

# Study shows cities with more transportation options most resilient

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The downtown Dallas, Texas (USA) skyline from a levee along the Trinity River. Facing southeast. Credit: drumguy8800/Wikipedia

Researchers at the University of Colorado Denver studying how the region would react to a sudden spike in gas prices, found those living closest to their work, in areas with more compact street networks and better multi-modal infrastructure, would be more resilient than others.

"A city that has invested heavily in transit, walking, and biking infrastructure - even if experiencing minimal ridership today - would likely be able to withstand a shock to the system such as rising gas prices far better than a city that has not made such investments," said study

author Wesley Marshall, PhD, PE, assistant professor of civil engineering at the CU Denver College of Engineering and Applied Science, the top research university in Denver.

The study examined the effect on Denver metro area commuters if gas prices suddenly doubled or tripled. Marshall and co-author Alejandro Henao, a doctoral student in engineering at CU Denver, took into account incomes, community design, bus routes, light rail lines, rideshares, housing costs, distances from home to work and walking and bicycling infrastructure.

Previous researchers assumed those who drive to work would continue to drive under the [resiliency](#) scenarios. But Marshall and Henao took into account the fact that some commuters that drive today might be able to walk, bike, and use transit tomorrow.

If gas prices doubled, they found that the commuting expenses for 24.2 percent of households would rise above the affordability threshold. And if prices tripled, the commuting expenses for 69.4 percent of households would become unaffordable.

At the same time, those living in areas with the highest density of bus stops wouldn't even spend 1 percent of their household income on commuting, even when [gas prices](#) tripled.

"As the cost of driving increases, the trends depict vulnerability across the suburbs with shrinking pockets of resilience around Denver and Boulder," said Henao, a student who gained real-world experience doing this research. "Proximity to transit makes a big difference with respect to resilience while those living without viable mode options would be the most vulnerable."

The research exposed a huge gap in what commuters would spend in the

event of a major gas hike with some paying less than 1 percent of their income and others laying out nearly 27 percent.

"The economic ramifications of that much income being consumed by simply getting to work could be devastating to those with no transportation choices beyond the automobile," Henaó said.

They also highlighted the need to consider the resilience value of an infrastructure that includes biking, buses and light rail.

"The viability of most multi-modal infrastructure projects hangs on projected ridership," Marshall said. "Our study showed that such [infrastructure](#) can have immense value under various resiliency scenarios, even if few are using them today."

The most resilient regions will be those that invest in expanding transportation choices.

"The most vulnerable will be those that continue to promote a single mode of transportation such as the automobile," Marshall said.

The study was presented at the Transportation Research Annual Meeting last week in Washington D.C. and will be published in the *Transportation Research Record*.

Provided by University of Colorado Denver

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