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Wired for Success

With the proliferation of sensors, communication and energy management systems, we have the ability to extract more data than ever from our buildings. But how do we use it?

Increasingly, machine learning plays a role. At Building Technology & Urban Systems (BTUS), we are researching and developing systems that can automatically detect problems, deliver advanced control, and provide higher levels of performance with less hands-on management. Learn more about our Energy Management and Information Systems work at buildings.lbl.gov/emis, and read on to discover more important work aimed at making our buildings smarter and safer.

—Jessica Granderson, Deputy of Research, Building Technology and Urban Systems Division

Video Feature: Energy Reporting Devices

With so many devices at play in a given building, how should decisions about energy use be made?

A new video featuring researchers Bruce Nordman, Aditya Khandekar, Marco Pritoni and Anand Prakash explains energy reporting work under way at BTUS, funded by the California Energy Commission.

Watch on YouTube: youtu.be/28oURL5em4I

Ventilation and Indoor Air Quality in New California Homes: What's Working?

Reducing energy waste through air sealing is essential to California achieving zero energy homes, but indoor air quality (IAQ) can be a concern.

To address this, California's Title 24 Building Standards have required mechanical ventilation in new homes since 2008. A new Berkeley Lab

report evaluates the impact of these requirements in newer homes with natural gas appliances.

Read more:
Project Fact Sheet

Learn more about the Indoor Environment Group:
indoor.lbl.gov

Rosenfeld Symposium Honors Efficiency

A select audience recently gathered for the 2019 Art Rosenfeld Symposium on Energy Efficient and Grid Interactive Buildings.

The day was dedicated to the ongoing scientific discoveries and research inspired by Rosenfeld, a Berkeley Lab Senior Scientist, UC Berkeley Professor and former Commissioner of the California Energy Commission. A new video about Rosenfeld and his legacy also debuted at the symposium.

The picture at right shows all the poster presenters from the conference.

Read more: buildings.lbl.gov/news/article/rosenfeld-symposium-honors-efficiency

Watch the Video: youtube.com/watch?v=tqTTnIdK6ZM

Working With Industry to Save Energy

Industry leaders learned the latest techniques and technologies to save energy and water during a recent event at Berkeley Lab hosted by the Department of Energy's Better Buildings, Better Plants program. The program helps industrial partners achieve voluntary energy performance improvement goals.

Read more about the event:
buildings.lbl.gov/news/article/working-industry-save-energy

It's New: The Rosenfeld Scientific Workforce Development Program

A new program designed to draw scientists and engineers who want to contribute to society through fundamental scientific and technological advances in the field of building technology research has been launched at ETA.

Nari Yoon (pictured) is the first selected to this program, and started at ETA on June 10, 2019. She is a postdoctoral researcher focusing on sustainable design, design-integrated simulation methodologies and natural ventilation. Her recent

study on natural ventilation simulation utilized experiments from a living lab, as well as Modelica, a next-generation Building Energy Simulation engine. Yoon has worked as a building performance specialist, engineer and architectural intern prior to her doctorate. She received degrees from the Harvard Graduate School of Design, and Hongik University, Korea.

The new program is based in ETA's Building Technology and Urban Systems Division, in partnership with the Building Technologies Office of the Office of Energy Efficiency & Renewable Energy, Department of Energy.

Read more: buildings.lbl.gov/rosenfeld-building-scientific-workforce

Cultivating an Entrepreneurial Mindset in Building Technology

BTUS scientists recently completed a new Department of Energy program aimed at helping building technology researchers develop market-oriented skills.

Reshma Singh led the program, Incubating Market-Propelled Entrepreneurial Mindset at the Labs (IMPEL), and the participants included researchers Robert Hart, Howdy Goudey and Baptiste Ravache.

Read more: energy.gov/eere/buildings/articles/impel-your-building-technology-idea

A Clear View of Window Energy Savings

This year U.S. consumers will see new in-store labels for window coverings such as blinds and shades. The labels were informed by a product rating and certification program developed via extensive modeling and research at Berkeley Lab.

Read more at American Council for an Energy-Efficient Economy:
aceee.org/blog/2019/05/new-store-label-window-coverings-will

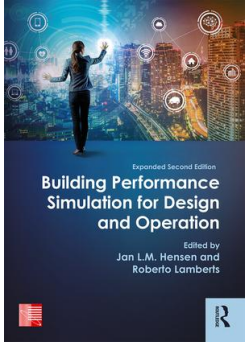
OpenADR Becomes Global Standard for Demand Response

The grid communications model OpenADR, which began as a Berkeley Lab research project, recently became an international standard. OpenADR offers a common language energy customers and grid operators can use to communicate. Its approval as a global standard in January came from the International Electrotechnical Commission (IEC), which publishes consensus-based standards for the world's electric systems.

More on the standard: buildings.lbl.gov/news/article/lab-research-streamlines-modern-grid

OpenADR video: youtube.com/watch?v=_Weo3TbrTnU

Researchers Contribute to New Building Performance Title



A new edition of *Building Performance Simulation for Design and Operation* features a chapter co-authored by Michael Wetter on future building system modeling and simulation. The Routledge title offers a comprehensive overview of building performance simulation from conception to demolition, with new chapters on building information modeling, occupant behavior modeling, urban physics modeling, urban building energy modeling and renewable energy systems modeling.

Check out the release:
routledge.com/Building-Performance-Simulation-for-Design-and-Operation/Hensen-Lamberts/p/book/9781138392199

Launch of Advanced M&V Tool

Many stakeholders in the M&V industry are using a software tool or method for advanced M&V on a project. Berkeley Lab developed a test procedure to answer the following questions: how accurate is the tool, and how does it compare to similar tools? After many months of development work, EVO is taking that procedure to market by offering an online testing service. The testing service gives a general sense of accuracy for a given tool, and also lets you compare one tool/method to another. It is founded upon a consistent methodology and industry-accepted performance metrics for M&V 2.0 software tools. It derives baseline model accuracy results using a standard procedure and dataset. The portal's target audience consists of vendors (software developers) who can use the service for benchmarking, independent review and performance assessment as well as for marketing. The portal could also potentially be used by sponsors such as utilities for vendor qualification, for custom testing using utility's own data set or comparative results analyses.

Check it out at: mvportal.evo-world.org/

Comparing Attic Approaches for Zero Net Energy Homes

BTUS researchers recently investigated the thermal and moisture performance of a low-cost approach to sealing and insulating attics using glass fiber insulation. Results from both field measurements and simulations indicate that the use of air and vapor permeable insulation can be acceptable from a thermal/energy point of view, but additional measures need to be taken to reduce moisture risks, primarily from mold growth.

Project Fact Sheet

ASHRAE HVAC Applications Handbook

A new Chapter 65, occupant-centric sensing and controls, is now available as part of the 2019 ASHRAE HVAC Applications Handbook. Berkeley Lab's Tianzhen Hong, Jared Langevin, and Na Luo are co-authors of the chapter.

Handbook can be found at:
www.ashrae.org/technical-resources/ashrae-handbook/ashrae-handbook-online

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Recent BTUS Publications

- Arian Aghajanzadeh and Peter L. Therkelsen. "Agricultural demand response for decarbonizing the electricity grid." *Journal of Cleaner Production*

- Travis Walter, and Paul A. Mathew. *Is the BPD Nationally Representative? A Comparison of the Building Performance Database to the Commercial Buildings Energy Consumption Survey.*
- L.R. Hu, Jessica Granderson, David M. Auslander, and Alice M. Agogino. "Design of machine learning models with domain experts for automated sensor selection for energy fault detection." *Applied Energy*
- Jordan D. Clark, Brennan Less, Spencer M. Dutton, Iain S. Walker, and Max H. Sherman. "Efficacy of occupancy-based smart ventilation control strategies in energy-efficient homes in the United States." *Building and Environment*
- Prakash Rao, Darren Sholes, and Joe Cresko. "Evaluation of U.S. Manufacturing Subsectors at Risk of Physical Water Shortages." *Environmental Science & Technology*

See more:
buildings.lbl.gov/publications

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

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