

Study identifies travel choices for a smaller carbon footprint

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A new study by researchers from IIASA and CICERO shows that individual choices about how people drive or take public transport make a big difference in their contribution to climate change. Credit: © Lucila De Avila Castilho | Dreamstime.com

The study, published in the journal *Environmental Science and Technology* by researchers at IIASA and Center for International Climate and Environmental Research (CICERO) calculates the climate impact for passenger trips of 500-1000 km—typical distances for business or holiday trips. It shows that while air travel continues to have the biggest climate impact per distance travelled, the choices that people make

about how they drive or take public transport make a big difference in how much they contribute to climate change.

"Traveling alone in a large car can be as bad for the climate as flying, but driving with three in a small car could have an equally low impact as a train ride," says IIASA's Jens Borken-Kleefeld. A 1000 km trip alone in a big car could emit as much as 250 kg of carbon dioxide (CO₂), the researchers calculate, while a train trip or carpooling in a small car could emit as little as 50 kg of CO₂ for each traveler.

Air travel has by far the biggest impact on climate per distance traveled, because it can lead to contrails and formation of [cirrus clouds](#) that have a strong [climate impact](#), as well as ozone. These mechanisms have a strong effect on the climate, but cause warming over much shorter periods of time than CO₂.

The study focused on the short-lived [greenhouse gases](#) and aerosols emitted by both ground transportation and airplanes. In addition, the researchers accounted for vehicle occupancy and efficiency, based on real-world [emissions data](#) from cars, buses, trains, and airplanes in Europe.

"These components have not been regulated in the [Kyoto Protocol](#)," says Terje Berntsen, climate researcher at CICERO. "This means they risk being overlooked when comparing the climate impact from different travel choices."

Previous work and publicly available carbon footprint calculators estimate only averages for the whole transport system, at best. That means that they can miss big differences in climate impact that come from other pollutants, personal choices, and local mitigation measures.

Technologies to control air pollutant emissions from cars, buses, power

plants, and trains effectively minimizes their climate impact, the study also shows—benefiting not just air quality but also [climate change](#) mitigation efforts. The researchers say that mitigation efforts should concentrate on improving fuel efficiency and developing low-carbon fuels.

While this is also important for aircraft, they say, more needs to be done to avoid the contrail and cirrus clouds. For people wanting to minimize their climate impact, Borken-Kleefeld says, "Try to avoid flying, driving alone, and driving big cars. Instead, when you can, choose the train, bus, or carpool with 2 to 3 people."

More information: Borken-Kleefeld, Jens, Jan Fuglestvedt, and Terje Berntsen, 2013. Mode, load, and specific climate impact from passenger trips. *Environmental Science and Technology*: Just accepted manuscript. [doi: 10.1021/es4003713](https://doi.org/10.1021/es4003713)

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