



A New Way Forward

Envisioning a Transportation System without Carbon Pollution

Preventing the worst impacts of global warming will require us to nearly eliminate carbon pollution from transportation by 2050. By employing smart strategies to repower our vehicles with electricity, reduce growth in vehicle travel, and optimize the efficiency of our transportation network, America's cities can transition to a zero-carbon transportation system.

An Urgent Imperative to Reduce Emissions

World leaders made a bold commitment at the 2015 Paris climate talks to limit global warming to 2° Celsius above pre-industrial levels, with an aspiration to limit temperature rise to 1.5° Celsius. Fulfilling that promise will require the United States to reduce emissions of greenhouse gases starting now, with reductions exceeding 80 percent by mid-century.

Transportation without Carbon Pollution

America's transportation system produces more greenhouse gas pollution than any entire nation in the world other than China, India and Russia. Reducing pollution from transportation in the U.S. is essential to prevent the worst impacts of global warming.

Transformation to a zero-carbon transportation system is possible. New technologies and emerging social trends make it easier to envision a transition to a zero-carbon transportation system than ever before.

Now is the time for federal, state and local officials in the U.S. – as well as citizens and the private sector – to adopt the policies and tools that can enable America's cities to transition to a zero-carbon urban transportation system by the middle of the 21st century.



Light rail in San Jose, CA. On a per-passenger-mile basis, rail transit uses 24 percent less energy than a car and 43 percent less energy than a light truck or SUV.



Pedestrians and bicyclists in Austin, Texas. Active transportation is a zero-carbon alternative to motorized travel.

Change Is Possible

Our current, auto-dominated transportation system seems like it has been with us forever, but it is largely the product of rapid, transformational change that occurred over the course of just a few decades in the mid-20th century. Transformational change can occur through incremental steps that grow in ambition and scope over time or through dramatic policy shifts that occur during narrow windows of opportunity.

There are many possible pathways for transforming our transportation system to eliminate greenhouse gas pollution:



Some cities might choose to **build up**, expanding the availability of housing and commercial space in dense, transit-oriented neighborhoods and investing in robust public transportation systems to accommodate growth and reduce reliance on personal cars.



Other cities might **fix up** – employing scarce resources to regrow walkable neighborhoods that have fallen victim to disinvestment and decay. Creating grassroots shared-economy services and shifting spending from highway expansion to urban infrastructure repair and reinvestment can help these cities to become the focus of future low-carbon development in their regions.



Growing cities might **link up**, using public transportation to facilitate the growth of walkable communities and slow the onrush of sprawl. These cities might choose to advance electrification of their transportation system, taking advantage of locally abundant supplies of clean, renewable energy.



Still other growing cities might **sync up** – developing systems of shared, driverless and connected cars that are managed for optimal environmental performance and efficient use of existing infrastructure. Areas no longer needed for parking could be repurposed to support the development of pleasant, walkable communities in areas formerly famous for sprawl.



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For more information and the full report, please visit www.frontiergroup.org

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Tools for Transformation

America has the tools it needs to transition to a zero-carbon transportation system – and to do it in time to prevent the worst impacts of global warming.

Among those tools are:

- **Repowering Vehicles:** Efficient electric vehicles that can be powered by clean, renewable electricity are entering the marketplace faster than the hybrid cars of a decade ago and technology continues to improve, reducing costs and increasing travel range.
- **Urbanization and Smart Growth:** A future in which most new development takes place in urban and walkable neighborhoods could reduce transportation greenhouse gas emissions by 9 to 15 percent by mid-century.
- **Shared Mobility:** Over the last decade, an explosion of technology-enabled services – from carsharing to bikesharing to Lyft and Uber – has revolutionized transportation in many cities. Some of these “shared mobility” services have been shown to reduce vehicle ownership and driving, while the effects of others are just beginning to be studied.
- **Public Transportation:** Transit ridership hit a modern high in 2014. Current public transportation services reduce vehicle travel (and GHG emissions) by about 10 percent in U.S. cities.
- **Reallocating Space:** Cities in the United States and around the world are reallocating space formerly devoted to cars to other public purposes, encouraging the use of low-carbon modes of transportation. U.S. cities with good bicycling infrastructure have nearly twice as many bike commuters as the national average.
- **Smart Pricing:** Government subsidies for driving and free access to roads create economic signals that encourage Americans to drive and put competing low-carbon transportation modes at an economic disadvantage. Cities around the world have shown that smart pricing policies can reduce congestion and encourage the use of low-carbon modes of travel.
- **Walking and Biking:** Americans prefer walking to any other mode of transportation, according to a recent survey, and the number of people traveling by bicycle in many cities has grown dramatically in the last decade. The Institute for Transportation and Development Policy estimates that bicycling alone could curb global carbon dioxide emissions from transportation by 11 percent by 2050.
- **Information Technology:** Advances in technology are enabling Americans to plan, schedule and pay for trips via low-carbon modes as easily as traveling by car. Real-time transit information has already been shown to trigger modest increases in transit ridership.

Driverless cars can potentially be deployed in ways that can be supportive of efforts to reduce greenhouse gas emissions – especially if they facilitate the use of shared mobility services, vehicle electrification and smart pricing, and do not undermine other emission-reduction strategies.