

Hidden benefits of electric vehicles revealed

March 19 2015



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Electric vehicles are cool, research shows. Literally. A study in this week's *Scientific Reports* by researchers at Michigan State University (MSU) and in China add more fuel to the already hot debate about whether electric vehicles are more environmentally friendly than conventional vehicles by uncovering two hidden benefits.

They show that the cool factor is real - in that [electric vehicles](#) emit significantly less heat. That difference could mitigate the urban [heat](#)

[island effect](#), the phenomenon that helps turn big cities like Beijing into pressure cookers in warm months.

Moreover, the cooling resulting from replacing all gas-powered vehicles with electric vehicles could mean city dwellers needing less air conditioning, another environmental win.

"It's easy not to see the big picture on issues like electric cars and global warming, but when we look with a holistic approach, we find these unexpected connections," said co-author Jianguo "Jack" Liu, who holds the Rachel Carson Chair in Sustainability at MSU and is director of the Center for Systems Integration and Sustainability (CSIS). "Heat waves kill, and in terms of [climate change](#), even one degree can make a difference."

The research was led by Professor Canbing Li of Hunan University in Changsha, China, who was a visiting scholar at CSIS. The electric vehicles' benefits of reduced greenhouse gas emissions are countered by the expense and pollution from producing the vehicles, leading to debate on whether they are the best replacement for conventional vehicles.

In the paper, Li and his colleagues take a wider view to find new positives for plug-ins. Conventional vehicles and air conditioners are the two biggest contributors to the heat island intensity - the difference between urban temperatures and the cooler temperatures of rural areas. In that arena, electric vehicles are cooler - giving off only about 20 percent of the heat a gas vehicle emits.

The researchers used Beijing in summer of 2012 to calculate that switching vehicles from gas to electricity could reduce the heat island intensity by nearly 1 degree Celsius. That would have saved Beijing 14.4 million kilowatt hours and slashed [carbon dioxide emissions](#) by 11,779 tons per day, according to the paper "Hidden Benefits of Electric

Vehicles for Addressing Climate Change."

The authors caution that several factors can influence the [urban heat island](#) effect, not all of which were addressed in the study. For example, there are conflicting reports regarding the impact of reduced aerosol pollution on heat island intensity. These factors may need to be considered when weighing the benefits and disadvantages of replacing conventional vehicles with electric vehicles.

Provided by Michigan State University

Citation: Hidden benefits of electric vehicles revealed (2015, March 19) retrieved 26 April 2024 from <https://phys.org/news/2015-03-hidden-benefits-electric-vehicles-revealed.html>

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