Energy efficiency: a key strategy for meeting energy and climate goals

Editorial by the guest editors for the ACEEE Summer Study special issue

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As readers of this journal well know, energy efficiency has dramatically reduced global energy use and there is much remaining potential. For example, the International Energy Agency, in its sustainable development scenario designed to reach the Paris Climate Agreement targets globally, found that energy efficiency can provide 44% of the needed emissions reductions in 2040 (IEA 2018). And a recent analysis by the American Council for an Energy-Efficient Economy (ACEEE) in the USA found that energy efficiency could cut energy use and greenhouse gas emissions in half by 2050, making a large contribution towards reaching Paris Climate Agreement targets (Nadel and Ungar 2019).

Achieving these large savings will require expanded policy interventions, more programs to encourage and assist businesses and consumers to implement efficiency measures, and continued research and development to improve existing technologies and services and to develop new ones. These topics were discussed

extensively at the biennial ACEEE Summer Study on Energy Efficiency in Buildings, which took place in August 2018 and included presentation of more than 300 papers. Working with leaders of the 13 different panels, we selected some of the best papers from the conference to present in this special issue. All these papers went through substantial additional review and revisions since the conference and thus, these papers are both expanded and improved.

The papers in this issue cover an array of cutting-edge topics on energy efficiency in buildings including on energy-saving technologies/practices, programs, policies, analysis, evaluation, challenges, and opportunities. On technologies and practices, Kramer discusses the state-of-the-art for building analytics and monitoring-based commissioning, and Shickman discusses capturing the value of trees, cool roofs, and urban heat island mitigation. On programs, Zeifman discusses how to scale up residential retrofits and Roussac discusses the value of setting targets for building operators. For policy, Contoyannis discusses the importance of performance tradeoffs when developing zero-energy codes. For analysis and evaluation, Satre-Meloy discusses intra-day variation in residential electricity consumption, Day discusses post-occupancy evaluation of buildings, and Fuchs discusses ways to analyze data center energy use. On opportunities, Keskar discusses using buildings to provide grid ancillary services. And for challenges, Belknap discusses some of the unique challenges in rural areas and James et al. discuss

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addressing racial disparities through investments in people and places.

Taken together, these papers paint a picture of the current state of energy efficiency efforts, what we are learning, and where we need to head if we are to use energy efficiency to help play a large role in meeting energy and policy objectives.

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