Electric car sales drive toward cleaner air, less mortality

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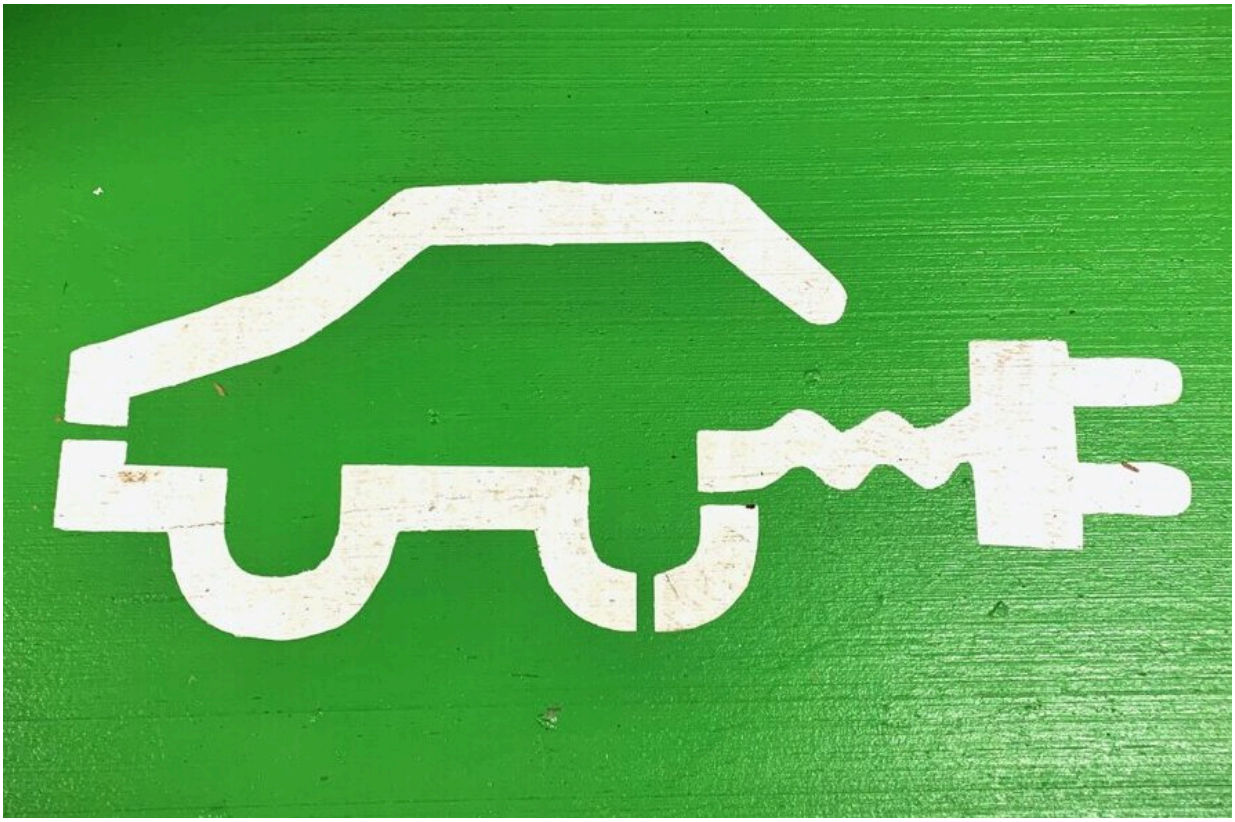

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Electric cars—and their continued sales growth—are expected to have a greener, cleaner influence on air pollution and reduce human mortality in most, if not all, U.S. metropolitan areas, according to Cornell

University research published in *Renewable and Sustainable Energy Reviews*.

As the microscopic soot discharged from carbon-fueled cars continues to drop substantially, the research measured the potential of the large-scale use of passenger electric vehicles on air pollution and associated economic gains throughout the U.S. by 2050.

"While we enjoy the mobility that passenger vehicles provide, many of us don't realize how bad those carbon emissions are, that come out from tailpipes, and how they're impacting our health," said senior author Oliver Gao, the Howard Simpson Professor of Civil and Environmental Engineering in the College of Engineering at Cornell University.

Gao and his colleagues examined data from the Environmental Protection Agency's National Emission Inventory, the Community Multi-scale Air Quality modeling system and an associated tool, which estimates the economic value of health impacts resulting from changes in air quality—specifically ground-level fine particles (2.5 micrometers and smaller, known as PM2.5.)

With fresher air, in 27 years greater Los Angeles will have 1,163 fewer premature deaths annually, corresponding to $12.61 billion in improved economic health benefits, according to the paper. Greater New York City could see 576 fewer such deaths annually and have $6.24 billion in associated economic gains and health benefits, while Chicago could have 276 fewer deaths and gain about $3 billion in financial well-being.

In California's San Joaquin Valley, the scientists calculated there would be 260 fewer annual deaths and a $2.82 billion economic benefit, while Dallas-Fort Worth would see 186 fewer annual deaths and $2 billion in economic and health gains, to round out the top five areas.

Global sales of electric vehicles have grown steadily, the researchers said. While electric cars sold around the world was less than 1% of market share in 2016, the share grew to 2.2% by 2018. The market share globally doubled to about 4.1% in 2020 and then to 6.6% in 2021.

In the U.S., market share of electric passenger vehicles was 4.5% in 2021, but at the city sales level, according to the paper, passenger vehicle market shares were 22% in San Francisco, 11.9% in Los Angeles, 11.7% in Seattle and 3.4% in New York City.

With carbon-fueled passenger vehicles still all around now, tailpipe emissions surround us, said Gao, a faculty fellow at the Cornell Atkinson Center for Sustainability. "It's not like power plants, where the stacks are usually far away," he said. "If we fully electrify transportation, we're not only helping defeat global climate change, but we're also helping the regional improvement of air quality."

The benefits of electric vehicle adoption on air quality and public health are quite clear, it is also important to accelerate the implementation of this mitigation strategy, said the paper's lead author Shuai Pan, a former Cornell post-doctoral researcher, now at Nanjing University of Information Science and Technology (NUIST), China.

"In addition to sound policies at the national level," he said, "the successful implementation of zero-emission vehicle goals requires commitments and actions at the regional level."

Electrifying transportation has comprehensive advantages. "We all want to win this battle against climate change and we all want to electrify transportation," Gao said. "I hope this research can help local decision-makers to carry out real action and policy that improve the air and gain health rewards for regional residents in many ways."

More information: Shuai Pan et al, Impacts of the large-scale use of passenger electric vehicles on public health in 30 US. metropolitan areas, *Renewable and Sustainable Energy Reviews* (2022). DOI: 10.1016/j.rser.2022.113100