Scientists present concept for the elimination of traffic jams

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A team of researchers from Cologne and New York has presented proposals for future traffic management. A dynamic, fair toll for road use could reduce congestion.

In the current issue of *Nature*, the economists Peter Cramton, Axel Ockenfels (both University of Cologne) and R. Richard Geddes (Cornell University) describe a concept in which drivers would have to pay a dynamic fee for the use of roads. This would contribute to avoiding traffic jams and protecting the environment, the researchers argue. Fees that respond to traffic volumes in real time and with site precision, taking into account factors such as vehicle type and exhaust emissions, can significantly improve traffic flow and contribute to reducing air pollution.

Traffic jams are not only annoying and time-consuming, they are also costly. In Germany, the economic damage caused by congested roads in 2017 totaled approximately €80 billion. "Currently, road users who cause traffic jams, while damaging the environment and even incurring costs, are paying just as much as those who are not involved," says Ockenfels. "Without a toll, this means that the general public is subsidizing these road users. That's unfair." A toll for road use would bring these costs to light and reduce congestion. "If the fee adapts to the volume of traffic and the situation on the road in real time, i.e., is more expensive at rush hour than around noon, everyone can choose the route that suits them best. This already works for navigation systems," explains Cramton. "Ultimately, this would reduce the load on main traffic arteries, improve traffic flow and reduce CO2 emissions.

Technically, a dynamic road toll could already be implemented in real time today. Navigation and telecommunications systems, GPS data and apps can provide drivers with information and predict traffic volumes. "Of course, you have to develop a system that is an acceptable compromise between collecting personal data and protecting privacy," says Cramton. Modern cryptology could allow system operators to charge tolls without exposing private travel information.

The scientists do not believe that the toll would disadvantage people who

cannot afford the tolls. "Pricing must be dynamic and offer options. Imagine pricing the left lane of regularly congested, multi-lane roads. A lower traffic volume on the left lane would be the result. This in turn means that the flow of traffic on the right-hand lane also increases," says Ockenfels. "That way, everyone benefits."

More information: Peter Cramton et al, Set road charges in real time to ease traffic, *Nature* (2018). DOI: 10.1038/d41586-018-05836-0

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