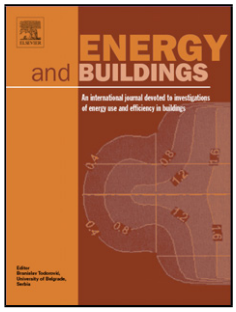

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A method for distinguishing appliance, lighting and plug load profiles from electricity 'smart meter' datasets

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Highlights

- Analysis and comparison of two residential electricity load measurement datasets.
- Includes sub-metered load data from 22 Canadian homes at a 1-minute time-steps.
- Includes whole-house load data from 160 Canadian homes at a 15-minute time-steps.
- New method to identify homes with electric space heating, cooling and DHW heating.
- 66 annual ALP consumption profiles at a 15-minute time-step have been generated.

Abstract

In the Canadian residential sector, the end-uses of appliances, lighting, and plug loads (ALP) account for 16% of total end-use energy consumption. In an effort to reduce the impacts of this energy consumption, electricity technologies such as solar photovoltaics and smart appliances are being adopted. Evaluation of their performance requires an understanding of residential electricity use patterns. Building simulation tools can estimate the time-step performance of such technologies, but require accurate and representative ALP electricity profiles as an input. Sub-metered datasets lack in quantity and thus overall representativeness of the sector. Meanwhile, large, representative datasets are becoming available through electricity smart-metering programs, but usually consist only of whole-house electricity load and lack summary household characteristics (e.g. occupancy, floor space, appliance descriptions). However, homes which are not electrically heated (space, water) or cooled may function as ALP load profiles for simulation. This research addresses these loads with a new method of distinguishing non-electrically heated and cooled homes from a broad dataset of whole-house profiles. The method originates from a comparison of two electricity load datasets: (i) "smart-meter" 15-minute time-step whole-house data for 160 homes spanning three years, and (ii) "sub-metered" 1-minute time-step