



## Amplifying the Impact of our Research

Here in Berkeley Lab's Building Technologies and Urban Systems (BTUS) Division, our researchers take great pride in our foundational scientific findings on energy systems in buildings and industry. But we find even greater satisfaction when this research is translated into impacts in the real world — reducing energy use and its associated emissions from real buildings, saving consumers and businesses on their energy bills, and improving air quality for everyone. This spring issue of the BTUS newsletter highlights several ways that our researchers are amplifying the impact of our research.

One approach to scaling up these impacts is through community-scale deployment of clean energy, exemplified by Department of Energy's (DOE) Connected Communities program, for which BTUS researchers serve in a national coordinator role. Secretary Granholm's recent visit to one of these research communities in Southern California gave a preview of how transformative these energy efficiency and distributed energy technologies can be when deployed at scale.

Our BTUS researchers also operate the Incubating Market-Propelled Entrepreneurial-Mindset at the Labs (IMPEL) program, which trains and equips the next generation of clean-energy entrepreneurs so they can effectively scale their innovations for commercial deployment. IMPEL recently achieved several significant milestones.

And continuing a legacy that goes back to the earliest days of BTUS's research, we always strive to share our research findings in ways that are accessible to the people who can use this information to make practical decisions about their buildings and industrial plants — whether they are building operators, Federal energy managers, or the general public. Read on to learn more about some of our recent activities to turn our research results into actionable information.

Richard Brown, Deputy Department Head, Building Technology, BTUS Division

## Secretary Granholm Visits Connected Communities Project in California

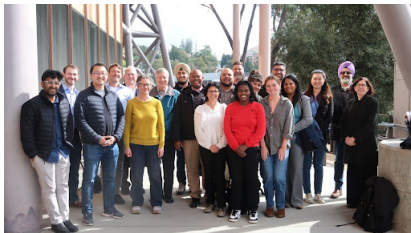


On Monday, February 26, DOE Secretary Jennifer Granholm visited two all-electric Menifee, California neighborhoods that are part of DOE's Connected Communities program, for which Berkeley Lab is the national coordinator. The community's 230 homes are powered entirely by solar energy and a community-level microgrid. The Menifee project is one of ten DOE-funded demonstration projects that show how smart, resilient, energy-efficient buildings can help the nation reach its energy and climate goals.

The project partners have applied a "reduce before produce" approach to designing, constructing and connecting the homes. First, in the "reduce" step, project partner KB Home built all-electric homes with high-efficiency building technologies to produce houses about 40% more energy efficient than typical California homes. In the second "produce" step, technologies from partner SunPower were installed, including solar photovoltaics (PV) and storage systems. The homes are connected in a microgrid and they function as distributed energy resources that can be controlled simultaneously, which provides both resiliency for the community and service to the grid.

Learn more: <https://connectedcommunities.lbl.gov/>

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## IMPEL's 5th Year of Training Building Tech Innovators is Underway

In January, the **IMPEL** program conducted its annual Carbon Tools Training, a core piece of the program's Foundational Training which provides its cohort with training and hands-on experience utilizing carbon estimation tools with experts from national labs, Carbon Leadership Forum, and Prime Coalition. Using Scout, CRANE, and GREET (Greenhouse gasses, Regulated Emissions, and Energy use in Technologies), among other life cycle analysis tools, the cohort dived headfirst into estimating the potential carbon reduction impact of their technologies.

In February, IMPEL kicked off its Advanced Training through a dynamic 3-day Business Seminar Training at Berkeley Lab. The training, tailored for 19 select Innovators from their cohort, offered invaluable business plan coaching and even included a tour of FLEXLAB<sup>2</sup>. As IMPEL celebrates its 5-year anniversary this year, we invite you to explore the program's newly revamped website for more insights on their Innovators and successes.

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## Making Housing Sustainable: Finding a Path to Home Decarbonization

Reducing the contributions of the housing sector to greenhouse gas (GHG) emissions will be essential for California to meet its climate goals. Currently, California homes have some of the highest uses of on-site methane combustion in the nation. This presents a significant challenge in reducing emissions of CO<sub>2</sub> and other products of combustion. **Dr. Iain Walker** will give a talk which examines the

**"Making Housing Sustainable: Finding a Path to Home Decarbonization"**  
**Dr. Iain Walker, Building Technology and Urban Systems Division, Lawrence Berkeley National Laboratory**

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This talk examines the current barriers to decarbonizing California homes, including the need to transition away from the traditional focus on how much energy is used, to instead focus on when it is used, and how to control housing's contributors to potential increases in demand on the state's electricity system. It will also discuss current construction solutions and future technology and policy needs that can contribute to the goal of home decarbonization and incorporate considerations of affordability, equity, as well as technological and workforce availability.

**Dr. Iain Walker** is a staff scientist at Lawrence Berkeley National Laboratory (LBNL) and an American Society of Heating, Refrigerating and Air Conditioning (ASHRAE) Fellow. He is Deputy Head of the Whole Building Systems Department at LBNL, where he also leads the Residential Building Research Team. Dr. Walker has more than 20 years of experience as a building scientist and is a leader and developer of national and international standards and technical committees for ASHRAE, the American Society for Testing and Materials, the Residential Energy Services Network, the International Electrotechnical Commission, the International Energy Agency, and the International Organization for Standardization. Dr. Walker is the author of over 200 papers and research reports and his current work focuses on residential ventilation and home decarbonization.

For calling purposes please RSVP by **April 24th** (to accommodate) to ensure that we have a search by you.

For information contact: **Dr. Iain Walker** at (925) 947-4170 or [iwalker@lbl.gov](mailto:iwalker@lbl.gov). The views and opinions expressed during this session are those of the speaker and do not necessarily represent the views of LBNL.

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Click [here](#) for more information.

## New Resource Supports Building Owners to Procure Decarbonization Audits



In support of **DOE's Better Climate Challenge**, Berkeley Lab researchers developed a new resource for building owners and operators called the **GHG Emissions Reduction Audit Scope of Work Template**. Currently, there is no standard for the scope of a GHG emissions reduction audit so this resource aims to fill a gap in the industry. The resource is a template that can be used to develop a scope of work for a GHG Emissions Reduction Audit to share with an auditor or include in a request for proposal. The aim of the scope of work template is to achieve building-level solutions that will reduce operational GHG emissions.

**Energy Efficiency Requirements for Acquisition**  
 Getting Everyone On The Same Page

## BTUS to Federal Buyers: Take Five Minutes for a More Stable Climate

DOE asked for “back-to-basics” training to guide federal buyers toward more energy efficient purchases, and our Sustainable Operations team answered with a series of pithy, five-minute videos that are gaining kudos from key federal actors.

Getting buyers to make clean, efficient choices is consequential. The U.S. government is the nation’s largest purchaser of goods and services *and* is its largest energy user. Federal law requires agencies to buy efficient products, yet contracting officers indicate in surveys that energy efficiency is often low on their list of purchasing priorities. Meenakshi Venkatraman and Ian Hoffman devised the **Take Five video series** around a simple message: every purchase counts in the arithmetic of climate change. It’s worth a few minutes to procure a less carbon-intensive future.

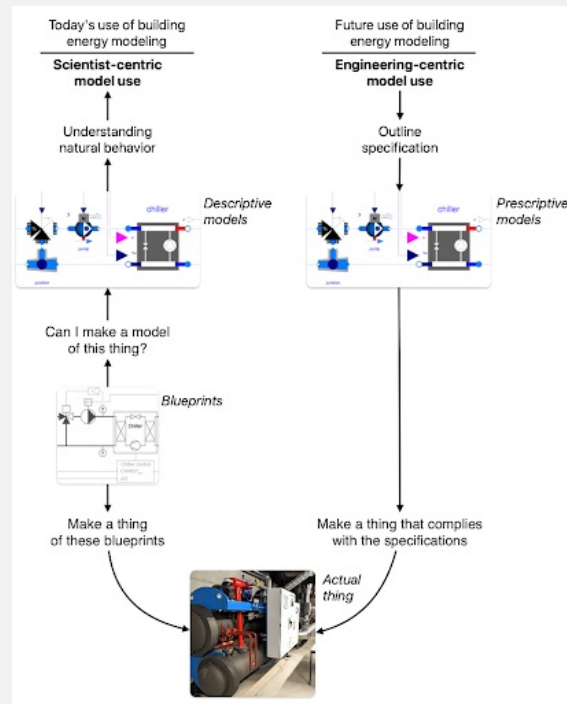
“The Take Five training modules are fantastic,” said GSA chief sustainability officer Kevin Kampschroer. “They’re so good that we’ve shipped them out to all of our building managers, all of the contractors who work for us, thousands of people.”

## FEATURED PUBLICATIONS

### A Call to Action for Building Energy System Modeling in the Age of Decarbonization

In this recent **publication**, Berkeley Lab researchers argue that the energy and building sectors are currently at a transformative crossroads, driven by the integration of distributed energy resources and the quest for greater load flexibility. This evolution brings complex challenges that outdated simulation and optimization workflows cannot address. The traditional, scientific approach — focused on understanding and predicting systems that exist or are to be built using descriptive models — should be replaced by an engineering-centric paradigm: prescriptive models should be blueprints, unambiguously specifying the design and functionality of systems. This paradigm shift will revolutionize our design-build-operate processes and enhance digitalization and automation which are vital for achieving our ambitious decarbonization goals. Such a workflow can be embedded in Platform-Based Design, which is built on prescriptive models, structuring system design through formally defined layers of abstractions, where functional requirements drive specifications, a method proved effective in the semiconductor and automotive industries, as described in the **companion article**.

For details, contact: **Michael Wetter** and **Matthias Sulzer**.



## PUBLICATIONS

- Ham, S.w., Paul, L., Kim, D., Pritoni, M., Brown, R., Feng, J. (2024) "Decarbonization of Heat Pump Dual Fuel Systems Using a Practical Model Predictive Control: Field Demonstration in a Small Commercial Building." <https://buildings.lbl.gov/publications/decarbonization-heat-pump-dual-fuel>
- Shamila, H., Zhang, W., Paolini, R., Gao, K., Altheeb, M., Mogirah, A.A., Moammar, A.B., Hong, T., Khan, A., Cartalis, C., Polydorose, A., Santamouris, M. (2024) "Quantifying the Energy Impact of Heat Mitigation in Cities: A Catalyst for Building Energy Saving." <https://buildings.lbl.gov/publications/quantifying-energy-impact-heat>
- Webster, B., Toffoli L., Campbell, M., Satre-Meloy, A., Badger, L., Donovan, A., Lane, D., McGrath, K., Wilson, E., Reyna, J., Metzger, C., Pilet, T. (2024) "Accelerating Residential Building Decarbonization: Market Guidance to Scale Zero-Carbon-Aligned Buildings." <https://buildings.lbl.gov/publications/accelerating-residential-building>

Above is a sample of our recent publications. To find more, please visit [buildings.lbl.gov/publications](https://buildings.lbl.gov/publications).

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