International Conference on Sustainability in Energy and Buildings

Invited Sessions

Title of Session:
Energy, Space and Digital Society – Entanglements and Encounters

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Description:

Energy use in the built environment is a multi-dimensional concern, one that cannot be described independently of spatial and social configurations - where people, technology, designed spaces and energy are entangled. Use and management of energy in buildings has been mostly studied through either social behaviour and socio-technical focused approaches, environmentally driven monitoring and modelling methods, and more recently mixed and multidisciplinary perspectives (Sovacool et al., 2020; D'Oca et al., 2018). In all approaches, *space* as a data set and use of *energy management technologies* within diverse spatial configurations have been largely ignored. Where space has been studied, energy has been seen as impacted by mostly building fabric, occupant behaviour and/or heating/cooling emitter specification, with people, their social relations and use of space and technologies underexamined. Where technologies have been studied, emphasis has been placed on device designs, considering peoples' interaction with these devices without a specific embodied spatial context or social dimension.

While recent calls in energy research have highlighted need for methodological innovation and use of multidisciplinary and multidimensional approaches, there have been very few published empirical examples of the challenges and benefits involved from an epistemological, ontological, and practical perspective. In addition, interdependencies within these multi-dimensional entanglements are largely overlooked - how does energy use in a building relate to a street, neighbourhood, or city morphology? What are the collective and individual characteristics of energy management modalities? What can be learnt from nature through biomimetic approaches by codifying the logic of other species' use and management of resources? How can a computational approach draw on social and visual data that includes space, energy and technology to develop new systems of resource use?

Recent paper by Oliveira et al., (2021) offers an approach that draws on architecture, energy behaviour, biomimetics and computation science to study energy management in the home. Building upon this call, this session invites research that -

- offers new methodological approaches to study of energy use drawing on multiple disciplines such as architecture, energy behaviour, energy justice, engineering, computation, biomimetics
- examines interdependencies of energy use across multiple scales – space, building, neighbourhood, and city
- explores effects of different spatial arrangements on use of energy management or more widely sustainable behaviour change technologies

D'Oca, S., Hong, T., & Langevin, J. (2018). The human dimensions of energy use in buildings: A review. *Renewable and Sustainable Energy Reviews*, *81*, 731-742.
Oliveira, S., Badarnah, L., Barakat, M., Chatzimichali, A., & Atkins, E. (2022). Beyond energy services: A multidimensional and cross-disciplinary agenda for home energy management research. *Energy Research & Social Science*, *85*, 102347.

Sovacool, B. K., Hess, D. J., Amir, S., Geels, F. W., Hirsh, R., Medina, L. R., ... & Yearley, S. (2020). Sociotechnical agendas: Reviewing future directions for energy and climate research. *Energy Research & Social Science*, *70*, 101617.
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