

## ENVIRONMENTAL IMPACTS

**Grocery shop emissions***Environ. Sci. Technol.* <https://doi.org/gqmrzk> (2022)

Credit: Marius Graf / Alamy Stock Photo

E-commerce in the grocery industry has grown rapidly since 2019, fuelled by the COVID-19 pandemic. Understanding how growth in this sector affects food system greenhouse gas (GHG) emissions is important, and comprehensive studies comparing emissions of different methods of grocery shopping are lacking.

Nicholas Kemp of the University of Michigan, USA, and colleagues have estimated GHG emissions of a 36-item basket of groceries (containing 22 non-refrigerated items and 14 refrigerated items) along 72 different supply chain paths from warehouse to customer, considering the impact of factors such as vehicle type and use of microfulfilment centres. The base case was conventional in-store shopping with last-mile transportation using an internal combustion engine (ICE) SUV (6.04 kg CO<sub>2</sub>/basket). Last-mile transportation emissions were the major contributor to supply chain emissions across all paths. Modelling showed that emissions could be reduced by use of microfulfilment centres, by use of electric vehicles and by home delivery. In-store shopping using an ICE pick-up truck was associated with the highest emissions (6.95 kg CO<sub>2</sub>/basket) and delivery using a sidewalk automated robot was associated with the lowest emissions (0.97 kg CO<sub>2</sub>/basket).

The authors conclude that grocery e-commerce can reduce GHG emissions and also note that consumers can mitigate grocery supply chain emissions through combining several activities in a single trip ('trip chaining') and by reducing shopping frequency.

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