



September 10, 2021

## Surface Transportation and Climate Change: Provisions in the Senate-Passed Infrastructure Investment and Jobs Act

Surface transportation is a major source of carbon dioxide in the atmosphere, one of the main greenhouse gases (GHGs) contributing to climate change. At the same time, the effects of climate change, such as extreme heat and sea level rise, pose a threat to highways, bridges, and public transportation infrastructure. The House and Senate both have taken reauthorization of surface transportation programs as an opportunity to propose policies and programs that address climate change. The current authorization of federal highway, public transportation, and intercity passenger rail programs in the Fixing America's Surface Transportation (FAST) Act (P.L. 114-94), as extended, expires on September 30, 2021.

In August 2021, the Senate passed an amendment in the nature of a substitute to the House-passed H.R. 3684. The Senate-passed bill is known as the Infrastructure Investment and Jobs Act (IIJA). The IIJA includes *mitigation* policies and programs that aim to reduce GHG emissions from surface transportation and *adaptation* policies and programs that aim to make the surface transportation system more resilient to the impacts of actual or expected future climate change and to reduce its vulnerability to the harmful effects of future climate change.

### Transportation and GHG Emissions

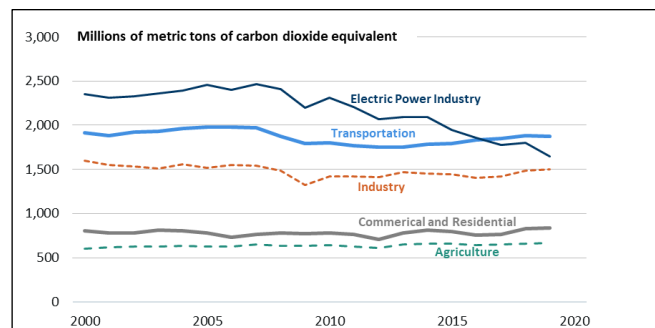
The U.S. Environmental Protection Agency (EPA) estimates that since 2017, transportation has emitted more GHGs than any other sector of the U.S. economy. In 2019, transportation accounted for approximately 29% of the total (Figure 1). Total GHG emissions from transportation were about 5% less in 2019 than in 2005, but increased each year from a recent low in 2012 through 2018, in part because of increased passenger travel and goods movement; the effects of greater vehicle mileage have been somewhat mitigated by improvements in fuel efficiency. There was a slight reduction in transportation emissions in 2019, but a larger drop is expected in reports for 2020 due in part to the disruptions related to the COVID-19 pandemic.

### Mitigating GHG Emissions from Surface Transportation

Economists generally agree that broad, market-based policies, such as a cap and trade system or carbon tax, are likely to be the most efficient way to reduce GHG emissions across all economic sectors. Motor vehicle fuel taxes might be considered a crude form of carbon tax in surface transportation, and the comparatively higher fuel taxes in other countries are associated with lower annual mileage per person and greater use of more fuel-efficient vehicles. In 2019, the average of U.S. state taxes weighted by fuel volume combined with the federal tax on a gallon of gasoline was 48 cents. The equivalent tax was \$2.48 per

gallon in Japan, \$3.93 in the United Kingdom, and \$4.27 in Italy. Federal taxes on gasoline and diesel in the United States have been collected largely to raise funds for infrastructure construction, not to control GHG emissions. They are typically extended and sometimes raised in surface transportation authorizing legislation.

Figure 1. U.S. Greenhouse Gas Emissions by Economic Sector, 2000-2019



Source: Environmental Protection Agency, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2019*, table 2-10, at <https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2019>.

Several other current federal policies that address GHG emissions from transportation are not typically addressed in surface transportation reauthorization legislation. This includes the regulation of vehicle fuel economy by the Corporate Average Fuel Economy standards administered by the National Highway Traffic Safety Administration and, by extension, the GHG standards, administered by EPA. These policies, along with tax incentives and grants for the domestic development and manufacture of alternative fueled vehicles, are typically dealt with in energy bills rather than in transportation legislation. One exception is the designation of alternative fuel corridors, a FAST Act provision, which may be the basis for a national network of alternative fueling and charging infrastructure.

Surface transportation programs do in some respects encourage the deployment of alternative fueled vehicles and a reduction of vehicle miles traveled. The Federal Transit Administration (FTA) program that provides funding for buses includes a set-aside for buses that are alternatively fueled, and the Federal Highway Administration (FHWA) administers the Congestion Mitigation and Air Quality Improvement (CMAQ) program. The original motivation for these programs was to meet air quality goals, but such policies may help reduce GHGs from surface transportation.

## Adaptation to Climate Change in Surface Transportation

Impacts from actual or expected future climate change are likely to include higher average temperatures, greater extremes of temperature, more precipitation overall with an increase in precipitation intensity and greater variation, and a rise in sea level. While the consequences of some of these changes may depend to some extent on other human activities, such as urban development patterns, they are likely to include more frequent periods of extreme heat; fewer days below freezing; more coastal, riverine, and flash flooding; and more droughts and wildfires. Intense precipitation could lead to more mudslides, particularly following droughts and wildfires.

Existing surface transportation infrastructure can be vulnerable to climate change because it was constructed for sea level and weather extremes that are being or are likely to be exceeded in the future. If the effects of climate change become more pronounced, as studies anticipate, the impacts of extreme weather on surface transportation infrastructure and operations are likely to increase in magnitude, duration, and frequency. For example, an increase in the number of very hot days could cause more damage to bridges because of greater thermal expansion of bridge joints.

“Adaptation” is action to reduce the vulnerabilities and increase the resilience of the transportation system to the effects of climate change. Adaptation and resilience options include structural and nature-based engineering and policy-based activities. For example, highway bridges can be engineered structurally to withstand the threats of higher wind and water. Nature-based engineering may involve reducing climate vulnerabilities through activities such as wetland restoration, artificial reef construction, and beach restoration. Policy-based activities include changing maintenance practices, such as more frequent drain cleaning, and improving plans for weather emergencies.

Currently, there is no dedicated surface transportation funding for adaptation and resilience projects. FHWA has stated that federal highway funds can be used to assess the potential impacts of climate change and to apply adaptation strategies. Likewise, federal transit funding administered by FTA can be used for adaptation projects. Several aspects of federal law, regulation, and policy require state and local agencies that manage surface transportation assets to consider the effects of climate change.

## Infrastructure Investment and Jobs Act

The IJA would make several changes to existing law and surface transportation funding programs in relation to GHG mitigation and surface transportation infrastructure adaptation and resilience.

### Mitigation

The IJA would authorize increases in funding for public transportation and intercity passenger rail. Some advocates of these provisions assert that this funding would mitigate climate change. This assumes that greater spending will boost rail and bus travel, replacing trips by private motor vehicles and airplanes—something that has been difficult to achieve in the past. The authorization for public

transportation would increase from \$12.6 billion in FY2021 to \$16.5 billion in FY2022, then rise every year to \$17.8 billion in FY2026. In addition to providing the funding authorizations, the IJA would appropriate \$4.3 billion annually for public transportation for FY2022-FY2026. The authorization for Amtrak and other intercity rail programs would increase from \$2.5 billion in FY2021 to \$7.2 billion in FY2022. After decreasing in FY2023 to \$6.7 billion, the authorization would then rise every year to \$7.8 billion in FY2026. In addition, the IJA would appropriate \$13.2 billion annually for intercity rail for FY2022-FY2026.

The IJA also would authorize an increase in funding for the federal-aid highway program from \$47.3 billion in FY2021 to \$60.9 billion in FY2022, then rise every year to \$66.6 billion in FY2026. Although this may result in more highway vehicle travel and GHG emissions, the funding includes increases for existing highway programs aimed at emissions reductions as well as new programs. For example, funding from the Highway Trust Fund (HTF) for the existing Transportation Alternatives Program would increase from \$850 million in FY2021 to \$1.4 billion in FY2022. New mitigation programs and the average annual authorization from the HTF for FY2022 through FY2026 are:

- Carbon Reduction Program: \$1.3 billion
- Charging & Refueling Grant Program: \$500 million
- Reduce Truck Emissions at Port Facilities: \$50 million
- Congestion Relief Program: \$50 million.

New programs and the average annual appropriation from the Treasury general fund for FY2022 through FY2026 are:

- Electric Vehicle Charging Formula Program: \$1 billion
- Reduce Truck Emissions at Port Facilities: \$30 million.

### Adaptation and Resilience

The IJA would make several changes to the federal highway program aimed at improving adaptation and resilience. It would add definitions of “resilience” and “natural infrastructure” to Title 23 of the *U.S. Code*. It would specifically allow federal funding to be used for “protective features” designed to mitigate the risk of recurring damage from extreme weather events, flooding, or other natural disasters. The IJA would also allow up to 15% of the annual apportionment of National Highway Performance Program funding to be used for resilience features for highways or bridges that are not part of the National Highway System.

The IJA also would establish the Promoting Resilient Operations for Transformative, Efficient, and Cost-saving Transportation (PROTECT) Program to support adaptation and resilience projects. Funding from the HTF would be authorized at an annual average of \$280 million.

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