THE U.S. NATIONAL BLUEPRINT FOR

TRANSPORTATION DECARBONIZATION

A Joint Strategy to Transform Transportation

May 16, 2023

Motivation

- Transportation is the **largest source of U.S. greenhouse gas (GHG) emissions;**

  o responsible for **poor air quality** (disproportionate impacts)

  o the **second largest household expenditure**

  o main **driver of global petroleum demand**

- To address the climate crisis, we must **eliminate nearly all transport emissions** by 2050.

- Transportation is **complex:**

  o A **multitude of stakeholders and decision makers** with distributed and siloed responsibilities.

  o **High-inertia systems** that require decades to transition.

  o <u>Decisive actions are needed now</u>
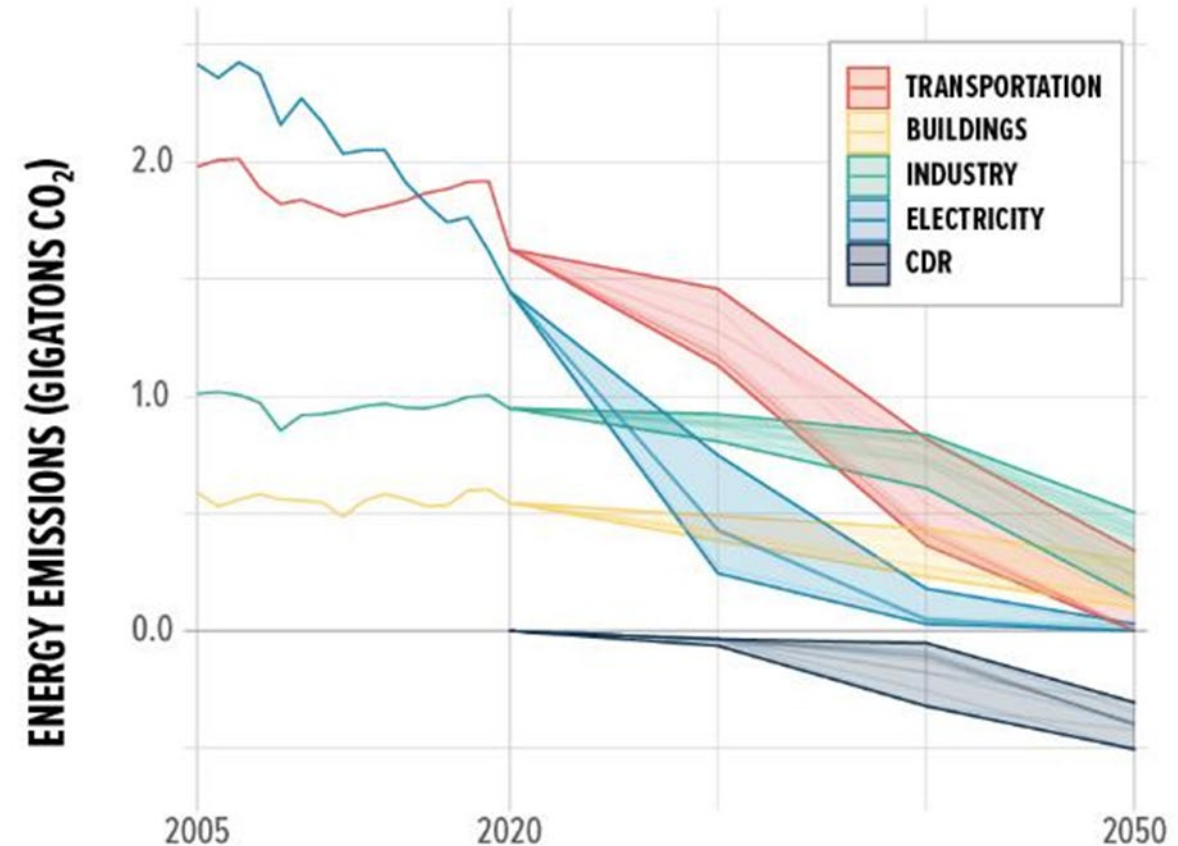
A Coordinated Approach

Four agency MOU signed 9/15/2022 established a historic, whole-of-government approach to transportation decarbonization

- Consistent and expanded stakeholder outreach
- Clear signals to industry
- Coordination at all staff levels:
  - RDD&D planning and execution
  - Infrastructure deployment
  - Policy & regulation development
  - Data, tools, education and training

Underpinned by a singular aligned transportation decarbonization vision/blueprint
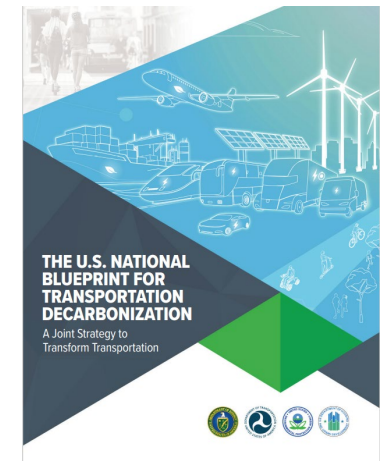
Focus on the Entire Transportation Sector

The goal is **complete decarbonization** of the transportation sector

The Blueprint

- Covers every mode and sets up **realistic, achievable** pathways based on innovation and science

- Builds on existing federal commitments

- Is a strategic approach that **leverages market forces** for **widescale** deployment of **cost-effective** clean transportation technologies

- Focuses on solutions that can be **incrementally deployed**, delivering results by 2030

- Addresses full **lifecycle emissions** and integration with the **electric grid**

2019 U.S. GHG EMISSIONS

- 9% Agriculture
- 11% Buildings
- 22% Industry
- 33% Transportation
- 25% Electric Power
- 49% Light Duty Vehicles
- 21% Medium & Heavy Vehicles (including Trucks and Buses)
- 10% Off Road Vehicles and Equipment
- 2% Rail
- 3% Maritime
- 11% Aviation
- 4% Other (Pipeline/Military/Lubricants)
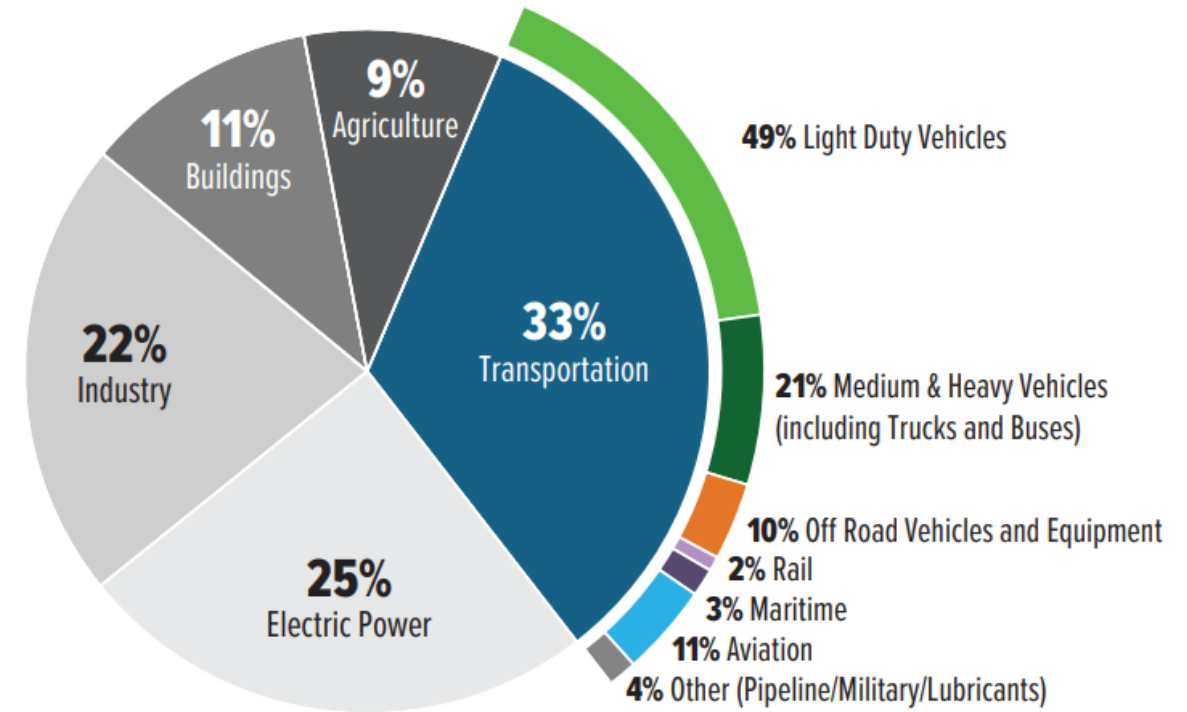
Figure 2. Total 2019 U.S. GHG emissions with transportation and mobile sources breakdown. Data derived from the EPA Inventory of U.S. Greenhouse Gas Emissions and Sinks [REF.8] This Blueprint uses 2019 as a baseline since impacts due to COVID-19 complicate the use of later data.

Launch and Rollout

- Historic announcement including four government agencies and the Executive Office of the President

- Joined by representation from the entire spectrum of stakeholders

- Reflects the government, non-profit, and industry shared commitment to decarbonizing the transportation sector

TRB
Transportation Research Board

January 10, 2023

Watch the video
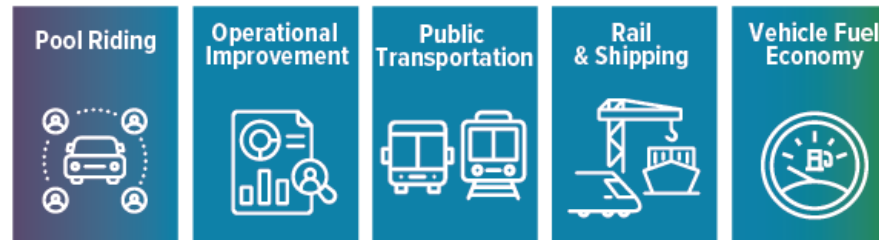
Strategies to achieve decarbonization:

Convenient

| Planning | Telework E-Commerce | Travel Demand Management | Active Mobility |

Improve Community Design and Land-use Planning

Efficient

| Pool Riding | Operational Improvement | Public Transportation | Rail & Shipping | Vehicle Fuel Economy |

Increase Options to Travel More Efficiently

Clean

| Clean Electricity | Sustainable Biofuels E-fuels | Clean Hydrogen |

Transition to Zero Emission Vehicles and Fuels

Prioritizing land-use decisions and community design solutions that prioritize access

Expanding options to enable shifts in more efficient vehicles and transport modes

Deployment of zero-emission vehicles, fuels and associated infrastructure

Clean Solutions for All Modes

Achieving net-zero emissions will require a suite of technology solutions across all modes of transportation.

1 icon represents limited long-term opportunity
2 icons represents large long-term opportunity
3 icons represents greatest long-term opportunity

	BATTERY/ELECTRIC	HYDROGEN	SUSTAINABLE LIQUID FUELS
Light Duty Vehicles (49%)*	🔋🔋🔋	—	TBD
Medium, Short-Haul Heavy Trucks & Buses (~14%)	🔋🔋	⚛	⛽
Long-Haul Heavy Trucks (~7%)	🔋	⚛⚛⚛	⛽⛽
Off-road (10%)	🔋🔋	⚛	⛽
Rail (2%)	🔋🔋	⚛⚛	⛽⛽
Maritime (3%)	🔋	⚛⚛†	⛽⛽⛽
Aviation (11%)	🔋	⚛	⛽⛽⛽
Pipelines (4%)	🔋🔋	TBD	TBD
Additional Opportunities	• Stationary battery use • Grid support (managed EV charging)	• Heavy industries • Grid support • Feedstock for chemicals and fuels	• Decarbonize plastics/chemicals • Bio-products
RD&D Priorities	• National battery strategy • Charging infrastructure • Grid integration • Battery recycling	• Electrolyzer costs • Fuel cell durability and cost • Clean hydrogen infrastructure	• Multiple cost-effective drop-in sustainable fuels • Reduce ethanol carbon intensity • Bioenergy scale-up

* All emissions shares are for 2019

† Includes hydrogen for ammonia and methanol

Rail

Rail Goals

- Work to establish specific rail targets

- Focus resources to develop technology pathways and set efficiency and zero-emissions vehicle targets

- Encourage greater use of passenger and freight rail travel to reduce emissions from road vehicles

Key Actions

- **Infrastructure investments** in electric locomotives and the expansion of electrification corridors.

- **Multi-stakeholder collaborations** to accelerate the deployment of rail technologies that reduce emissions and increase efficiency.

- **Research and innovation** to advance technology through pilot projects, greater infrastructure investments, and continued policy and regulation support.

Next Steps: Looking to 2023

- Develop and release mode-specific decarbonization plans in collaboration with industry and stakeholders.

- Align agency actions to enable quick execution on BIL and IRA investments.

- Prioritize critical technologies and research that reduce costs to ensure wide scale deployment.

- Define areas of key stakeholder engagement

- Focus on realistic actions that will achieve long-term benefits

Thank You

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Vehicle Technologies Office

U.S. Department of Energy