

2018 ACEEE Summer Study on Energy Efficiency in Buildings

Making Efficiency Easy and Enticing

August 12 - 17, 2018
Asilomar Conference Center
Pacific Grove, California

CONFERENCE CALENDAR

- OCTOBER 27, 2017**
Abstracts due to the ACEEE Summer Study Office
- JANUARY 22 - 26, 2018**
Authors notified of abstract status — acceptance letters sent and instructions for preparing papers posted
- MARCH 20 - 24, 2018**
First drafts of refereed papers due to designated Panel Leaders
- APRIL 16, 2018**
Registration materials available
- MAY 1, 2018**
Reviewed drafts sent to authors
- MAY 21 - 25, 2018**
Second drafts of refereed papers due to designated Panel Leaders
- MAY 24 - JUNE 1, 2018**
Final refereed papers uploaded
- JULY 19, 2018**
Conference registration deadline (late fee in effect after this date)
- AUGUST 12 - 17, 2018**
Summer Study

CONFERENCE ARRANGEMENTS

The Summer Study will be held August 12 - 17, 2018 at the Asilomar Conference Center in Pacific Grove, California. Information about accommodations at Asilomar will be provided in the registration materials.

ALL SPEAKERS MUST PAY THE EARLY BIRD REGISTRATION FEE.

The conference will be conducted in a casual atmosphere. The dress is also casual.

The 2018 ACEEE Summer Study is the 20th biennial ACEEE conference on Energy Efficiency in Buildings. A diverse group of professionals from around the world will gather at this preeminent meeting to discuss the technological basis for, and practical implementation of, actions to reduce energy use and the climate impacts associated with buildings. Presentations and discussions will relate to the theme, “Making Efficiency Easy and Enticing.”

Technologies, strategies, and programs for advancing energy efficiency abound. The technical efficiency of buildings systems and components continues to increase, with advances in material science and technology development. The information technology revolution is enabling vastly more insight and data-driven decision making by stakeholders across the spectrum of the building lifecycle. Advanced sensors and controls are making dynamic, grid-integrated buildings a reality. Hundreds of buildings are now operating at or near net-zero energy. The major challenge for the building industry is to significantly increase the pace of adoption across all market sectors and regions. Overcoming stubborn behavioral, economic, and market barriers call for innovation in how we approach technology development, program design and implementation, codes and standards, financing, workforce development, and community development. Put simply, we need innovation to make energy efficiency the easy and enticing choice for decision-makers across the board. Come to the 2018 Summer Study with your ideas, experiences, and vision to make energy efficiency easy and enticing.

We invite you to contribute your most creative work in the following areas:

- technologies, design, operations, and industry trends
- program design, implementation, and evaluation
- codes and standards
- utilities
- market transformation
- behavior science and practice
- energy efficiency policy
- zero net energy
- resilient and sustainable communities
- smart buildings, smart grid, and information technology
- energy efficiency and equity (new!)

2018 ACEEE Summer Study on Energy Efficiency in Buildings Making Efficiency Easy and Enticing

Abstracts

Abstracts should relate to the panels described. There are three general categories for abstract submission:

- **Oral Presentation**
(Presentation + Published Paper)
- **Visual Presentation**
(Display + Published Paper)
- **Display Presentation**
(Display + No Published Paper)

Authors may submit more than one abstract in each category, but only one abstract per “lead author” will be accepted and the lead author will be expected to present the resulting paper. Only one presentation by an author will be allowed. If you are “lead author” on more than one abstract selected, you will be asked to designate a co-author as “lead author.” Your abstract may be accepted for a category other than the one you have chosen; therefore, it is important that you rank your abstract submissions in order of priority. To ensure a balanced program, ACEEE reserves the right to exclude papers at any point in the publication process.

Every author is required to register (pay registration fees) to attend the Summer Study. If the registration fee is not received by the deadline date, July 19, 2018, the author’s paper will not be scheduled for presentation or published in the proceedings.

The following criteria will be used for selecting papers for the Summer Study:

- Presentation of new material (must not have been presented at another conference or published in another set of proceedings)
- Relevance of topic to the conference theme
- Likelihood of stimulating discussion and debate
- Clarity of thought and presentation

The Summer Study is intended to be a participatory event and actively seeks knowledgeable reviewers to assist in the peer review of submitted papers. If you wish to volunteer as a reviewer, please fill out the Reviewer Request Form.

Refereed Paper (for Oral or Visual Presentation)

Authors with accepted abstracts will prepare a draft paper that will be peer reviewed and returned to the author for revision. Authors will then submit a final paper to be included in the published proceedings. Final papers are limited to 12 pages. Each author of a Refereed Paper for Oral Presentation will be allotted 20 minutes for their presentation at the Summer Study. Authors of a Refereed Paper for Visual Presentation will be assigned to a two-hour display session.

Display Presentation

This category is designed for the presentation of material not suited to a refereed paper. Examples include interactive software, operable technologies, video displays, or complex graphics.

Display sessions, scheduled on two afternoons, are designed so that participants may circulate and discuss these presentations with their authors. Authors will be assigned to a two-hour display session.

Instructions for Authors

Abstracts must not exceed 250 words of text. The following information must be included

at the top of each abstract:

- a. Title of Abstract
- b. Category:
 - I. Oral Presentation
(Presentation + Published Paper)
 - II. Visual Presentation
(Display + Published Paper)
 - III. Display Presentation
(Display + No Published Paper)
- c. Selection of Panel (by Panel number)

Do not include authorship or institutional affiliation on the abstract.

Submit abstracts online:

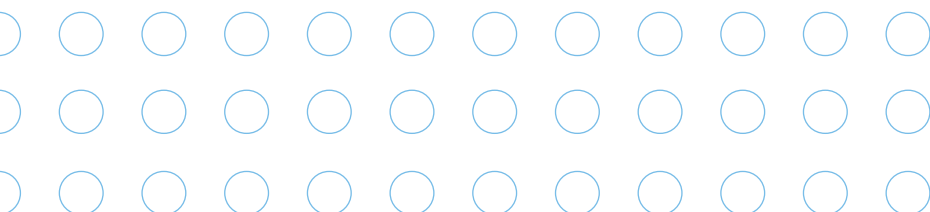
<http://aceee.org/conferences/2018/ssb/#call>

2018 Summer Study Organizing Committee

Bing Liu (Co-Chair)
Pacific Northwest National Laboratory

Paul Mathew (Co-Chair)
Lawrence Berkeley National Laboratory

Jennifer Amann, Wendy Koch,
Rebecca Lunetta, Steve Nadel,
Lynn Pyle, and Justine Seas
American Council for an Energy-Efficient Economy



PANEL DESCRIPTIONS

Abstracts from outside the U.S. are encouraged and will be included in all relevant panels below.

1

Residential Buildings: Technologies, Design, Operations, and Building Industry Trends

PANEL LEADERS: **Cheryn Metzger**, *Pacific Northwest National Laboratory* and **Dave Roberts**, *National Renewable Energy Laboratory*

SESSION TOPICS: This panel will cover a range of building science and engineering topics focusing on high-performance innovations that make energy efficiency easy and enticing in residential buildings in the US and internationally, including: integrated design; envelope load reduction; energy-efficient and demand-responsive equipment; connected devices; smart controls; net zero energy; comfort; indoor air quality; performance analysis/modeling; performance monitoring; benchmarking/rating/ labeling; fault detection and diagnostics; commissioning; construction trends and techniques.

2

Residential Buildings: Program Design, Implementation, and Evaluation

PANEL LEADERS: **Valerie Richardson**, *DNV GL* and **Tory Weber**, *Southern California Edison*

SESSION TOPICS: This panel will cover a range of topics for the US and internationally, including: fresh ideas or applications in the design, implementation, and measurement of energy efficiency programs. Program Design: ideas that emphasize cost-effective solutions; move to systems approaches; short- & long-term savings; integration of EE and other demand-side technologies; mix proven technologies with new ideas for success; the role of financing; balancing codes with program design; innovations in program design for new and emerging measures; residential programs in the age of smart meter data. Implementation: using innovative delivery channels; delivering cost-effective comprehensive retrofit programs; next-generation residential lighting strategies; new ideas in low- and middle-income programs; trends in residential building modeling software; incorporating advances in automation and building science; incorporating behavior strategies targeting individuals and community-scale. Evaluation: impacts of online programs/tools; cost-effectiveness of programs; innovative cost-effectiveness evaluation; using data mining for better predictive value; innovative approaches to evaluating program impacts; early-feedback evaluation approaches; understanding customer response to program outreach. All of these topics are intended to focus on how to make energy efficiency easy and enticing.

3

Commercial Buildings: Technologies, Design, Operations, and Building Industry Trends

PANEL LEADERS: **Chad Gilless**, *Stillwater Energy* and **Nora Wang**, *Pacific Northwest National Laboratory*

SESSION TOPICS: To support the conference theme of making energy efficiency easy and enticing, this panel will cover a range of US and international topics, including: building science and engineering focusing on retrofitting existing buildings and new construction technologies; integrated design and technologies; innovated, smart technologies; prefabrication and modular construction techniques; energy-efficient and demand-responsive equipment, systems and controls for ventilating, space conditioning, lighting, daylighting, and water heating; energy information systems; occupant comfort, well-being, and other benefits; innovated user approach; benchmarking; performance analysis/modeling; performance monitoring; commissioning; fault detection and diagnostics; on-site renewable generation and management; community level energy management; miscellaneous and process load optimization and management; and industry and market trends.

4

Commercial Buildings: Program Design, Implementation, and Evaluation

PANEL LEADERS: **Tom Coughlin**, *National Grid* and **Emily Moore**, *Northwest Energy Efficiency Alliance*

SESSION TOPICS: This panel will feature a range of topics aimed at innovative approaches to program design, implementation and evaluation featuring speakers from around the world. In today's energy efficiency environment, serving commercial buildings and making efficiency easy and enticing to the diverse range of commercial customers can be challenging. Suggested topics are: designing, implementing, and evaluating innovative EE and demand reduction programs; new approaches for integrating efficiency and demand response; program opportunities and challenges with advanced building controls and connected lighting; harnessing the power of data for program implementation and evaluation; innovative approaches for serving hard-to-reach markets; influencing decision-makers and making the business case for efficiency; capturing operational efficiency and behavioral changes; beyond widgets -- whole building approaches and deep energy retrofits; moving towards net-zero energy buildings; transitioning government policy into program design.

5

Codes and Standards

PANEL LEADERS: **Dave Cohan**, *US Department of Energy* and **Kristen Driskell**, *California Energy Commission*

SESSION TOPICS: This panel will cover all aspects of building energy codes and appliance and equipment standards. Focus areas for topic papers include making codes and standards easy and enticing, such as incentivizing early compliance, getting consumers to buy-in to codes, and simplifying standards; codes and standards development, opportunities to improve compliance and enforcement, above-code or beyond-code programs and concepts, data collection to support codes and standards, test procedure challenges and opportunities, and the interaction of codes and standards with renewable policies and flexible grid operation. All topics related to codes and standards will be considered. Papers may be retrospective, current, or forward looking.

6

Utilities and the Future

PANEL LEADERS: **Rafael Friedmann**, *Pacific Gas & Electric Company* and **Robert Ramirez**, *DNV GL*

SESSION TOPICS: Making energy efficiency easy and enticing for customers is increasingly difficult in the complex and evolving utility environment. Utility EE services, portfolios and programs will need a paradigm shift to stay relevant. We seek empirical results and findings that demonstrate both successful and unsuccessful repositioning and adaptation to current and future trends. These changes include increasing EE activity outside utility programs; decarbonization of the energy sector; sustainable-beneficial electrification; the continuing rise of PV, EVs, and storage; new IoT EE measures and transactive energy markets; advanced metering and new rate structures; new evaluation methods based on smart meters, AMI data, Big or Large Data, and machine learning; Smart Cities; "stretch" goals for EE & renewable savings-generation. Example topic areas are Targeted DSM, integration of EE with other DERs, Strategic Energy Management, and EM&V 2.0.

7

Market Transformation with Speed and Scale

PANEL LEADERS: **Julie Hughes**, *Institute for Market Transformation* and **Linda Sandahl**, *Pacific Northwest National Laboratory*

SESSION TOPICS: Innovative approaches and processes for strategic market transformation; assessments of market barriers, with strategies for overcoming them; results documenting lasting changes in market behavior towards improved energy-efficient products, services, systems, or practices; government's involvement in private market transformation; strategies for making energy efficiency easy and enticing; emerging technology identification and planning; public-private partnerships, the role of codes and standards; other regulatory changes; and tracking progress.

Capturing Savings through Behavior: Science and Practice

PANEL LEADERS: **Beth Karlin**, *University of Southern California* and **Christopher Payne**, *Lawrence Berkeley National Laboratory*

SESSION TOPICS: Human behavior plays a key role in making energy efficiency easy and enticing. This panel invites papers that discuss the role of behavior and behavioral science in targeting energy consumption. Submissions should address a specific behavior or behavioral science strategy, discuss past literature and/or theory, introduce a real-world example or empirical study, and include implications for future work. We are especially interested in papers that address the social context of behavior, innovative approaches, organizations and institutions, the use of data in design and evaluation of behavioral programs, and energy efficiency outside of the residential context.

Energy Efficiency Policy: US & Beyond

PANEL LEADERS: **Adam Hinge**, *Sustainable Energy Partnerships* and **Cody Taylor**, *US Department of Energy*

SESSION TOPICS: This panel will cover a range of topics on policies that make EE implementation easy, economical, and enticing for consumers in the US and internationally, including: state & local policy leadership; how states and municipalities can integrate and use EE to meet sustainability goals; EE's role in meeting climate goals and environmental regulations; balancing EE & demand response policies to meet the needs of a changing grid; compatibility of electrification and efficiency; EE policy design and cost-effectiveness under lower energy price scenarios; emerging business models and innovative financing mechanisms for EE; international experience with EE policies; future trends in energy use; policy packages to maximize EE impacts; best practice comparisons of EE policies; "If I knew then what I know now"- lessons learned from policies that didn't work despite good intentions; impact of climate adaptation on energy use and efficiency policy; benchmarking EE at state, regional, national, or international level.

Net Zero: Moving Beyond 1%

PANEL LEADERS: **Smita Gupta**, *Itron* and **Cathy Higgins**, *New Buildings Institute*

SESSION TOPICS: The methods and outcomes of getting to net zero are proven but they remain a very minor portion of the building stock. Panel 10 will share solutions to move beyond the 1% by making them 'easy and enticing.' The panel addresses four areas with examples of topics as follows: 1. Building Solutions: Integrated design approaches; Tools for increasing Net Zero design and adoption; Data and case studies; Performance modeling, prediction and evaluation; Innovative and leading edge technologies and strategies;

Markets and motivations for zero energy buildings; Cost and finances; Controls and load shaping for net zero; Operations and occupancy; On-site renewable generation; 2. Aggregated Solutions: Community, Campus, and Portfolio Scale; Microgrids and nanogrids for net zero campuses and buildings; Corporate portfolios; 3. Policies and Regulations: City, State, and Federal policies, codes and standards; Definitions and policies regarding net zero, renewables, on-site and RECs; GHG and carbon reduction challenges for net zero; 4. Utility and Programs: Utility programs for adoption of net zero; Rate design options; Grid integration and impact of net zero; Energy storage and EV charging in the net zero equation; Education and work force training for increasing adoption of net zero.

Resilient, Sustainable Communities

PANEL LEADERS: **Katherine Johnson**, *City of DC* and **Stephanie Ohshita**, *Lawrence Berkeley National Laboratory*

SESSION TOPICS: This panel will cover a spectrum of topics on resilient communities: Integrated planning and assessment of energy efficiency, climate change mitigation, and resilience at the community scale; utilizing building energy data and community-wide energy analysis to inform policy and contribute to better urban infrastructure; examining how a community focus can make energy saving and climate readiness easier and more enticing; quantification of energy benefits from sustainable and resilient building strategies, including tree canopy, architectural shade, solar-reflective materials, and blue and green infrastructure; analysis of the resilience benefits (i.e. thermal safety and passive survivability) of high performance buildings; incorporating equity considerations into planning for resilient, sustainable communities; assessment of the benefits of urban sustainability initiatives, such as energy savings or value added to real estate by integrated transport and land-use planning and other measures for livable and walkable communities; the contribution of energy efficiency and renewable energy measures to urban climate resilience, such as how district energy, micro-grids, and demand management can address an increased demand for cooling and a need for power stability during more severe weather.

Smart Buildings, Smart Grid, and the Internet of Things

PANEL LEADERS: **Larry Brackney**, *National Renewable Energy Laboratory* and **Jessica Granderson**, *Lawrence Berkeley National Laboratory*

SESSION TOPICS: Information Technology and the Internet of Things hold the promise of easier, more compelling energy efficiency opportunities. This panel focuses on novel applications of data science, modeling, management, and visualization; technologies that support behavior change and inform decision making throughout the building

lifecycle; advancements in hardware, software, and communications interoperability for a secure and agile smart grid; application of advanced hardware and software technologies that increase adoption of energy efficiency, load flexibility, and demand response in commercial and residential buildings.

Energy Efficiency and Equity: Addressing the Underserved

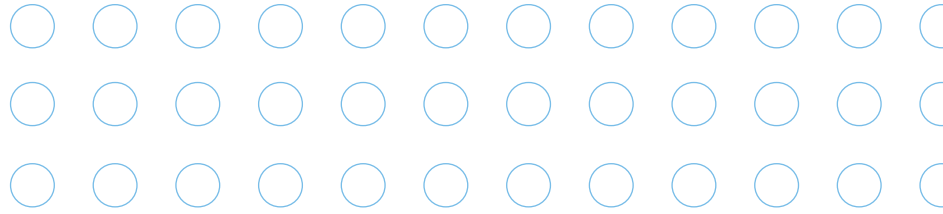
PANEL LEADERS: **Lauren Ross**, *American Council for an Energy-Efficient Economy* and **Jennifer Somers**, *The Energy Foundation*

SESSION TOPICS: This panel focuses on efforts to reach historically underserved households with energy efficiency investments. Low-income communities and communities of color stand to benefit from energy efficiency upgrades, healthier housing, and local job creation; yet, often cannot take advantage of energy efficiency opportunities given a variety of policy, regulatory, and other structural barriers. This panel seeks content related to energy efficiency programs serving low-income communities, community-based strategies for energy efficiency, renewables, healthy homes, local workforce development, equitable transportation initiatives, and more generally, effective approaches for delivering energy efficiency in low-income communities and communities undergoing transition. The panel encourages submissions that seek to tell the stories of residents in communities that have benefited from energy efficiency and the programs that served them through a variety of media beyond the traditional paper submission. Best practices in this space are still emerging and we welcome research and storytelling that speaks to the experience of delivering energy efficiency in a way that benefits all households.

Poster Displays

PANEL LEADERS: **Kristen Parrish**, *Arizona State University*

SESSION TOPICS: This panel leverages various media, including videos, posters, software programs, and other graphical displays, to tell the story of how your work makes energy efficiency easy and enticing. The panel seeks content related to the broad topic of building energy efficiency, in the commercial, industrial, or residential sectors. Panel submissions can address any aspect of the building lifecycle at any scale. The panel encourages submissions with rich visuals and graphics and offers presenters an opportunity to engage with conference attendees in one-on-one or small group discussions, rather than a traditional lecture format.



Making Efficiency Easy and Enticing

Who Should Attend? Individuals interested in energy efficiency and climate change issues associated with buildings including innovative technologies, programs, financing, design and operations practices, policies and education are encouraged to attend, including representatives from industries and utilities; architects; builders; financial and insurance professionals involved with buildings; clean-tech investors; manufacturers of building products, appliances and equipment; building owners and operators; engineers; government personnel; energy and climate researchers and educators; and consultants. Be sure to sign up early for this opportunity to participate in a unique blend of presentations and informal meetings.

Deadline for Abstract Submission: October 27, 2017

NEW!

Another opportunity for paper publication

Authors of selected papers presented at the 2018 ACEEE Summer Study will have the chance to also publish their papers in a special issue of the Springer Journal, "Energy Efficiency." To be considered for this honor, please check the "Yes" box in the cover sheet below. Authors will be notified about the selection at the Summer Study.

For more information about this publication, go to: <https://www.editorialmanager.com/enef>.

ABSTRACT COVER SHEET

Please include one cover sheet for each abstract submitted.

List **LEAD** author first. (Please print legibly.)

TITLE OF ABSTRACT	
AUTHOR(S) NAME(S)	
COMPANY/ORGANIZATION	

LEAD AUTHOR Contact Information:

NAME	
COMPANY/ORGANIZATION	
ADDRESS	
CITY, STATE, ZIP, COUNTRY	
TELEPHONE/WORK	CELL
E-MAIL	

CATEGORY OF SUBMISSION (please check one)

- Oral Presentation (Presentation + Published Paper)
 Visual Presentation (Display + Published Paper)
 Display Presentation (Display + No Published Paper)

Panel Number(s) to which abstract is submitted:

1ST CHOICE:	2ND CHOICE:
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I would like my paper considered for publication in the special issue of the Springer Journal, "Energy Efficiency."

- YES NO

Panels:

- 1 Residential Buildings: Technologies, Design, Operations, and Building Industry Trends
- 2 Residential Buildings: Program Design, Implementation, and Evaluation
- 3 Commercial Buildings: Technologies, Design, Operations, and Building Industry Trends
- 4 Commercial Buildings: Program Design, Implementation, and Evaluation
- 5 Codes and Standards
- 6 Utilities and the Future
- 7 Market Transformation with Speed and Scale
- 8 Capturing Savings through Behavior: Science and Practice
- 9 Energy Efficiency Policy: US & Beyond
- 10 Net Zero: Moving Beyond 1%
- 11 Resilient, Sustainable Communities
- 12 Smart Buildings, Smart Grid, and the Internet of Things
- 13 Energy Efficiency and Equity: Addressing the Underserved
- 14 Poster Displays

REVIEWER REQUEST FORM I am best qualified to review for this

panel: _____ (indicate only one).

MY AREA OF EXPERTISE IS:	
NAME	
COMPANY/ORGANIZATION	
ADDRESS	
CITY, STATE, ZIP, COUNTRY	
WORK PHONE	CELL
E-MAIL	

Submit each abstract by October 27, 2017

via ACEEE's Web site: <http://aceee.org/conferences/2018/ssb/#call>