



## BUILDING TECHNOLOGY & URBAN SYSTEMS ENERGY TECHNOLOGIES AREA



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### The Next 90 Years for Building and Cities

As the Lab marks its 90th anniversary by both honoring the past and envisioning the future, it's inspiring to think about the many contributions to building energy efficiency that have resulted from our research. "Super window" technology first developed at the Lab in the 1970s, for example, continues today in the Building Technology and Urban Systems Division (BTUS), saving the nation billions in energy costs. Everyone within BTUS is furthering the legacy Art Rosenfeld established when he founded the Lab's Center for Building Science in 1975.

With a push toward zero-emissions buildings in California and worldwide, and with two-thirds of the global population destined to live in cities by 2050, our work is more critical than ever. The outcome of efforts to head off the most dangerous effects of climate change will depend on our ability to make our homes, schools, and workplaces as efficient as possible while maximizing our resources, particularly in urban areas. We want our work to benefit all members of society, and promote gender, racial and economic equity. Given this context, 90 years is like the blink of an eye. Read on for examples of how our researchers are making every day count.

— Christian Kohler, Department Head, Building Technology Department

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### Berkeley Lab Launches 90th Anniversary Celebration



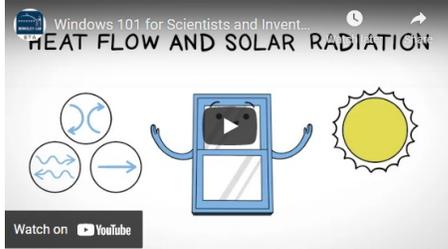
Last month Berkeley Lab launched an official year of celebration to honor the Lab's 90th anniversary. In 1931, a 30-year old physics professor, Ernest Orlando Lawrence, created the Radiation Laboratory in a modest building on the UC Berkeley campus. From that humble beginning, a research powerhouse was born.

You can explore historical milestones, sign up for events and virtual tours, and more at the 90th anniversary website: [berkeleylabnext90.lbl.gov/](https://berkeleylabnext90.lbl.gov/)

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### Windows 101 Video Series for Scientists and Inventors

The [Windows & Daylighting Group](#) is creating a series of videos aimed at introducing windows topics to non-windows researchers and inventors. The second video, *Windows 101 for Scientists and Inventors: Episode 2, Heat Flow & Solar Radiation* recently launched.



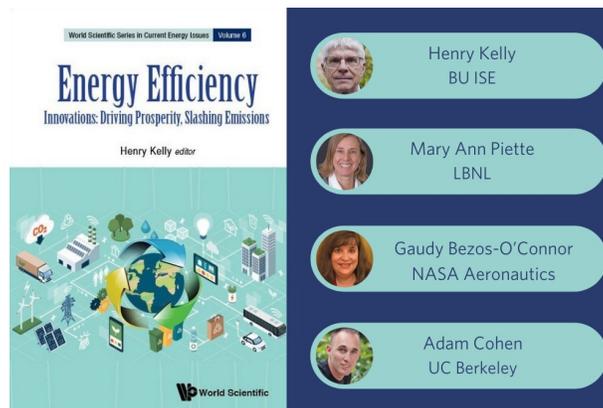
You can find both episodes here: <https://windows.lbl.gov/windows-videos>

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## Webinar March 10th: Energy Efficiency Innovations

You're invited to join pioneers and leaders in mobility, aviation, buildings, and industrial energy efficiency for a panel discussion of World Scientific's new release, *Energy Efficiency | Innovations: Driving Prosperity, Slashing Emissions*.

[RSVP here](#) for the March 10th webinar hosted by Boston University Institute for Sustainable Energy.



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## Women @ The Lab Award



BTUS' Jessica Granderson is among this year's honorees of the Women @ The Lab. The awards promote the achievements of 15 brilliant women and aim to inspire a new generation of women to enter the STEM workforce, where their participation could lead to important breakthroughs.

Meanwhile, as part of Women's History Month, the Department of Energy is focusing on women in climate action. Read more about these stories of the pioneering women at DOE's Women in Energy website, <https://www.energy.gov/women>.

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## Hong Elected ASHRAE Fellow



Tianzhen Hong, deputy of the Building Technology Department, was recently elected as an ASHRAE Fellow. He has been a member of ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers) for 25 years and served on various technical committees. His involvement has included chair of the Multidisciplinary Task Group on Occupant Behavior in Buildings and as a voting member on ASHRAE standards that cover testing methods for building energy simulation tools and representing performance simulation data for heating, cooling, and other facility equipment.

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## Spread the Word About CalTestBed Initiative

Clean energy innovators outside Berkeley Lab are invited to

Berkeley Lab's role is to conduct the testing for any applicants that list the Lab as their top choice. ETA test facilities such as FLEXLAB, the Battery Research and Testing Facility, the Fuel Cell Research and Testing Facility and other LBNL facilities such as the Advanced Light Source are examples of potential sites. Each voucher can be worth up to \$300,000. The application period is now open with a deadline of March 19, 2021.

Questions related to the capabilities of our facilities or the program? Please contact [Cindy Regnier](#), Berkeley Lab's PI for CalTestBed, or [Alecia Ward](#), the Program Ombudsperson.

Encourage clean energy innovators to apply at the CalTestBed website: [caltestbed.com](https://caltestbed.com)

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## CalFlexHub Grant and California Energy Commission (CEC) Updates

Congratulations to BTUS Division Director Mary Ann Piette and her team for the recent award of \$16 million for the "Achieving Integrated and Equitable Decarbonized Loads" CalFlexHub proposal.

The Hub will develop and deploy practical solutions to ensure California's customer loads evolve from static demand to become integrated, equitable, flexible, price responsive and reliable for demand flexibility modes. The planned projects will increase end-use demand flexibility, reduce dependence on fossil fuels, enhance grid stability and help resolve reliability issues related to achieving California's renewable generation, electrification and decarbonization goals.



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## Building Efficiency for a Sustainable Tomorrow (BEST) Center 2021 Annual Institute

More than 300 people attended the [2021 BEST Annual Institute](#) conference, with this year's event focused on sustaining healthy and energy efficient buildings through technician education. Key presentations were given by Berkeley Lab staff, including Mary Ann Piette, Jessica Granderson and Iain Walker. Making a business case for a healthy building; buildings and wildfires; and grid-interactive efficient buildings were just some of the topics covered.



Read the full article for more about the event's speakers and topics <https://buildings.lbl.gov/news/article/building-efficiency-sustainable>

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## IMPEL+ Update



IMPEL+ is successfully closing out their 2021 pitch workshop season with a full roster of forty-five building and energy technology innovators from small businesses, startups, academia and national labs. Congratulations to the FY21 cohort of Innovators that includes LBNL's Carolyn Szum (EAEI), Reshma Singh (BTUS), and Nemanja Danilovic (ESDR). From the IMPEL+ workshops, selected innovators will participate in exciting opportunities--including two national pitch events and an accelerator program--made possible by IMPEL's partnership with Greentown Labs and the Austin Technology Incubator, and the DOE Building Technologies Office. [Stay tuned](#) for an announcement about these Innovator selections!

See more: <https://impel.lbl.gov/>

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## Infant Warmer Receives Patents for Humanity Recognition



An infant-warming device developed by two researchers at the Berkeley Lab was recently recognized with an honorable mention in the 2020 Patents for Humanity awards. Designed by Berkeley Lab researchers Ashok Gadgil and Vi Rapp, the device offers warmth to a newborn infant when skin-to-skin care is inadequate or infeasible, helping to prevent infant hypothermia. Global Newborn Solutions™ has licensed the technology and, in collaboration with Harvard Medical School, has tested over 204 times in district hospitals and health centers throughout Rwanda.

More about the award:

<https://energyanalysis.lbl.gov/news/article/patents-humanity-recognizes-infant>

## LBNL Pitch Competition 2020



Berkeley Lab recently held a pitch competition for scientist-entrepreneurs who participate in the Lab's [I-Corps Lite](#) program, providing them with the opportunity to practice pitching their ideas. First place winner Andrew Haddad of the Energy Storage and Distributed Resources Division advances to a DOE-wide pitch competition to compete for cash prizes supporting additional research. Participants included BTUS's Reshma Singh, who won third place.

Watch the competition here: [youtu.be/tqcnK17h4bM](https://youtu.be/tqcnK17h4bM)

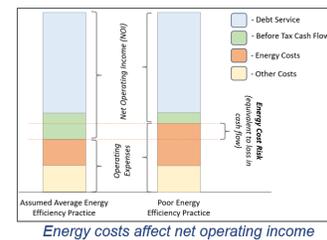
## Featured Publications

### Should Commercial Mortgage Lenders Care About Energy Efficiency? Lessons From a Pilot Study

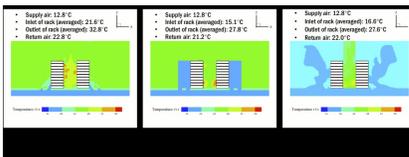
This paper presents results on the impacts of energy efficiency on commercial mortgage defaults. The research is a joint effort between BTUS and UC Berkeley Haas School of Business.

Mathew, P, Issler, P and Wallace, N. "Should commercial mortgage lenders care about energy efficiency? Lessons from a pilot study." *Energy Policy* 150 (2021)

<https://eta-publications.lbl.gov/publications/should-commercial-mortgage-lenders>



### New Prototype Building Models for Laboratories, Data Centers and Tall Buildings



A recent article, led by Kaiyu Sun with co-authors of Na Luo, Xuan Luo and Tianzhen Hong, on the prototype data center models was published in *Energy and Buildings*. The models use a novel approach implemented in EnergyPlus to consider the effect of nonuniform distribution of air temperature in data centers. New prototype building models for laboratories and tall buildings were also developed, which

are additions to DOE's 16 existing prototype building models. These models were developed with input from domain experts and stakeholders including ASHRAE, and have been used in modeling and analyses to support technology assessment and codes and standards development. These models are part of the BTO funded OpenStudio project led by Tianzhen Hong.

Sun K, Lu N, Luo X. and Hong T. **Prototype energy models for data centers.** *Energy and Buildings*, 231, p.110603. 2021

<https://eta-publications.lbl.gov/publications/prototype-energy-models-data-centers>

## Other Recent Publications

Zhao H, Chan WR, Singer BC, Delp WW, Tang H, Walker IS. **Factors impacting Range Hood Use in California Houses and Low-Income Apartments.** *International Journal of Environmental Research in Public Health.* 17(23), 8870. Published online 28-Nov-2020.

<https://eta.lbl.gov/publications/factors-impacting-range-hood-use>

Zhao H, Chan WR, Cohn S, Delp WW, Walker IS, Singer BC. **Indoor Air Quality in New and Renovated Low-Income Apartments with Mechanical Ventilation and Natural Gas Cooking in California.** *Indoor Air.* Published online 18-Oct-2020.

<https://eta.lbl.gov/publications/indoor-air-quality-new-renovated-low>

Singer BC, Chan WR, Delp WW, Walker IS, Zhao H. **Effective Kitchen Ventilation for Healthy Zero Net Energy Homes with Natural Gas.** CEC Final Report. January 2021

<https://ww2.energy.ca.gov/2021publications/CEC-500-2021-005/CEC-500-2021-005.pdf>

Booten C, Rao P, Rapp V, Jackson R, Prasher R. **Theoretical Minimum Thermal Loads in Buildings.** *Joule.* 5(1), pp.24-46. 20-Jan-2021

<https://eta-publications.lbl.gov/publications/theoretical-minimum-thermal-load>

See more:

[buildings.lbl.gov/publications](https://buildings.lbl.gov/publications)

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See also: Department of Energy [Building Technologies Office](#)

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Lawrence Berkeley National Lab (Berkeley Lab) is located in the Berkeley Hills near UC Berkeley and conducts scientific research on behalf of the United States Department of Energy (DOE). It is managed and operated by the University of California (UC). The Laboratory overlooks the University of California, 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 13 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](http://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](http://science.energy.gov).

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