

# Compact Electric Cities: The Only Way to 1.5°



Example of a complete street that highlights cycling, transit, and pedestrian access in Seattle, USA.  
Photo: Green Lane Project, Flickr

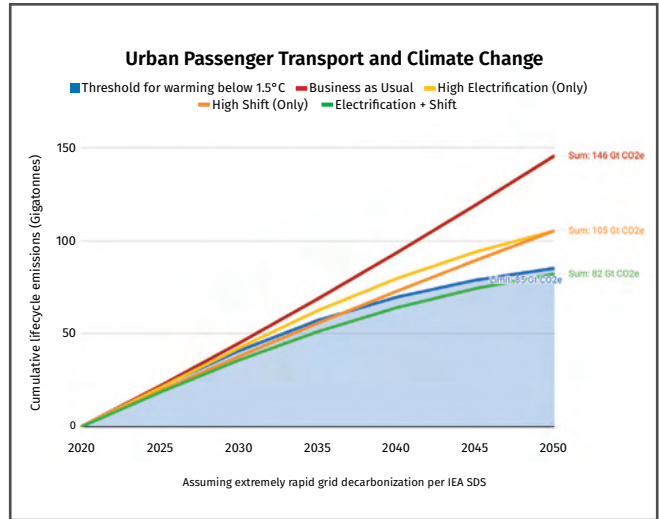
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**The impacts of climate change are already wreaking havoc on ecosystems and economies.** To meet the goals of the Paris Climate Agreement and for a chance of limiting global warming to less than 1.5°C, governments worldwide will need to use every possible policy tool to reduce emissions from transportation. Neither vehicle electrification nor mode shift is sufficient alone: the world needs both.

Transportation is responsible for about a quarter of the world's energy-related greenhouse gas (GHG) emissions, so transportation policy is integral to combating climate change. Electric cars are increasingly practical and affordable for consumers, and they do not contribute to air pollution or directly emit GHGs, but electric vehicles alone will not stop climate change. In a recent study, researchers from ITDP and the University of California, Davis have found that the only way to prevent the worst effects of climate change is to engage in a comprehensive strategy of compact, mixed-use cities built around walking, cycling, and public transit, combined with investments in electric vehicles.

To reduce emissions to a level consistent with the Paris Climate Agreement, and for a possibility of limiting global warming to less than 1.5°C by the end of the century, annual GHG emissions

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from urban passenger transport must remain below a threshold curve from now until 2050.

Delegates to COP26, the 2021 United Nations Climate Change Conference, included 24 countries and leading car manufacturers that agreed on a goal to make all new cars electric worldwide by 2040. While this goal is extremely ambitious, it is also technically feasible, and could lead to a significant drop in emissions by 2050. But without compact city measures, emissions will stay high through 2030 as the demand for cars surges in rapidly-growing low- and middle-income cities. After 2030, electric vehicles will become more mainstream, but emissions will remain higher than the threshold required for limiting global warming to less than 2°C.

Embracing walking, cycling, and public transit over the next decade can quickly reduce the demand for car travel, buying time for electric vehicle technology to improve. Only electrification and mode shift combined can keep emissions below the threshold curve. To reduce emissions enough to prevent the worst effects of climate change, cities must be built and designed differently. Urban planning policies that make it easier to travel without a car are paramount. These policies include:

- Dense, mixed-use, transit-oriented development;
- Reallocation of space from cars to sidewalks, protected bicycle lanes, and public transit;
- Shifting funding from highways and roads to mass public transit.

If cities around the world employ those policies while also switching to electric vehicles, emissions from urban passenger transport would fall to a level consistent with limiting global warming to less than 2°C — and possibly less than 1.5°C.



Top: Only mode shift and electrification together can lead to a reduction in carbon emissions consistent with the Paris Agreement.

Source: ITDP

Bottom: Electrification of public transit, like this e-bus in China, should work in tandem with compact city planning.

Photo: ITDP China



Above: An open street in Rio de Janeiro that prioritizes pedestrians and cyclists.  
 Photo: Jeffrey Eisen, Unsplash

As an added benefit, mode shift can save economies money. Car-based transport is expensive because cars need roads, parking spaces, batteries, and tires, and they move fewer people per vehicle. On a per-person basis, walking, cycling, and public transit are much less expensive. By focusing on human-centered urban planning with accessible public transportation, the direct public and private costs of urban passenger transport could be reduced by \$5 trillion per year, compared to a business-as-usual or an electrification-only approach.

Combining electrification with compact city development and mode shift is critical for our planet’s future. It will require a vast global effort, comparable in each country to the construction of the United States’ interstate highway system in the 1950s, or of the development of China’s high-speed rail network in recent years. But if those tremendous feats of infrastructure were possible, then so is the decarbonization of our existing urban passenger transport systems.

Learn more in the recent report by ITDP and UC Davis, *The Compact City Scenario — Electrified*, available at [ITDP.org](https://www.itdp.org).

Scenario: Electrification-Only	Scenario: Electrification Combined with Compact, Transit-Oriented Cities
<p><b>Impacts</b></p> <ul style="list-style-type: none"> <li>• Sharp reduction in carbon emissions</li> <li>• Sharp reduction in local air pollution</li> <li>• Sharp reduction in local noise pollution</li> <li>• Increased traffic fatalities</li> <li>• Higher direct public and private costs</li> <li>• Reduced access to opportunities for low-income people without cars</li> </ul>	<p><b>Impacts</b></p> <ul style="list-style-type: none"> <li>• Massive reduction in carbon emissions consistent with the terms of the Paris Agreement</li> <li>• Extreme reduction in local air and noise pollution</li> <li>• Reduction in traffic fatalities</li> <li>• Increased access to opportunities for all</li> <li>• Increase in walking and cycling, which improves physical and mental health and reduces health care costs</li> </ul>