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TRB TRANSPORTATION RESEARCH BOARD

TRB Webinar: Career Series #2 – Sustainable Mobility: New and Expanding Opportunities

February 22, 2023

1:00 – 2:30 PM



TRB Webinar: Career Series

February 8, 2023

[TRB Webinar: Career Series #1 – The Future Transportation Workforce is Happening Now!](#)

March 22, 2023

[TRB Webinar: Career Series #3 – Transportation Equity: Community-Building in Action](#)



Purpose Statement

This webinar will focus on the concepts of sustainable mobility and transport and all that it encompasses. Presenters will discuss the importance of the transportation workforce's role in equity-centered sustainability, environmental justice considerations, and the Zero Emissions Vehicle (ZEV) program.

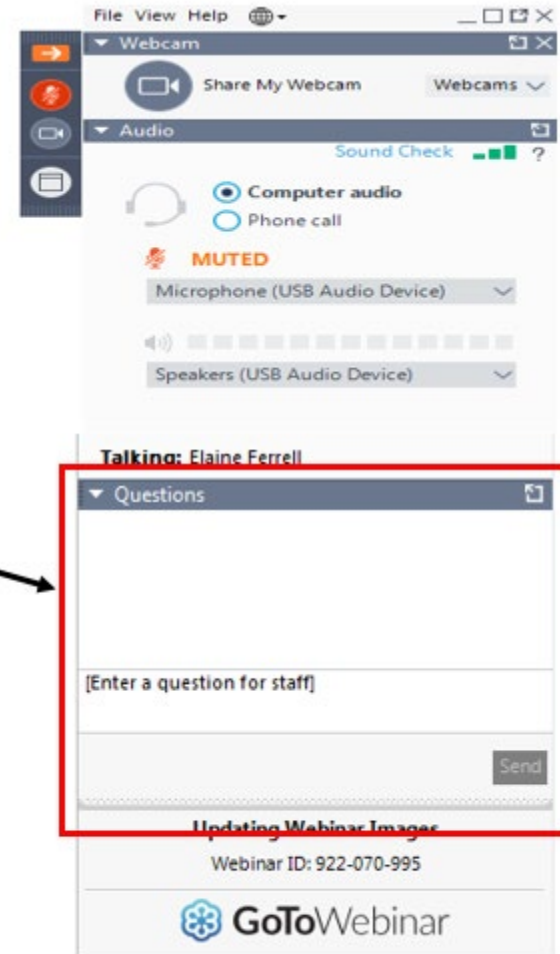
Learning Objectives

At the end of this webinar, you will be able to:

- Aware of the importance of the transportation sector in helping to achieve overall climate and sustainability outcomes

Questions and Answers

- Please type your questions into your webinar control panel
- We will read your questions out loud, and answer as many as time allows



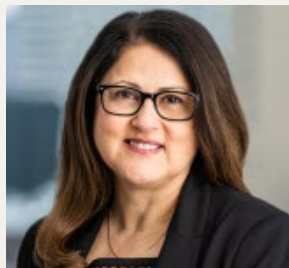
Today's presenters



Francisco Donez
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Alva Carrasco
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*Burns Engineering
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Cris Liban
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z electrification>> v transformation>>



TRB Webinar: Career Series No. 2

“Sustainable Mobility: New and Expanding Opportunities”

By Alva Carrasco

Rail & Transit, Director – Los Angeles, Burns Engineering

President of the Board of Directors, Latinos In Transit

February 22, 2023



ZE -Topics

- US Greenhouse Gas Emissions
- California Air Resources Board (CARB)
- The Future is Zero
 - Zero-emission Vehicles
- Careers in Zero
- Workforce Development





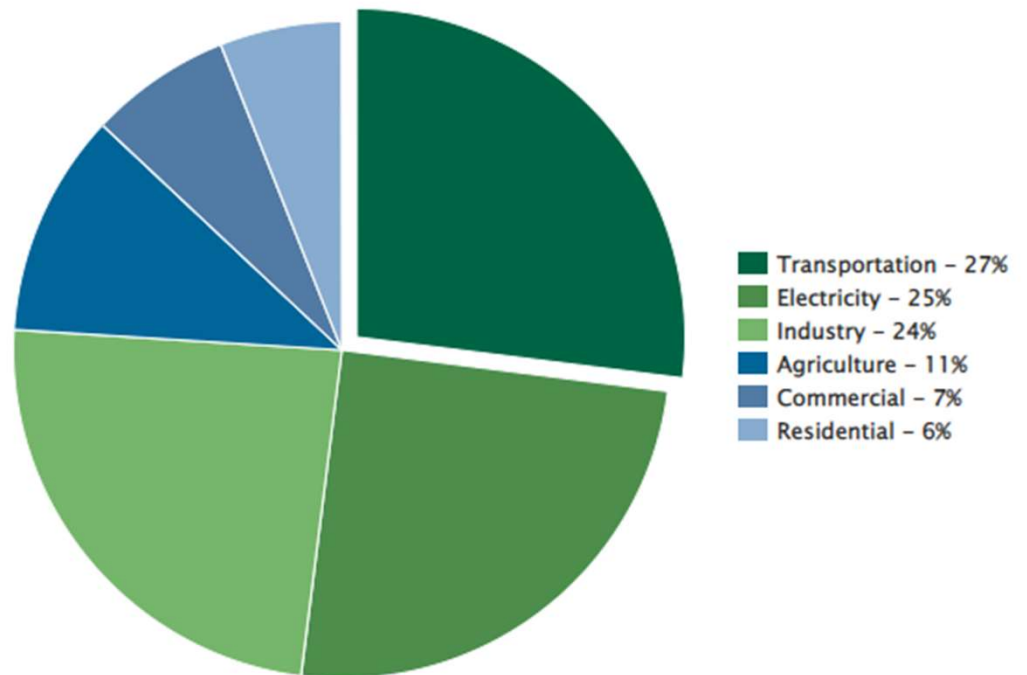
Greenhouse Gas Emissions

Transportation

Gasoline and diesel to transport people and goods was the largest source of CO₂ emissions in 2020, accounting for about 33% of total U.S. CO₂ emissions and 27% of total U.S. GHG emissions.

Includes domestic transportation sources such as highway and passenger vehicles, air travel, marine transportation, and rail.

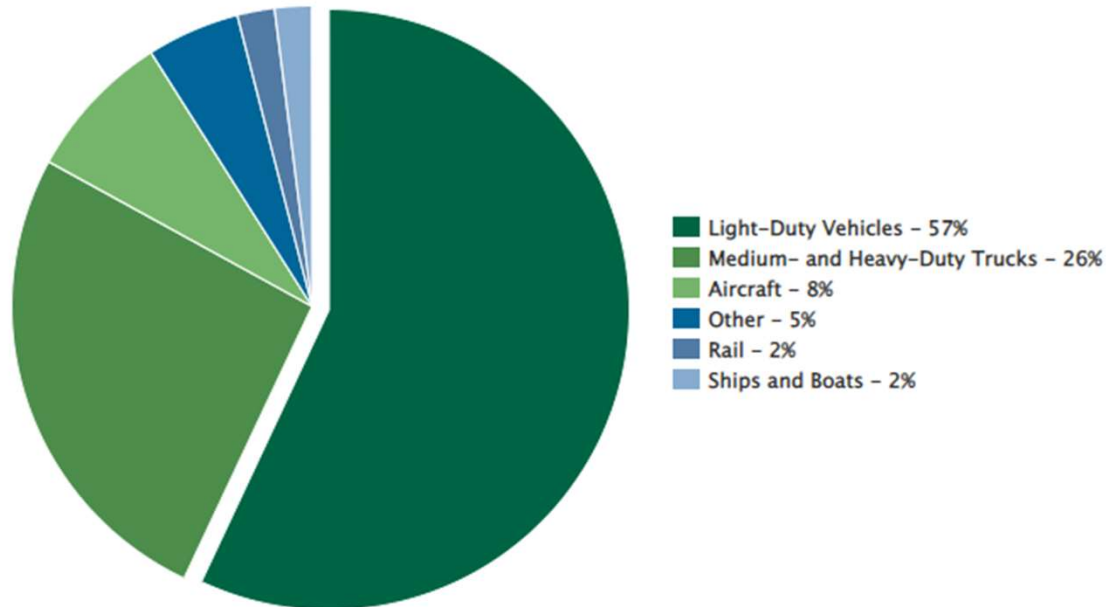
2020 U.S. GHG Emissions by Sector



<https://www.epa.gov/greenvehicles/fast-facts-transportation-greenhouse-gas-emissions>

Greenhouse Gas Emissions

2020 U.S. Transportation Sector GHG Emissions by Source



| | |
|--|--|
| Class 1 - 6,000 lbs & Less | Light Duty 6.6 Million New sold per year (1.8 M. Pickups) 4.9 Million Barrels/day |
| Class 2 - 6,001 to 10,000 lbs | |
| Class 3 - 10,001 to 14,000 lbs | Medium Duty 100,000 New vehicles per year 0.5 Million Barrels/day |
| Class 4 - 14,001 to 16,000 lbs | |
| Class 5 - 16,001 to 19,500 lbs | |
| Class 6 - 19,501 to 26,000 lbs | Heavy Duty 210,000 New vehicles per year 1.9 Million Barrels/day |
| Class 7 - 26,001 to 33,000 lbs | |
| Class 8 - 33,001 lbs & Over | |



Los Angeles 1970's



California Air Resources Board (CARB)



- **Innovative Clean Transportation (ICT) Regulation 2018**
 - Requires all public transit agencies to gradually transition to 100% ZEB fleet by 2040
 - *15 states and the District of Columbia join forces to accelerated bus and truck electrification – July 14, 2020 press release*
- **Advanced Clean Trucks Program, June 25, 2022**
 - Manufacturers ZEV sales requirement and a one-time reporting requirement for large entities and fleets.
- **Advanced Clean Cars II, August 25, 2022**
 - 100% of new cars and light trucks sold in California will be zero emission vehicles
 - By 2037, the regulation delivers a 25% reduction in smog-causing pollution from light-duty vehicles to meet federal air quality standard.

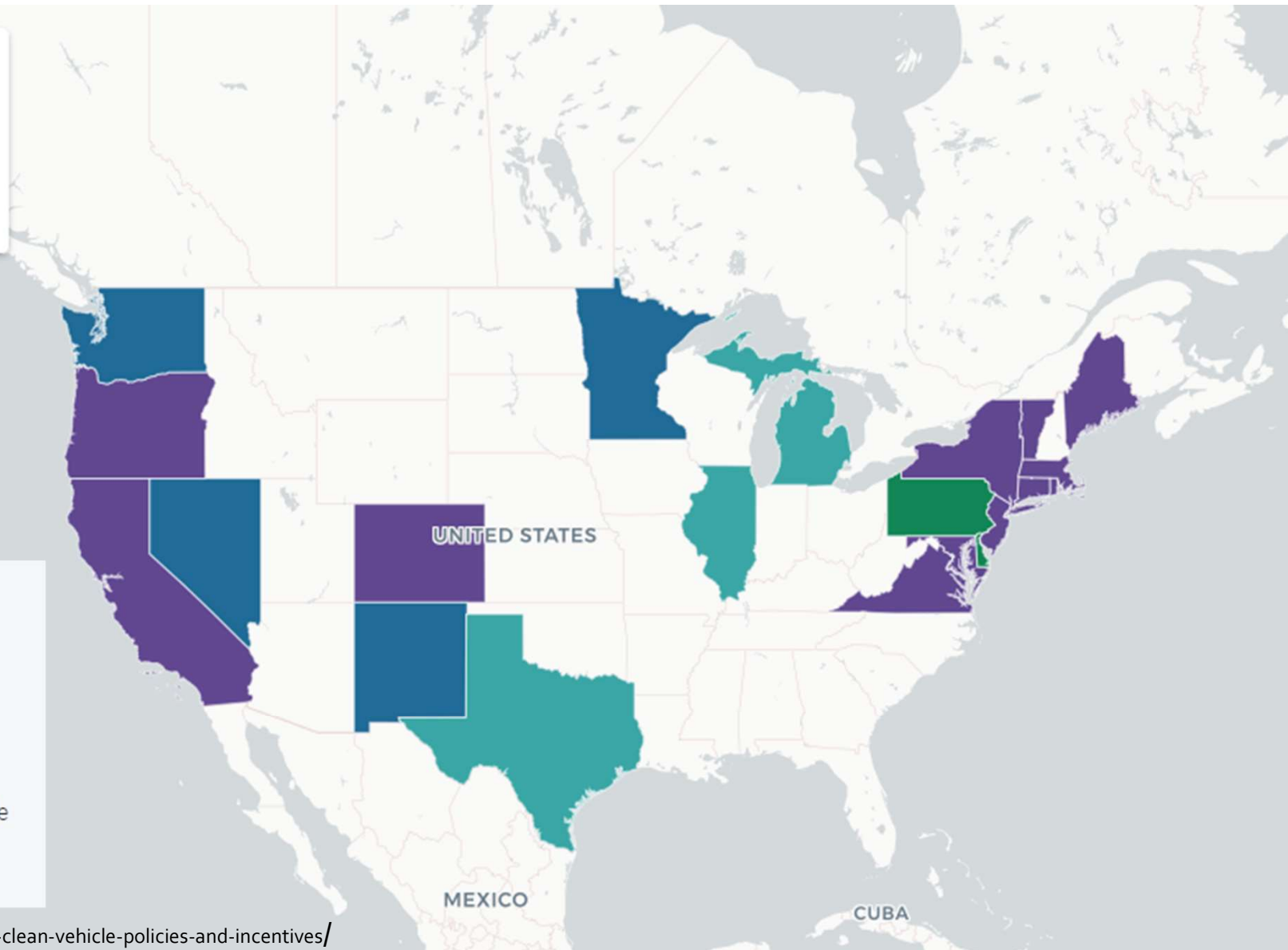
<https://ww2.arb.ca.gov/>

US State Clean Vehicle Policies & In...

- ZEV & LEV STANDARD AND PURCHASE I...
- LEV & ZEV STANDARDS
- PURCHASE INCENTIVES
- LEV STANDARD AND PURCHASE INCENT...
- LEV STANDARD

- EV: Electric vehicle
- ZEV: Zero-emission vehicle
- LEV: Low-emission vehicle
- BEV: Battery-electric vehicle
- PHEV: Plug-in hybrid-electric vehicle
- FCEV: Hydrogen fuel-cell vehicle

<https://www.czes.org/document/us-state-clean-vehicle-policies-and-incentives/>





The Future is Zero





ZE Sea





ZE Air





The Future is Here





Careers in ZERO

- Architects
- Engineers
- Planners
- Project Managers
- Supervisors/Managers/CEO's
- Maintenance Personnel/Technicians
- Operators
- IT/Programmers/App Developers
- Trainers/Apprentice Training
 - Construction, cement masons, iron workers, sheet metal workers, pipefitters, plumbers, electricians
- Construction
- Recruiters/Human Resources
- Small Business Owners
- Charger and Vehicle Manufacturers





Workforce Development

High School

Vocational Schools

College and Universities





Los Angeles Today



Thank You!

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Resilience in Transportation Workforce Needs

Aimee Flannery, Ph.D., PE

1,000-year (0.1% chance in any given year) Rain Fall Events in August 2022



Shifting the Culture – Implications for Workforce

Reactive

- ✓ Budgets based on prior years
- ✓ Reactive
- ✓ Break/fix
- ✓ Projects based on oldest or loudest stakeholder
- ✓ Run-to-fail
- ✓ Reactive projects
- ✓ Funds spent with little risk reduction

Proactive

- ✓ Budgets based on future needs
- ✓ Planning/scheduling work – improved service
- ✓ Risk-based work prioritization
- ✓ Repair/replace algorithms
- ✓ Better resource allocation
- ✓ Better long-term financial planning



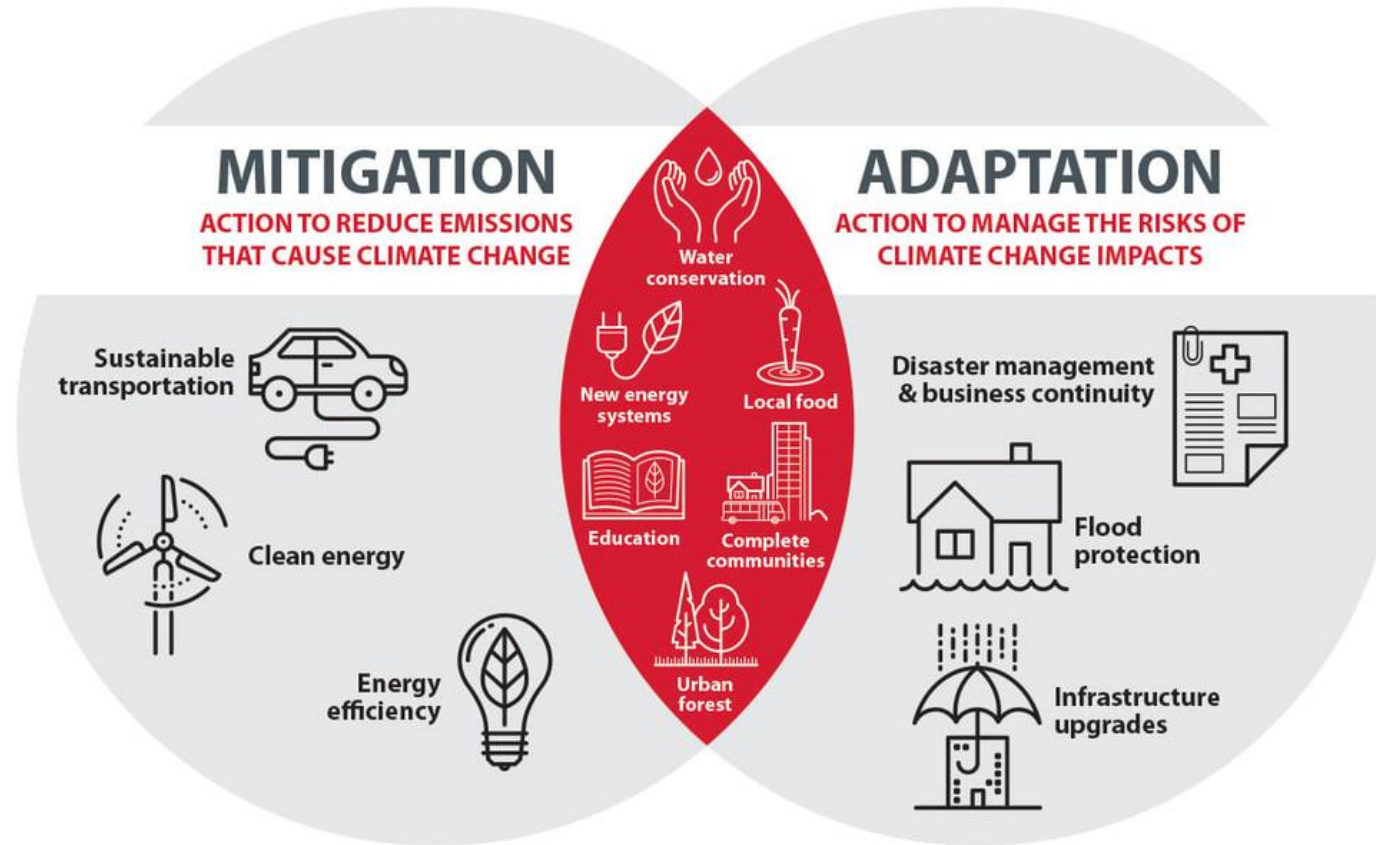
*Proactive organizations effectively manage assets & facilities over entire lifecycle, using **performance metrics** to make best O&M and financial decisions*



Resulting in improved customer service & reduced asset total cost of ownership

Climate Response

Climate Response: **mitigating and adapting to the impacts of climate change** on the world

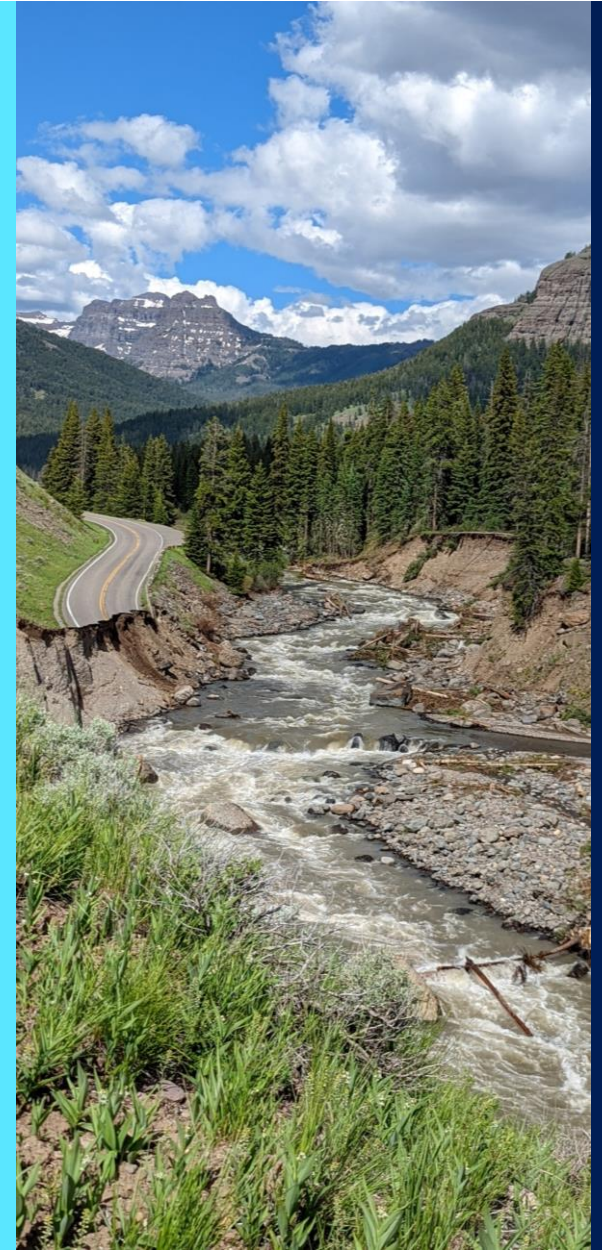


Decarbonization: reduction in the greenhouse gas emissions "footprint" (to, or beyond, net zero)

Resilience: a system that is prepared for, able to resist and then recover, adapt and learn from disruptive trends or events, such as climate change

From Biden White House, March 31, 2021

The United States of America is the wealthiest country in the world, yet we rank 13th when it comes to the overall quality of our infrastructure. After decades of disinvestment, our roads, bridges, and water systems are crumbling. Our electric grid is vulnerable to catastrophic outages. Too many lack access to affordable, high-speed Internet and to quality housing.



- **Proactive Resilience Efforts**
 - PROTECT Program (\$7.3 billion formula funds & \$1.4 discretionary grants)
- **Supports Reduced Carbon Emissions**
 - Carbon Reduction Program (\$6.4 billion formula funds)
- **Supports Electrification of Vehicles**
 - National Electric Vehicle Infrastructure (\$5 billion formula funds)

New Opportunities – Infrastructure Investment & Jobs Act (IIJA)

Resilience Planning

Vision & Strategy:

understand current drivers & risks,
stakeholder needs, manage
dependencies, life-cycle approach,
social value, diversity & inclusion

Project Delivery:

Design and construction,
supply chain management,
risk informed processes,
community engagement

Response and Recovery:

Preparedness, training,
emergency operations,
evacuation, testing,
restoration strategy

Planning and Development:

risk informed site selection,
whole life planning, design
for shocks & stresses, MODA
decision-tools, prioritization,
emergency management
planning

Operations & Maintenance:

Workforce development,
team empowerment,
continuity of operations, life-
cycle asset management




Expanding Needs to Plan, Design, Build, Manage Transportation Infrastructure

- Multiple disciplines and skills needed
 - Climate modeling
 - Asset managers, modelers of asset performance under stress
 - Deterioration curves of assets under a range of threats
 - Right sizing resilience investments
 - Social impacts of extreme weather & climate change
 - Systems assessment
 - Consider solutions outside of the right of way

Emphasis Areas in Resilience

- Nature based solutions
 - Outside of right of way
 - PROTECT eligibility



| | Benefits and Processes | Factors Affecting Performance |
|--------------------------------|---|---|
| Beaches and Dunes | <ul style="list-style-type: none">• Breaking of offshore waves• Attenuation of wave energy• Slow inland water transfer | <ul style="list-style-type: none">• Berm height and width• Beach slope• Sediment grain size and supply• Dune height, crest, and width• Presence of vegetation |
| Salt Marshes and Seagrass Beds |  <ul style="list-style-type: none">• Breaking of offshore waves• Attenuation of wave energy• Slow inland water transfer• Increased infiltration | <ul style="list-style-type: none">• Marsh, wetland, or SAV elevation and continuity• Vegetation type and density |
| Oyster Reefs | <ul style="list-style-type: none">• Breaking of offshore waves• Attenuation of wave energy• Slow inland water transfer | <ul style="list-style-type: none">• Reef width, elevation, and roughness |
| Barrier Islands |  <ul style="list-style-type: none">• Wave attenuation and/or dissipation• Sediment stabilization | <ul style="list-style-type: none">• Island elevation, length, and width• Land cover• Breach susceptibility• Proximity to mainland shoreline |
| Land Restoration or Creation |  <ul style="list-style-type: none">• Wave attenuation and/or dissipation• Shoreline erosion stabilization• Soil retention | <ul style="list-style-type: none">• Land elevation, length, and width• Land cover• Breach susceptibility• Proximity to mainland shoreline |

Additional Areas of Job Growth

- Considerations of equity in climate and resilience considerations
 - Justice40
 - Goal: at least 40% of the benefits from federal investments to disadvantaged communities.
 - Managed retreat
 - Are we able to model or measure the impacts of our decisions through an equity lens?

Challenges in Workforce Development

- One-third of all Federal Government Workers eligible for retirement by 2025
- Only 6% of Federal Government Workers are under age 30
- State Departments of Transportation
 - Many openings – lots of new programs/investment areas
- Private Industry – companies like Jacobs
 - Many openings – pull from multiple sectors to address climate resilience

Transportation Resilience

Transportation is a critical infrastructure sector

- Climate change, extreme weather events, pandemics have demonstrated need for continuity of operations within transportation

Resilience assessment new emphasis area within our sector

- Lessons learned from other critical sectors
Water/wastewater, Defense, Banking, Air Travel, Energy, etc.
- New funding resources
- New acknowledgement that business as usual is not sufficient from Congress, USDOT, Funding Organizations

Industry needs include:

- Education/training for current and future practitioners
- More fundamental research to understand asset performance, effect of decisions on community resilience, equity, generational wealth

Thank you!

Contact Information

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Challenging today.
Reinventing tomorrow.

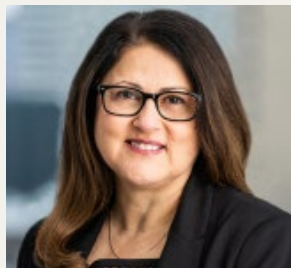
Today's presenters



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LATINOS
IN TRANSIT

Burns



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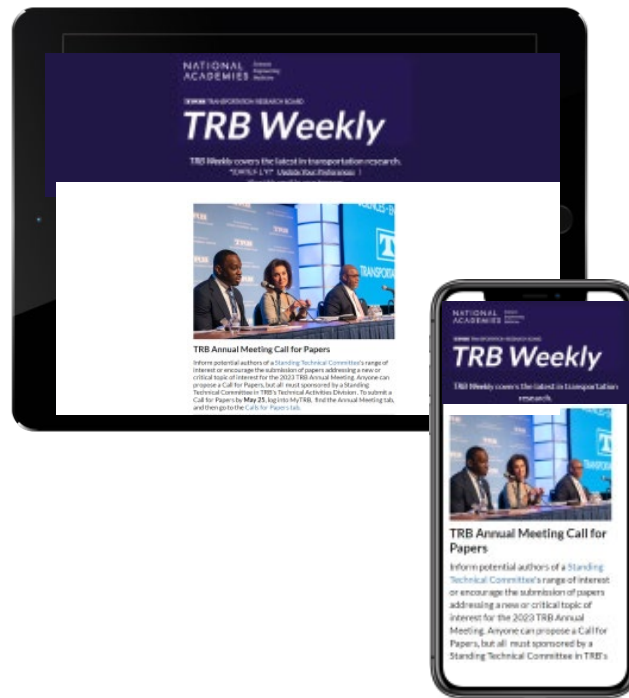


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Get involved

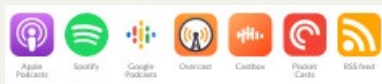
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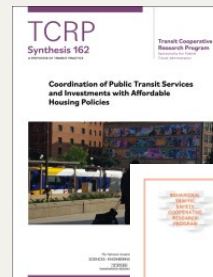
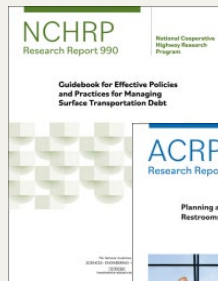
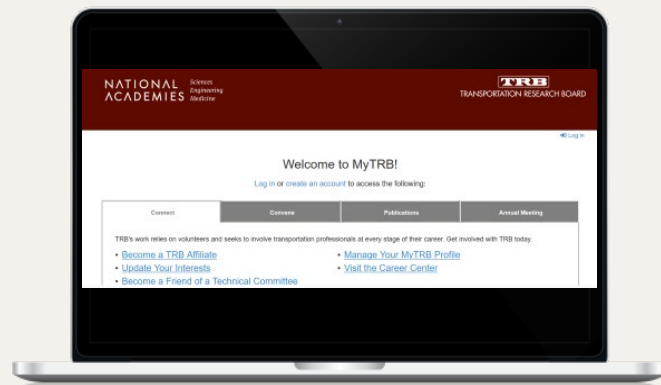
Network and pursue a path to Standing Committee membership

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