

# Study shows best way to reduce energy consumption

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Study shows window shades are most efficient for reducing energy consumption.  
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We know adjusting the thermostat, using blinds, opening windows or using electronics such as a heater or air conditioning unit has an impact on the amount of energy consumed in homes. But a new study looks at which of these is the most efficient when it comes to saving power.

"I was interested to find the trends of energy use in typical households and to understand the consumer behavior and the reasons behind high and low energy consumption. I have a strong belief that, if society boosts [energy conservation](#) (as well as other resources), we will have less of a challenge meeting future demands," explained Dr. Gabriel Kamiel.

Kamiel and Wei Yang and Yaolin Lin, associate professors at the Wuhan University of Technology in China developed a holistic and integrated model which considered the building enclosure, the mechanical systems, the external environment, the proportion of window opening and the shading factor based on data collected from 270 households including single and multiple units, as well as different heating methods. All houses were located in the city of Oshawa, Ontario, which is located 55 km east of Toronto, Canada.

To calculate the building energy consumption, the researchers simulated the occupants' possible activities on different days for various types of housing while utilizing a number of heating and cooling methods. These activities included turning on lights, using electrical appliances and the continuous adjustment of the thermostat.

The results, which were published in *Frontiers in Built Environment*, show that opening the window opening had the greatest impact on the [energy consumption](#) during times when the heater was used to warm the house, and using windows shades had the greatest impact on reducing the energy consumed during in warm temperatures.

The researchers recommend hanging appropriate window shades to help

reduce energy costs. For an increased reduction in energy use, homeowners should keep their windows closed in winter, add solar panels to reduce the heating loads of the house, only adjust the thermostat temperature slightly during transitional seasons and turn off lights when not needed.

"The study is a first of its kind in that it related actual energy usage in typical households to the consumer's actual trends and habits in consuming [energy](#). The latter was obtained through surveying the inhabitants of the homes we monitored," Kamiel said.

To ensure a high level of reliability in future studies, factors such as climatic zones, occupants' attitudes, as well as financial, social and cultural behaviors will be integrated into the existing building performance simulation.

The researchers believe this model could be used for creating efficient building design and for retrofit analysis as it takes into account factors such as building orientation, building envelop material, shading and control on heating and cooling.

"Once we can accurately classify the type of consumers in terms of high, medium or low consumption, municipalities and governments can effectively develop programs targeting these segments," Kamiel said.

**More information:** Yaolin Lin et al. A Study on the Impact of Household Occupants' Behavior on Energy Consumption Using an Integrated Computer Model, *Frontiers in Built Environment* (2015). [DOI: 10.3389/fbuil.2015.00016](https://doi.org/10.3389/fbuil.2015.00016)

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