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Happy New Year from Building Technology & Urban Systems

As we begin a new year already filled with bright prospects for advancing smarter, more efficient buildings, it's worth reflecting on many noteworthy developments from late last year. Researchers at Berkeley Lab's Building Technology & Urban Systems (BTUS) Division have contributed foundational, important research and guidelines that are helping organizations across the U.S. and around the world to save energy, avoid carbon emissions, and improve indoor air.

A framework for reducing greenhouse gases in building portfolios was named among the most valuable decarbonization guides for 2024, while the Building Efficiency Targeting Tool for Energy Retrofits (BETTER) put a nonprofit in Massachusetts on a path to nearly $2.5 million a year in energy cost savings. And what began as a pandemic response to improve energy efficiency and indoor air quality in schools is now an established Department of Energy (DOE) program, Efficient and Healthy Schools, which officially launched last November.

Read on for more news and accolades from BTUS, including an opportunity to nominate exemplary small commercial building controls projects for heating, ventilation, and air conditioning (HVAC) units as part of the Smarter Small Buildings Campaign.

Jessica Granderson, Interim Division Director, BTUS Division

NEWS

Smarter Small Buildings Campaign: Honoring Leaders in HVAC Controls

The **Smarter Small Buildings Campaign** is accepting submissions for recognition of outstanding achievements in HVAC controls within small commercial buildings. Building owners are invited to participate by submitting their work in a

range of categories, celebrating their success in installing and managing controls for HVAC rooftop units (RTUs) in both existing buildings and new construction. We also encourage our campaign partners to highlight their contributions toward energy justice, diversity, equity, and inclusion.

Submissions are open until March 15, 2024, and selected honorees will be revealed in June. For more details or to begin your submission process, contact **SSBC-Controls@lbl.gov**.

GreenBiz Highlights Emissions Framework in 2024 Roundup

The **Framework for Greenhouse Gas Emissions Reduction Planning: Building Portfolios**, published as part of the Department of Energy (DOE)'s Better Climate Challenge, was recently included in a roundup of the **most valuable guides to building decarbonization in 2024** at media site GreenBiz. The framework provides guidance to organizations on reducing greenhouse gas emissions for their building portfolios and vehicle fleets. BTUS's **Hannah Kramer**, **Nora Hart**, and **Jessica Granderson** are coauthors of the framework, which offers both near-term actions and a longer-term transition path to low- or no-carbon operations.

Berkeley Lab Delivers a 'BETTER' Approach to Decarbonizing Underserved Buildings in New England

The Building Efficiency Targeting Tool for Energy Retrofits (BETTER) is enabling major cost and emissions savings for Massachusetts. PowerOptions, a nonprofit energy consortium, has been using BETTER, which was developed by Berkeley Lab and Johnson Controls, since January 2023 to conduct virtual energy efficiency audits for over 50 buildings from eight nonprofit organizations. BETTER enabled PowerOptions to avoid on-site energy audit costs, save time, and provide roadmaps that will help its members cut energy costs by $2.48 million and avoid emissions equivalent to 6,560 metric tons of carbon dioxide each year. To learn more, see the **full case study** or visit BETTER at **https://better.lbl.gov/**.

The DOE Building Technologies Office's BETTER is an award-winning software toolkit that delivers actionable insights to improve energy, emissions, and financial performance in buildings and portfolios without requiring site visits and complex modeling. Since its launch in 2021, BETTER has 1,100 registered users that have analyzed more than 12,000 buildings covering 2 billion square feet of floor space in more than 60 countries. For more information, please contact **Carolyn Szum** or **Han Li**.

Efficient and Healthy Schools Program Launches

Efficient and Healthy Schools, which began as a campaign in response to the coronavirus pandemic, has been formalized as a DOE program, the agency **announced** last November. The program provides recognition and technical assistance to school districts seeking to implement high-impact indoor air quality and efficiency improvements. Efficient and Healthy Schools has also released its 2023-2024 **Recognition Award Categories** and application support. Berkeley Lab provides technical support for the program, which is an interagency effort from the Department of Energy, Department of Education, and the Environmental Protection Agency (EPA). Read about the **growing network** of schools and districts applying for recognition. If you would like to provide support, please **sign up as a supporter** or encourage schools to **sign up as a participant**.

A Milestone for IMPEL: 2024 Marks Fifth Anniversary!

Five years ago, the IMPEL program began by supporting five DOE National Lab teams through an incubation and industry mentorship process, where each team learned to communicate the value of their R&D to broad audiences. Today, IMPEL has vastly expanded its programming to entrepreneurs and researchers, providing coaching, mentoring **and public and private sector opportunities** that connect innovators to potential investors, partners, and policymakers. It serves critical needs of building technologists at the national labs and beyond, springboarding over 250 innovators from small businesses, nonprofits, and academia into **countless success stories**.

This year, IMPEL's Berkeley Lab-based project team is developing a research publication describing front-line perspectives from emerging technologists, investors, and researchers, with insights from the past five years. The paper will explore the barriers building tech faces when going to market and propose new approaches for commercialization programs moving forward. If you would like to get involved with our research publication, contact us at **IMPEL@lbl.gov**.

How FLEXLAB® Is Helping to Decarbonize the Grid, Communities, and Buildings

The U.S. is aiming for net-zero greenhouse gas emissions by 2050, and expanding into a reliable, efficient clean energy grid is a major part of the equation. FLEXLAB allows researchers to test new strategies and technologies under real-world conditions — a one-of-a-kind scientific sandbox for the energy sector. In a recent feature, the Berkeley Lab NewsCenter describes three

ways that FLEXLAB supports research on equitable, clean energy in our communities.

Read the full article **here**.

Implementation and Administration of Building Performance Standards (BPS) Guide Published

DOE has **published a guide** to implementing and administering Building Performance Standards (BPS), coauthored by BTUS researchers **Joshua Kace**, **Robin Mitchell**, and **Yashima Jain**. The guide covers how to structure, implement and administer a newly enacted BPS, including start-up and ongoing responsibilities, staffing recommendations, and tips/best practices. Contact **Joshua Kace** or **Haley Tong** for more information.

AWARDS

National Fenestration Rating Council Honors Charlie Curcija

The National Fenestration Rating Council (NFRC) presented **Charlie Curcija** with the Dariush Arasteh Member of the Year award at its annual fall membership meeting. The annual award recognizes a member "whose talent, achievements, and innovative contributions are integral to the fenestration industry and the NFRC mission."
Curcija leads BTUS research in the thermal and optical performance of windows, window shading, building facades and other fenestration systems.

"This year's winner has shown incredible dedication to the mission of the NFRC and has been active in NFRC for many years, including several years on the Board of Directors," said NFRC Board Chair Tony Cinnamon in his announcement at the membership meeting. "His contributions to NFRC efforts, particularly those related to thermophysical properties and software development, have been vital to our success."

Read the full article **here**.

Jared Langevin Receives 2023 Assistant Secretary Outstanding Achievement Award

Jared Langevin, along with National Renewable Energy Laboratory's Eric Wilson, received the 2023 Assistant Secretary Outstanding Achievement Award for their work to draft a National Building Decarbonization Strategy.

Tianzhen Hong Named Highly Cited Researcher

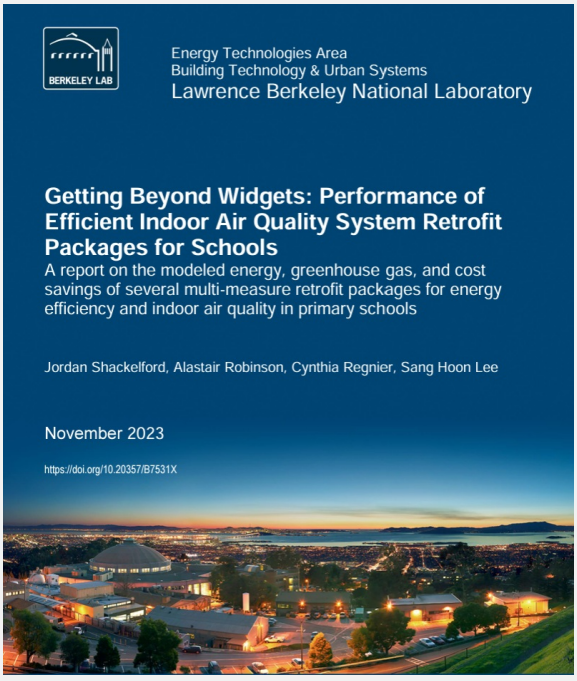
Tianzhen Hong was selected as one of 6,849 Highly Cited Researchers in 2023 by Clarivate™. **Highly Cited Researchers** have demonstrated

significant and broad influence in their field(s) of research.

FEATURED PUBLICATIONS

Getting Beyond Widgets: Performance of Efficient Indoor Air Quality System Retrofit Packages for Schools

Last November, BTUS researchers published a report on the results of retrofit packages in primary schools. The report is the latest from the Beyond Widgets program, which advances systems-based retrofit approaches rather than those that tackle one component at a time. In ***Getting Beyond Widgets: Performance of Efficient Indoor Air Quality System Retrofit Packages for Schools***, researchers evaluated integrated system packages for two climate zones: Northern California and North Carolina. They compared baseline and retrofit whole-building annual energy simulation results, looking at annual savings on energy use and demand, utility costs, and carbon emissions. The report found that energy and carbon emissions savings were greater for the higher-cost, more comprehensive retrofit packages, with impacts ranging from 13% to 35% energy savings.



PUBLICATIONS

- Liu, J., Yu, L., Yin, R., Piette, M.A., Pritoni, M., Casillas, A., Schwartz, P. (2023) "Factors Influencing Building Demand Flexibility." **DOI**
- Grahovac, M., Ehrlich, P., Hu, J., Wetter, M. (2023) "Model-based data center cooling controls comparative co-design." *Science and Technology for the Built Environment* **DOI**
- Queiroz, N., Fernandes, L., Pereira, F. (2023) "Comparison of Fast Daylighting Climate-Based Simulation Methods for Parametric Design: Two-Phase, Three-Phase Method and Path Tracing." *Architectural Engineering and Design Management* **DOI**

Above is a sample of our recent publications. To find more, please visit **buildings.lbl.gov/publications**.

Building Technology & Urban Systems | Energy Technologies Area | Berkeley Lab

Jessica Granderson, Interim Division Director, Building Technology & Urban Systems
Tianzhen Hong, Interim Deputy for Research Programs

1 Cyclotron Road, Berkeley, CA 94720

See also: Department of Energy **Building Technologies Office**

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Lawrence Berkeley National Laboratory (Berkeley Lab) is located in the Berkeley Hills near University of California (UC) Berkeley and conducts scientific research on behalf of the United States Department of Energy (DOE). The Laboratory overlooks the UC Berkeley.

Berkeley Lab addresses the world's most urgent scientific challenges by advancing sustainable energy, protecting human health, creating new materials, and revealing the origin and fate of the universe. Founded in 1931, Berkeley Lab's scientific expertise has been recognized with 14 Nobel prizes. The University of California manages Berkeley Lab for the U.S. Department of Energy's Office of Science. For more information, visit www.lbl.gov.

DOE's Office of Science is the single largest supporter of basic research in the physical sciences in the United States, and is working to address some of the most pressing challenges of our time. For more information, see ***science.energy.gov****.*