



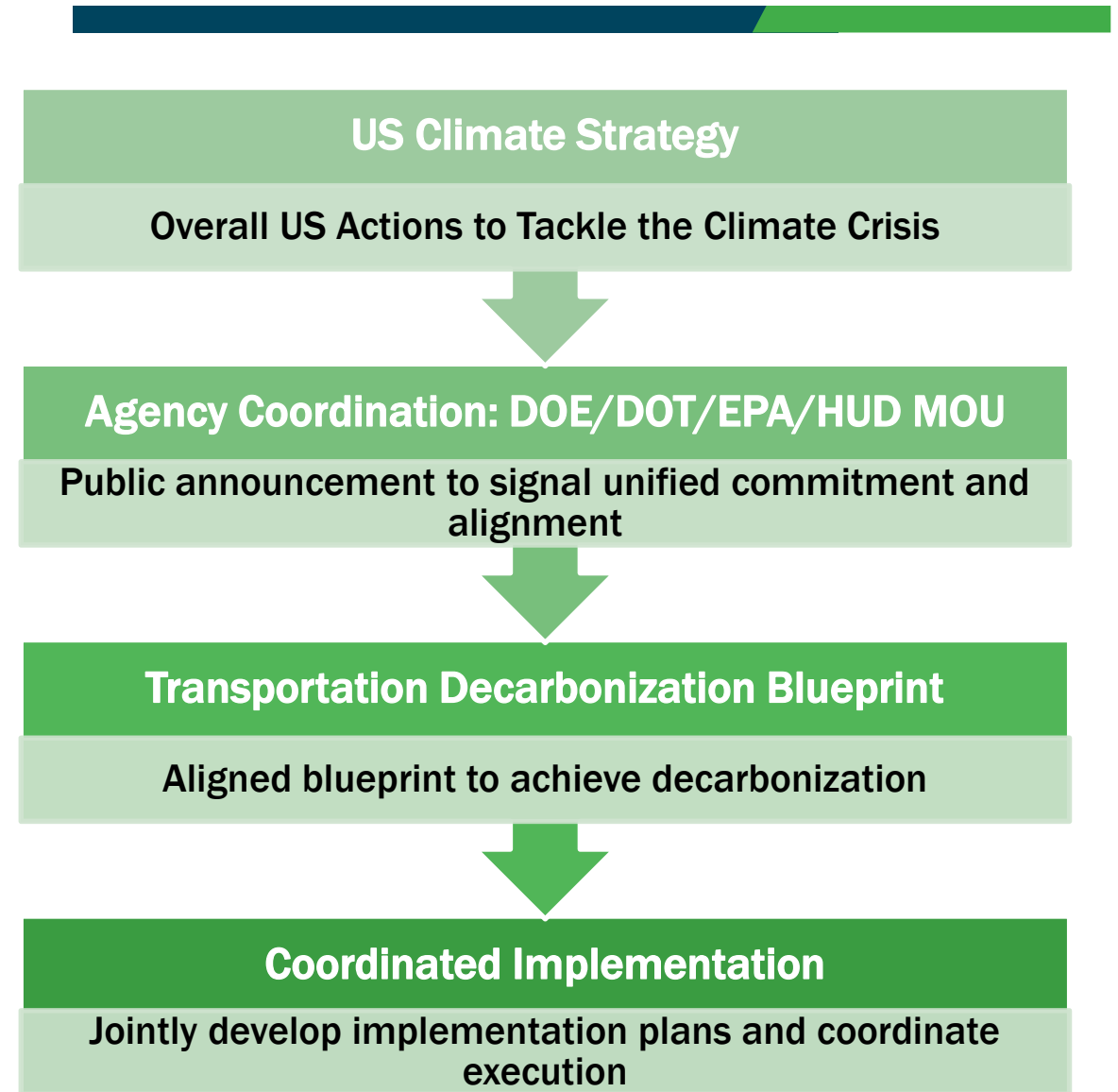
Decarbonizing Transportation: Engagement across Federal Programs

Michael Berube, DOE
Karl Simon, EPA
November 30, 2022



Agenda

1. Where we are today
2. United States actions
3. Agency coordination (The MOU)
4. Setting a path (The blueprint)
5. Looking forward (Implementation)





JANUARY 27, 2021

Executive Order on Tackling the Climate Crisis at Home and Abroad

 [BRIEFING ROOM](#) [PRESIDENTIAL ACTIONS](#)

AUGUST 05, 2021

Executive Order on Strengthening American Leadership in Clean Cars and Trucks

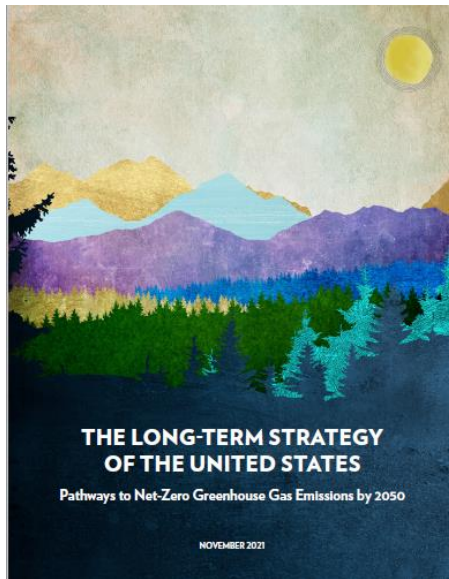
 [BRIEFING ROOM](#) [PRESIDENTIAL ACTIONS](#)

- Established a whole of government approach to reducing GHG emissions (EO 14008)
- Established the goal of 50% zero-emission light-duty vehicle by 2030 (EO 14037)

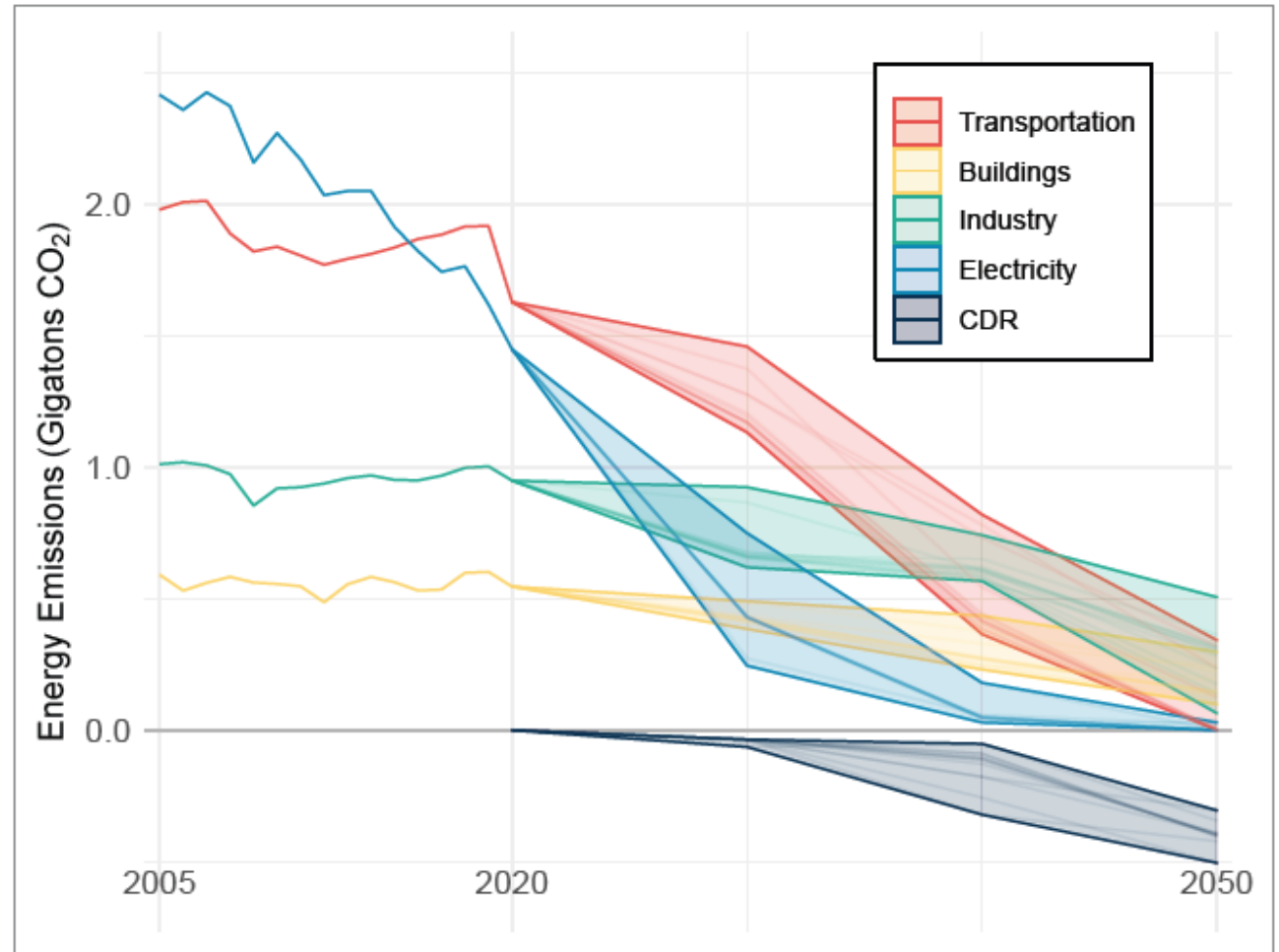


The Long-Term Strategy of The United States

Sets a goal of US economy-wide decarbonization by 2050



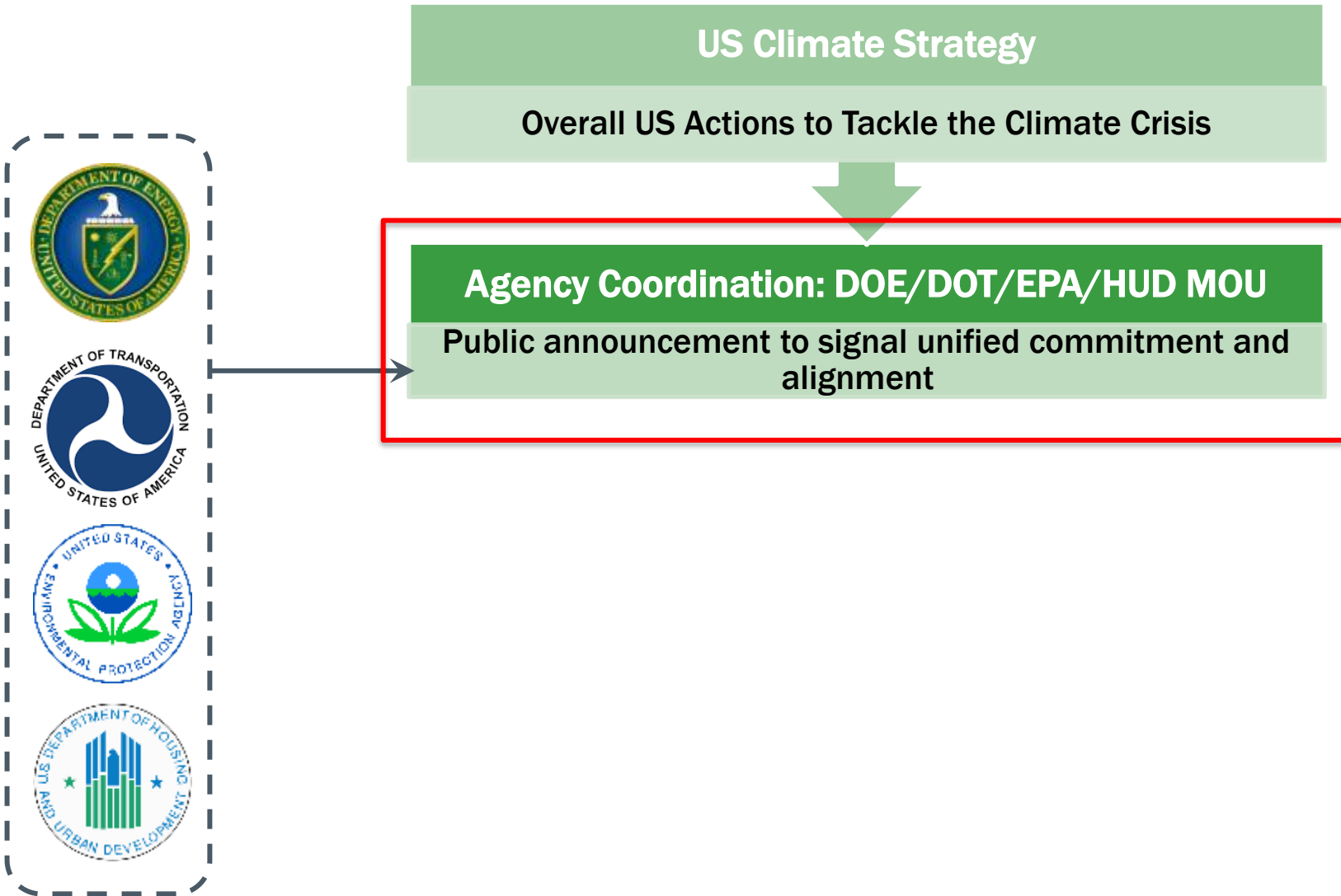
Released November 2021





The United States signed the **Global Memorandum of Understanding on Zero-Emission Medium-and Heavy-Duty Vehicles**, an international agreement supporting a path to **100% new zero-emission medium- and heavy-duty vehicle (MHDV) sales by 2040** with a targeted floor of 30% new zero-emission MHDV sales by 2030

Coordinated Approach to a Decarbonization Vision



Define an aligned transportation decarbonization vision

- Establish a clear goal
- Promote coordination
 - Research Priorities
 - Policy and Regulation
 - Infrastructure deployment
 - Data, tools, education and training
- Create new opportunities for innovative solutions

Federal Coordination – The MOU

The Memorandum of Understanding was signed on **September 15th, 2022**



“In recognition of the critical role that the transportation sector will play in addressing the global climate crisis and building a clean economy, the Parties undertake this MOU to ensure the highest level of collaboration and coordination. The Parties plan to coordinate on policy and accelerate the research, development, demonstration, and deployment needed for innovative solutions and technologies that enable a clean, safe, accessible, equitable, and decarbonized transportation system for all.”



MOU Press Release Quotes



“A modernized transportation sector, equipped with accessible clean energy technologies, is critical for providing commuting options that are more affordable, more secure, and produce less polluting,”

U.S. Secretary of Energy Jennifer M. Granholm



“With this agreement, we will collaborate across the federal government to reduce greenhouse gas emissions and deliver the clean transportation future that Americans want and deserve,”

U.S. Transportation Secretary Pete Buttigieg



“... EPA is working with our federal partners to aggressively reduce pollution that is harming people and our planet – while saving families money at the same time. At EPA, our priority is to protect public health, especially in overburdened communities, while advancing the President’s ambitious climate agenda. This MOU is a step forward in delivering on those goals and accelerating the transition to a clean transportation future ”

U.S. Environmental Protection Agency Administrator Michael S. Regan



“The people HUD serves deserve clean, affordable transportation options. HUD is proud to join our federal partners... to ensure that clean transportation investments are made equitably and include communities and households that have been most harmed by environmental injustice.”

U.S. Housing and Urban Development Secretary Marcia L. Fudge

<https://www.energy.gov/articles/biden-harris-administration-announces-interagency-commitment-lower-transportation>



Contents of the MOU

The MOU establishes a partnership to **achieve the 2050 net-zero emissions target** set by the President of the United States.

The MOU establishes seven Goals:

- Decarbonize the transportation sector
- Reduce air pollution
- Cut costs for consumers
- Enable an equitable transition
- Secure domestic supply chains
- Support good-paying domestic jobs
- Lead global decarbonization efforts

And nine Planned actions of the Parties, to guide coordination efforts, require **updates for the head of each agency**, and requires the agencies to compile a **decarbonization strategy** for the transportation sector within 90 days.



There are 14 Supporting Activities identified:

- Develop a standing collaboration process across the Parties' research centers (e.g., DOE National Laboratories, **EPA Ann Arbor National Vehicle and Fuel Emissions Laboratory**, U.S. DOT Volpe National Transportation Systems Center) and others, including collaborating on mobility, land use and transportation data, modeling, and analysis to ensure consistency and sharing of approaches, tools, data, assumptions, and insights.
- Coordinate work that supports transformations of the **electrical grid**...
- Seek technical and policy paths to decarbonize **aviation** through sustainable aviation fuels...
- Identify and remove barriers to the use of **hydrogen** fuel cell and related infrastructure...

Supporting Activities

- Collaborate with private **rail** companies and other stakeholders to develop green energy sources for long-distance freight train systems, improve operational efficiency, and reduce emissions from rail facilities.
- Identify additional solutions to decarbonize **off-road vehicles**, freight and passenger rail, and **maritime vessels and port equipment**...
- Develop clean, safe, and reliable transportation **options for traditionally underserved** ‘and disadvantaged communities such as **transit**, intercity passenger rail, **bicycle** and pedestrian infrastructure, **electric vehicles**, and **e-mobility** solutions.
- Align investments in **transit-oriented development** and as feasible incorporate location efficient decision-making in financing new housing, commercial or mixed-use development.

The MOU includes a wide system-level view of transportation decarbonization



The points of contact responsible for administration of the MOU are:

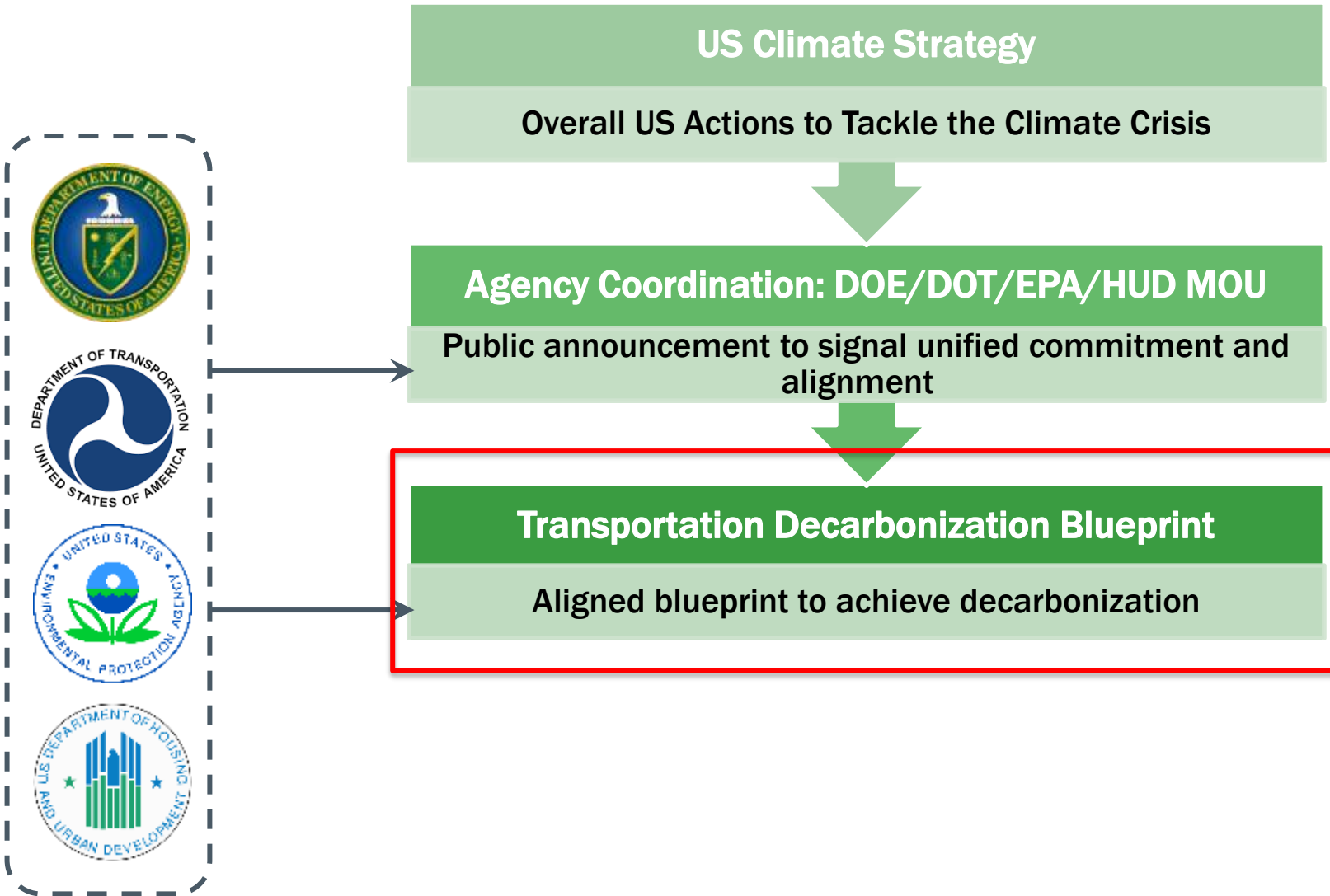
DOE: **Michael Berube**, Deputy Assistant Secretary for Sustainable Transportation

DOT: **Andrew Wishnia**, Deputy Assistant Secretary for Climate Policy

HUD: Crystal Bergemann, Senior Advisor for Climate, Office of the Secretary
(now **Alexis M. Pelosi**, Senior Advisor, Office of Community Planning and Development)

EPA: **Karl Simon**, Director, Transportation and Climate Division, Office of Air and Radiation

Coordinated Approach to a Decarbonization Strategy



Create a decarbonization strategy to guide future policy, research, development, demonstration, and deployment

- Provide clear direction
- Articulate existing pathways to decarbonize transportation
- Align multiple agencies to enable quick execution
- Consider new opportunities for collaboration
- Set the stage for detailed execution plans

Blueprint Rollout – TRB

Current document is being reviewed by senior leadership teams and White House staff, with a target release date of December 15th and a high-level round table conversation at TRB:



← **Join Us!!**
Your feedback needed

Lectern Session 3194

Transportation Decarbonization: An Interagency Approach at the Federal Level

Tuesday, January 10 3:45 PM- 5:30 PM ET

[Sign in to reveal location](#)

Lectern | PDH

Sponsored by:

Executive Committee (E0000)



Blueprint Rollout – SAE Gov/Ind

Wednesday, January 18

Luncheon Roundtable: Transportation Decarbonization Blueprint
(Session Code: G800)

Room TBD 12:30 p.m.

This discussion will begin with a point of view statement video from each of the Secretary/Directors followed by representatives from each agency participating in a panel discussion. Topics to be addressed include XYZ with the intent to answer the following questions

[Learn more about the Participants](#)

Moderators - Rachel Muncrief, International Council On Clean Transport

Panelists -

Michael Berube, US Department of Energy

Austin L. Brown, The White House Council on Environmental Quality

Michael Freedberg, HUD

Alexis Pelosi, HUD

Karl Simon, US Environmental Protection Agency

Andrew Wishnia, US Department of Transportation

← **Join Us!!**
Your feedback needed



Government/Industry Meeting
January 17-19, 2023 | Washington, District of Columbia

SAE INTERNATIONAL

Event-at-a-Glance

Registration Information



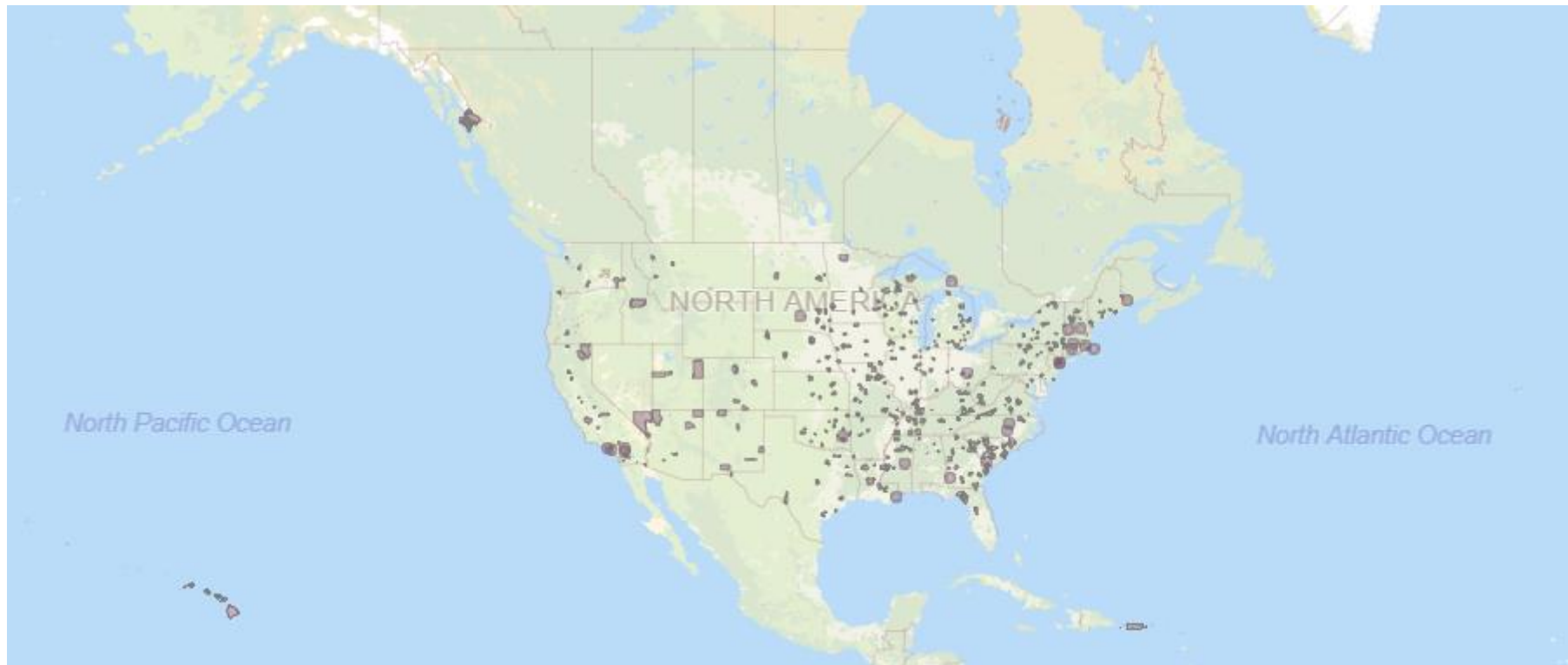
Bipartisan Infrastructure Law (November 2021) Inflation Reduction Act (August 2022)

- Over \$100 billion in funding to EPA, including billions for EJ initiatives, green bank support, state GHG grants
- Key OTAQ programs:
 - BIL: \$5B Clean School Bus Program
 - IRA: \$1B Clean HD Vehicles, \$3B Clean Ports



With the truly unprecedented investments from BIL and the Inflation Reduction Act, we have a rare opportunity to move further and faster than we ever have in the past.
U.S. Environmental Protection Agency Administrator Michael S. Regan, 11/15/2022

Clean School Bus Program Awards



epa.gov/cleanschoolbus



The Joint Office of Energy and Transportation

Established by the Bipartisan Infrastructure Law to address areas of joint interest to the U.S. Departments of Energy and Transportation

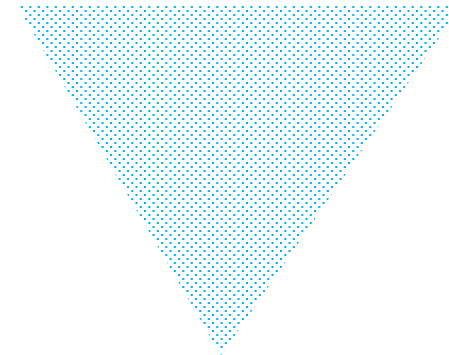
\$300M

in Fiscal Year 2022 funds to DOT with transfer authority to DOE

Partnering with the U.S. EPA to provide direct technical assistance for eligible school bus fleets

The EPA's Clean School Bus Program provides over \$5 billion over 5 years (fiscal years 2022-2026) to replace existing school buses with clean and zero-emission models. The **Joint Office** provides technical assistance to school districts to plan for an deploy clean school buses.

driveelectric.gov/bus



Summary

Tax Credits

Vehicles

- 30D – Clean Vehicle Credit
- 25E – Previously Owned Vehicle Credit
- 45W – Commercial Vehicle Credit
- 30C – Alternative Fuel Refueling Property Tax Credit
- 48C – Extension of Advanced Energy Project Credit
- 45X –Advanced Mfg Production Credit

Bioenergy

- 40B – Sustainable Aviation Fuel Credit
- 45Z – Clean Fuel Production Credit
- 30C – Alternative Fuel Refueling Property Tax Credit
- 40A - Extension of second-generation biofuel tax credit
- IRAct §13201 – Extension of Incentives for Biodiesel, Renewable Diesel, and Alternative Fuels
- 48C – Extension of Advanced Energy Project Credit
- 45X –Advanced Mfg Production Credit

Hydrogen

- 45V – Hydrogen Production Credit
- 48C – Extension of Advanced Energy Project Credit
- 48E – Clean Electricity Investment Credit
- 45Y – Clean Electricity Production Credit
- 45X – Advanced Mfg Production Credit
- 45W – Commercial EV Tax Credit
- 30C – Alt Fuel Refueling Property Credit
- 25D – Residential Clean Energy Credit

Crosscutting

- §13801 Direct Pay and Transferability

Deliberative Draft – Not a Statement of Administration Policy

Summary

Non-Tax Credits

Vehicles

- IRAct § 60101 – Clean Heavy-Duty Vehicles (EPA, \$1B)
- IRAct § 60102 – Grants to Reduce Air Pollution at Ports (EPA \$3B, also relevant to SAF)
- IRAct § 60104 – Diesel Emissions Reductions (EPA \$60M)
- IRAct § 50142 – Advanced Tech Vehicle Mfg (DOE \$3B)
- IRAct § 50143 – Domestic Manufacturing Conversion Grants (DOE \$2B)
- IRAct § 70002 US Postal Service Clean Fleets (USPS \$3B)

Sustainable Aviation Fuels

- IRAct § 60108 – Grants to Reduce Air Pollution at Ports (EPA \$15M)
- IRAct § 40007 – Alternative Fuel & Low-Emission Aviation Technology Program (DOT \$0.3B)
- IRAct § 22003 – Biofuel Infrastructure & Ag Product Market Expansion (USDA \$0.5B)

Deliberative Draft – Not a Statement of Administration Policy

Lithium Battery Supply Chain Provisions in BIL

Li-based Battery Supply Chain

Upstream

Mining and Extraction

Raw Materials Production



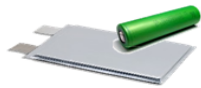
Midstream

Cathode Powder Production, Separator Production, Electrode and Cell Manufacturing

Materials Processing



Cell Manufacturing



Downstream

Pack Manufacturing, End of Life Recycling and Reuse

Pack Manufacturing



Electric Vehicles



Stationary Storage



National Defense



Aviation



End of Life Recycling and Reuse



U.S. Department of Energy
Vehicle Technologies Office

Sec. 40207(b) Battery Material Processing Grants
(\$3 Billion Total over 5 years)

Sec. 40207(c) Battery Manufacturing and Recycling Grants
(\$3 Billion Total over 5 years)

Sec. 40207(e) Lithium-Ion Battery Recycling Prize Competition (\$10 Million)

Sec. 40207(f) Battery and Critical Mineral Recycling: Battery Recycling Research, Development, and Demonstration Grants (\$125 Million)

Sec. 40208 Electric Drive Vehicle Battery Recycling and Second-Life Applications Program (\$200 Million Total over 5 years)

Key Hydrogen Provisions in BIL

Manufacturing RD&D across H₂ and fuel cell technologies

Raw
Materials

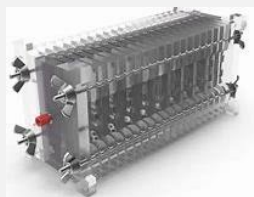
Processed
Materials

Subcomponents

End Product

Includes end of life (EOL) & recycling – RD&D

Sec. 40314, Sec 815: Clean Hydrogen Manufacturing & Recycling
\$0.5 Billion over 5 years



Electrolysis RD&D: BIL Includes RD&D across multiple electrolysis technologies, compression, storage, drying, integrated systems, etc.

Sec. 40314, Sec 816:
Clean Hydrogen Electrolysis Program;
\$1 Billion over 5 years. Goal \$2/kg by 2026



Regional Clean H₂ Hubs: At least 4 Hubs, geographic diversity, includes renewables, fossil + CCS, nuclear, for clean hydrogen production, multiple end use applications

Sec. 40314, Sec 813:
Regional Clean Hydrogen Hubs;
\$8 Billion over 5 years



National Hydrogen Strategy and Roadmap: Within 180 days
Clean Hydrogen Standard: 2 kg CO₂/kg H₂, update within 5 yrs

Sec. 40315, Sec 814 (Strategy & Roadmap) **Sec 822** (Clean Hydrogen Production Qualifications)