ASim2024! ■

04-06 June 2025
Milan, Italy
www.climaworldcongress.org



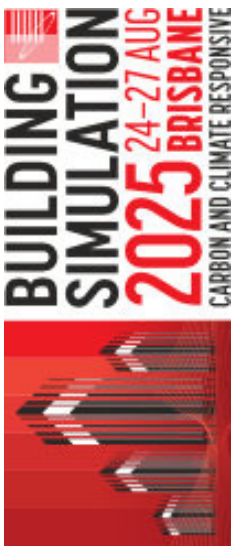
CLIMA 2025: Buildings for the climate of the future

The REHVA HVAC World Congress CLIMA is a leading event for professionals, academics, and companies in the HVAC sector. CLIMA 2025 will take place in Milan, Italy, from 04-06 June 2025. The theme this time is *Decarbonized, healthy, and energy-conscious buildings in future climates*, a topic highlighting the multi-aspect importance of HVAC.

Decarbonizing the European building stock by 2050 will require deep energy renovation of buildings and neighbourhoods without compromising health. We need to improve our design approach to reduce the carbon footprint of buildings, to take account of health and threats such as COVID-19, and to take advantage of digitization and sensors to optimize the design, operation, and indoor environmental quality of new and refurbished buildings. Advanced sensor-based measurement and control pose numerous challenges. We know the climate is changing. Will more cooling or heating capacity be needed? What energy conservation technologies will work best?

For updates on the programme, paper submission, venue, delegate registration and more visit **www.climaworldcongress.org** ■

24-27 August 2025
Brisbane, Australia
www.bs2025.org



BS 2025: the latest news

Following the 2023 Building Simulation Conference in Shanghai, China, Australia will take the reins in hosting the next worldwide Building Simulation Conference.

The Australasian Affiliate of the International Building Performance Simulation Association (IBPSA Australasia) and the Australian Institute of Refrigeration, Air Conditioning and Heating (AIRAH), are delighted to jointly host the Building Simulation 2025 Conference in Brisbane, Australia over 24-27 August 2025.

Preparation for the Building Simulation 2025 conference is well underway, and we have received over 960 abstracts to date! Next August will be here in no time, and the organising committee are excited to welcome a truly international cohort of academics, practitioners and anyone else with an interest in building performance simulation down under!

The focus of our conference is to discuss the leading issues that drive the use of building performance simulation in the built environment. The event will focus on how building simulation can play a significant role in achieving net zero energy and carbon both now and in the future, without compromising human health and wellbeing. We are currently working through the program and reaching out to our keynote speakers; more will be announced over the coming months.

Key topics

- Climate Change Mitigation and Adaptation
- Energy Efficiency and Sustainability
- Innovative Design Exploration and Industry Transformation
- Urban Planning and Smart Cities
- Indoor Environmental Quality (IEQ)

Key dates

Main conference program	Student modelling competition
Abstract acceptance notification: from 15 October 2024	Released early October 2024
Full paper submission deadline: 15 January 2025	Notification from student teams on intent to submit: early November 2024
Paper review notification: 1 April 2025	Submission deadline: 1 April 2025
Revised paper submission: 30 April 2025	Finalists announced (maximum two teams): 15 May 2025
Paper acceptance notification: 1 June 2025	Winning team announced at the conference!
Final manuscript deadline: 30 June 2025	

Why attend?

- You are passionate about climate action and making a positive impact with your work. BS2025 is focused on how the simulation industry can make a more sustainable planet.
- You are keen to collaborate with global peers on your current and future research or projects. BS2025 will have breakout sessions geared at maximising connections and collaborations.
- You've never been to an IBPSA conference and don't know many folks in the wider industry. BS2025 will have events geared specifically towards students and emerging career professionals to ensure you get the most of your attendance.
- You want to see amazing Australian animals. BS2025 cannot guarantee drop bears, but can guarantee bin chickens!
- You are a researcher keen to collaborate with practitioners. BS2025 will have networking events specifically aimed at connecting
- You want to convince your home city / state / country to adopt a building performance rating system like NABERS. BS2025 will be full of expert NABERS practitioners who can share their technical and bureaucratic expertise in how NABERS came to be.
- You are terrified of spiders, snakes, and crocodiles. At least one of the BS2025 organisers has lived in Australia for 8 years and has yet to encounter 2 out of these 3, so don't believe all the hype!

- You are tired of going to events where the poster sessions are often underappreciated. BS2025 will be launching a poster social event to ensure that all the great work displayed on conference posters gets as wide an audience as possible.
- You want to know if Australians really do wear shorts in winter or "put a shrimp on the barbie". BS2025 can guarantee lots of Aussies in attendance to welcome all our international colleagues and friends.

For all questions, please contact **info@bs2025.org** .

If you are interested in sponsoring or exhibiting, please fill out the form at the bottom of the *Sponsorship & Exhibition* page on our website, **www.bs2025.org** .

For updates about the programme and speakers, and to find out about the conference, visit our website **www.bs2025.org** .

We can't wait to see you all soon!

BRISBANE CONVENTION & EXHIBITION CENTRE (BCEC)

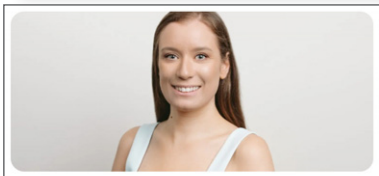
QUENTIN JACKSON
IBPSA Australasia President
Conference Chair

PRIYA GANDHI
IBPSA Australasia Vice-President
Conference Co-Chair

NICKI PARKER
IBPSA Australasia Treasurer
Conference Committee Member

PC THOMAS
IBPSA Member
Scientific Committee Chair

PAUL BANNISTER
Past IBPSA 2011 Conference Chair
Conference Adviser



MARIE KAREKLA
AIRAH
Conference Manager

News from IBPSA Affiliates

IBPSA-Canada: Highlights from eSim 2024

The eSim 2024 International Research Conference, held in Edmonton, Alberta, Canada, from June 5-7, 2024, brought together professionals, researchers, and students in the field of Building Performance Simulation. The event featured a rich blend of workshops, keynote presentations, parallel sessions, and social events, providing a platform for in-depth knowledge exchange and valuable networking opportunities.

Workshops (June 5)

Workshop 1: Modeling and simulation of building energy systems using Modelica

Led by Dr Kun Zhang, this workshop focused on the Modelica language, an equation-based, object-oriented modeling language used for simulating complex physical systems. This workshop covered best practices in setting up thermo-fluid flow models and included hands-on exercises in constructing models of simple heating and air conditioning systems.

Workshop 2: Introduction to the EnergyPlus Python API

In this workshop, Hussein Elehwany introduced attendees to the EnergyPlus library and Python Plugin, demonstrating how to develop control sequences using the API. Participants engaged in hands-on exercises to read variables, set actuators, and integrate control sequences with the EnergyPlus environment.

Workshop 3: A collaborative Building and Energy Systems Simulation platform (BESOS)

Dr Fred Boafo and Dave Rulff showcased the BESOS platform, which facilitates the integration of multiple tools for designing and analyzing building and energy systems. The session included demonstrations of two test example applications, focusing on constructing a surrogate model and solving a building optimization problem.

Conference Sessions & Keynotes (June 6-7)

The conference included multiple parallel sessions (65 presentations) addressing a wide array of topics.

Session 6A-1 covered topics such as optimizing ventilation strategies for mitigating SARS-CoV-2 transmission in long-term care facilities, building occupancy analysis pre- and post-lockdown, and identifying policy barriers to promote good indoor environmental quality in multi-unit residential buildings in Canada. Session 6B-1 included data-driven modeling of pressurized corridor ventilation system performance, evaluation of UVGI air disinfection methods, and CFD investigations on urban morphology's effect on pollution removal. **Session 6A-2** focused on examining moisture reference years and future weather for hygrothermal analysis, disparities in Canadian

households' satisfaction with indoor environmental quality, and global daylight metrics in the Canadian context. **Session 6B-2** included evaluating the potential of electric thermal storage devices, development and validation of TRNSYS types for energy performance simulation, and implementing thermal electric storage in EnergyPlus. **Session 6A-3** addressed topics like nudging window use behavior and characterizing heating energy in remote communities, and developing residential building stock archetypes were discussed. **Session 6B-3** featured optimization of building envelope latent heat storage, design of modular solar-driven distillation systems, and transient modeling of low-energy residential buildings. **Session 6A-4** focused on neural ordinary differential equations for residential simulations and the impact of interactions between buildings and outdoor conditions.

Session 6B-4 discussed energy flexibility strategies, lessons from modeling complex residential building systems, and experimental validation of EnergyPlus models. **Session 7A-1** and **7B-1** covered topics such as air-source heat pump control strategies, deep energy retrofits, and model predictive control for hydronic floors. **Session 7A-2** and **7B-2** discussed building form influence on energy flexibility, managing humidity in greenhouses, and forecasting electricity demand.

Keynote Presentations

Dr Andreas K. Athienitis (Concordia University) discussed systematic modeling and early-stage design considerations for advanced solar buildings and communities. His presentation highlighted Canadian case studies, such as the Varennes Library, showcasing net-zero energy buildings and solar communities, and addressed challenges and strategies for integrating these designs with smart grids.

Anders MacGregor (Stantec) presented Stantec's approach to low carbon mandates and the AIA. He emphasized innovative design strategies and energy modeling tools, providing a case study that illustrated the strength of an integrated Carbon Impact team and various modeling strategies to achieve zero carbon goals.

Social and Networking Events

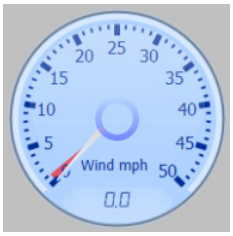
Following the conference workshops, attendees enjoyed an **early registration and mixer event** on June 5. This provided a relaxed setting for networking over light refreshments. On June 6, the **banquet at Fort Edmonton Park** featured the **awards ceremony**, including the presentation of the **Best Paper Award** and **Test of Time Award**, followed by a **keynote speech**. This event continued to foster networking and social interaction among participants. The conference concluded on June 7 with another **mixer event**, offering attendees one last opportunity to network before departing.

Acknowledgments

Special thanks to the organizing committee, led by General Conference Chair Dr. Yuxiang Chen and Scientific Committee Chair Dr. Lexuan Zhong, Industry and Municipality Liaison Chair Dr. Tabinda Shakeel, as well as Charlie Shields, Alexander Jordan, Bowen Yang, Kadie Sinclair, and Tesfaalem Atsbha.
We also extend our gratitude to all sponsors and supporting organizations, including IBPSA Canada, the Department of Civil and Environmental Engineering - Faculty of Engineering at the University of Alberta, Hydro Quebec, and Stantec. The dedication and hard work of the organizing team and volunteers were crucial to the success of eSim 2024.

Feedback from attendees is crucial for continuous improvement. Feedback forms have been shared with participants and they are encouraged to share their thoughts and suggestions to help shape future eSim conferences. ■

Software news



Updated Global Simulation Climate and Future Ireland & Brazil Datasets available from Climate.OneBuilding

In July 2024, Climate.OneBuilding released updated TMYx with data through 2023. As 2023 is the hottest global year on record, you may see increased cooling when using these files in building simulation compared to older TMY-type files. These include weather station meteorology data through 2023 and corresponding solar radiation from the ERA5 reanalysis data set (**www.ecmwf.int/en/forecasts/datasets/reanalysis-datasets/era5**). The ERA5 data, courtesy of Oikolab (**oikolab.com**), provides a comprehensive, worldwide gridded solar radiation data set based on satellite data. The new data (and all other weather files on the site including the 2009-2023 TMYx) include the latest ASHRAE 2021 design conditions.

The TMYx are derived from hourly weather station meteorology data through 2023 in the ISD (US NOAA/NCEI's Integrated Surface Database) and gridded solar radiation data from ERA5 reanalysis using the TMY2/ISO 15927-4:2005 methodologies. Often, there are two TMYx for a location, e.g., for Washington Dulles Intl AP:

USA_VA_Dulles-Washington.Dulles.Intl.AP.724030_TMYx *and*
USA_VA_Dulles-Washington.Dulles.Intl.AP.724030_TMYx.2009-2023.

In these cases, there's a TMY for the entire period of record and a second TMY for the most recent 15 years (2009-2023). *Not all locations have recent data*. The older 2004-2018 and 2007-2021 TMYx will remain on the web site.

TMYx climate files in this update – locations over entire available period/recent (2009-2023):

- WMO Region 1 (Africa) 1382 locations, 1122 recent
- WMO Region 2 (Asia) 3167 locations, 2209 recent
- WMO Region 2 (Asia) / Region 6 (Europe) – Russia 1825 locations, 972 recent
- WMO Region 3 (South America) 1143 locations, 967 recent
- WMO Region 4 (North and Central America, Caribbean except USA and Canada) 444 locations, 410 recent
- WMO Region 4 (USA) 2969 locations, 2697 recent
- WMO Region 4 (Canada) 914 locations, 862 recent
- WMO Region 5 (Southwest Pacific) 1396 locations, 1171 recent
- WMO Region 6 (Europe) 3999 locations, 3014 recent
- WMO Region 7 (Antarctica) 109 locations, 97 recent

The Climate.OneBuilding TMYx data set now includes more than 17,000 locations in more than 250 countries. **Climate.OneBuilding.Org** now hosts more than 75,000 weather files from various sources including future projections for several countries. All data have been through extensive quality checking to identify and correct data errors and out of normal range values where appropriate.

In September 2024, we posted two new Future Climate datasets:

- Ireland, MetEireann, 6 locations: Belmullet, Birr, Clones, Cork, Dublin and Limerick: **www.met.ie/climate/available-data/climate-data-for-thermal-modelling-of-buildings** For each location, a TRY (Typical Reference Year) and three DSYs (Design Summer Years) along with future data (2021, 2041, 2071) for RCP 2.6, 4.5, and 8.5 with low, medium and high sensitivity – a total of 76 files per location. Dataset comprises 456 files.
- Brazil Future, 28 locations, Brazilian state capitals plus Brazilia: **https://zenodo.org/records/13628290** For each location, RCP 2.6 and 8.5 from three GCMs: HadGEM2, MPI-ESM, and NorESM1 along with two nested RCMs (regcm and remo) for 2010s, 2050s, and 2090s, yielding a total of 36 files per location. Dataset comprises 1,008 files.

To make it easier to find and download individual files, we have added both KML maps and XLSX spreadsheets with links for all the datasets on **Climate.OneBuilding.Org**.

Each climate location .zip contains: EPW (EnergyPlus weather format: **https://climate.onebuilding.org/papers/EnergyPlus_Weather_File_Format.pdf**), CLM (ESP-r weather format: **www.strath.ac.uk/research/energysystemsresearchunit/applications/esp-r**), WEA (Daysim weather format: **https://web.mit.edu/sustainabledesignlab/software.html**), and PVSyst (PV solar design weather format: **www.pvsyst.com**) along with DDY (ASHRAE 2021 design conditions in EnergyPlus format), RAIN (hourly precipitation in mm, where available), and STAT (significantly extended EnergyPlus weather statistics).

Climate.OneBuilding thanks the building simulation community for their support – we have already had more than 2 million weather files downloaded in 2024 and are seeing more than 15,000 weather files downloaded daily in August (total of 500,000), more than 6 GB/day.

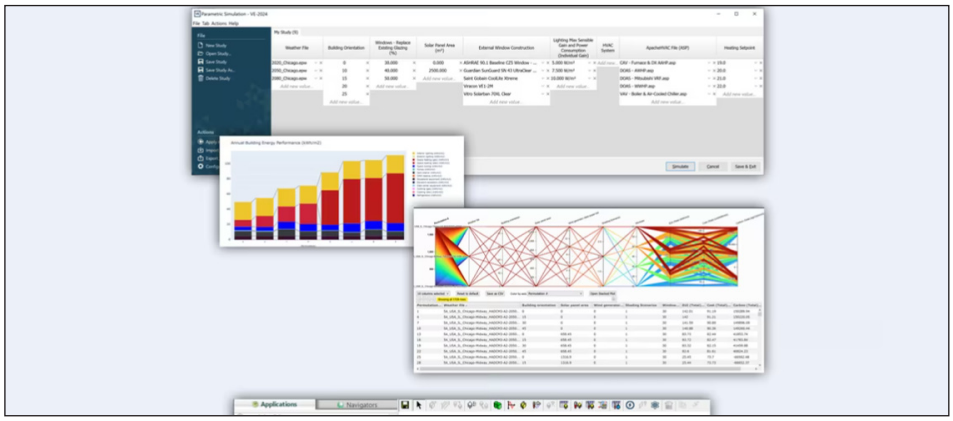
For more information or to download any of the climate data (no cost), go to **https://Climate.OneBuilding.org** ■

IES release IESVE-2024

IESVE 2024 provides increased flexibility to users and continues to aid the drive for decarbonisation and electrification. New features include:

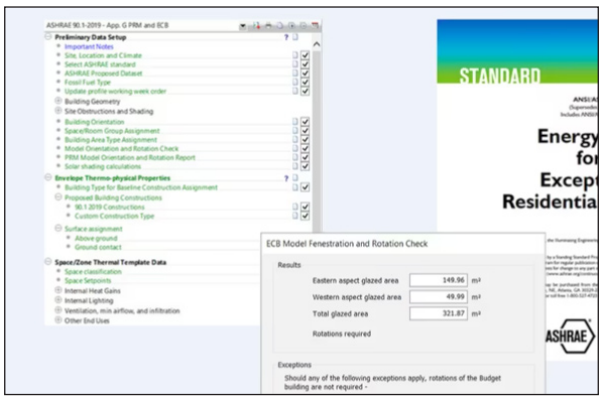
Parametric Simulation Feature

The Parametric Simulation feature in IESVE empowers users to compare a large range of design possibilities, be it for a single-variant design study or a multi-parameter whole-building design perspective. The Parametric Simulation feature has access to a large number of model variables and is integrated into the full range of APACHE's links (Solar, Daylight, Airflow, Loads/Sizing and HVAC Systems). Over a thousand permutations are possible with one model.

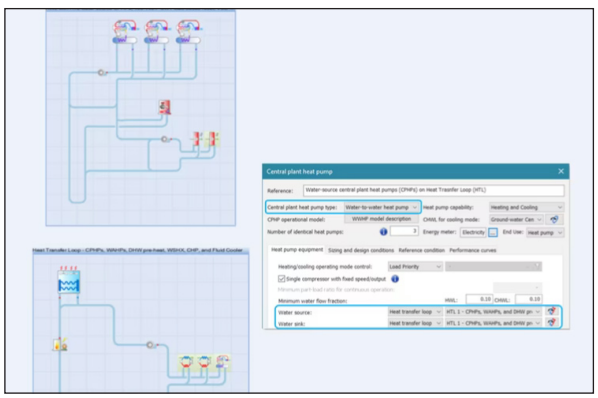


ASHRAE Standard 90.1's Energy Cost Budget (ECB) Method for 2016 & 2019 versions

The Energy Cost Budget method (ECB) has now been included in the 90.1 2016 and 2019 navigators alongside the Performance Rating Method (PRM), providing users with the option to submit with either method. The same workflow is used as per previous navigator versions, with updates catering to both 2016 and 2019.



Central Plant Heat Pumps coupling to Heat Transfer Loop as water source and/or sink

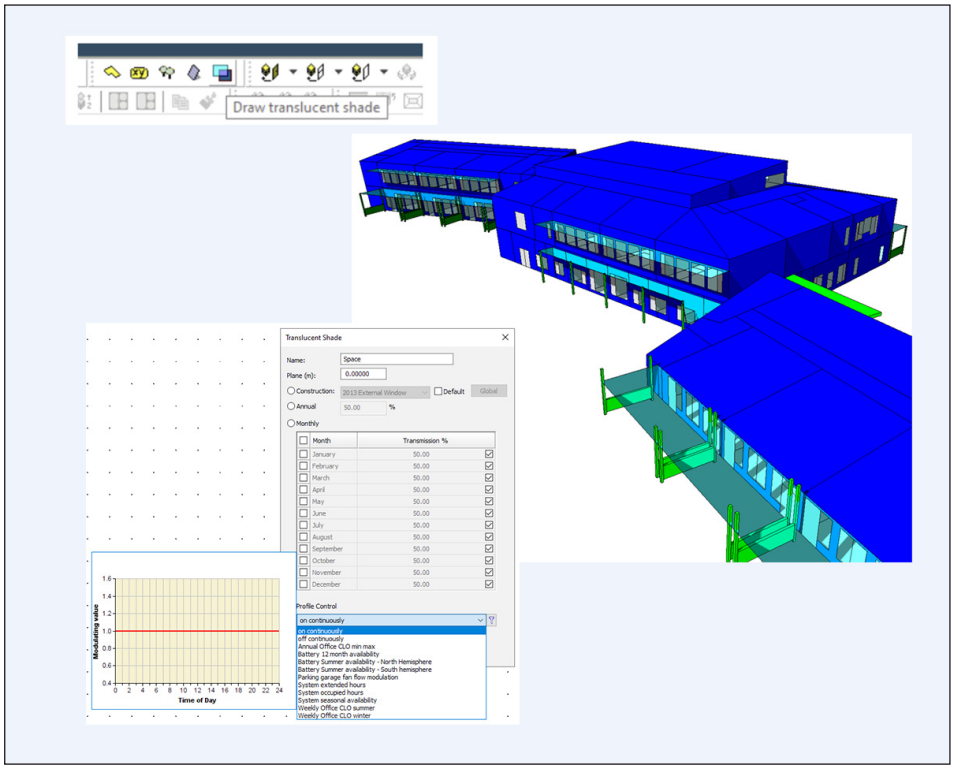


The Central Plant Heat Pump (CPHP), can now use a Heat Transfer Loop (HTL) as a heat source or sink, when it's configured in water-to-water mode. When configured correctly, the permutations for these systems are vast, and will allow the simulation of a multitude of modern decarbonisation strategies, designed to maximise the recycling of heat within a building, before needing to acquire or reject it to an external energy reservoir.

Translucent Shades – Dynamic Profile

The option to apply a profile to vary transmission through a translucent shade lets you emulate detailed variations for dynamic shading performance. This enables an accurate

representation of translucent surfaces, such as brise soleil, mesh or lattice shading with a single transparent surface, drastically reducing computation and modelling times.



Other updates include:

- Update to Scotland Section 63 to align with iSBEM_v6.1.e
- IESVE Plug-in compatibility with SketchUp 2024

For full details on all IESVE new features visit **www.iesve.com/ve2024** .

IES Events

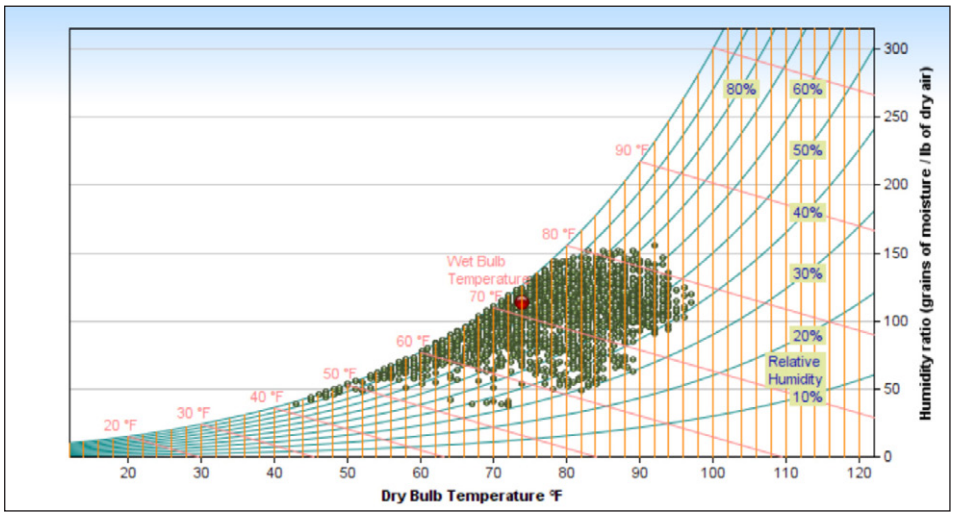
IES is exhibiting at **Greenbuild** in Philadelphia, USA from 12-15 November 2024 at booth #1119. Find out more and register at **www.iesve.com/discoveries/view-event/38762/greenbuild-2024** .

IES is exhibiting at **CIBSE Build2Perform Live** in London, UK from 13-14 November 2024 at stand #277. Find out more and register at **www.iesve.com/discoveries/view-event/45358/cibse-b2p-2024** .

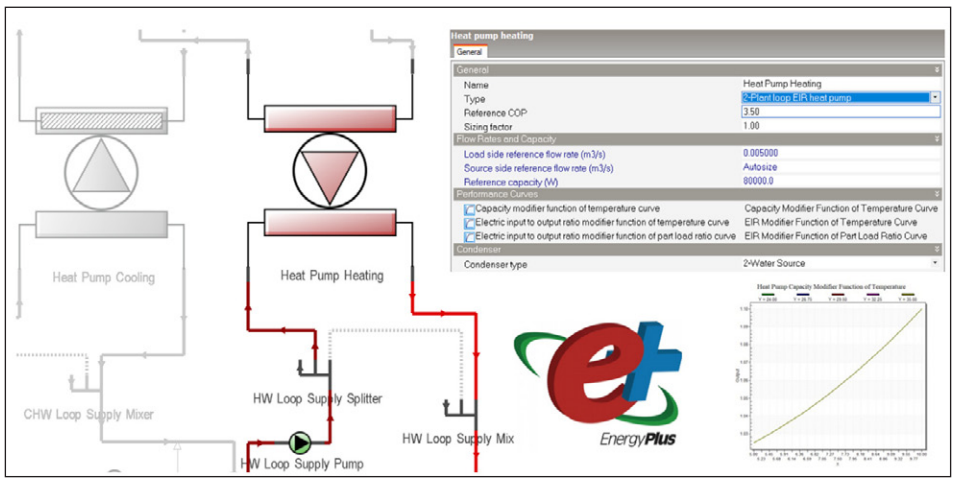
IES Technical Article: How to Calculate Peak Cooling Loads in Humid Climates

Peak cooling coil loads can often occur during either the Monthly Design Dry-Bulb conditions or the Monthly Design Wet-Bulb conditions. As a continuation of ASHRAE Heating and Cooling Loads and HVAC Equipment Sizing (see **www.iesve.com/discoveries/view/10017/ashrae-heating-and-cooling-load-calculations**), this article is

tailored to provide guidance to engineers designing in humid climates. The 9,237 global locations available in IESVE Software uses the ASHRAE Design Weather Database (Version 7.0). These locations datasets can be used with in two ways to calculate cooling loads under design conditions. The full article is available at **www.iesve.com/discoveries/view/46017/how-to-calculate-peak-loads-in-humid-climates**. ■



DesignBuilder v7.3 is released!



This latest update delivers significant new features and improvements to streamline your modelling workflow and stay up to date with industry best practices. Key features include:

- New detailed HVAC systems, including air and water source plant loop heat pumps, a generic unitary AHU, and more flexible options for CO2 control.
- Improvements to the ASHRAE 90.1 Appendix G 2016 automated baseline generation tools, including Systems #11, #12 and #13.

- Updated and improved LEED module for automated generation of LEED v4.1 MEPC reports.
- Updates to our Daylighting Module, including improvements to the sDA and ASE annual daylighting calculations, new Right To Light calculations, and a revamped user interface.
- Improvements to the Boolean, Cutting, and Clone modelling tools to help ensure more robust model geometry.
- Updates for the International Glazing Database (IGDB).
- Component blocks can be exported as XML files and used as variables in Optimisation and Parametric analysis, allowing complex shading systems to be assessed parametrically.
- The updated Visualisation module now includes a 3D display of linear thermal bridging.

The full list of v7.3 new features and improvements can be viewed at **https://support.designbuilder.co.uk/support/solutions/articles/103000294299-designbuilder-new-version-feature-list.**

Curious to learn more? You can view the *DesignBuilder Version 7.3 Preview* webinar for a detailed walkthrough of the latest features at **https://app.gotowebinar.com/unified/index.html#/embedded/recording/92d42233f57f4ef8af846f08f40adb0b?source=G2S-EMBEDDED**.

Download DesignBuilder v7.3 at **https://designbuilder.co.uk/download/release-software**. ■

Call for Nominations for IBPSA Awards and Fellows

Achievement Awards

The Board of Directors of IBPSA is seeking nominations for Awards to be presented at Building Simulation 2025, in Brisbane, Australia (August 24-27, 2025). IBPSA provides four awards for outstanding work in the building performance simulation field. These awards are provided on a biennial basis at each Building Simulation Conference, provided there is a qualified candidate. The awards are:

1. IBPSA Distinguished Achievement Award

This award, formerly named the IBPSA Award for Distinguished Service to Building Simulation, recognizes an individual who has a distinguished record of contributions to the field of building performance simulation, over a long period.

2. IBPSA Outstanding Young Contributor Award

This award recognizes an individual at the beginning of their career who has demonstrated potential for significant contributions to the field of building performance simulation.

3. IBPSA Innovative Application Award

This award recognizes an individual, group or firm, who has made a significant contribution to the effective application and/or advancement of building performance simulation in practice. The award may be given for a unique or noteworthy use of simulation in practice; development of simulation software or supporting software that has had a significant impact on industry practice; or other contribution that has advanced building performance simulation in practice.

4. Godfried Augenbroe Award

This new award, in honour of the late Prof. Godfried Augenbroe, recognizes a recent outstanding PhD thesis on the topic of building performance simulation. Eligible candidates will have been awarded their PhD in the two years since the last biennial IBPSA World Simulation Conference.

Achievement Award nominations

Nominations for awards must be made by an independent third party (ie, at a different organization) and submitted by February 28, 2025. We would like as many nominations as possible, so please contact the Chairs of the Awards and Fellows Committee, Liam O'Brien (**liam.obrien@carleton.ca**) and Ji-Hyun (Jeannie) Kim (**jihyun.kim@anl.gov**), to discuss a possible nomination if required.

Detailed instructions on how to submit nominations and a list of recent past recipients of these awards can be found on the IBPSA website: **https://ibpsa.org/awards** .

Fellows of IBPSA

The Board of Directors of IBPSA is seeking nominations for the 2025 class of Fellows. The criteria for the award of IBPSA membership grade of Fellow are as follows:

> *"The grade of IBPSA fellow is awarded to individuals who have attained distinction in the field of building performance simulation (or in the allied arts or sciences), by either the teaching of major courses in said arts and sciences, or by way of research, simulation code development, original work, or the application of building simulation on projects of a significant scope. The individual must have been active in the field for at least 15 years, which can include thesis-based graduate-level degrees (e.g. master's, PhD) if they are focused on BPS".*

The IBPSA Board of Directors elects new Fellows on a two-year cycle, culminating with recognition at the biennial Building Simulation conferences.

Fellow nominations

Nominations for Fellows of IBPSA may be made by IBPSA members other than the nominee. The deadline for nominations is February 28, 2025. Nominations should include details of the nominee's accomplishments in one or more of the following categories: industrial leadership, research, simulation code development, application of building simulation on projects of significant scope, educational leadership, and significant technical contributions to the allied arts and sciences. Detailed instructions on how to submit nominations, and a list of IBPSA Fellows, can be found on the IBPSA website: **https://ibpsa.org/awards/fellows** . We would like as many nominations as possible, so please contact the Chairs of the Awards and Fellows Committee, Liam O'Brien (**liam.obrien@carleton.ca**) and Ji-Hyun (Jeannie) Kim (**jihyun.kim@anl.gov**), to discuss a possible nomination if required.

Student Travel Awards - supporting students to attend BS2025

In order to assist as many students as possible to participate in Building Simulation 2025, IBPSA will grant up to five travel awards valued at up to US$1,000 each to students presenting peer-reviewed papers. The selection committee bases its decisions upon the following selection criteria:

- need for financial assistance, evidenced in a letter of recommendation from the student's supervisor/ advisor of studies (must be on university letterhead);
- overall quality of the peer-reviewed paper;
- relevance of contribution to the field of and/or furthering the effective application of building simulation.

To be eligible, the student must be:

- enrolled in a graduate program related to building simulation at the time of the conference; and
- their thesis project must be directly related to building simulation.

Student Travel Award applications

The deadline for applications is two weeks after the BS2025 paper deadline. Details on applications will be published on the IBPSA website in due time: **https://ibpsa.org/awards/student-travel-awards** ■.

IBPSA Standards Committee

The IBPSA Standards Committee is a Board of Directors standing committee. The Standards Committee and the Board have approved co-sponsorship of several published or developing ASHRAE building-performance-related standards. Collaborating with ASHRAE allows formal participation of IBPSA in standards development without setting up substantial administrative structures that conform to the requirements of governing bodies such as ANSI or ISO. The Standards Committee is seeking opportunities for participation in developing standards in regions other than the United States. Contact Dru Crawley (**dbcrawley@gmail.com**) for more information about the Standards Committee.

The ASHRAE standards development process is open and consensus based. All standards undergo public review. Information about ASHRAE standards and how to get involved in their development is available at **www.ashrae.org/technical-resources/standards-and-guidelines**. Many ASHRAE standards can be previewed at no cost via **www.ashrae.org/technical-resources/standards-and-guidelines/read-only-versions-of-ashrae-standards**.

ASHRAE standards with active IBPSA involvement are:

ANSI/ASHRAE/IBPSA Standard 140-2023 - *Method of Test for Evaluating Building Performance Simulation Software*

Standard 140 specifies test procedures for evaluating the technical capabilities and ranges of applicability of software that simulate the performance of buildings and their systems. Extensions and refinements to Standard 140 are being developed. See **https://data.ashrae.org/standard140**

ANSI/ASHRAE Standard 169-2021 - *Climatic Data for Building Design Standards*

Standard 169 provides recognized climatic data for use in building-design and related equipment standards.

ANSI/ASHRAE/IBPSA Standard 205-2023 - *Representation of Equipment Performance Data for HVAC&R and Other Facility Equipment*

Standard 205 defines schemas and serialization formats for automated exchange of equipment performance data to support simulation and analysis of facility equipment. Included component types are chillers, direct-expansion air conditioners, fan assemblies, motors, and drives. Work is underway to extend coverage to heat pumps, cooling towers, VRF, energy recovery, water heaters, and fenestration. See **https://data.ashrae.org/standard205**.

ANSI/ASHRAE Standard 209-2018 - *Energy Simulation Aided Design for Buildings Except Low-Rise Residential Buildings*

Currently in revision with the updated title Building Performance Simulation Process. Standard 209 establishes minimum requirements for the use of simulation to evaluate building performance and inform decision making.

Proposed Standard 229P - *Protocols for Evaluating Ruleset Application in Building Performance Models.*

This proposed standard establishes tests and acceptance criteria for application of rulesets and related reporting for building performance models.

Proposed Standard 232P - *Common Content and Specifications for Building Data Schemas*

Proposed Standard 232P defines metaschemas (such as data types, data elements, naming conventions, and formats) to specify and validate other standard schemas for data exchange among building performance and HVAC&R software. The initial public review of Standard 232P is underway as of September 2024.

A related effort is the **IBPSA-USA Building Data Exchange Committee**. The BDE Committee provides an inclusive forum to support the development of tool-agnostic consensus-based data models for building design, analysis, and operational performance. See **https://bde.ibpsa.us** .

The next *ibpsa*NEWS will include more details about each of these standards and how IBPSA members can participate in their development.

IBPSA Strategic Planning Committee

IBPSA has a new standing committee: the Strategic Planning Committee. This was officially approved by the IBPSA Board at their meeting on 10 July 2024. The IBPSA Strategic Planning Committee takes over from what was previously the IBPSA Futures Committee. The formal mandate of the new committee is still a draft, to be approved at the next Board meeting. However, the idea is that the Strategic Planning Committee will look at the goals, priorities and plans of IBPSA. Topics that we hope to address are for instance the long-term financial sustainability of the association, but also the recruitment of new and young talent to IBPSA. For information and further details, please contact Pieter de Wilde (**pieter.de_wilde@ebd.lth.se**), who is presently coordinating the formation and start-up of the new committee. ■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MEMBER
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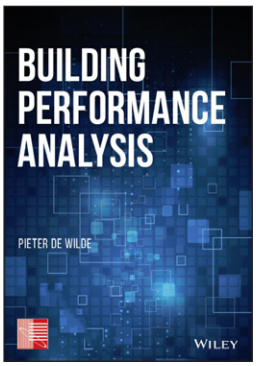
Details, prices, and sign up: visit https://ibpsa.org/membership
More information about IBPSA: https://ibpsa.org

Books by IBPSA Fellows

Building Performance Analysis (Wiley, 2018)



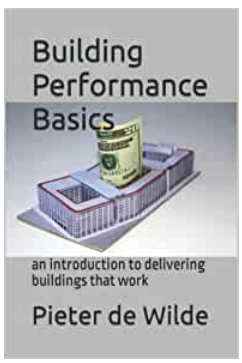
Building Performance Analysis is the go-to resource for those who want to have a deep understanding of what building performance is. The book is endorsed by IBPSA.

Offering a comprehensive and systematic overview of the concept of building performance analysis, *Building Performance Analysis* brings together many existing notions and ideas in one title. A substantial book, it has 11 chapters, 600 pages, and cites over 1600 references. Part I deals with the foundations of building performance, Part II deals with performance assessment, and Part III with the impact of applying of building performance analysis throughout the building life cycle. The book concludes with an epilogue that presents an emerging theory of building performance analysis.

Written for the building science community, it aims to make the following contributions to the field:

1. It reviews the significant body of knowledge on building performance that already exists.
2. It emphasizes that building performance has many aspects, and challenges the community to address those that get less prominence in the literature.
3. Going beyond simulation as a tool for building performance analysis, it also discusses physical measurement approaches, expert judgment, and stakeholder evaluation. It offers a review of the many analysis approaches available in each of these categories.
4. The emergent theory in the epilogue is intended as a key resource for researchers seeking to develop questions and hypothesis. This is intended as matter for discussion, debate, and deeper exploration. ■

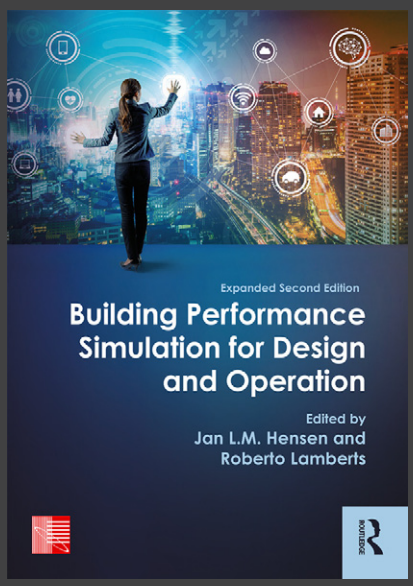
Building Performance Basics (Amazon KDP, 2022)



Building Performance Basics is a short book intended as an introductory text for students at BSc and MSc level, a primer for those entering the industry, and a refresher for those who are already in practice but want to sharpen their view. As *Building Performance Analysis* (above) is rather encyclopaedic, this booklet has been written with a different tone and set-up: short and cheerful, published with Amazon KDP in order to be quick to market, brief and to the point, and more persuasive in order to champion the importance and role of building performance.

Building Performance Basics deals with core questions about building performance: Why is it important? What exactly is it? Where does it play a role? Who should champion building performance? How do we quantify it? And how much performance should we aim for?

Building Performance Basics aims to provide a solid foundation for further professional development and learning about building performance, and for claiming leadership about building performance in practice. In academic courses, it provides context to modules that introduce students to hands-on performance quantification efforts using simulation, measurement and occupant surveys. In industry, this book can be used at any time where there is a wish to refresh a role as building performance champion. ■



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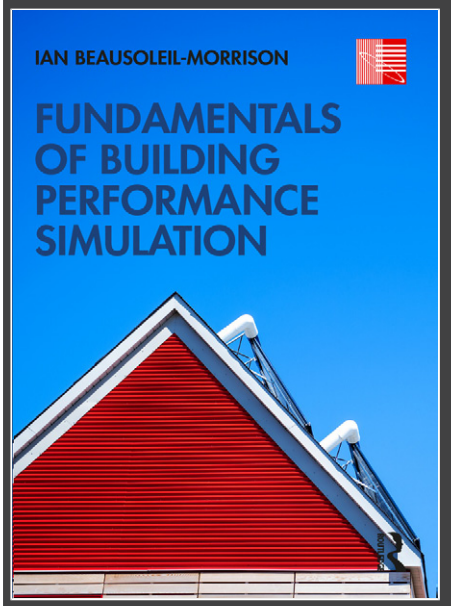

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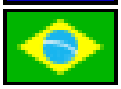

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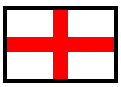

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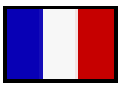

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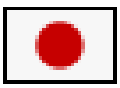

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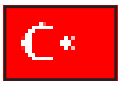

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