TRB

TRANSPORTATION RESEARCH BOARD

MEMORANDUM

TO: Members, TRB Executive Committee
TAC Representative to TRB Executive Committee

FROM: Victoria F. Sheehan, Executive Director

DATE: June 21, 2023

SUBJECT Agenda Book for TRB Executive Committee Meetings
June 28 & 29, 2023

Enclosed is the agenda book for your review prior to our summer TRB Executive Committee Meetings on June 28 and 29, 2023 (all day Wednesday and Thursday until noon). For those who will be attending in person, the meeting will be held in the NAS Lecture Room at the National Academy of Sciences (NAS) building, Washington, DC. Zoom invitations have been sent to those who will be participating online.

All of you are receiving this information electronically. We will make hard copies available at the meeting for those who requested them. Chair Diane Gutierrez-Scaccetti urges all members to review the agenda material prior to the meeting, so that time spent in oral briefings can be reduced to a minimum. This will also expedite the handling of the more routine items on the agenda, allowing more time for discussion of substantive transportation issues. If you have limited time to review the agenda materials ahead of time, I ask that you read the draft version of *Critical Issues in Transportation,* found in Tab 12. The Executive Committee will be asked to approve this draft during the meeting, so that the formal review process can begin.

Our traditional policy session on the afternoon of June 28 will be on traffic safety. We will have a one-hour panel presentation session with four speakers, DeReece Smither, Gabrielle Herbert, Norma Bowman, and Laura Sonderup. The four speakers will discuss the disproportional representation of Black, Indigenous and People of Color (BIPOC) in traffic fatalities, and how to potentially address the causes from a research and policy perspective across all levels of government and community organizations. This will be followed by a discussion with the entire Executive Committee.

You are asked to bring your agenda material with you as only late items or corrected material will be distributed at the meeting. (A few extra agendas will be available in case you forget yours). Please note that the electronic PDF version of the agenda book includes bookmarks. In the left column, please click the "Bookmark" icon to find tabs that will take you directly to each agenda item.

On **June 28 (Wednesday)**, the meeting will start promptly at 8:30 a.m. Breakfast will be served in the NAS East Court starting at 7:30 a.m.

NATIONAL ACADEMIES Sciences Engineering Medicine

500 Fifth Street, NW, Washington, DC 20001
Phone 202.334.2936 Fax 202.334.2920 Email vsheehan@nas.edu www.TRB.org

We will break for evening activities at 5:00 p.m. An offsite reception and dinner will be held at the McCormick & Schmick's restaurant at 6:00 p.m. for members of the TRB Executive Committee and their guests, Technical Activities Council members, and policy session panelists. The restaurant is within a 7-minute drive from the State Plaza Hotel. For those planning to attend the reception and dinner, we encourage you to walk, or use rideshare (Uber, Lyft, Taxi, etc.) For those allergic to seafood, steak, chicken, or vegetarian meals will be available.

On **June 29 (Thursday)**, the meeting will start at 8:30 a.m. and adjourn by 1:00 p.m. Breakfast (7:30 a.m.) and lunch (12 noon) will be served. If you are not planning to stay for lunch on Thursday but would like to take a boxed lunch with you, and did not RSVP yet, please let Sierra Reffell know.

Business casual wear is appropriate at the meetings, as well as the local restaurants. Ties are very strongly discouraged.

Wireless internet will be available at no charge.

I look forward to seeing you either at the National Academy of Sciences or online and to us having a productive meeting.

Note: If you find your plans change and you cannot attend the meeting, please call the hotel directly – State Plaza Hotel (202-861-8200). You must cancel 72 hours prior to your arrival. I would appreciate your letting us know also.

AGENDA
TRB EXECUTIVE COMMITTEE MEETING
National Academy of Sciences (NAS), Washington, D.C.
June 28-29, 2023

TUESDAY, JUNE 27, 2023

Reception & Dinner – 6:00 pm – 9:00 pm, Ristorante Piccolo, 1068 31st Street, NW, Washington, DC 20007

WEDNESDAY, JUNE 28, 2023

Item	Time	Page	Speaker	Type
1. Welcome and Announcements a. Cover Memo b. Agenda c. Hybrid Meeting Instructions d. Policy Statement on Preventing Discrimination, Harassment, and Bulling e. Bias and Conflict Discussion	8:30 a.m.	 1 3 6 9 10	Gutierrez-Scaccetti	Information
2. Self-Introductions; Bias/Conflict of Interest	8:40		All	Discussion
3. Approval of January 11-12, 2023 Minutes	8:50	12	Gutierrez-Scaccetti	Action
4. Approval of Consent Agenda a. SPPR Meeting Notes b. Conference Approvals	8:55	 20 34	Gutierrez-Scaccetti	Action
5. Executive Director's Report a. Financial Update	9:00	39 49	Sheehan Walker	Information
6. TRB Division Committee Report	9:20	51	Febey	Information
7. Technical Activities Update	9:30	58	Grimes/Brach	Information
8. Consensus and Advisory Studies Update	10:00	62	Menzies	Information
9. Break	10:30			
10. Communications Update	10:45	69	Mackie	Information
11. TRB Strategic Plan	11:00	74	Sheehan	Discussion
12. Critical Issues in Transportation	11:15	83	Shaheen	Action
13. Lunch	12:00 p.m.			
14. Policy Session on Traffic Safety Introduction a. Summary of TRB Activities b. OMB Data Collection Policy Changes	1:15	127	 Lewis Retting Smither	 Presentation Presentation

c. NHTSA Study Summary d. Tribal Transportation Safety Efforts e. Multicultural Communications Strategies			Herbert Bowman Sonderup	Presentation Presentation Presentation
15. Policy Session Discussion	2:30		Lewis/All	Discussion
16. Break for Evening Activities	5:00			
17. Walk to Dinner	5:30			
18. Dinner at McCormick & Schmick's, 1652 K Street NW, Washington, DC 20006	6:00			

THURSDAY, JUNE 29, 2023

Item	Time	Page	Speaker	Type
19. Policy Session Follow Up Discussion	8:30 a.m.		Lewis	Discussion
20. Future Policy Sessions	9:00	143	Houston	Action
21. Diversity and Inclusion Strategic Plan	9:15	148	Hall	Information
22. International Subcommittee Strategic Plan	9:30	153	Iwasaki	Information
23. Marine Board Update	9:45	157	Philip	Information
24. Break	10:00			
25. Young Member's Council	10:15	162	Kontou	Information
26. Cooperative Research Program Update	10:30	164	Houston	Information
27. Critical Issues Implementation	10:45	169	Sheehan	Action
28. Other Business	11:45		Gutierrez-Scaccetti	Information
29. Lunch	12:00 p.m.			
30. Adjourn	1:00			
Consent Agenda Items				
1. Conferences and Workshops 2. SPPR Meeting Minutes		34 20	Brach Menzies	

BACKGROUND ATTACHMENTS:

Next Meeting:	**January 10 & 11, 2024 (Wednesday & Thursday)** **Marriott Marquis, Washington, DC**
Next Summer Meeting:	**TBD**

TRB EXECUTIVE COMMITTEE HYBRID MEETING INSTRUCTIONS

Sierra Reffell is inviting you to a scheduled Zoom meeting.

Topic: TRB Executive Committee Summer Meetings – Day 1

Date/Time: Wednesday, June 28, 2023, 8:30 AM – 5:00 PM Eastern Time (US and Canada)

Join from PC, Mac, Linux, iOS or Android:
https://nasem.zoom.us/j/95733660015?pwd=QWd0bFpKRTNLcHppVUpFOGxEMTVZZz09

Password: 942280

Or iPhone one-tap :

US: +13017158592,,95733660015# or +13126266799,,95733660015# Or Telephone:

Dial(for higher quality, dial a number based on your current location):

US: +1 301 715 8592 or +1 312 626 6799 or +1 470 250 9358 or +1 646 518 9805 or +1 646 558 8656 or +1 651 372 8299 or +1 213 338 8477 or +1 253 215 8782 or +1 602 753 0140 or +1 669 219 2599 or +1 669 900 6833 or +1 720 928 9299 or +1 971 247 1195 or 888 475 4499 (Toll Free) or 877 853 5257 (Toll Free)

Meeting ID: 957 3366 0015
Password: 942280
International numbers available: https://nasem.zoom.us/u/aJjKKeVb

Would you like to test your Zoom connection? Please click on the link below.
https://nasem.zoom.us/test

NOTICE: The Zoom service allows audio and any materials exchanged or viewed during the session to be recorded and shared. Please be aware that by participating in this activity, you consent to your voice, likeness, and any materials you provide, being recorded for use and dissemination, without payment of any compensation for such use, in any language, format, or media now known or later devised, and you release the National Academies of Sciences, Engineering, and Medicine from any and all claims, liability, or damages arising from any such use. The Academies will proceed in reliance upon such consent and release. If you do not consent to the foregoing, please do not join the session.

Code of Conduct: The National Academies of Sciences, Engineering, and Medicine (NASEM) follows the NASEM guidelines in preventing discrimination, harassment, and bullying of participants at NASEM events, including conferences. http://www.nationalacademies.org/about/NA_186023.html

(Continued)

Topic: TRB Executive Committee Summer Meetings – Day 2

Date/Time: Thursday, June 29, 2023, 8:30 AM – 12 Noon Eastern Time (US and Canada)

Join from PC, Mac, Linux, iOS or Android:
https://nasem.zoom.us/j/97604096922?pwd=Qk4raFhLMkxEbk5uYkUrMkkrZllyUT09

Password: 894726

Or iPhone one-tap :

US: +13017158592,,97604096922# or +16465588656,,97604096922# Or Telephone:

Dial(for higher quality, dial a number based on your current location):

US: +1 301 715 8592 or +1 646 558 8656 or +1 651 372 8299 or +1 312 626 6799 or +1 470 250 9358 or +1 646 518 9805 or +1 669 900 6833 or +1 720 928 9299 or +1 971 247 1195 or +1 213 338 8477 or +1 253 215 8782 or +1 602 753 0140 or +1 669 219 2599 or 877 853 5257 (Toll Free) or 888 475 4499 (Toll Free)

Meeting ID: 976 0409 6922
Password: 894726
International numbers available: https://nasem.zoom.us/u/attqSnM2g

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(Continued)

Zoom Meeting Best Practices

- Use the "Raise Hand" feature to notify the host or current speaker that you wish to speak or use the chat feature.
- Unmute you microphone before speaking.
- Mute your microphone anytime you are not actively speaking.
- Avoid noisy activities like typing while your microphone is on.
- Focus on the meeting – avoid multitasking when you can.
- Monitor chat for conversation.
- Make sure you can see the Zoom windows at all times, especially if someone is sharing their screen.
- Sit somewhere with a neutral background.
- Make sure your camera is on a steady surface to prevent shaking.
- Turn off your camera if you need to take care of business outside of the meeting. Turn the camera back on when you are present in the meeting again.
- Communicate privately with the meeting host or co-host if you need to step away from the computer. Notify the host or co-host when you return.

PREVENTING DISCRIMINATION, HARASSMENT, AND BULLYING:
POLICY FOR PARTICIPANTS IN NASEM ACTIVITIES

The National Academies of Sciences, Engineering, and Medicine (NASEM) are committed to the principles of diversity, inclusion, integrity, civility, and respect in all of our activities. We look to you to be a partner in this commitment by helping us to maintain a professional and cordial environment. **All forms of discrimination, harassment, and bullying are prohibited in any NASEM activity.** This policy applies to all participants in all settings and locations in which NASEM work and activities are conducted, including committee meetings, workshops, conferences, and other work and social functions where employees, volunteers, sponsors, vendors, or guests are present.

Discrimination is prejudicial treatment of individuals or groups of people based on their race, ethnicity, color, national origin, sex, sexual orientation, gender identity, age, religion, disability, veteran status, or any other characteristic protected by applicable laws.

Sexual harassment is unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature that creates an intimidating, hostile, or offensive environment.

Other types of harassment include any verbal or physical conduct directed at individuals or groups of people because of their race, ethnicity, color, national origin, sex, sexual orientation, gender identity, age, religion, disability, veteran status, or any other characteristic protected by applicable laws, that creates an intimidating, hostile, or offensive environment.

Bullying is unwelcome, aggressive behavior involving the use of influence, threat, intimidation, or coercion to dominate others in the professional environment.

REPORTING AND RESOLUTION

Any violation of this policy should be reported. If you experience or witness discrimination, harassment, or bullying, you are encouraged to make your unease or disapproval known to the individual at the time the incident occurs, if you are comfortable doing so. You are also urged to report any incident by:

- Filing a complaint with the Office of Human Resources at 202-334-3400 or hrservicecenter@nas.edu, or
- Reporting the incident to an employee involved in the activity in which the member or volunteer is participating, who will then file a complaint with the Office of Human Resources.

Complaints should be filed as soon as possible after an incident. To ensure the prompt and thorough investigation of the complaint, the complainant should provide as much information as is possible, such as names, dates, locations, and steps taken. The Office of Human Resources will investigate the alleged violation in consultation with the Office of the General Counsel.

If an investigation results in a finding that an individual has committed a violation, NASEM will take the actions necessary to protect those involved in its activities from any future discrimination, harassment, or bullying, including in appropriate circumstances **the removal of an individual from current NASEM activities and a ban on participation in future activities**.

CONFIDENTIALITY

Information contained in a complaint is kept confidential, and information is revealed only on a need-to-know basis. NASEM will not retaliate or tolerate retaliation against anyone who makes a good faith report of discrimination, harassment, or bullying.

Updated December 2, 2021

Conflict of Interest and Bias Definitions

- “Conflict of interest" means any financial or other interest which conflicts with the participation of an individual in particular decisions of the institution because the interest (1) could significantly impair the individual's objectivity or (2) could create an unfair competitive advantage for any person or organization.
- “Bias" ordinarily relates to views stated or positions taken that are largely intellectually motivated or that arise from the close identification or association of an individual with a particular point of view or the positions or perspectives of a particular group.

Conflict of Interest

- Financial in nature;
- For individual and immediate family;
- Includes *current* employment, investment, and property interests and only lasts for the duration of the project;
- Details provided on forms are confidential;
- Financial conflicts are usually disqualifying

Bias

- Perspective -- point of view;
- Expertise -- relevant to understanding and analyzing the issues;
- Goal is to achieve balance, not disqualify.

NATIONAL ACADEMIES Sciences Engineering Medicine

TRB TRANSPORTATION RESEARCH BOARD

Executive Committee Meeting Minutes
January 11-12, 2023
Liberty LM Room (Meeting Level 4)
Marriott Marquis Hotel, Washington, DC

Wednesday, January 11, 2023

8:30 a.m.
Welcome and Announcements (Ford) Information

a. Policy Statement on Preventing Discrimination, Harassment, and Bullying was noted.
b. Bias/Conflict of Interest Discussion – There were no conflicts of interest reported.

8:53 a.m.
Recognition of Outgoing Members of the Executive Committee (Ford) Presentation

8:55 a.m.
Approval of the June 15-16, 2022 Minutes (Ford) Action

- The minutes were approved.

8:58 a.m.
Approval of Consent Agenda (Ford) Action

9 a.m.
Executive Director's Report (Sheehan) Information

- She is excited to lead TRB and discussed her plan for her first year upcoming as Executive Director.
- Critical Issues and "Everyone Interested is Invited" from the TRB history book have really resonated with her in her first weeks as ED.
- She said her responsibility is to carry out the work as directed by the Executive Committee.
- TRB is part of the National Academies and she is committed to aligning TRB's work with that of the National Academies.
- She wants to preserve TRB's reputation and integrity in the industry and through our work, and to address ways we can involve in a fast-moving landscape.
- She discussed the guiding tenants of TRB.
- She thanked everyone for such a warm welcome.
- She has been thinking about the changing nature of volunteerism and how best to move forward with our 8,500+ volunteers, how to bring in more, and how to prevent burnout.
- There are more than 12,000 registrants officially in attendance, and that number will likely go up with Secretaries Buttigieg and Granholm speaking later.

- TRB is in good financial shape.

9:30 a.m.
Strategic Plan Implementation (Shaheen) Discussion

- This is a five-year plan and will be for staff and volunteers. It was adopted on June 15, 2022.
-
    a. The NRC Strategic Plan was adopted in February 2021 and TRB is committees to developing a new strategic plan to be aligned with it, hopefully this upcoming June.
    b. The proposed goals and strategies were outlined.

9:45 a.m.
Break

10 a.m.
Critical Issues in Transportation Update (Shaheen) Discussion

- There was a discussion on candidate metrics for Critical Issues topics. A small number of key metrics will be included for each of the topics in the next edition planned for release in mid-2023.
- It was suggested that roadway crashes or safety could possibly being given more weight in the pie chart of top issues.

10:50 a.m.
USDOT RD&T Strategic Plan Update (Hampshire, Ibrahim) Information

- The plan is for FYs 2022 to 2026.

11:15 a.m.
Introduction to Policy Session on Megaprojects (Wilson, Pollack, Paiewonsky, Silverberg, Wilson) Information

- The priorities are outlined in the Infrastructure Implementation Executive Order.
- The plan is to build the federal workforce, tell the story of the Building a Better America brand (launched build.gov), and deliver results.

12 p.m.
Lunch

1:30 p.m.
Chair's Plenary Session (Ford)

3:30 p.m.
Policy Session on Megaprojects (Wilson, Shen, Shaw, Gray, Marchbanks) Presentations/Discussion

- Eric Shen of Port of Long Beach detailed best practices and recommendations for a 20-year bridge project in Long Beach, Calif.
- Susan Shaw of Virginia DOT discussed ways they have partnered to deliver managed lanes.
- Representatives from the Ohio DOT discussed a nine-mile bridge project that is kicking off and will stretch into Kentucky.

6 p.m.
Executive Director's Reception (Shaheen)

Thursday, January 12, 2023

8:30 a.m.
Policy Session Follow Up (Ford, Wilson) Discussion

- Megaprojects cross over multiple modes and the presentations yesterday focused on roads and bridges.
- It was suggested that TRB could research salaries in the megaproject workforce, the benefits of private versus public investment, and many other issues.

9 a.m.
June 2023 Policy Session (Houston) Action

- The SPPR's recommendation for the June policy session topic is traffic safety, particularly how it relates to equity issues.

9:10 a.m.
Technical Activities Update (Grimes,Brach) Information

- One of the key topics at the Technical Activities Council meetings was how to attract and retain young, and in general new, volunteers. We also want to communicate that TRB is much more than 5 days in January.

9:30 a.m.
TRB Division Committee Report (Hendrickson) Information

- TRB has a very different structure than most of the rest of the National Academies, so there has been a lot of interaction to understand if we should alter some of our structure.

9:40 a.m.
Diversity, Equity, and Inclusion Strategic Plan (Lewis) Information

- An update was given on TRB's Diversity, Equity, and Inclusion (DE&I) Strategic Plan.

9:55 a.m.
Minority Student Fellow Programs (Febey) Information

- A program overview was given of its status in the 14th year of its existence.

10:15 a.m.
Young Member's Council (Kontou) Information

- The Young Members Coordinating Council (YMCC) has continued to develop and promote opportunities for involvement, resources, connections, and representation in all levels of TRB.

10:20 a.m.
Break

10:30 a.m.
International Subcommittee (Iwasaki) Information

- TRB continues to look into possible international agreements with several transportation research-focused organizations around the world.

10:40 a.m.
Marine Board Update (Philip) Information

- An update was given of the Marine Board's activities, including information on its Fall 2022 Meeting on Building Equity into Infrastructure and the Spring 2023 Meeting in Norfolk, Va with issues on workforce, coastal resiliency, and other issues.

10:55 a.m.
Communications Update (Mackie) Information

- A report was given on how the TRB Communications Strategic Plan has progressed since its adoption by the Executive Committee in July 2021.

11:15 a.m.
Cooperative Research Program Update (Hedges) Information

- The many publications from CRP in 2022 and increased funding for the program from the infrastructure bill were noted.

11:25 a.m.
Consensus and Advisory Studies Update (Menzies) Information

- Details were given about how the program works, the three reports released since April, and the nine CAAS studies currently in progress.

11:50 a.m.
Other Business (Ford) Information

- No other business was discussed.
- Victoria Sheehan thanks everyone for their hard work and feedback this week.
- June 14-15 are under consideration as the dates for the summer meeting at the Keck Center in Washington DC.
- Nathaniel Ford thanked everyone for supporting him throughout his year as Chair.
- Shawn Wilson thanked Nathaniel Ford for his leadership.

11:55 a.m.
Adjourn

Full list of attendees:

CHAIRS

- Nathaniel P. Ford, Chief Executive Officer, Jacksonville Transportation Authority
- Shawn Wilson, Secretary, Louisiana Department of Transportation and Development

MEMBERS

- Michael F. Ableson, CEO, Arrival Automotive-North America
- James F. Albaugh, President and Chief Executive Officer of Boeing Integrated Defense Systems, The Boeing Company (Retired)

- Douglas C. Ceva, VP Customer Lead Solutions, Prologis, Inc.
- Marie Therese Dominguez, Commissioner, New York State Department of Transportation
- Ginger Evans, President, Tower Consulting, LLC
- Michael F. Goodchild, Professor Emeritus, Department of Geography, University of California, Santa Barbara
- Diane Gutierrez-Scaccetti, Commissioner, New Jersey Department of Transportation
- Stephen W. Hargarten, Director, Injury Research Center, Associate Dean Office of Global Health, Professor of Emergency Medicine, Medical College of Wisconsin
- Chris T. Hendrickson, Hamerschlag University Professor Emeritus, Department of Civil and Environmental Engineering, Carnegie Mellon University
- Randell Iwasaki, Leader of State and Local Transportation, Amazon Web Services (AWS)
- Ashby Johnson, Executive Director, Capital Area Metropolitan Planning Organization
- Joel M. Jundt, Secretary of Transportation, South Dakota Department of Transportation
- Drew Kodjak, Executive Director, International Council on Clean Transportation
- Carol A. Lewis, Professor, Transportation Studies, Texas Southern University
- Julie Lorenz, Secretary, Kansas Department of Transportation
- Michael R. McClellan, VP Strategic and Network Planning, Norfolk Southern Corporation
- Patrick K. McKenna, Director, Missouri Department of Transportation
- Russell McMurry, Commissioner, Georgia Department of Transportation
- Craig E. Philip, Research Professor and Director, VECTOR, Department of CEE, Vanderbilt University
- Steward T.A. Pickett, Distinguished Senior Scientist, Cary Institute of Ecosystem Studies
- Leslie S. Richards, General Manager, Southeastern Pennsylvania Transportation
- James M. Tien, Distinguished Professor and Dean Emeritus, College of Engineering, University of Miami

EX OFFICIO MEMBERS

- Michael R. Berube, Deputy Assistant Secretary for Sustainable Transportation, U.S. Department of Energy
- Amit Bose, Administrator, Federal Railroad Administration, U.S. Department of Transportation
- Carlos M. Braceras, Executive Director, Utah Department of Transportation
- Tristan Brown, Deputy Administrator, Pipeline and Hazardous Materials Safety Administration, U.S. Department of Transportation
- Ann Carlson, Acting Administrator, National Highway Traffic Safety Administration
- Steven Cliff, Executive Officer, California Air Resources Board
- Nuria I. Fernandez, Administrator, Federal Transit Administration, U.S. Department of Transportation
- LeRoy Gishi, Chief, Division of Transportation, U.S. Bureau of Indian Affairs (BIA), U.S. Department of the Interior
- Major General William Graham, Deputy Commanding General for Civil and Emergency Operations, U.S. Army Corps of Engineers
- John T. Gray, Senior Vice President Policy and Economics Association of American Railroads
- Robert C. Hampshire, Deputy Assistant Secretary for Research and Technology, U.S. Department of Transportation
- Robin Hutcheson, Administrator, Federal Motor Carrier Safety Administration

- Eleftheria (Ria) Kontou, Assistant Professor, University of Illinois Urbana-Champaign
- Billy Nolen, Acting Administrator, Federal Aviation Administration
- Stephanie Pollack, Deputy Administrator, Federal Highway Administration, U.S. Department of Transportation
- Susan A. Shaheen, Professor and Co-Director, TSRC, University of California, Berkeley
- Karl Simon, Director, Transportation and Climate Division
- Paul P. Skoutelas, President and CEO, American Public Transportation Association
- Polly Trottenberg, Deputy Secretary of Transportation, U.S. Department of Transportation
- Jim Tymon, Executive Director, American Association of State Highway and Transportation Officials

Technical Activities Council Representatives

- George Avery Grimes, CEO Advisor, Patriot Rail Company
- Pasi Lautala, Michigan Technological University, Rail Group
- Allison Yoh, Executive Officer, Marine Group
- Eleftheria Kontou, Assistant Professor, Young Members Council

NEW INCOMING MEMBERS OF THE EXECUTIVE COMMITTEE

- Nancy T. Daubenberger, Commissioner, Minnesota Department of Transportation
- Hani S. Mahmassani, W.A. Patterson Distinguished Chair in Transportation, Director, Transportation Center, Northwestern University

NEW EX OFFICIO MEMBERS

- Ann Carlson, Acting Administrator, National Highway Traffic Safety Administration
- Shailen Bhatt, Administrator, Federal Highway Administration
- Billy Nolen, Acting Administrator, Federal Aviation Administration

VIRTUAL OBSERVERS

- Michael F. Ableson, CEO, Arrival Automotive-North America
- Michael F. Goodchild, Professor Emeritus, Department of Geography, University of California, Santa Barbara
- Ashby Johnson, Executive Director, Capital Area Metropolitan Planning Organization
- Joel M. Jundt, Secretary of Transportation, South Dakota Department of Transportation
- George Avery Grimes, CEO Advisor, Patriot Rail Company
-

OTHER USDOT ATTENDEES

- Gloria Shepherd, Executive Director, Federal Highway Administration (FHWA)
- Kelly Regal, Associate Administrator of Research, Development, and Technology, Federal Highway Administration (FHWA)
- Laura Springer, Waterways & Ocean Policy Division Chief, U.S. Coast Guard (USCG)
- Bradley Mims, Deputy Administrator, Federal Aviation Administration (FAA)
- Timothy Klein, Director, Technology Policy, and Outreach, Office of the Assistant Secretary for Research and Technology (OST-R)

- Candace Nachman, Senior Ocean Policy & Program Advisor, U.S. Coast Guard Headquarters
- Harinderbir Warraich, Virginia Department of Transportation
- Mary Leary, Acting Associate Administrator, Office of Research, Demonstration, and Innovation, Federal Highway Administration (FHWA)
- Kenneth Blacks, Federal Highway Administration (FHWA)
- Firas Ibrahim, Director, Office of Research, Development, and Technology, Office of the Assistant Secretary for Research and Technology (OST-R)
- Nanda Srinivasan, Associate Administrator, Research and Program Development, National Highway Traffic Safety Administration, (NHTSA)
- Veronica Vanterpool, Federal Transit Administration (FTA)
- Veronica McBeth, Federal Transit Administration (FTA)
- Shailen Bhatt, Administrator, Federal Highway Administration
- Anne Aylward, Director of the Volpe National Transportation System, OST-R/Volpe Center
- David Valenstein, Federal Railroad Administration
- Maryam Allahyar Wyrick, Director of Research, Development, & Technology, Federal Railroad Administration (FRA)

MEMORANDUM OF UNDERSTANDING (MOU) SIGNING

- Alva Carrasco, President, Board of Latinos in Transit

TRB Staff

- Victoria F. Sheehan, Executive Director
- William Anderson, Senior Program Officer
- Ann M. Brach, Director, Technical Activities
- Scott Brotemarkle, Marine Board Program Director, Senior Program Officer
- Patrice Davenport, Deputy Director, TRB Program Development & Strategic Initiatives
- Karen S. Febey, Senior Report Review Officer
- Christopher Hedges, Director, Cooperative Research Programs
- Russell W. Houston, Associate Executive Director
- Katherine Kortum, Senior Program Officer
- Claudette Louard-Clark, Director, TRB Human Resources
- Stephen Maher, Deputy Division Director of Program Content, Technical Activities
- Paul Mackie, Director, Communications/Media
- Tom Menzies, Director, Consensus and Advisory Studies
- Sierra Reffell, Executive Assistant
- Gary Walker, Senior Deputy Director, TRB Program Finance, Office of Chief Financial Office

Policy Session Speakers

- Jim Gray, Secretary, Kentucky Transportation Cabinet
- Jack Marchbanks, Director, Ohio Department of Transportation
- Susan Shaw, Megaprojects Director, Northern Virginia District, Virginia DOT
- Eric Shen, Founder, Shen & Associates, LLC

Invited Policy Session Guests

- Luisa Paiewonsky, White House Infrastructure Implementation Team
- Samantha Silverberg, White House Infrastructure Implementation Team

Subcommittee on Planning and Policy Review (SPPR)
Meeting Notes
Friday, April 28, 2023
8:30 am – 3:15 pm PT (11:30 am – 6:15 pm ET)
Beckman Center, Board Room, Irvine, CA

Members in Attendance – Susan Shaheen (Chair); George Avery Grimes (Virtual); Carlos Braceras; Ginger Evans; Nathaniel Ford (Virtual); Diane Gutierrez-Scaccetti; Chris Hendrickson; Randy Iwasaki; Carol Lewis; Craig Philip

Staff in Attendance – Victoria Sheehan; Ann Brach (Virtual); Patrice Davenport (Virtual); Karen Febey (Virtual); Steve Godwin (Virtual); Chris Hedges; Russell Houston; Katherine Kortum; Paul Mackie (Virtual); Tom Menzies; Sierra Reffell (Virtual); Myah Stroman (Virtual); Gary Walker (Virtual)

The Spring meeting of the Subcommittee on Planning and Policy Review (SPPR) was called to order at 8:30 am on April 28, 2023, at the Beckman Center in Irvine, CA by Susan Shaheen, Chair, SPPR. She began the meeting by welcoming committee members and staff in attendance. Chairman Shaheen briefly reviewed the agenda items for the meeting. She motioned approval of the consent agenda. No items on the consent agenda were raised for discussion, so these items were approved by consent.

Executive Director's Report

Victoria Sheehan updated the committee on the changes within TRB's Executive Committee membership. Shawn Wilson stepped down as the appointed Chair in January, leaving the role open for a state DOT CEO. Diane Gutierrez-Scaccetti has accepted the new role and will now lead as Executive Committee Chair. Carol Lewis will remain as the Vice Chair.

Victoria briefly shared participation results from the TRB Annual meeting. Results showed registration for the January 2023 meeting exceeded 12,000 attendees just shy of 13,000. The meeting was well received, and many attendees were pleased to see the meeting back to its traditional format. As a strategy to expand TRB's messages, Victoria explained TRB will continue to emphasize the value of the organization outside of the Annual Meeting by promoting its various activities throughout the year, including 11 conferences planned for 2023, several committee and subcommittee meetings, the webinar program, access to online reports and research databases, and its Careers in Motion job center. She also explained in the year ahead TRB will also develop a comprehensive communications plan to increase engagement from individuals from across the transportation community to participate throughout the year.

Victoria informed the committee that since becoming Executive Director her focus has been on learning how TRB does it's work throughout its divisions, the initiatives implemented to make it efficient as possible for staff to conduct and manage work, and opportunities for improvement to ensure the focus remains on its true objective. She also explained her interest in TRB finances across the current programs, how they were originally established,

financial contributions provided in the past from other entities, and opportunities where TRB can strengthen its financial resiliency and engagement with volunteers, sponsors, and global affiliates. She explained in the short term the focus will be to look internally to understand how staff are navigating the pandemic, and how it has impacted their ability to deliver and meet the expectations of TRB's volunteer community. Victoria explained that she is taking a deeper look at the financial vulnerabilities and what strategies TRB can develop to increase volunteer engagement, secure resources for projects and work, workforce development, and address attrition challenges.

Victoria also highlighted the academies has deployed technology tools that can assist with helping staff work more efficiently. The Academies internally invested in Catalyst, a technology modernization initiative that includes systems like Microsoft Teams, Asana, and Impexium, that help to manage projects and workflow. TRB is evaluating the current tools to determine which systems the organization needs/will utilize for the future ahead, and how they can assist committees and revolving work.

Victoria shared that TRB is involved in an initiative shared across NASEM called the Climate Crossroads initiative. The initiative will serve as a nexus point with the National Academies, allowing the organization to chart new pathways for sustained national and global leadership over the coming decades. Climate Crossroads will leverage the disciplinary breadth of the organization, provide space to be responsive to new challenges, and expand the impact of the Academies' work to a more diverse range of stakeholders and decision-makers by developing new ways to work with underrepresented communities. TRB will use the initiative to showcase the extensive body of work it has undertaken around climate and leverage some of the research that was conducted by other program areas to identify solutions from a transportation perspective.

Victoria concluded her presentation by touching on the topic of conflict of interest. She discussed a recent New York Times article that was released about the National Academies receiving funds from the Sackler Family, the family's involvement in a number of lawsuits associated with the opioid crisis, the work the Academies has done around opioids, and if there is a conflict of interest. Victoria informed committee members there is no conflict of interest. She explained no funds were used to fund the opioid research and that the funds received from the Sackler Family in 2019 were frozen during the time that many of the lawsuits were advancing. No funds received were used for any advisory work relative to the opioid crisis. The funds were received by the National Academy of Sciences and not the National Academy of Medicine. The National Academy of Sciences will discuss what will be done with the funds received while they work through the legal issues of how most appropriately to move forward.

Victoria also mentioned there are no significant changes in financial expenditures, and that she will share a more robust financial report at the June Executive Committee meeting.

Cooperative Research Programs Update

Chris Hedges discussed the new Cooperative Research Programs (CRP) projects that have been selected to cover the major goals and supporting factors of the *Critical Issues in Transportation* document. To address the critical issue of climate change, Chris explained

CRP will focus on topics that discuss flooding and resiliency, electric vehicles and charging stations at airports, stormwater best practices, lead-free aviation fuel, and zero emission bus fleets. To promote the critical issue of equity, CRP will focus its topics on racial equity, rural and low-income populations, transit users with visual disabilities, the gender equity transfer program for the travel needs of women, and equity in transit in terms of measuring its performance. Chris further discussed the critical topic of increasing safety. With safety being a popular focus of CRP's research, it will focus on topics that will address driving under the influence, electronic surveillance of railway grade crossing, work zone crashes, vulnerable users such as teen drivers and motorcyclists, clear zones for hot spots, and an array of research projects on sign signals, lighting safety, safety hardware, and transit development. To advance the critical issue of public health, CRP will address the topics of preventing human trafficking, and eliminating/mitigating the impacts of PFAS in firefighting equipment and other sources. For building and sustaining a strong competitive economy, Chris explains that CRP will focus its research on the economic impact of e-commerce on the airport industry and preparing an airport for a new airline start up service.

Chris also highlighted CRP's projects that will focus on the supporting factors contributing to the goals of the critical issues document. For Supporting Factor A - Transportation Travel and Infrastructure, CRP will research topics from bridge construction and displacement, impact of e-commerce on land use, technology and wireless networks at airports, transportation systems operation and maintenance, and other topics across the board to address advancing travel and travel infrastructure. For Supporting Factor B - Governance of the System, CRP will look into topics of coordination between state and federal agencies on MPO's on transportation policy and benefits from sharing data between organizations. Topics addressing Supporting Factor C- Funding and Finance include updating AASHTO's guide to practical cost estimating, equity impacts of existing fuel taxes, and the relation between new mobility and the user fee concept. CRP will also focus on research that addresses Supporting Factor D – Workforce Issues, to include knowledge management and retention, alternative delivery methods, training for airport firefighters, modernizing transit station staffing, and impacts of new technologies and workforce requirements.

Committee feedback and comments:

- Victoria Sheehan – How to promote the work of TRB and the NCHRP program to those working across the transportation sector that could benefit from the research? Work on implementation strategies to expand the target audience to those that could leverage the information.
- Carlos Braceras – Focus on brevity of reports. Communicate information in a short, concise, consumable format to get material distributed to a broader audience.
- Victoria Sheehan – The report is the foundation of the research but utilize different ways of curating the content that is much more accessible.
- Ginger Evans – Utilize more graphic and PowerPoint formats of presenting research.

- Carlos Braceras - Advocate to build efforts like SHRP 1 & 2 research for the transportation industry.
- Diane Gutierrez-Scaccetti – Find a way to provide the outcomes to CEO's, provide the core of the research to staff for in depth study with different parts of the organization.
- Carol Lewis – More research on anticipation of revenues with the use of EV's and impact of user fees. Develop a forecasting model on DOT level.
- Chris Hendrickson – Look at best practices from derivative product consensus studies. Educate the academic sector on CRP reports.

Critical Issues Review and Guidance

Susan Shaheen discussed the timeline for the development of the *Critical Issues in Transportation* document and how it has evolved since the January annual meeting. She explained the document is at about 85 percent completion. Between May-June, TRB staff will work to edit and circulate a 95 percent complete document to SPPR members. The goal is to move forward with presenting the 95 percent complete document to the Executive Committee at the June meeting. Based on the feedback from the Executive Committee, the document will be sent for peer review. Upon peer review completion the document will be sent to publications in August/September. Susan highlighted that due to the changes being made to the critical issues document, efforts now need to be made to reflect those changes within the wheel of goals and cross cutting issues. She explained the target goals that lie in the center of the wheel to obtain the outcome of a "thriving society" will remain unchanged, however the outer cross cutting topics have changed. The suggestions for changes included separating "Funding and Finance" from "Governance", expanding "Technology" to "Innovation", changing "Travel Demand" to "Travel", moving "Physical Infrastructure" to "Infrastructure", and adding in "Metropolitan Land Use." As a result, the five topics expand to seven topics on the outer wheel.

SPPR comments and feedback on changes to outer wheel:

- Carlos Braceras – Prefer "Travel" be changed to "Mobility", Mobility is a more inclusive terminology for moving people and the things they need.
- Carol Lewis – Looking at "Travel Demand" as a numerical figure. A projection of future volume in passenger travel or trucks. What are we trying to say with "Travel Demand"?
- Craig Philip – In favor of "Mobility" rather than "Travel Demand." Mobility expresses what is moving (people, goods).
- Tom Menzies – The original idea of "Travel Demand" was looking at it in terms of behavior.
- Ginger Evans – Numbers that reflect "Travel Demand" and what is happening in transportation.
- Craig Philip – Establish a name for the outer issues (determinants, influences, supporting factors?) Adjust the figure to reflect tiers of goals to arrive at a "Thriving Society."

- Steve Godwin – The topic of "Land Use" deals with planning and regulation. Not much planning and regulation outside of metropolitan areas.
- Carol Lewis – Why not just use "Land Use"? Need to also focus on emerging areas as well. There is an issue with the lack of policy and regulation for land use.
- Diane Gutierrez-Scaccetti – Broaden land use issue. There is a failure in planning and connecting with DOTs before land use approvals are issued. "Land Use" affects the community, safety, and quality of life.

Susan shared with the committee the organization and logic of the critical issues document in a chart depiction (figure one). In figure one, supporting a "Thriving Society" is the core goal. The five societal goals (Economy, Climate, Safety, Public Health, and Equity) will serve as the pillars to sustain a "Thriving Society".

SPPR comments and feedback on Figure One:

- Carlos Braceras – "Thriving Society" should be the goal. Next tier could be strategies to focus on reaching the outcomes. Build in "access to opportunity" with "Economy" and "Equity". Generalize "Climate" to the entire "Environment". Replace "Travel" and "Infrastructure" to "Moving People and the Things They Need". Move "Infrastructure" to bottom tier.
- Carol Lewis – In favor of the idea of "Moving People and the Things They Need" in the center of Figure One instead of narrowing down to one word.
- Diane Gutierrez-Scaccetti - Infrastructure is a derivation of workforce, funding and finance, governance, and land use. Change "Metropolitan Land Use" to "Land Use".
- Ginger Evans & Diane Gutierrez Scaccetti – Bottom row can be labeled as "Drivers" or "Success Factors" that drives the "Infrastructure", "Travel", to arrive at a thriving society.
- Terminology for bottom row of Figure One – Success Factors, Drivers, Levers, Determinants. Susan Shaheen suggests these ideas be put on the table and revisited.
- Craig Philip – Where does supply chain fit into the document?
- Victoria Sheehan – How do we articulate supply chain in the chart?
- Diane Gutierrez-Scaccetti – Supply chain fits in with "Workforce".
- Susan Shaheen – Ensure within the chart there is a box to address other critical issues.
- Committee – Critical Issues wheel should serve as the logo, remove the outer wording. Figure One would replace the wheel to show the interconnection of critical issues.
- Tom Menzies – Add transportation modes to the outer circle of wheel.
- Committee Consensus – Note how the levels in the figure relate to one another.

SPPR comments and feedback on the outline for the Critical Issues document:

Travel

- Craig Philip – Suggests moving to "Mobility", then tinkering to "Moving People and the Things They Need"
- Carlos Braceras – Add bullet for access to opportunity.
- Victoria – Articulate supply chain in mobility goal.
- Carol Lewis – Reference the impacts of Transportation Network Companies (TNC) as a disruptor to transit ridership.

Infrastructure

- Randy Iwasaki – Identify tools for digitizing infrastructure and physical infrastructure along the lines of innovation.
- Tom Menzies – Look at infrastructure in a broader perspective and its impacts on mobility.
- Victoria Sheehan – Make "Infrastructure" its own layer and color.
- Craig Philip – Add "Innovation" to the bottom row of "drivers and success factors".
- Committee Consensus – Change title to "Infrastructure Systems". Topic will address connecting systems, digital systems, energy, transportation, etc.

Metrics

- Craig Philip – Avoid metric bias issue with data.
- Randy Iwasaki – Metrics are important for what you are trying to solve. Analyze mobility options to provide better experience for consumers.
- Carlos Braceras – Use metrics to highlight why selected issues are critical issues.
- Carol Lewis – Narrow transit metrics to those who utilize transit modes. Focus on where transit is successful.
- Victoria Sheehan –Identifying the metrics that are needed to make good transportation decisions. Determine the data gaps for TRB to close.
- Susan Shaheen – Use data metrics to highlight the gaps in research for critical issue areas.
- Craig Philip – Determine how robust the data and metrics are for critical issue areas and then determine where the research gaps are.
- Committee Consensus – Identify the outcomes TRB wants to achieve, identify the gaps in metric data and research, and think about TRB's role in addressing the gaps.

Summary/Conclusions to Critical Issues Document

Katherine Kortum and Steve Godwin shared with the committee suggestions on how the critical issues document could be summarized and concluded. Katherine suggested summarizing the key critical issues addressed in the document, reflect their interchangeable nature, highlight the interconnection between the issues, and conclude with the need for ongoing research to address and solve the issues. Steve requested feedback from the committee to review the key priority issues selected and determine if any missing topics should be brought into the document. He also requested the committee decide if the summary should appear in the front of the document and determine the structure for each section in terms of underscoring a specific critical issue or grand challenge.

SPPR feedback and comments on concluding critical issues document:

- Carlos Braceras – Format should answer the question of why we are doing critical issues, why these issues matter, highlight the important topics in the document, and then incorporate the specifics of what should be brought into focus.
- Diane Gutierrez-Scaccetti – Begin with an executive summary, present the framework of the document, and conclude with a recap.
- Victoria Sheehan – Express how the ideas of critical issues have not changed, but rather the way they are addressed has changed. Include how the importance of transportation work has changed, and how it impacts the quality of life. Highlight the complexity of the critical issues chart and how certain aspects of transportation wasn't thought of as policy decisions, to show how transportation arrived at the current situation. Show how looking at things in a different perspective (through the critical issues chart) can help to progress towards a more sustainable system.
- Chris Hendrickson – Defining the grand challenges within critical issues can be helpful to researchers. Consider using grand challenges to draw in the interest of younger people.
- Russell Houston – Suggest ways that TRB can meet the critical issues goals or how consumers might use critical issues to address the problems.
- Ginger Evans – In the equity section, highlight the actionable best practices to improve equity.
- Craig Philip – Broaden discussion on innovation in technology regulation and sources to fund public infrastructure.
- Carlos Braceras – Not in favor of talking about funding issues. If the message of the critical issues document presents the compelling vision of what TRB is trying to do, the funding will follow.
- Avery Grimes – Recommends continuing to read the detailed report in the critical issues document to leverage new research and references.

Executive Committee Policy Sessions: Plans for June Meeting/Guidance on Purpose and Structure of Future Sessions

Russell Houston provided an update on the planning for the next policy session at the June Executive Committee meeting. The June 2023 policy session will explore the disproportional representation of Black, Indigenous, and People of Color (BIPOC) in traffic fatalities. He shared the confirmed invited speakers and the basis of their presentations. DeReece Smither, Research Psychologist at NHTSA will discuss proposed changes to race and ethnicity data collection policy at NHTSA, including read ahead material evaluating disparities in traffic fatalities by race, ethnicity, and income; Laura Sonderup, Managing Director at Heinrich Marketing, Inc. will discuss effective multicultural communications strategies to address transportation safety; and Norma Bowman, Deputy Division Director of the Navajo Division of Transportation will discuss tribal transportation safety management.

Russell provided history and background information about the policy session, explaining the sessions have taken place for 35 years based on a model from the Governing Board. From that model, the SPPR identifies a suggested topic that is considered and accepted by

the Executive Committee for future policy sessions, in which staff will coordinate to identify experts in the field to give presentations, that create follow up discussion. He explains the goal of the sessions is to educate, stimulate discussion, and identify potential activities as a result of the discussion. Russell requested the feedback from the committee to consider forming a long-term plan for the policy sessions over the next few years that would evolve around critical issues topics, what follow-up activities should be considered from the sessions, and if there are any changes that should be made associated with the policy session goals.

SPPR feedback and comments on plan for policy sessions:

- Carlos Braceras – Connect critical issues to the policy sessions. Identify the takeaways that build on what was learned. Consider inviting a committee chair that is doing work that supports the critical issues as a speaker.
- Victoria Sheehan – Where do we take the discussions? Highlight the work that TRB is already doing. Share work with DOT's and committees to expose the transportation sector to research that can offer assistance in best management of projects. Committee Chair's should be invited to sit in on the policy session discussions.
- Carol Lewis – Have a podcast or video conversation with the policy session speakers hosted by someone from the Executive Committee.
- Russell Houston – The webinar program could also benefit from the policy session podcast.

SPPR shared their feedback and comments for policy session topics to be prioritized in January and June 2024:

- Chris Hendrickson – Exclude topics that have already been discussed in previous policy sessions.
- Carlos Braceras – In favor of topic on the connection between transportation impacts on access to healthcare (broader perspective on the impacts of transportation and public health). Consider public health topics directed to bringing people together through transportation.
- Victoria Sheehan – Partner with Dr. Victor Dzau (National Academy of Medicine) and HMD for opportunities to address public health.
- Craig Philip – Work with committees that are working to highlight public health and transportation issues.
- Craig Philip – Discussion on economy and global competitiveness
- Diane Gutierrez Scaccetti – Connect the discussion of economy and global competitiveness with workforce.
- Ginger Evans – Address the lack of diversity and inclusion in transportation workforce. Highlight the shortage of women in transportation (family issues, maternity leave, childcare).
- Randy Iwasaki – Highlight success stories of maintaining workforce, and the best practices being used. Highlight agencies that have balanced workforces.
- Victoria Sheehan – Begin thinking about workforce decisions long-term.

- Committee consensus – The policy session for January 2024 will discuss workforce and June 2024 policy session will discuss public health.

Technical Activities Update

Avery Grimes addressed the topic of conflict of interest and the importance of integrity and objectivity within TRB's activities and processes. He highlighted the key areas the Technical Activities Council will focus on to help eliminate and prevent conflicts of interest. These focus areas include reviewing the TRR journal processes for accurate, independent, and transparent work; adhering to NASEM guidelines as it relates to the composition of annual meeting sessions, paper approvals, and invited speakers; reviewing membership policies to ensure balance, diversity, and no conflicts of interest on committees; support factual and unbiased consensus study research; and promote a culture of fairness, balance, objectivity, and inclusion.

Ann Brach informed the committee the Technical Activities is continuing to improve the Transportation Research Record by working to expand volunteer leadership roles. The Editorial Board has completed its first rotation and is moving forward. Technical Activities also formulized and approved an advisory board to manage the membership process and policy for liaison roles, rotations, nominations, vetting, and approval. Ann also explained Technical Activities have convened a volunteer group from the Data Science Section Committees in an effort to add more expertise to the Editorial Board. The group will also review the statistics and data analysis in paper submissions. Ann also addressed the use and impacts of Large Language Models such as ChatGPT, and how Technical Activities are following industry guidelines from the Committee of Publication Ethics about transparency and responsibility. The division issued guidelines to committees to include author instructions and frequently asked questions section. The Technical Activities plans to work with experts from the Data and Data Science Section to assist with ways to utilize artificial intelligence to improve efficiency and accuracy of paper assignments and other administrative aspects of the journal.

Ann also provided a snapshot of data from the 2023 Annual Meeting. Results showed the annual meeting is close to returning to normalcy since the onset of the Covid pandemic. The meeting had a 12,200 attendance in 2023 versus the prior Covid baseline figure in 2020 of 14,000 attendees. Exhibitor numbers also increased to 212 but did not quite reach the baseline number of 220 exhibitors from 2020. However, the number of Patrons surpassed the baseline number of 32 in 2020 totaling 43 sponsors in 2023. Numbers from the career fair employers also showed good results. There were fewer sessions in 2023, which may be due to the reorganization of committees. Committee meeting numbers largely remained the same as prior years. Ann reported the overall attendee rating increased higher than it has been since Covid, with a rating of 4.37 in 2023. For this year's annual meeting, organizers sought to allow more access to committee meetings, and committee chairs received a survey about remote access. Of those results, only a small increase in percentage of committees offered remote access to meetings. Results from the survey also showed committees who followed the tips/best practices for conducting remote meetings had a more positive experience than those that did not and experienced technical issues. Looking ahead to the 2024 annual meeting, Technical Activities will base its focus on action items that provide

tips/best practices for conducting hybrid meetings to participants and help them understand the importance of following the guidelines to have a successful meeting. The division will also estimate costs for purchasing more microphones in committee rooms.

Strategic Plan Implementation and Integration with Critical Issues

Victoria Sheehan provided her thoughts on the integration of the strategic plan and critical issues. She suggested reviewing the strategic plan to ensure it prioritizes the work in areas that support the critical issues topics. Victoria explained the current plan successfully identifies the goals, strategies, actions, and metrics to research, but falls short of prioritizing the targets that should be worked on first. She proposed looking inward at metrics in terms of setting goals and targets that can be measured to articulate the impact of TRB's work. Following the completion of the critical issues document, the goal is to capture the metrics that help determine what success looks like for the strategic plan, prioritizing what is needed, determine what TRB values in the plan, and measuring impact through the goals and strategies.

Feedback and comments from SPPR:

- Susan Shaheen – Request feedback from staff to determine where they believe the priorities are.
- Carol Lewis – Identify three short term goals that are reachable.
- Ginger Evans – Leverage existing resources for success. Utilize email lists to survey key stakeholder groups on the satisfaction TRB's product and services.
- Chris Hendrickson – Set priorities in terms establishing time limits to reach target goals. Scope what needs to be accomplished within the next year or period.

Marine Board Update

Craig Philip provided the Marine Board update. He shared the 2023 areas of interest the Marine Board will focus on, including emerging technology and the potential impacts on maritime, environmental justice and equity in marine transportation, maritime supply chain, maritime resilience, zero emissions shipping, development of offshore wind energy, and policy in maritime. Craig also shared the crosscutting elements the board will expand its focus, including human and intellectual capital and workforce DEI, safety management, and cyber technology in marine transportation systems. Craig shared highlights from the 2023 Marine Board Spring Meeting in Norfolk, VA. He reported attendees participated in tours of the ship repair facility, the Newport News Shipbuilding Apprentice School, Virginia Port Authority, and NOAA Marine Operations Center-Atlantic. Keynote speaker, Rear Admiral Ann Phillips briefed the board on the workforce challenges of maintaining maritime reserve fleet and material and cargo needed for an offshore military event, as well as the difficulty faced if asked to mobilize to support the U.S. Given these challenges, Craig highlighted the importance of Norfolk, VA due to it being the home of the Atlantic fleet for the U.S. and home to the Newport News shipyard which supports building aircraft carriers and submarines for the U.S. Craig also highlighted keynote speakers from Norfolk, VA who discussed the importance of early childhood education in building the Maritime workforce. He reported the industry faces challenges with creating pathways to careers in Maritime, including the workforce challenges due to limited exposure to the Newport News

Shipbuilding Apprenticeship School. Craig also reported attendees explored the areas where the deployment of offshore wind farms is underway in Norfolk, VA, and the work being done in Hampton Roads to support maritime transportation resilience to address sea level rise and flood risk mitigation.

Craig also shared the vacancy positions open within the Marine Board for the 2023 nominations period. The board has three available board positions open and three membership vacancies to fill. Of these positions, he explained the board is seeking expertise in board areas related to shipping and barge line operations, system infrastructure, policy, and operations in Maritime transportation. In 2023, the Marine Board will participate in convening events in Washington, DC; San Diego, CA; and New York, NY on topics related to science and technology innovations for sustainability of the marine transportation system, utilizing new technologies to solve complex maritime problems, and addressing current and emerging threats to maritime security. In preparation of its 2023 fall meeting in November, the board is considering focus session topics around maritime workforce and education pipelines, offshore wind energy development, and supply chain reliability and resiliency.

Feedback and comments from SPPR:

- Victoria Sheehan – Project the maritime workforce needs. Advocate for partnerships with government, such as DOE to increase presence and resources in schools.
- Susan Shaheen – Consider a policy session topic on resiliency in Maritime.
- Carlos Braceras – Invite Marine Board members to policy session discussion on workforce.

NASEM Impacts Survey

Paul Mackie presented the communications report. He shared the National Academies will release an impact survey to staff volunteers to determine what people think about the academies/TRB. The survey will serve as a baseline and tracking system to improve communications and the organization. Paul reported the communications team is focusing its attention on the Communications Strategic Plan and ways to revamp the current plan from its original document format. He suggested presenting the plan in a more dynamic layout that will help pitch the ideas and strategies within the document. The communications team is also working on increasing the frequency of articles centered around how TRB works and the impact TRB has on the real world. Paul reported they are also working to build an audience development strategy aimed to help expand TRB's products to larger audiences. He also provided examples of the impacts TRB has on the real world, including an article from the Washington Post that cited TRB's warning of negative impacts from highway construction on low income, non-white, and elderly populations; and comments from CEO Alan Shaw's at a congressional hearing regarding the National Academies of Science's research findings on railroad ECP brakes. Paul updated the committee on the modifications to the TRB homepage. The homepage can now feature more content, spotlight features such as the Annual Meeting, and graphics. The homepage is also more mobile friendly for access to TRB's Newsletters, the Annual Meeting homepage, and TR News Weekly. Since the redesign and launch of the TRB Newsletters, subscribers to

TRB Weekly increased from 10K in 2021 to over 23K subscribers as of April 2023. The TRB Webinars newsletter currently has 30K subscribers and is the primary source to register for webinars. The TRB AM Express reached its third successful year, publishing eight issues with open rates ranging from 65 percent to 45 percent. This year, the communications department documented messages, talking points, and protocols in its TRB Annual Meeting Crisis Communications Plan. Paul highlighted the media coverage at the Annual Meeting cited NTSB Chair Jennifer Homendy and Secretary Pete Buttigieg's speeches and press conferences held at the Annual Meeting. The media coverage drove interest to TRB's website which generated exposure for TRB. He underscored some of TRB's significant media coverage, including Victoria Sheehan named TRB's Executive Director, the Washington Post covering a BTSCRP study on road safety signs, and references to consensus reports in news publications. Paul also mentioned videos from the Annual Meeting consistently stand out amongst the Academies YouTube collection. He suggested including video content into the communications strategy to further promote TRB.

Consensus Studies Update

Tom Menzies provided the consensus studies report. He shared the recent report releases and studies nearing completion. The division completed a study in April sponsored by the Gulf Research Program (GRP) to look at how the risks in the Gulf of Mexico have changed in terms of oil and gas production. It is the first high profile study done by TRB and report findings were well received by the GRP. Tom reported CAAS has two studies in peer review, one on "New Coast Guard Authorities for Emerging Developments." The study looked at the emerging developments that could potentially affect the Coast Guard and the legal authorities to pursue actions. The study was approved by the Report Review Committee (RRC) and is expected to be released May 2023. The second report on "Repurposing Plastics Waste in Infrastructure" is also in peer review. The study was sponsored by the USDOT and EPA. The report explores ways to utilize recycled plastics and its use in building transportation infrastructure. The report is expected to be released June/July 2023.

Tom also highlighted research studies that are underway. The studies include the "Equity Metrics for Surface Transportation" which explore the metrics helpful for decisions made by DOT's and assessing impacts from equity proposals. The study was sponsored by USDOT-R and TRB. A study on "Retrofitting Pipelines with Automatic Shutoff Valves" researches the issue of transmission pipelines and the usefulness of automatic shutoff valves for closing and isolating pipelines sooner. The study was sponsored by PHMSA. Another research study on "Safety Impacts of Truck and Bus Driver Compensation Methods" investigates the impacts of bus and truck driver compensation methods on the safety performance of the industry. The compensation methods are incentives for safer driving and maintaining driver retention. The report will be sponsored by FMCSA. Other projects in progress included a study on, "Transitioning Road Safety Research to Practice." The project examines how evidence-based road safety research finds its way into practice, the influence of standards, and decision making. The study is funded by FHWA, NCHRP, and IIHS. The division will also research the "Impacts of Very Long Trains". The study investigates the impacts of derailments, the blocking of grade crossings, and the affects on communities.

The division also received legislative request from the Federal Maritime Commission to research "Best Practices for Chassis Management." The report will investigate management provisions to address the supply chain issues associated with chassis suppliers and the delivery of shipment containers. CAAS has a long-standing study sponsored by the Federal Aviation Administration (FAA) on "Emerging Trends in Aviation Safety." A total of six studies will be released over the next 10 years. The studies will focus on mitigation methods that are helpful to the FAA to address the rising safety trends in aviation. Tom mentioned the Transit Research Analysis Committee (TRAC) has been reinstated and will work on projects that advise the Federal Transit Administration (FTA). He also highlighted the Research and Technology Coordinating Committee (RTCC) which advises the Federal Highway Administration (FHWA). The RTCC and TRAC jointly convened in December 2022 to look at areas where transit and highway share similar challenges and issues. The RTCC will hold its spring meeting in Ruckersville, VA to visit the crash test facility and museum. The meeting will also include presentations from FHWA on the testing and construction of safe vehicle models.

Tom shared the division currently has six pending projects. The US Army Corps of Engineers will sponsor a study on the "Use of Innovative Materials in Water Resources Infrastructure." The study will look at core strategies to advancing materials such as deposits, steels, and corrosion into water navigation systems. The Coast Guard will fund a study on "Alcohol Use by Merchant Mariners." The study will focus on the impacts of alcohol consumption by merchant mariners and its connection to sexual assault/sexual harassment onboard ship vessels. Negotiations are underway for the study and should be settled by summer 2023. Funding for a USDOT-Research has been granted for the phase 2 study on "Equity Metrics for Surface Transportation Investments. The study will look at how state, local governments, and NPO's consider equity as part of their prioritization of investments. The division will also conduct a study sponsored by FHWA on "Best Practices for Stormwater Management." The study aims to provide management solutions to reduce the effects of rainwater runoff and the impacts on transportation. Included in the pending projects is a "Workshop on Training Skilled/Technical Workforce for EV's and ITS." TRB will collaborate with other academy units to identify opportunities at community colleges and minority serving institutions that could help provide training and skills for the capital workforce development needed for emerging/changing industries. The workshop is in proposal development status and is funding jointly by the National Science Foundation (NSF) and NASEM. The division also submitted a proposal to the USDOT for an annual joint symposium with Europe on specific transportation research topics. The symposium will highlight the transportation issues faced in each region and the research conducted to address the problems. The symposium will kick off in June 2024.

Tom concluded with sharing recent studies being tracked that have been introduced to legislation. Of the recent studies, two topics focus on the impacts of airport noise, the tools needed to conduct community assessment, assessing whether metrics used to measure noise impacts is appropriate for the future of air transportation system, and building structures that mitigate airport disturbances. Another study on the "Best Practices of the Shanghai Shipping Exchange" looks to examine any anticompetitive advantages that benefit the Shanghai shipping exchange and ability to manipulate container freight

markets. Lastly, a study on the "Bering Strait Vessel Traffic Projects and Emergency Response Capacity" looks to assess the adequacy of emergency response capabilities and infrastructure at Port of Point Spencer. The study would address navigation safety risks and geographic challenges necessary to conduct emergency maritime response operations in the Arctic.

Other Business

Russell Houston informed the committee about the rollout of the Impexium database in June. He explained profile information of volunteers will be added to the system. The database will ask additional questions related to gender identity, sexual orientation, security clearances, etc. TRB is working with the DEI department to include language that will explain the reasoning for each question. TRB will also provide responses related to privacy, equity, and security on its website.

Victoria Sheehan informed the committee Drew Kodjak will be stepping down as a member of the Executive Committee.

Adjournment

The meeting adjourned at 3:35 PM.

Proposals for TRB Convened and Co-sponsored Conferences Approvals (ACTION – Consent Agenda)

The following criteria are used in evaluating proposals for conferences, workshops, and similar activities. In general, an activity should not be proposed unless it draws a favorable response to all applicable criteria. The TRB staff and the proposing committees feel that the conferences being proposed satisfy these criteria.

Criteria to consider when approving –

- Is the proposed activity consistent with TRB's mission?
- Does it have a high probability of producing worthwhile results?
- 3Is the purpose of the activity objective and noncommercial? (Might the undertaking of the activity or the potential result give TRB an image of bias in an area in which it must remain neutral?)
- 4Are the available time and funding adequate to conduct it in a proper manner and to carry it to a logical conclusion?
- Is it within the existing staff capability of TRB or a capability that can reasonably be established?
- Can committee members necessary to guide it be identified and their services obtained?
- Does TRB retain the requisite control? Alternately, in case where TRB is not the lead organization, will TRB be involved in developing the program, and will TRB receive appropriate recognition?
- Does it duplicate other efforts? Has the subject received all of the attention that is justified for the present time?
- Is there a more appropriate organization, within the National Research Council or elsewhere, to handle it?

The Executive Committee's approval is requested for the upcoming TRB Convened and TRB Co-sponsored conferences presented on the forthcoming page –

TRB Co-Sponsored Conference Proposals

Event Title	12th International Conference on Bridge Maintenance, Safety and Management (IABMAS 2024)
Date	June 24-28, 2024

City/State	Copenhagen, Denmark
Is this event TRB Convened or Cosponsored?	Cosponsored
Description	The aim of IABMAS2024 (the 12th in a series of conferences that TRB has been a cosponsor to) is to bring together the very best work done in the field of bridge maintenance, safety, evaluation, management, and related topics; to stimulate and promote research in this field; and to bridge the gap between theory and practice. The conference will be of interest to researchers, representatives from all sectors of bridge engineering: bridge engineers serving in transportation departments, construction corporations, consulting firms, contractors and local authorities interested in every aspect of bridge maintenance, safety and management. The objective of the conference is to promote international cooperation in the fields of bridge maintenance, safety and management, for the purpose of enhancing the welfare of society.
Anticipated Number of Attendees	600
Target Audience	Practicing engineers and researchers from public and private sectors and academia
Convening Organization	IABMAS, International Association for Bridge Maintenance and Safety and IABMAS Denmark
Other Sponsors	n/a
TRB Standing Committees	"Bridge and Structures Management, AKT50 Safety and Security of Bridges and Structures, AKT50(1) Bridge Preservation Committee, AKT60 Seismic Design and Performance of Bridges, AKB50 Structures Maintenance, AKT40"
TRB Role	"Committee member(s) to organize or participate in session(s); Committee member(s) to review papers/abstracts; Committee member(s) to serve on program committee; TRB staff to be invited speaker(s)"

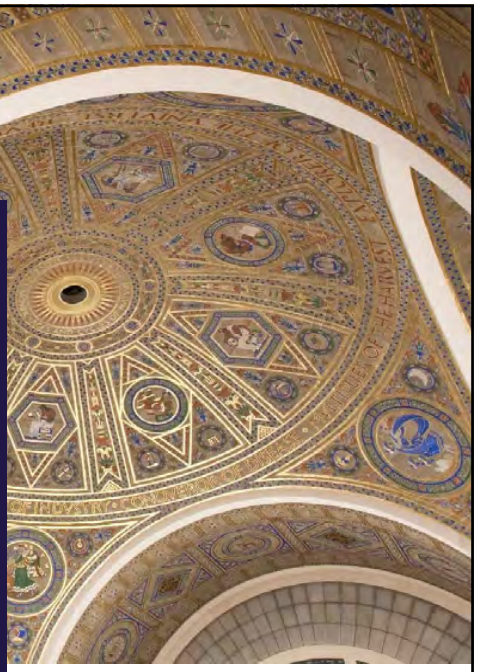
NATIONAL ACADEMIES Sciences Engineering Medicine

TRB TRANSPORTATION RESEARCH BOARD

TRB Executive Director's Report

Victoria Sheehan

June 28, 2023



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National Academies of Sciences, Engineering, and Medicine

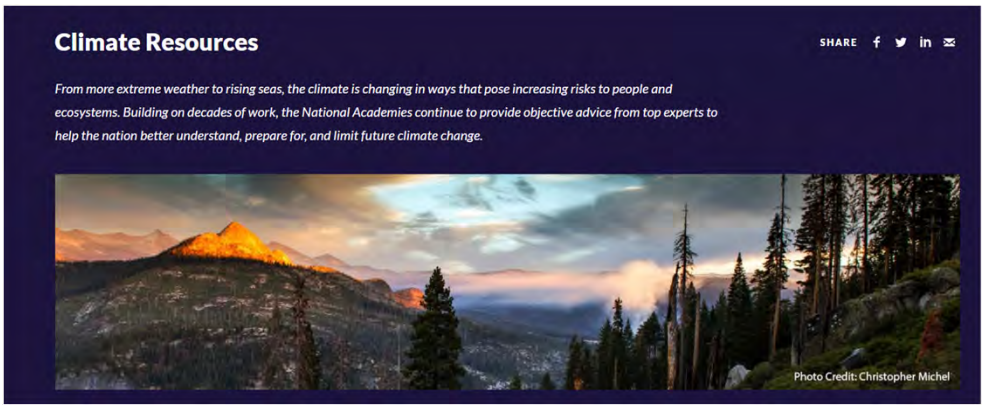
- National Academy of Sciences
- National Academy of Engineering
- National Academy of Medicine

National Research Council

Division of Behavioral & Social Sciences & Education
Division on Earth & Life Sciences
Division on Engineering & Physical Sciences
Gulf Research Program
Health & Medicine Division
Policy & Global Affairs
Transportation Research Board

2

2



- *The new Climate Crossroads initiative will serve as a nexus point within the National Academies, allowing the organization to chart new pathways for sustained national and global leadership over the coming decades. Climate Crossroads will leverage the disciplinary breadth of the organization, provide space to be responsive to new challenges, and expand the impact of the Academies' work to a more diverse range of stakeholders and decision-makers including by developing new ways to work with underrepresented communities.*

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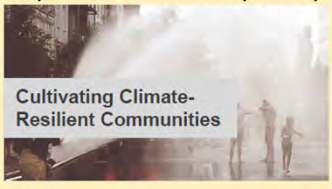
Climate Crossroads plans for 2023

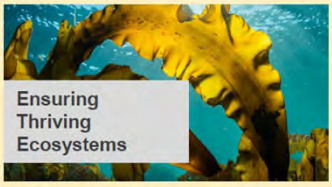
Establish a new Advisory Committee

Launch Legislative Fellows Program

Host Summer Partners Convening

Co-develop new Transdisciplinary Activities





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Measurement and Management of Systemic Risk in Gulf of Mexico Offshore Oil and Gas Operations Have Improved Since Deepwater Horizon Disaster, But Progress Lags in Some Areas

News Release | April 4, 2023

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Health and Medical Division

Board on Global Health

The health of the world knows no boundaries, and health events in one area impact far beyond local populations. In light of this, the Board on Global Health carries out activities and studies aimed at advancing the health of people worldwide.

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Critical Issues

The overall purpose of our transportation system is to help **develop and support a thriving society**.

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TRB TRANSPORTATION RESEARCH BOARD

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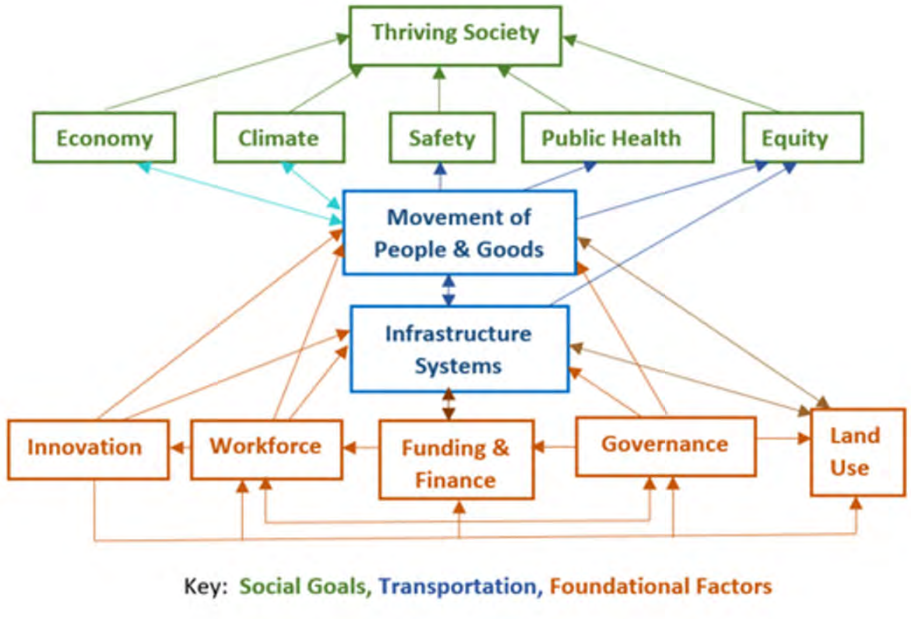

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All Staff Memorandum

FAQs on The New York Times article

To: **All Staff**
From: **David May, Chief Communications Officer**
Unit: **Offices of the Chief Communications Officer**
Date: **April 26, 2023**
Subject: **FAQs on The New York Times article**

Since the release of the article in The New York Times on donations received by the National Academy of Sciences from the Sackler family, we have heard from many of you expressing concerns and asking questions. To help answer some of your questions and provide as much information and transparency to you as possible, we have developed a list of questions we have been asked most frequently. The FAQs will be updated as we have new information to share.

Thank you for your understanding as we work through this complex and sensitive topic. If you have additional questions or comments, please contact me or Katie Hines. We may not have answers to all of your questions, but we will take them into consideration as we update the FAQs.

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NATIONAL ACADEMIES Sciences Engineering Medicine

SEARCH

About Us Events Our Work Publications Topics Engagement Opportunities

Composition and Balance, Conflicts of Interest, and Independence: Policies and Procedures

SHARE

The National Academies of Science, Engineering, and Medicine have adopted policies that are intended to ensure that the hundreds of committees of volunteers appointed each year to participate in the work of the National Academies can successfully fulfill their charge. These policies address committee composition and balance, committee member conflicts of interest, and the independence of committee members from project sponsors. The policies and forms can be accessed through the following links:

Committees Used in the Development of Findings, Conclusions, and Recommendations

- Policy on Composition and Balance, Conflicts of Interest, and Independence for Committees Used in the Development of Findings, Conclusions, and Recommendations
- Conflict of Interest and Disclosure Form for Committees Used in the Development of Findings, Conclusions, and Recommendations

Committees Used to Plan Workshops, Symposia, and Other Similar Activities

- Policy on Composition and Balance, Conflicts of Interest, and Independence for Committees Used to Plan Workshops, Symposia and Other Similar Activities

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NRC Core Values

Independence

Objectivity

Rigor

Inclusivity

Truth

Integrity

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TRB TRANSPORTATION RESEARCH BOARD 11

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EVERYONE INTERESTED IS INVITED

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TRB Goals

1. Prepare transportation professionals and decision makers to address current and future transportation-related challenges and opportunities.
2. Expand TRB's impact and influence through its objective research, information exchange, and advisory activities.
3. Assure TRB's continued creativity, resilience, and sustainability in an ever evolving world.

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Strategies For Each Goal

Goal 2. Expand TRB's impact and influence through its objective research, information exchange, and advisory activities.

Expand TRB's national and international impact and influence by advancing knowledge, sharing lessons learned, and impacting policy through its objective research, information exchange, and advisory activities

a. In planning TRB activities, identify actions that will expand each activity's impact
b. Measure the impact of TRB's programs and activities
c. Educate transportation stakeholders about TRB's programs, products, and activities.
d. Communicate with transportation professionals and the public about transportation issues and research
e. To enhance impact, build a diverse and deep network of partners.
f. Ensure multidisciplinary involvement in addressing TRB's issues.

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Proposed Actions For Each Strategy

Goal 2. Expand TRB's impact and influence through its objective research, information exchange, and advisory activities.

b. Measure the impact of TRB's programs and activities

i. Develop both quantitative and qualitative performance metrics to measure the impact of TRB's convening activities, research studies and reports, TRB's consensus study reports, Transportation Research Record, TRID database, and communications efforts.

ii. Collect data and anecdotal information from users and sponsors on the short- and long-term impact of selected reports.

iii. Summarize impact data in TRB's annual report and in periodic reports for individual TRB programs.

iv. Working with oversight committees for each program area, adjust the program to focus on areas of greatest value and impact for TRB sponsors and stakeholders.

v. Survey members of key stakeholder groups to determine familiarity and satisfaction with TRB products and services and to understand how and the extent to which the products and services are being used by different audiences.

vi. Conduct an engagement survey of members of TRB standing committees, Cooperative Research Program research panels, and consensus study committees to evaluate their volunteer experience. Employ these data to improve volunteer outcomes

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Strategic Plan Implementation - Metrics

Goal 2. Expand TRB's impact and influence through its objective research, information exchange, and advisory activities.

# of unique individuals who are members and friends of TRB standing technical committees

# of attendees at the TRB Annual Meeting by academic/researcher, government employee, private sector

- # of first time attendees
- # of sponsor employees
- # of Congressional staff
- # of international attendees
- # of private sector organizations involved in the TRB Annual Meeting

# of papers submitted and peer reviewed by topic

# of downloads of Transportation Research Record papers by topic

# of webinars and attendance at webinars by critical issue topic; % giving positive ratings of webinars

# of unique individuals who are members of CRP research panels and oversight committees

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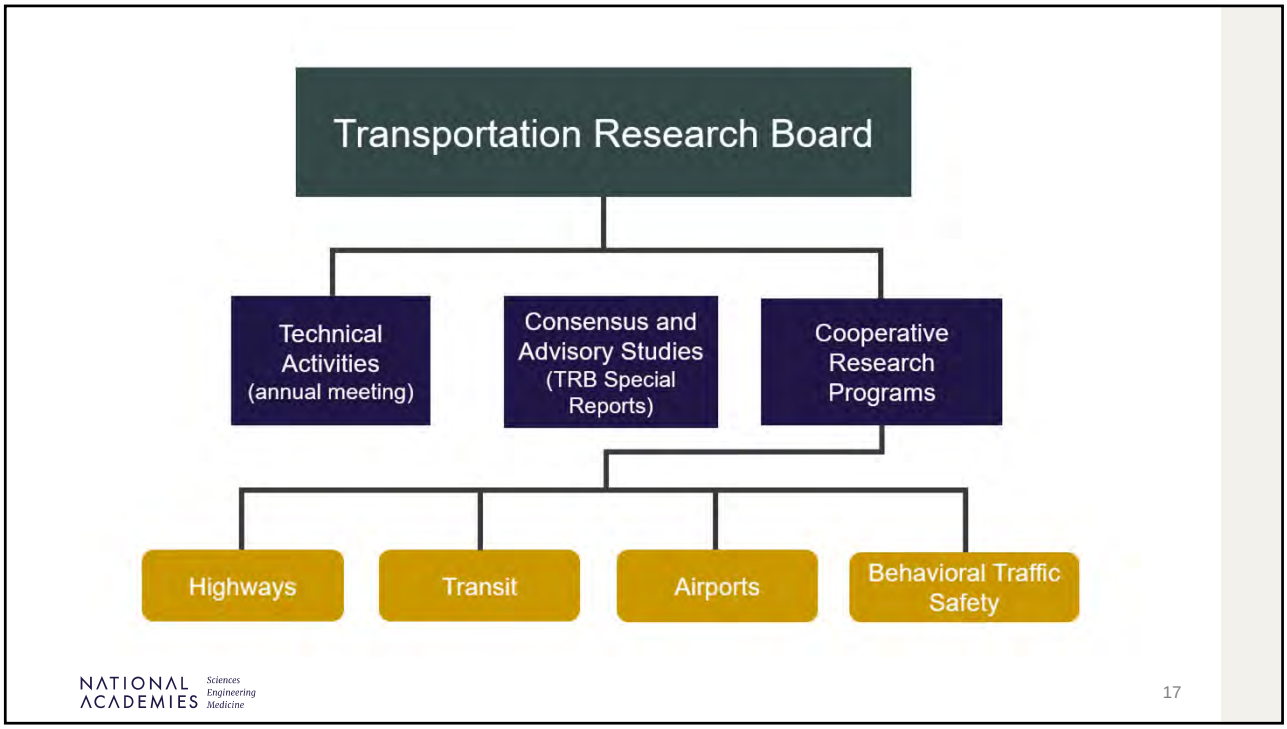

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Resources to Sustain our work

Sponsors, Patrons & Global Affiliates

Engaged Employees & Volunteers

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Target setting -

- Current staff and funding what can we accomplish
- Lot of people doing great work - silos of excellence
- More integrated teams – define success
- Measuring the right things, but even to measure takes resources and time
- Need to start setting targets and prioritizing our activities to ensure that we are actually providing the most value to our sponsors and volunteers
- Volunteer capacity given demands on industry
- Passive vs. active volunteers - micro volunteerism

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Target setting -

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NRC Goal 3

GOAL 3 **Strengthen** all aspects of the NRC to achieve Goals 1 and 2 and ensure its continued creativity, resilience, and sustainability

STRATEGIES

a. Strengthen the governance of the NRC

b. Sustain, support, and enhance staff

c. Provide relevant and timely evidence-based guidance through continuous innovation and learning

d. Develop new business models and methods

e. Deploy technology to improve NRC operations

f. Balance priorities

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Technology

Microsoft Teams

Asana, Inc.
American software company

impexium
Smarter, Simpler Membership Management

SharePoint / Dropbox/ Google docs.

Aptify

Workfront

Need an overall strategy on how best to you these tools

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Technology

Data and Systems

Software Procurement

- Document Management – find what you need
- Work-flow Management – know what you have to accomplish
- Volunteer Management – talent management
- Reporting – how to make data collection and work reporting part of the work, not another task.

Training and deployment

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People – Workforce & Volunteer Development

- Strategic Recruitment – MOUs, partnerships and fellowships.
- Hiring practices, job classifications, career path and compensation.
- Transparency around decision making
- Onboarding and bootcamps
- Knowledge inventory
- Communities of practice
- Departure Interviews

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Training for both Tacit and Explicit knowledge transfer

- Explicit – Technical Training “know-that” (facts)
- Tacit – Sharing of Experiences “know-how”
- Mentoring/shadowing
- After action reviews

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Data Collection and Analytics

Data – Invest in both data collection and analytics

- Review data that we have, how easily it can be collected, what frequency it can be collected.
- Ensure we collect the right data to help supervisors prioritize
- Establishing metrics, baselines and targets are understood and tracked consistently.

Analytics – Centralized (for cross training and Department wide support) or Imbedded in Division

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Table 1

TRB Spending by Program and Source(s) of Funds

	2021 act.	2022 act.	2023 est.	2022 Source(s) of Funds
Core Technical Activities	$14,049,000	$14,659,000	$15,233,000	State DOTs (56%), Fees & Sales (20%), Other (14%), FHWA (10%)
Cooperative Research Programs				
NCHRP	$40,463,000	$45,215,000	$48,344,000	State DOTs (99.5%) FHWA (.5%)
ACRP	$12,476,000	$13,994,000	$15,059,000	FAA
TCRP	$4,687,000	$5,277,000	$5,366,000	FTA
BTSCRP	$1,675,000	$2,092,000	$1,953,000	NHTSA/GHSA
Rail Safety IDEA	$223,000	$482,000	$258,000	FRA
Evaluation of FHWA Research Projects	$715,000	$174,000	$1,302,000	FHWA
Policy Studies	$2,611,000	$4,061,000	$4,396,000	OST-R (22%), PHMSA (20%), Coast Guard (16%), FAA (12%), FHWA (12%), Policy Fund (6%), FMCSA (4%), EPA (4%), FRA (2%), Other (2%)
Conferences, Workshops, Forums & Centennial	$1,393,000	$2,134,000	$2,040,000	Registration Fees/Core (84%), Other (6%), FHWA (5%), State DOTs (5%)
Marine Board	$345,000	$348,000	$364,000	Army (24%), Coast Guard (24%), ONR (21%), NOAA (13%), BSEE (9%), MARAD (6%), Navy (4%)
Total	$78,637,000	$88,436,000	$94,315,000	

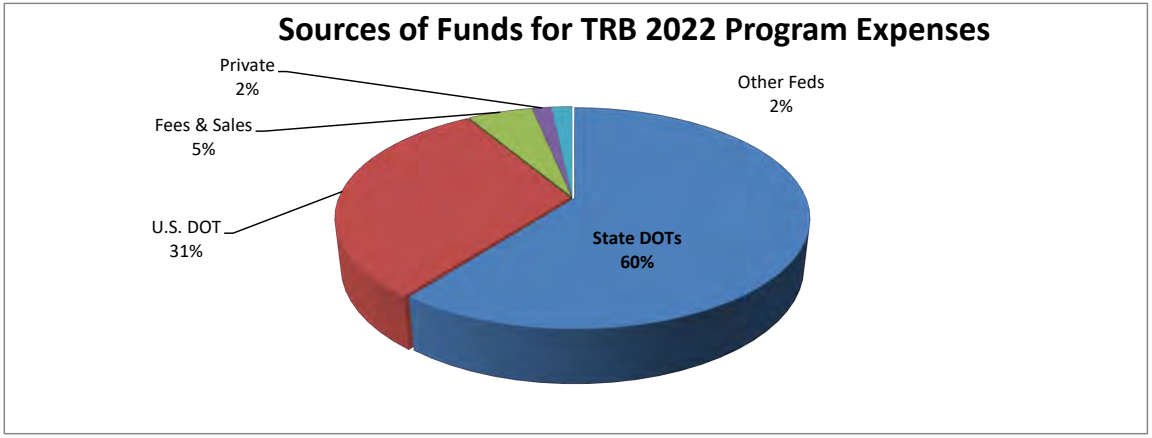


Table 2

TRB CORE BUDGET ESTIMATE FOR SIX FISCAL YEARS (July 1 - June 30)

	FY2022 (act)	FY2023	FY2024	FY2025	FY2026	FY2027
Revenue						
State Highway & Transportation Departments (State DOTs)	8,004,000	9,201,000	9,385,000	9,573,000	9,764,000	9,959,200
Federal Highway Administration (FHWA)	1,400,000	1,400,000	1,400,000	1,400,000	1,400,000	1,400,000
Other Federal Agencies						
Office of the Assistant Secretary for Research and Technology (OST-R)	231,000	300,000	300,000	300,000	300,000	300,000
Federal Transit Administration (FTA)	312,000	250,000	250,000	250,000	250,000	250,000
National Highway Traffic Safety Administration (NHTSA)	222,000	250,000	250,000	250,000	250,000	250,000
Federal Motor Carrier Safety Administration (FMCSA)	63,000	77,000	79,000	81,000	83,000	85,000
Federal Aviation Administration (FAA)	69,000	77,000	79,000	81,000	83,000	85,000
Federal Railroad Administration (FRA)	69,000	77,000	79,000	81,000	83,000	85,000
Pipeline and Hazardous Materials Safety Administration (PHMSA)	57,000	77,000	79,000	81,000	83,000	85,000
USDOT Office of the Under Secretary for Policy	38,000	77,000	79,000	81,000	83,000	85,000
Department of The Interior (DOI)	85,000	85,000	85,000	85,000	85,000	85,000
Air Force Civil Engineer Center (AFCEC)	76,000	-	-	-	-	-
Department of Energy (DOE)	76,000	77,000	79,000	81,000	83,000	85,000
Environmental Protection Agency (EPA)	76,000	77,000	79,000	81,000	83,000	85,000
Army Corps of Engineers (COE)	76,000	77,000	79,000	81,000	83,000	85,000
	1,450,000	1,501,000	1,517,000	1,533,000	1,549,000	1,650,000
Other Non-Federal						
Association of American Railroads (AAR)	76,000	77,000	79,000	81,000	83,000	85,000
American Public Transportation Association (APTA)	76,000	77,000	79,000	81,000	83,000	85,000
California Air Resources Board (CARB)	81,000	82,000	84,000	86,000	88,000	90,000
	233,000	236,000	242,000	248,000	254,000	260,000
TRB Fees & Sales	4,675,000	6,175,000	6,360,000	6,551,000	6,748,000	6,950,000
	15,762,000	**18,513,000**	**18,904,000**	**19,305,000**	**19,715,000**	**20,219,200**
Expenses						
Personnel Related Expenses	12,002,000	12,394,000	14,420,000	15,494,000	16,083,000	16,876,000
AM Logistics and Travel	1,968,000	2,031,000	2,345,000	2,439,000	2,537,000	2,638,000
Library, Publishing & Report Production	1,008,000	1,053,000	1,125,000	1,159,000	1,194,000	1,230,000
Staff/Committee Travel & Meetings	73,000	75,000	225,000	232,000	239,000	246,000
Other Costs	75,000	180,000	215,000	221,000	228,000	235,000
	15,126,000	**15,733,000**	**18,330,000**	**19,545,000**	**20,281,000**	**21,225,000**
Reserves						
Yearly Surplus/(Deficit)	636,000	2,780,000	574,000	(240,000)	(566,000)	(1,005,800)
Reserve Fund Balance	19,996,869	22,776,869	23,350,869	23,110,869	22,544,869	21,539,069
Percent of Core Operating Year	**127%**	**124%**	**119%**	**114%**	**106%**	**98%**

TRANSPORTATION RESEARCH BOARD
DIVISION COMMITTEE REPORT
January through May 2023

BACKGROUND

The Transportation Research Board (TRB) Division Committee (Div-Comm) liaises between the Governing Board of the National Research Council (NRC) and TRB. The Div-Comm ensures that TRB meets the NRC's standards for objectivity and ensures that its activities are appropriate for the NRC. In addition, the Div-Comm monitors TRB's project committees and panel appointments, report review, and programs approved by the Governing Board. The Div-Comm Chair also assists the Executive Committee with special project approvals from the Governing Board.

Members of the 2023/2024 Div-Comm are Chris Hendrickson (NAE), Chair; Nat Ford, Outgoing Executive Committee Chair; Diane Gutierrez-Scaccetti, Executive Committee Chair; Tanisha Hall, Special Committee on Diversity, Equity, and Inclusion Chair; Carol Lewis, Incoming Executive Committee Chair; Joel Jundt, State DOT Representative; and Craig Philip (NAE).

OVERSIGHT ACTIVITIES

The following projects and committees were approved by the NRC Governing Board Executive Committee from January through May 2023.

Committee and Panel Approvals

The Div-Comm Chair approved appointments to 22 Cooperative Research Programs (CRP) project panels:

- 2 from the Airport Cooperative Research Program (ACRP),
- 8 from the National Cooperative Highway Research Program (NCHRP), and
- 12 from the Transit Cooperative Research Program (TCRP).

Report Review

From January through May 2023, the Div-Comm oversaw reviews of four reports from CAAS and 59 from the CRPs. Details about the CRP projects are were follows:

Table 1: Number of CRP Projects: January 1-May 31, 2023

Program	Research	Syntheses	Legal	Totals
ACRP	6	6	0	**12**
BTSCRP	3	0	0	**3**
NCHRP	29	11	1	**41**
TCRP	3	0	0	**3**
Totals	**41**	**17**	**1**	**59**

The CAAS reports were as follows:

- Letter Report on Transit Research and Development: Federal Role in the National Program 2023
- Recycled Plastics in Infrastructure: Current Practices, Understanding, and Opportunities
- Review of Federal Highway Administration Infrastructure R&D
- The Coast Guard's Next Decade: An Assessment of Emerging Challenges and Statutory Needs

INVOLVEMENT IN CRP AND TAD BY RACE/ETHNICITY AND SEX

The Div-Comm monitors TRB's progress in broadening the representation of minorities and women, both as members and friends of standing committees in the Technical Activities Division, members of cooperative research program project panels, and committee members on consensus studies in the CAAS Division.

In 2021, the National Academies announced new categories by which volunteers will report their race/ethnicity and sex. Volunteers can now select more than one race/ethnicity if they choose which are as follows: American Indian/Alaska Native, Asian, Black/African American, Hispanic/Latino, Native Hawaiian/Other Pacific Islander, Other, White, and Prefer Not to Answer. Respondents are counted in each category to which they provide a reply—so they are double-counted. The denominator for reporting volunteers' demographic data is those who have both updated and reported their demographic information—not the total number of those who are on committees or panels.

<u>Volunteers Included in the Data</u>

For TAD standing committees, members of the 177 committees are appointed at the TRB level. Each committee is allotted 36 slots and selects its own members while working with its TRB staff member; chairs are approved by TRB's TAD director.

Individuals can also become involved in standing committees through becoming a "friend of a committee" which allows them to sign up for an unlimited number of committees. Friends can attend meetings, participate in committee activities, and can be also considered for committee membership.

On CRP panels, individuals included in the data are those who serve as either a chair, member, or AASHTO monitor on active Div-Comm-approved panels that oversee contract projects.

Table 2 shows the number of unique friends and members on TAD committees, members of CRP panels, and the number of All TRB volunteers—i.e., those on at

least one TAD committee or CRP panel. Also included is the percentage of those reporting their race/ethnicity since 2021 when NASEM implemented the new demographic categories. (Because of data accessibility issues, demographic data on CAAS committee members are not available but will be provided in the January 2024 report.)

Table 2: Number of Unique Volunteers and Percentage Report Race/Ethnicity

	TAD Friends			*TAD Members*			*CRP Panel Members*			*All TRB Volunteers**		
	2021	**2022**	**2023**	**2021**	**2022**	**2023**	**2021**	**2022**	**2023**	**2021**	**2022**	**2023**
N Unique Volunteers	17143	18991	17996	4623	4419	4027	3166	3425	3479	7009	7024	6701
Reporting Race/ Ethnicity	24%	42.4%	55.3%	45.7%	73.5%	83.1%	34.2%	59.2%	67%	37.4%	65.1%	78.6%

*Does not include friends of committees.

The number of friends is about 1,000 fewer than the number reported for 2022. That decrease can be attributed to efforts to "clean" the list of friends by requiring some friends to reaffirm their desire to continue to follow a committee and by deleting friends whose email addresses are no longer valid. Also of note, the number of TAD committee members is about 400 fewer than in 2022. This decrease can be attributed to completing work on "right sizing" the committees after mergers that occurred during the 2019/2020 Strategic Alignment actions and from committee appointments that are still pending.

The higher response rate for TAD members can be attributed to MyTRB (the software TRB uses to collect demographic data) having more functionality for those members than for CRP panel members as CRP uses a different software for its primary collaboration tool with its panel members.

Point-in-Time Demographic Data

Tables 3 and 4 below provide the current demographic data as of May 2023 of TAD friends, TAD standing committee members, CRP panel members, and all TRB volunteers for all categories of race/ethnicity and for sex. There were 91.4% of the respondents who reported just one race or ethnicity.

Because volunteers are no longer limited to selecting one category for reporting their race/ethnicity, data for each race/ethnicity will be reported in two ways: (1) responses for each race/ethnicity category for those who responded to only that one category, and (2) responses for each race/ethnicity category AND those who responded to at least one other race/ethnicity category.

Table 3: Race/Ethnicity of TAD and CRP Volunteers

	TAD Friends	TAD Members	CRP Members	All TRB Volunteers
American Indian/Alaska Native	0.2%	0.2%	0.5%	0.3%
American Indian/ Alaska Native + One or More Other Races/ Ethnicities	0.5%	0.6%	0.9%	0.7%
Asian	21.6%	18.9%	13.2%	15.3%
Asian + One or More Other Races/ Ethnicities	22.4%	19.5%	14%	16%
Black/African American	5.0%	4.5%	8.7%	5.8%
Black/African American + One or More Other Races/ Ethnicities	5.4%	4.8%	9.1%	6.2%
Hispanic/Latino	4.6%	4.4%	5.6%	4.6%
Hispanic/Latino + One or More Other Races/Ethnicities	5.9%	5.7%	7.3%	5.9%
Native Hawaiian/Other Pacific Islander	0.2%	0.2%	0.3%	0.2%
Native Hawaiian/Other Pacific Islander + One or More Other Races/Ethnicities	0.3%	0.4%	0.6%	0.4%
Other Race/Ethnicity	2.9%	2.4%	1.5%	2%
Other Race/Ethnicity + One or More Other Races/Ethnicities	3.3%	2.7%	2%	2.4%
White	62.9%	66.9%	67%	63.2%
White + One or More Other Races/ Ethnicities	65.1%	69%	69.3%	65.4%

Table 4: Sex of TAD and CRP Volunteers

	TAD Friends	TAD Members	CRP Members	All TRB Volunteers
Male	68.4%	67.3%	62.3%	66%
Female	31.6%	32.7%	37.7%	34%

TAD and CRP Volunteer Chairs

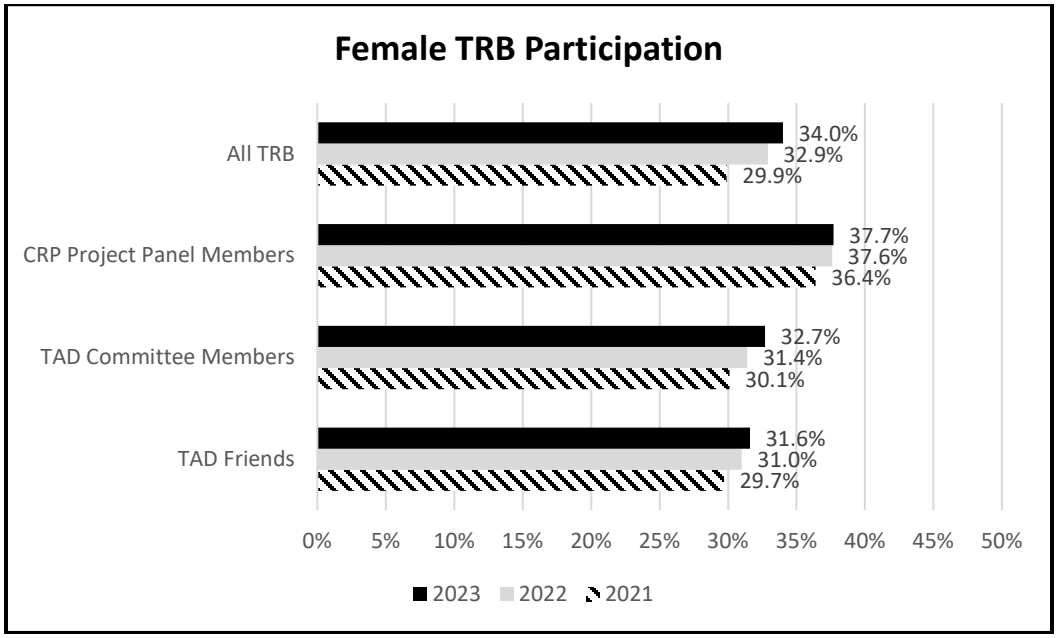
Table 5 shows the demographic composition of those in the role of either chair or co-chair of TAD standing committees or CRP project panels. The data for race/ethnicity includes both those who identified as only Black/African American, Hispanic/Latino, American Indian/Alaska Native, or Native Hawaiian/Other Pacific Islander and those who identified in at least one of those categories (in addition to others).

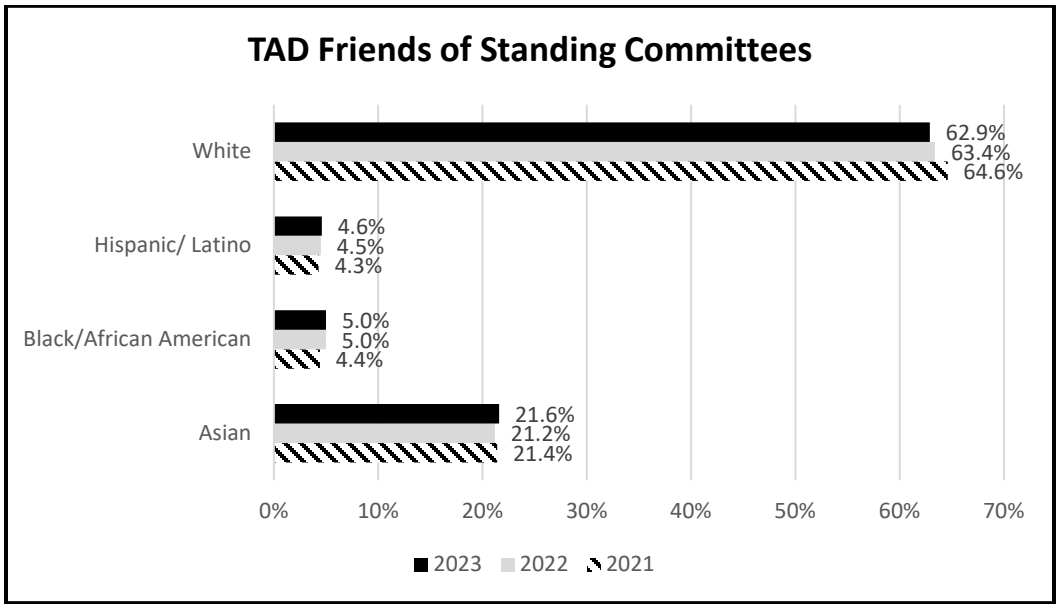
Table 5: Demographic Data of CRP and TAD Chairs

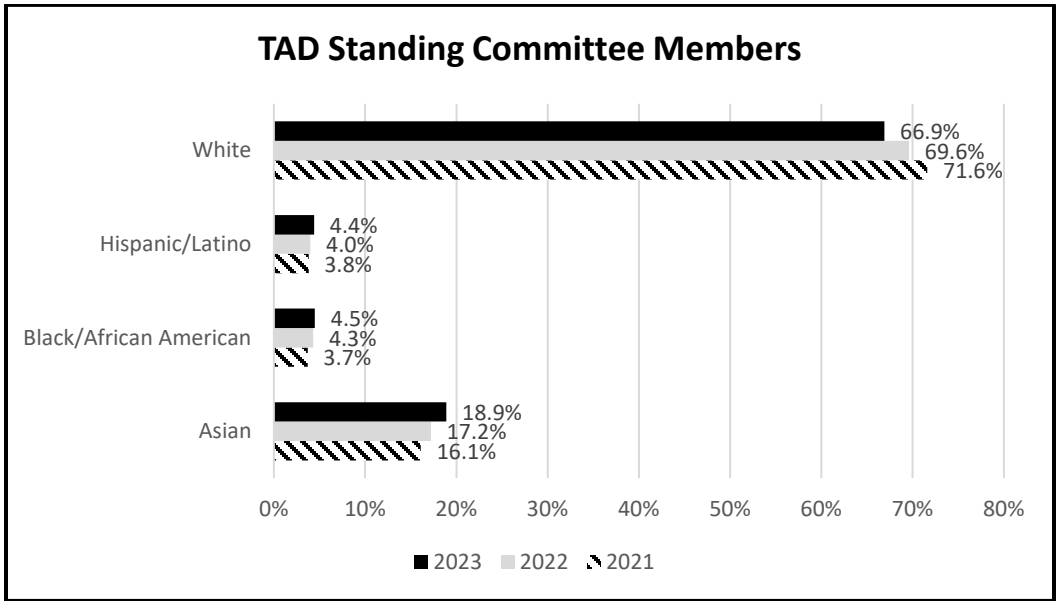
	CRP	**TAD**
Total N	**696**	**217**
% Reporting Sex	46.7%	96.8%
% Reporting Race/Ethnicity	45.2%	92.6%
% Female	39.4%	44.3%
% Black/African American, Hispanic/Latino, American Indian/Alaska Native, or Native Hawaiian/Other Pacific Islander	15.9%	9%

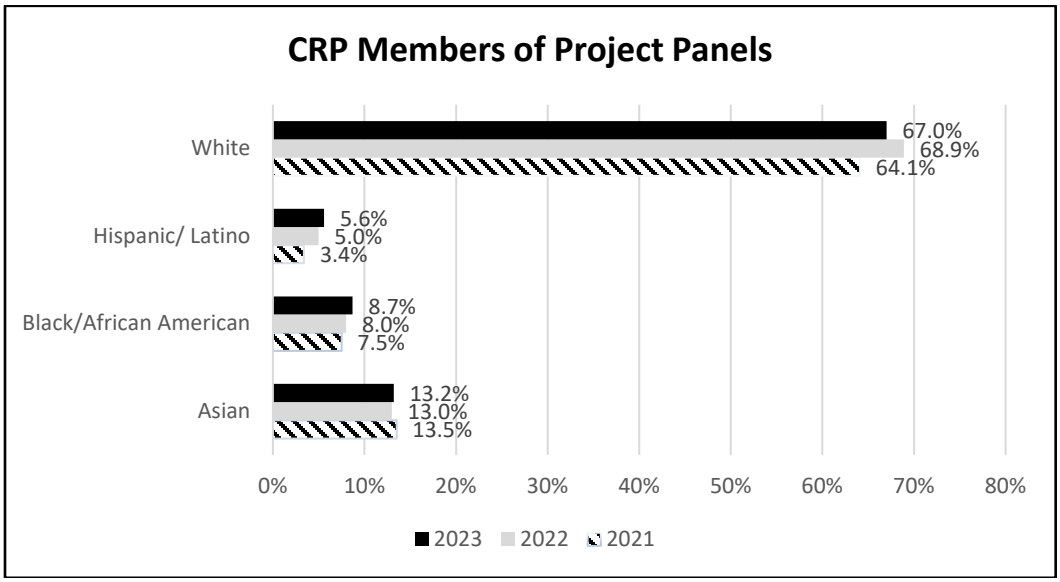
Trend Data

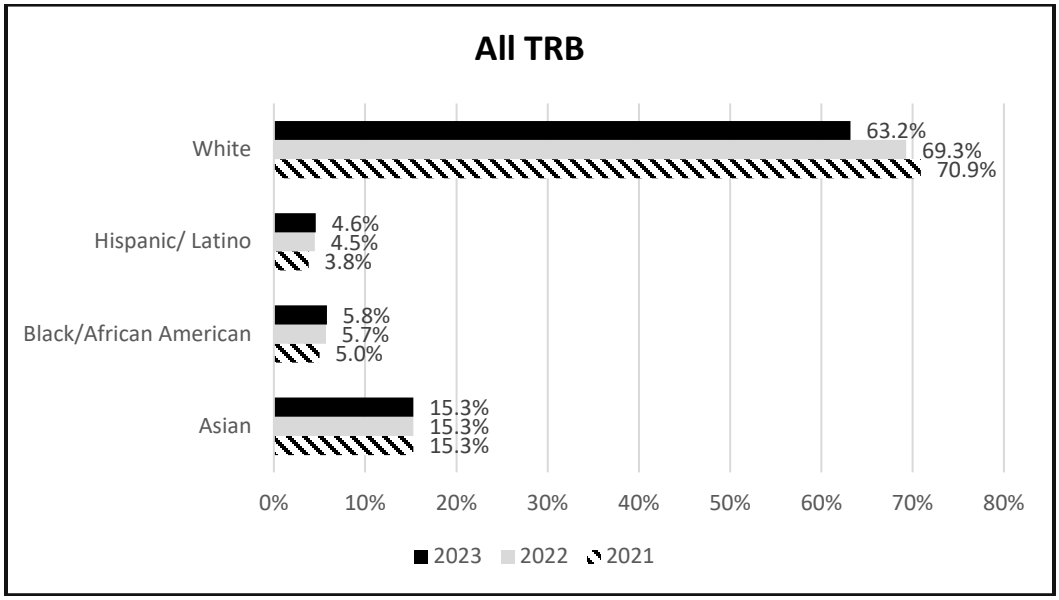
Given the availability of three data points (2021, 2022, 2023) since NASEM implemented its new demographic categories, trend data are provided below for different demographic groups for TAD friends and committee members, for CRP project panel members, and for TAD and CRP members combined.




TAD Friends of Standing Committees
White
Hispanic/ Latino
Black/African American
Asian
62.9%
63.4%
64.6%
4.6%
4.5%
4.3%
5.0%
5.0%
4.4%
21.6%
21.2%
21.4%
0%
10%
20%
30%
40%
50%
60%
70%
2023
2022
2021


TAD Standing Committee Members
White
Hispanic/Latino
Black/African American
Asian
66.9%
69.6%
71.6%
4.4%
4.0%
3.8%
4.5%
4.3%
3.7%
18.9%
17.2%
16.1%
0%
10%
20%
30%
40%
50%
60%
70%
80%
2023
2022
2021


CRP Members of Project Panels
White
Hispanic/ Latino
Black/African American
Asian
67.0%
68.9%
64.1%
5.6%
5.0%
3.4%
8.7%
8.0%
7.5%
13.2%
13.0%
13.5%
0%
10%
20%
30%
40%
50%
60%
70%
80%
2023
2022
2021


All TRB
White
Hispanic/ Latino
Black/African American
Asian
63.2%
69.3%
70.9%
4.6%
4.5%
3.8%
5.8%
5.7%
5.0%
15.3%
15.3%
15.3%
0%
10%
20%
30%
40%
50%
60%
70%
80%
2023
2022
2021

TRB Technical Activities Division Read-Ahead Information for Executive Committee
June 2023

Annual Meeting

The final verified attendance for the 2023 Annual Meeting is a little more than 12,000. "Verified" attendance means we have evidence that this number of registrants showed up on site. It is the measure TRB has traditionally used so we continue to report it for consistency. Total registration is always a little higher—it topped 13,000 this year—because we don't record everyone who comes on site and there are always a few no-shows who do not inform us that they don't plan to come.

The overall attendee rating for the 2023 was higher than it has been for several year as shown in the table below. Ratings are on a scale of 1 to 5 where 5 is the best rating.

Meeting	Overall Attendee Rating
2019 (in person)	4.26
2020 (last in-person before COVID)	4.24
2021 (virtual meeting during COVID)	3.10
2022 (first in-person after COVID	3.63
2023	**4.37**

The earliest stages of planning for the 2024 Annual Meeting are underway. Committees' workshop proposals are due in mid-June. As of June 12, committees have posted 94 calls for papers on topics spanning the committees' scopes. The paper submission site opened at the beginning of June; papers are due by August 1. We expect the usual 5,000-6,000 papers to be submitted for review.

Announcement of 2024 Deen Distinguished Lecture Awardee will be made during the Executive Committee meeting.

Conferences

TRB is putting more emphasis on the smaller conferences held throughout the year. These can be good opportunities for people who can't attend the Annual Meeting to experience the benefits of in-person events that are typically shorter and less expensive.

Five conferences have been held since the Annual Meeting:

- Workshop on Building More Resilient Supply Chains, *April 11-12, Washington, DC*

- Conference on Road Weather and Winter Maintenance, *May 9-10, Washington, DC*
- National Aviation System Planning Symposium, *May 15-18, Irvine, CA*
- Innovation in Travel Analysis and Planning, *June 4-6, Indianapolis, IN*
- Conference on the Marine Transportation System Innovative Science and Technologies Toward Greater Sustainability, *June 20-22, Washington, DC*

Six more conferences will be held between now and the 2024 Annual Meeting:

- National Conference on Asset Management, *July 8-11, Boston, MA*
- Automated Road Transportation Symposium, *July 9-13, San Francisco, CA*
- Annual Workshop on Transportation Law, *July 23-26, Richmond, VA*
- Conference on Low Volume Roads, *July 23-26, Cedar Rapids, IA*
- Innovations in Freight Data Workshop, *September 19-21, Washington, DC*
- Transportation Resilience 2023: Conference on Extreme Weather and Climate Change Challenges, *November 13-15, Washington, DC*

For more information, visit TRB's Events/Conferences page at https://www.nationalacademies.org/trb/events?types=Conference.

Transportation Research Record

The *TRR* team continues to implement policies and procedures to improve the quality and impact of the journal. The 250-member Editorial Board is undergoing its first rotation and expectations of members are being clarified. The *TRR* Advisory Board, which has existed for a number of years under different names and procedures, has also formalized its membership and rotation policies to provide better representation and bring new people onto the board. The Technical Activities Council reviewed and approved these policies during their Spring meeting. Policies and review standards are also being developed for special topic issues. After a few years of being completely engulfed in *TRR* process improvements, the *TRR* staff are creating a professional development plan for themselves to keep up with the many developments in journal publishing. We have also begun to benchmark the *TRR* staffing model against journals of a similar size.

Because of the importance of data-related research, artificial intelligence, and related technologies, the *TRR* team conducted a special outreach to TAD's Data Section committees. The volunteers from these committees are very interested in participating as Editorial Board members and reviewers. They will also create a data analysis team to help us use data and artificial intelligence to improve the Annual Meeting paper process.

The TRR is also working with our publisher, Sage, to address the use of Large Language Models in papers. We are following the guidelines of the Committee on

Publication Ethics (COPE) regarding transparency and author responsibilities. WE have provided guidelines to committees and added them to our author instructions and FAQs.

Committee Tools

Work continues on updating the format of the Triennial Strategic Plan (TSP) for the committee's activities. Currently, we are working on a tool that will make it easier to create TSPs and easier for committees to see other committees' TSPs, which will support collaboration across modes and disciplines.

IT staff have implemented several improvements in our IT tools to support committee chairs, including a new emailing system and a process for cleaning up and refreshing committee Friends lists. A new Research Needs Statements database was completed in time to roll out to committee chairs at the Annual Meeting.

Sponsor Relations Activities

The pooled fund agreement with FHWA for state DOTs to contribute to the Core Program was renewed for another five years.

After several years of virtual "state visits" we surveyed the TRB state DOT representatives about their experience with virtual visits in comparison to in-person visits. Not surprisingly there are benefits and drawbacks to each approach so we are developing a combination of virtual and in-person opportunities to meet the needs of both the states and TRB.

Staff

Over the last six months a significant amount of time and energy have gone into recruitment and hiring of staff as a result of retirements, promotions, and job changes. The following chart summarizes the status of changes. Because so many changes have occurred since the beginning of COVID and some positions took months to fill, the chart below includes all changes since immediately before COVID, representing a 30% turn-over.

Position	*Outgoing*	*Incoming*
Administrative Coordinator	Rosa Allen (retired)	*Not filled yet*
Conference Manager	Samantha Cid (move)	Elizabeth Price
Deputy Director	*New position*	Stephen Maher
Director of Meetings	Ed Leonardo (retired)	Karissa Bingham
Director of Operations	*New position*	Chris Rajaratnam

Meetings Assistant	Ted Jamele (new job)	Emily Gribbin
Operations Coordinator	Gary Jenkins (promoted)	James Manning
Operations Coordinator	Keyara Dorn (new job)	Tess Austin
Peer review	Rachel Laney (new job)	Amy Hardcastle
Senior Program Officer (SPO), Data	Tom Palmerlee (retired)	Katherine Kortum
SPO, Design	Stephen Maher (promoted)	Brian Roberts
SPO Maintenance	James Bryant (new job)	Ilona Kastenhofer
SPO, Operations	Rich Cunard (retired)	Cynthia Jones
SPO Planning	Jennifer Weeks (to CRP)	Anusha Jayasinghe

The Technical Activities Division is organized in four "offices" as follows:

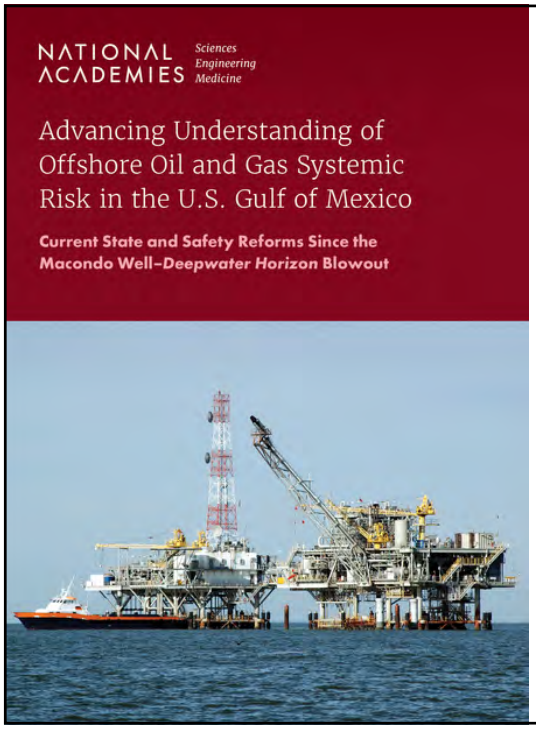
- The **Program Office** is responsible for the volunteers and all the technical programs for which the volunteers provide content; this includes committee membership, content development for the Annual Meeting and other conferences as well as developing and maintaining relationships with Core Program sponsors. Stephen Maher serves as the Director of Program Content as well as the Deputy Division Director.
- The **Publications Office** is responsible for TRB's peer-reviewed journal, the *Transportation Research Record* and for other TAD publications. This office also promotes communication with paper authors and their institutions and with TAD volunteers to strengthen the work of the volunteers, disseminate research findings, and otherwise promote the work of TAD's committees. Patti Lockhart is TAD's Director for Publishing and Outreach.
- The **Meetings Office** is responsible for all logistics for the TRB Annual Meeting and for all the smaller TAD conferences that take place outside of NASEM facilities. Karissa Bingham is TAD Director for Meetings
- The **Operations Office** is responsible for administrative and operational aspects of TAD's work. The professionals in this office are charged with ensuring the quality and efficiency of the many and complex operations that support hundreds of committees, subcommittees, sections, groups, and councils as well as the Annual Meeting, smaller conferences, committee rotation, state visits, etc. Chris Rajaratnam is TAD's Director for Operations

CONSENSUS AND ADVISORY STUDIES DIVISION
Director, Thomas Menzies

The Consensus and Advisory Studies Division provides consensus advice to the federal government and the transportation community more broadly based upon the deliberations of special, ad hoc committees appointed by the chair of the National Research Council.

INFORMATION AND DISCUSSION ITEMS

Studies Completed in 2023	Information
Studies Underway	Information
Pending Studies	Information
Studies in Active Legislation	Information



Changes in Risk Profile, Gulf of Mexico Oil and Gas Production since Deepwater Horizon Release

Findings—Major Positive Risk Developments

- **Creation of a new regulatory agency (BSEE) with singular focus on safety**
- **Mandated safety and environmental management systems (SEMS)**
- **Industry-funded well capping capability**
- **Heightened industry standards and regulations for well control and production safety systems**
- **Improved industry data collection and sharing of near-misses and other safety indicators (SafeOCS)**
- **Industry's creation and funding of the Center for Offshore Safety.**

Findings—Remaining Challenges/Needs

- **More progress in applying real-time monitoring, automation, and operational data to enhance safety decision making**
- **Address legal liability that inhibits information sharing, collaboration, dissemination of best practices**
- **Industry-wide commitment to safety culture that permeates the operator-contractor interface (contractors conduct 80% of safety-critical tasks)**

1

1

The Coast Guard's Next Decade An Assessment of Emerging Challenges and Statutory Needs

- The Coast Guard will face **new or increasing challenges** from **climate change**, **technological and industry innovation**, and **global strategic competition**.
- The Committee identified **10 foreseeable developments** in the coming decade and a total of **34 different types of actions** that the Coast Guard would likely need to take in response to these developments.
- The Committee concludes that the Coast Guard **likely has sufficient statutory authority** to take the needed actions in **all but two instances**.
- Even with statutory authority, the **Coast Guard will need sufficient mission support capabilities**, such as data, technology, and workforce, to meet the challenges of tomorrow. Continued attention to **legal foresight** is also needed.

2

2

STATUS OF CONSENSUS STUDIES AND OTHER ACTIVITIES UNDERWAY

(Expenditures through April 2023)

PROJECT	SPONSOR	FUNDED AMOUNT	SPENT	SCHEDULE BEGAN	COMPLETION	COMMENT
1. Research and Technology Coordinating Committee	FHWA	$473,000	80%	10/2003	9/2023 (new award anticipated)	Next meeting: Dec 2023
2. Long-term Infrastructure Performance	FHWA	$210,0000 annually for 5 years	80%	6/2022	5/2023	Letter delivered Jan. 2023. Project completed May 2023
3. Transit Research Analysis Committee	FTA	$145,000	70%	9/2003	9/2023 (new award anticipated)	Next meeting: July 2023
4. AV/Shared Mobility Forum	multiple	$368,000	50%	1/2018	continuing	Next event: July 2023
5. Emerging Aviation Safety Trends (Phase 2)	FAA	$1,500,000	60%	8/2022	7/2024	Phase 2 underway. Next meeting: July 2023
6. Automatic Shutoff Valves for Pipelines	PHMSA	$720,000	85%	8/2021	7/2023	Report being developed, scheduled for peer review July 2023
7. Repurposing Plastics Waste in Infrastructure	USDOT/EPA	$1,600,000	70%	9/2021	9/2023	Report in final production, expected release in July
8. Future Authorities for Coast Guard	USCG	$780,000	90%	9/2021	8/2023	Report delivered May 2023 House testimony in June

STATUS OF CONSENSUS STUDIES AND OTHER ACTIVITIES UNDERWAY

(Expenditures through April 2023)

10. Transportation Equity Metrics	USDOT/TRB	$1,000,000	70%	9/2021	11/2023	Report in developent, report scheduled for review in July 2023
11. Substance Abuse Treatment Programs for Airline Flight Crew	FAA	$1,000,000	80%	3/2022	9/2023	Collaboration with DBASSE leading. Report is in peer review
12. Safety Research to Practice	FHWA/NCHRP /IIHS	700,000	35%	6/2022	6/2025	Next meeting: June 2023
13. Certificate of Compliance Inspection Program	USCG	625,000	45%	7/2022	1/2024	Next meeting: July 2023
14. Impacts of Truck and Bus Driver Compensation Methods	FMCSA	1,250,000	35%	7/2022	7/2024	Next meeting:Sept 2023
15. Impacts of Trains Longer than 7,500 feet	FRA	1,200,000	25%	9/2022	6/2024	Next meeting: June 2023
16. Best Practices for Chassis Provisioning	FMC	500,000	25%	9/2022	9/2022	Next meeting: July 2023

SUMMARY OF PENDING AND POTENTIAL STUDIES

Study	Sponsor	Scope	Status
1. Stormwater Best Management Practices	FHWA	Make recommendations on the evaluation and selection by state DOTs of transportation of potential stormwater management and total maximum daily load compliance strategies	Enacted in Sec. 11520 of IIJA**. Award anticipated June 30 2023**.
2. Equity Metrics: Phase 2	OST	Examine metrics for states, MPOs, and local agencies to assess equity impacts of surface transportation investments	Enacted in **DOT Appropriations FY 22.** Study will commence following completion of Phase 1 study.
3. Impacts on Shipping and Fisheries of Renewable Energy Facilities on West Coast	DOI	Identify and analyze where fisheries are likely to shift in the future and how shipping lanes and Coast Guard operations relevant to fishing activities will be affected by the of renewable energy facilities on the West Coast	National Defense Authorization and Appropriation Act for FY2023, Section 11319. **Project will be led by DELS (Ocean Studies Board) with TRB collaboration.**

4. Alcohol at Sea	Coast Guard	Determine safe levels of alcohol consumption and possession by crew members aboard vessels of the United States engaged in commercial service.	National Defense Authorization and Appropriation Act for FY2023, Section 11606 Project would be lead by DBASSE with TRB collaboration. **Negotiations with Coast Guard underway**
5. Use of Innovative Materials in Water Resources Infrastructure	US Army Corps of Engineers	Examine USACE's R&D on w innovative materials for use in navigation and flood control infrastructure	Originally called for in Section 1046, Water Resources Development Act of 2016. Project would be lead by TRB in collaboration with DELS Water Sciences and Technology Board. **Proposal submitted May 2023**.
6. EC-USDOT Transportation Research Symposium	OST-R	Convene international symposium in June 2024 on decarbonization of transportation	**Award granted May 2023**

Studies in Legislation (Tracking Recent Activity)

Air Traffic Control Work Force Staffing (Section 314 HR 3935 passed T&I committee)
Compare the FAA's air traffic controller staffing models and methodologies for determining staffing standards targets with those developed by the Collaborative Resource Workgroup

Economic Feasibility of Wheelchair Securement Systems in Airline Passenger Cabins (Section 712 HR 3935 passed T&I)
Assess the economic and financial feasibility of requiring air carriers to implement seating arrangements that accommodate passengers with wheelchairs in the aircraft cabin during flight

Aviation Noise Metrics (Section 485 HR 3935 passed T&I)
Assess the efficacy of day-night noise level metrics used for measuring noise emissions near airports and recommend any changes to the metrics that may be warranted

Radio spectrum used by aviation (Section 532 HR 3935 passed T&I)
Assess the conflicts arising from aviation uses of radio spectrum and uses by wireless telecommunications networks

Airborne Ultra Fine Particles (UFP) emissions at commercial airports (Section 482 HR 3935 passed T&I)

Safe aircraft cabin air quality, safe temperatures, and radiation exposure (Sec's 537, 539, 540 HR 3935)

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Studies in Legislation (cont.)

Business Practices of the Shanghai Shipping Exchange (HR 1836 Introduced in House 3/28/2023
Examine any anticompetitive advantages benefitting the Shanghai Shipping Exchange and ability of the Ministry of Transport of the PRC to manipulate container freight markets.

Bering Strait Vessel Traffic Projects and Emergency Response Capacity (HR 2741 Introduced in House 4/20/2023)
Assess adequacy of emergency response capabilities and infrastructure at Port of Point Spencer, Alaska, to address navigation safety risks and geographic challenges necessary to conduct emergency maritime response operations in the Arctic environment.

Blocked Railroad-Highway Grade Crossings (S. 576, the Railway Safety Act of 2023, passed committee 4/20/2023)
Assess impacts of blocked grade crossings in 20 communities and 10 states.

2

NATIONAL ACADEMIES Sciences Engineering Medicine

TRB TRANSPORTATION RESEARCH BOARD

TRB Strategic Communications Update for the Executive Committee

June 28, 2023

1

Why does TRB do strategic communications?

The *TRB Strategic Plan for 2022-2027* essentially calls on us to:

- Mobilize the transportation industry
- Articulate the latest research clearly and widely
- Spotlight diverse perspectives.

Mission and Service

Video: Welcome to TRB

Video: Your Future in Transportation

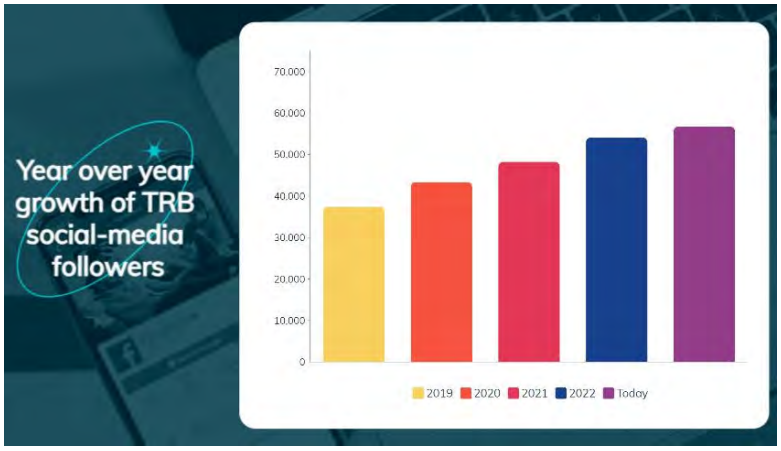
As part of the National Academies of Sciences, Engineering, and Medicine, the Transportation Research Board (TRB) provides leadership in transportation improvements and innovation through trusted, timely, impartial, and evidence-based information exchange, research, and advice regarding all modes of transportation. For example, committees, researchers, and staff are currently focused on advancing resilient infrastructure, exploring transformational technology, and caring for the public's health and safety. For more, please see the TRB 2021 Annual Report, the TRB Strategic Plan for 2022-2027, the TRB Diversity, Equity, and Inclusion Strategic Plan, and the TRB International Activities Strategic Plan for 2022-2027. TRB's mission is divided into three primary roles:

TRB TRANSPORTATION RESEARCH BOARD

2

2

Social media is an example of Comms helping TRB reach its goals.



- TRB's total social media followers from 2019 to June 2023 has grown from 37,368 to 56,730
- LinkedIn has been our biggest success, with followers growing from 6,900 (2019) total to 20,852 (June 2023).

TRB TRANSPORTATION RESEARCH BOARD

3

3

TRB Weekly is an example of Comms helping TRB reach its goals.

- In September 2021, we redesigned and relaunched the TRB E-Newsletter with 10,383 subscribers
- We now have 21,114 subscribers
- **Tell us what you and your volunteers like and don't like about *TRB Weekly*.** *We are focused on always improving it!*

TRB TRANSPORTATION RESEARCH BOARD

4

4

Audience Development via our engaged followers is an example of Comms helping TRB reach its goals.

With ***TRB Weekly*** **and our other newsletters**, we continue adding newsletter best practices. For example, we include "feature stories" in each issue. This allows the newsletter to stretch out with a bit of storytelling that is more engaging than just long lists of our many offerings.

- We also launched the ability to include exclusive content for specific audiences within our newsletter subscriber base. Global Affiliates, for example, now get exclusive content.

TRB TRANSPORTATION RESEARCH BOARD

5

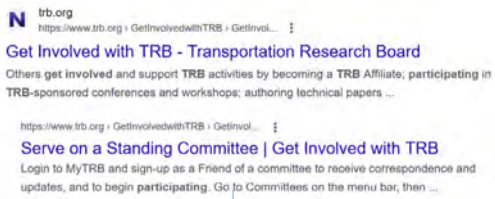
5

Audience Development via the web is an example of Comms helping TRB reach its goals.

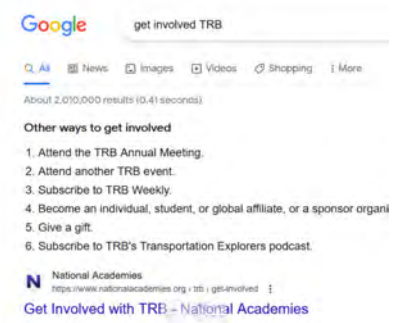
SEO (web findability) continues to improve as we move content from the old website to the new one:

- In this example →,
  Google "get involved TRB" and most people will now get much more helpful immediate information.

OLD



NEW



TRB TRANSPORTATION RESEARCH BOARD

6

6

Audience Development via the media is an example of Comms helping TRB reach its goals.

Mainstream and trade media coverage continues to increasingly show impressive results. Our strategy – to organize key research takeaways and share with targeted journalists and on social media – is getting TRB and our volunteers media coverage.

TRB TRANSPORTATION RESEARCH BOARD

7

7

USA TODAY

Fiery I-95 collapse puts renewed focus on critical role of interstates in American life

The Washington Post

Bill aims to improve air travel for passengers with disabilities

AP

Railroads warned about the problems long trains can cause

The Philadelphia Tribune

Highways have damaged communities of color

TRB TRANSPORTATION RESEARCH BOARD

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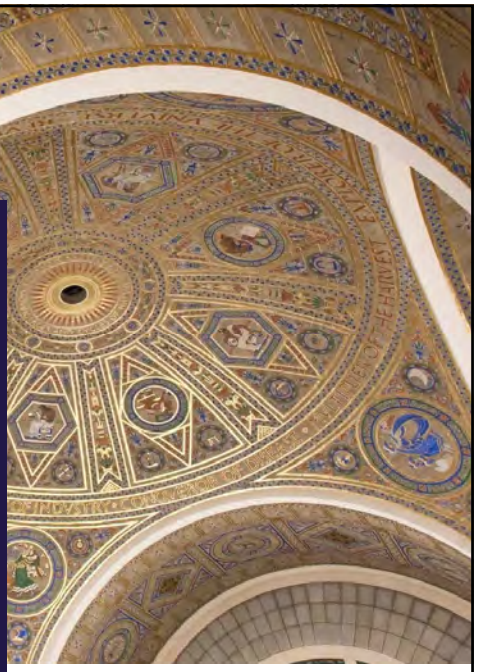
NATIONAL ACADEMIES Sciences Engineering Medicine

TRB TRANSPORTATION RESEARCH BOARD

Strategic Plan Implementation

Susan Shaheen

June 28, 2023



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TRB Vision

- A nation and a world that rely on scientific evidence and expertise about transportation to ensure a system that benefits individuals, society, and the environment.

TRB Mission Statement

- TRB mobilizes expertise, experience, and knowledge to anticipate and solve complex transportation-related challenges.

2

Diversity, Equity, and Inclusion (DE&I) Strategic Plan

Mission

TRB's Diversity, Equity, and Inclusion (DE&I) Initiative's mission is to create and foster an inclusive environment that leads to increased diversity of participants in TRB and equitable outcomes for the transportation system.

Strategic Plan for TRB International Activities

Vision

TRB's International Activities facilitates actions that result in a safe, more secure, and sustainable global transportation system through bilateral and multilateral international engagement and collaborative research conducted through international cooperation.

Mission

The mission of the Subcommittee on International Activities of the TRB Executive Committee is to provide guidance and support on building and strengthening strategic international transportation partnerships, and leveraging TRB activities, committees, and publications to advance impactful transportation research and practice around the globe.

TRB Goals

1. Prepare transportation professionals and decision makers to address current and future transportation-related challenges and opportunities.
2. Expand TRB's impact and influence through its objective research, information exchange, and advisory activities.
3. Assure TRB's continued creativity, resilience, and sustainability in an ever evolving world.

5

5

Strategies For Each Goal

Goal 1. Prepare transportation professionals and decision makers to address current and future transportation-related challenges and opportunities

a. Identify current and future critical transportation-related issues and address these issues through TRB's convening, research, and advising programs and activities.
b. Educate and communicate with transportation professionals, decision makers, and the public about the critical issues identified and the work that TRB is doing to address them.
c. Identify state-of-the-art methods and data for addressing critical issue

NATIONAL ACADEMIES Sciences Engineering Medicine

6

6

Strategies For Each Goal

Goal 2. Expand TRB's impact and influence through its objective research, information exchange, and advisory activities.

Expand TRB's national and international impact and influence by advancing knowledge, sharing lessons learned, and impacting policy through its objective research, information exchange, and advisory activities

a. In planning TRB activities, identify actions that will expand each activity's impact
b. Measure the impact of TRB's programs and activities
c. Educate transportation stakeholders about TRB's programs, products, and activities.
d. Communicate with transportation professionals and the public about transportation issues and research
e. To enhance impact, build a diverse and deep network of partners.
f. Ensure multidisciplinary involvement in addressing TRB's issues.

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Strategies For Each Goal

Goal 3. Assure TRB's continued creativity, resilience, and sustainability in an ever-evolving world.

a. Identify and address the issues and needs of existing and potential sponsors, partners, volunteers, and users of TRB's programs, products, and activities.
b. Pursue continuous improvements and efficiencies in TRB programs, products, and activities to increase effectiveness, usefulness, quality, and timeliness and to identify how to best use new resources.
c. Employ technology to expand TRB's outreach and participation.
d. Engage with and involve new participants in TRB activities.
e. Balance TRB's programs, products, and activities with available financial, volunteer, and staff resources to achieve the goals and strategies in this plan.
f. Expand the diversity of TRB participants, ensuring an inclusive and welcoming environment for all persons involved in transportation.
g. Sustain, support, and enhance staff

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Proposed Actions For Each Strategy

Goal 2 a. In planning TRB activities, identify actions that will expand each activity's impact.

i. As part of initial planning for conferences/workshops, cooperative research studies, and consensus studies, develop a communications and outreach approach for when reports are issued, including measures to gauge impact.

ii. Develop and deploy communications strategies to increase awareness of and participation in the TRB Annual Meeting, conferences, workshops, and committee meetings.

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Proposed Actions For Each Strategy

Goal 2. b. Measure the impact of TRB's programs and activities

i. Develop both quantitative and qualitative performance metrics to measure the impact of TRB's convening activities, research studies and reports, TRB's consensus study reports, Transportation Research Record, TRID database, and communications efforts.

ii. Collect data and anecdotal information from users and sponsors on the short- and long-term impact of selected reports.

iii. Summarize impact data in TRB's annual report and in periodic reports for individual TRB programs.

iv. Working with oversight committees for each program area, adjust the program to focus on areas of greatest value and impact for TRB sponsors and stakeholders.

v. Survey members of key stakeholder groups to determine familiarity and satisfaction with TRB products and services and to understand how and the extent to which the products and services are being used by different audiences.

vi. Conduct an engagement survey of members of TRB standing committees, Cooperative Research Program research panels, and consensus study committees to evaluate their volunteer experience. Employ these data to improve volunteer outcomes

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Proposed Actions For Each Strategy

Goal 2. c. Educate transportation stakeholders about TRB's programs, products, and activities.

i. Using impact information collected, develop and communicate value proposition statements for each of TRB's programs and major activities.

ii. Refine materials that describe TRB's programs, products, and activities, tailoring them to specific target audiences, as well as diverse audiences.

iii. Reach out to targeted audiences to educate and engage in dialogue with them about TRB, and how TRB can be of benefit to them.

iv. Develop communications materials and strategies about TRB's capabilities and value proposition for the following specific audiences:

- Sponsors,
- Congressional staff,
- Transportation professionals and organizations from nations other than the United States, and
- Young professionals and students.

v. Equip TRB staff and volunteers and MOU partners to be ambassadors for TRB's programs, products, and activities.

vi. Adapt TRB's communications strategies to rapidly changing communications methods and different groups of stakeholders.

vii. Strengthen and evolve the marketing strategy for the TRB Annual Meeting

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Proposed Actions For Each Strategy

Goal 2. d. Communicate with transportation professionals and the public about transportation issues and research.

i. Develop timely communications materials on transportation-related issues and share through blogs, social media, and other communications methods.

ii. Develop materials that demonstrate the value obtained from transportation research

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Proposed Actions For Each Strategy

Goal 2. e. To enhance impact, build a diverse and deep network of partners.

i. Identify a list of international and domestic organizations that TRB will engage with, publicize each other's activities, and as appropriate establish liaisons between the organizations' committees. The International Subcommittee and the Special Committee on Diversity, Equity, and Inclusion will facilitate engagement with international and minority-serving organizations.

ii. Pursue joint activities with these organizations.

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Proposed Actions For Each Strategy

Goal 2. f. Ensure multidisciplinary involvement in addressing TRB's issues.

i. Identify disciplines or sectors involved in transportation-related issues that are underrepresented in TRB, and develop strategies to engage with professionals from these disciplines or sectors.

ii. For individual standing technical committees, research panels, or study committees, ensure that membership reflects an appropriate diversity of disciplines

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Proposed Actions For Each Strategy

Goal 2. g. Provide career-long learning opportunities by fostering an environment that continually enhances the diversity, inclusivity, skills, and capacity of the transportation professional community.

i. Develop appropriate communications and resource materials and convey the benefits of standing committee volunteer opportunities to enhance professional development and encourage pathways for diverse groups to become actively engaged and take on leadership roles in TRB.

ii. Develop and deliver targeted communications materials for students, early career professionals, and underrepresented groups focused on learning and professional development opportunities through TRB.

iii. Enhance marketing of TRB's continuing education credit program

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Strategic Plan Implementation - Metrics

Goal 2. Expand TRB's impact and influence through its objective research, information exchange, and advisory activities.

# of unique individuals who are members and friends of TRB standing technical committees

# of attendees at the TRB Annual Meeting by academic/researcher, government employee, private sector

- # of first time attendees
- # of sponsor employees
- # of Congressional staff
- # of international attendees
- # of private sector organizations involved in the TRB Annual Meeting

# of papers submitted and peer reviewed by topic

# of downloads of Transportation Research Record papers by topic

# of webinars and attendance at webinars by critical issue topic; % giving positive ratings of webinars

# of unique individuals who are members of CRP research panels and oversight committees

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Strategic Plan Implementation - Metrics

of downloads of CRP reports by program and by type

Qualitative measure: value of CRP products based on anecdotal data of impact of individual products as reported in CRP impact reports, including changes in legislation, regulations, or policy

Sponsor satisfaction scores for consensus studies from sponsor interviews conducted after each consensus study

# of TRID sessions

% with positive responses to questions on knowledge of TRB and overall ratings of TRB from a broader transportation stakeholder survey

Ratings from engagement survey of TRB committee and research panel members

# of TRB Weekly subscribers; open rate

# of Upcoming TRB Webinars newsletter subscribers; open rate

# of TRB social media followers on LinkedIn, Twitter, and Facebook combined

Website users/open rates

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TRB

TRANSPORTATION RESEARCH BOARD

June 19, 2023

MEMORANDUM

TO: TRB Executive Committee

FROM: Victoria Sheehan, Executive Director

SUBJECT: *Critical Issues in Transportation* 2023 Edition

Since the Executive Committee discussed the Critical Issues document at its January meeting, the Subcommittee on Planning and Policy Review (SPPR) and staff have prepared a draft for your approval (see document that follows). This memo describes the process undertaken and remaining steps required to complete and release the document by this fall.

PROCESS

At the January 2023 Executive Committee meeting, agreement was reached on five social goals that transportation should serve, and a variety of critical issues were mentioned that could facilitate or impede the achievement of those goals. Based on this discussion, staff prepared a draft for SPPR discussion at their April 28 meeting. This draft includes a diagram (Figure 1 in the following) that conveys how transportation depends on a variety of interacting factors or policy levers (governance, funding, land use, workforce, and innovation) in order for it to be successful in serving social goals. The draft is organized around each separate item in this diagram (social goals, transportation, and foundational factors/policy levers). Following the April SPPR meeting, staff made changes to Figure 1 and the draft in response to SPPR comments. Most SPPR members reviewed the revised draft at a virtual meeting on June 9th. Based on the June meeting discussion, staff sharpened the focus on the most prominent critical issues in each section of the draft and provided a statement of them at the end of each section. The draft before you for approval is the result of these revisions.

We expect that approval of the document will be subject to any substantive comments you may have but hope that these will be fairly limited given the SPPR's endorsement of the draft. Any editorial comments or corrections can be sent to Katherine Kortum at Kkortum@nas.edu.

NEXT STEPS

Before the document can be released to the public, it must follow the Academies' process for an independent peer review by 8-10 anonymous experts approved by the Academies' Report Review Committee (RRC). Acting on your behalf, the SPPR and staff will respond to the most important review comments as determined by the RRC. The report cannot be released to the public until the RRC decides whether the responses are satisfactory. This process will take a couple of months, hence the need to achieve your approval at next week's meeting.

In parallel to peer review, the National Academies Press will edit the document, revise figures, and develop a design for the cover and interior.

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500 Fifth Street, NW, Washington, DC 20001
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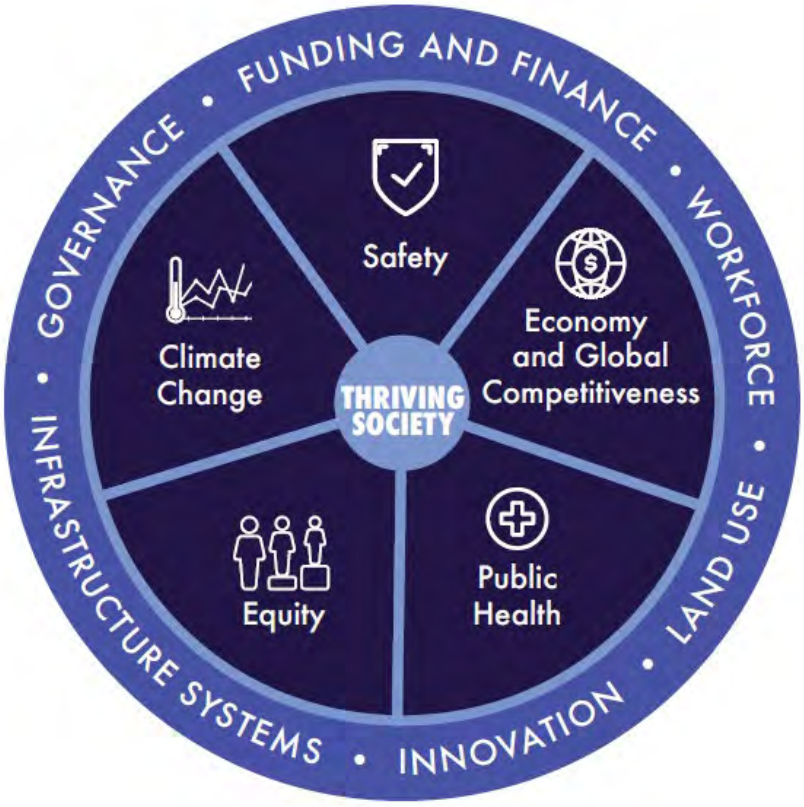
REVISED DRAFT

Critical Issues in Transportation, 2023 Edition



Transportation Research Board Executive Committee
National Academies of Sciences, Engineering, and Medicine

Executive Summary

Transportation is an essential and integral component of modern economies and thriving societies. It has two key dimensions: (a) the movement of people and goods from origin to destination and (b) infrastructure systems – the physical and digital structures that enable travel by foot, vehicles, vessels, and aircraft. Transportation benefits society by supporting a vibrant economy and allowing people to socialize, pursue their aspirations, and live well. It also imposes large costs in the form of deaths and injuries, harmful emissions, inequities, and other adverse impacts. *Critical Issues in Transportation* explores the issues involved in attempting to maximize transportation's benefits while minimizing its costs.

For this edition of *Critical Issues*, the TRB Executive Committee chose to focus on five vitally important goals that transportation serves, each of which contributes to the ultimate goal of a Thriving Society:

- Mitigating and Responding to Climate Change
- Promoting Equity and Inclusion
- Increasing Safety
- Advancing Public Health, and
- Building and Sustaining a Strong, Competitive Economy

Transportation directly affects the achievement of all these goals. Some, such as the economy and climate, directly affect transportation as well. For example, fluctuations in the economy influence the demand for travel and the changing climate increases infrastructure vulnerability, as illustrated in Figure 1. [1] (The social goals are summarized in abbreviated form in the top two rows of boxes in the figure.)

Transportation is heavily dependent on:

- public policy and oversight (governance) that accentuate its benefits and constrain its costs;
- the extent and nature of demand for travel generated by the built environment (land use);
- adequate revenues (funding and finance) to

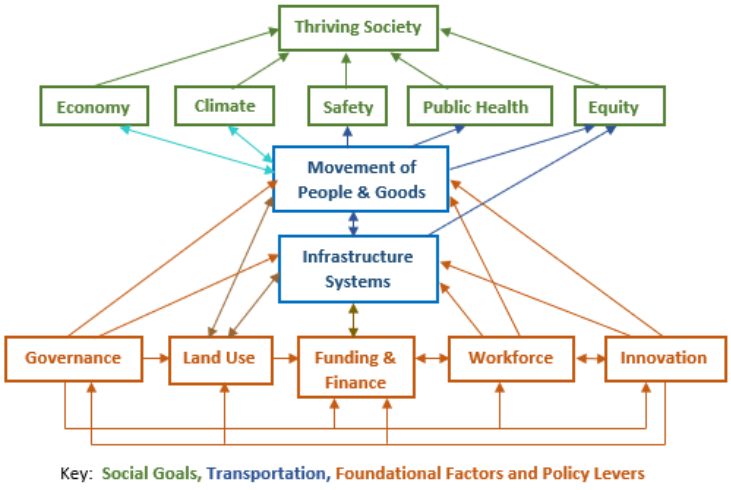


Figure 1: Transportation's Role in Achieving Social Goals & Dependence on Foundational Factors & Policy Levers

[1] Figure 1 does not include ways in which the foundational factors and policy levers affect social goals independent of transportation.

provide and maintain infrastructure;
- the extent and quality of its workforce; and
- the extent and implementation of innovation; (Figure 1).

Understanding and appreciating the complex interactions among social goals, transportation, and these foundational factors and policy levers influencing transportation are essential for addressing the many benefits and costs of transportation. The interactions depicted by the one-way and two-way arrows in Figure 1 are discussed in more detail in the sections that follow.

Fortunately, and as explained later, innovations in technology have created the opportunity to significantly reduce transportation's reliance on fossil fuels by converting most vehicles to clean electric power without increasing the cost of either the electricity for charging batteries or of vehicle ownership and operation. If successful, this energy transition and the resulting reduced vehicle emissions will also have substantial public health and environmental justice benefits. Even so, a massive effort will be required to deploy charging infrastructure; further improve battery performance and cost; develop net-zero carbon fuels for aircraft, vessels, and other heavy vehicles that depend on high energy density fuels; and minimize the adverse environmental impacts of mining and processing the minerals required for batteries on a massive scale.

Technology may also improve transportation productivity and highway safety. However, innovation, including in regulation, will be required to find and promote scientifically based policies that are acceptable in a pluralistic and divided society. Addressing transportation's role in the nation's history of racial discrimination will require more equitable and effective transportation policies and resource allocation. It will also require the development of a greater consensus around evidence-based options for doing so.

Centuries of investment and development have resulted in a vast transportation infrastructure that supports personal and freight travel as well as a substantial cost of maintaining and operating it. Privately funded infrastructure appears to be on a solid basis for continuing reinvestment. Public infrastructure faces greater uncertainty due to historically high levels of federal public debt and continued resistance among elected officials to taxes and user fees necessary to maintain and expand existing roads, transit, airports, and ports to support a growing economy and population. The transportation research community can help by documenting and spreading innovations and practices that work.

Fragmented governance and land use policies may well be integral to the United States based on its history, culture, and forms of government. Even so, innovations in transportation governance and land use policies addressing climate change and equity can be documented and shared. Implementing them and other policies described below depends on attracting and retaining a diverse workforce skilled across multiple disciplines. The challenges and opportunities for rewarding careers are as great as the need.

Introduction

Critical Issues in Transportation is authored by the Executive Committee of the Transportation Research Board of the National Academies of Sciences, Engineering, and Medicine. Editions have been published on a 2-5 year cycle since 1976. This document reflects the collective judgment of members regarding issues of priority concern at the time of publication. Critical issues are defined as those that have a significant impact on achieving social goals across all modes. They are unresolved matters of debate or concern or important and difficult problems or questions that can be informed by research and addressed through innovation and public policy. They can be long-standing or emergent, hence the somewhat shifting emphasis across editions over time. The statements in bold at the end of each section is our attempt to frame the core of the problem or source of contention. Each critical issue can have many sub-parts or dimensions. We encourage others to determine how they can best be framed and addressed.

In the sections that follow, we describe transportation's influence on each of the social goals and the dependence of transportation on the foundational factors and policy levers depicted in Figure 1. The document begins with a brief overview of movement of people and goods in the United States, describing the modes of travel for passengers and freight and their energy requirements. The next four sections discuss the impacts of moving people and goods on our ability to achieve social goals. The final five sections focus on the critical issues among the foundational factors and policy levers that could be exercised that have great influence on transportation's success, or not, in supporting social goals. Throughout these sections we refer to direct benefits and costs only. Students of transportation recognize that it has benefits and costs that cannot be easily monetized, and we've made no attempt to do so in this document. Instead, we highlight both transportation's positive and negative aspects.

Past editions of *Critical Issues* were intended to foster awareness, debate, and research rather than provide solutions to the sometimes contentious issues they identified. This edition of *Critical Issues* is offered in the same spirit. Unlike previous editions, this edition relies heavily on metrics, whenever possible and appropriate, both to justify inclusion of a topic and to show progress, or not, in addressing the critical issues raised. Readers are encouraged to explore alternate metrics as well as means of filling data gaps that can help the transportation community better contribute to a thriving society. Further development of metrics for monitoring progress is outlined in the Appendix.

Movement of People & Goods

Travel results from people, organizations, and communities pursing their own goals and freight carriers trying to serve them. The movement of people and goods is the means by which the benefits and costs of transportation affect social goals, as illustrated in Figure 1. Our lens in this document focuses on the national scale, recognizing that patterns of travel and modes used

range widely across the country from that of New York City to Yuma, Arizona, to Prudhoe Bay, Alaska.

Passengers traveled more than 6 trillion passenger miles in the United States in 2019, the last year before travel was severely reduced by the COVID-19 pandemic (Figure 2).[2] This enormous travel volume is not surprising for a continental-sized country inhabited by 334 million people, whose metropolitan areas are generally far apart (other than in the northeast) and designed around motor vehicles. Indeed, personal travel in light-duty vehicles (LDVs) (cars, sport utility vehicles, motorcycles, and light trucks) make up more than three-quarters of total passenger miles. Aviation follows with almost 12%, and then intercity bus, with almost 6%. Transit and intercity rail combined represent less than 1% of passenger miles. That seemingly small share belies the importance of transit for the economic vitality of center cities, the essential service it provides to the many who do not drive, and its importance in climate change mitigation strategies.

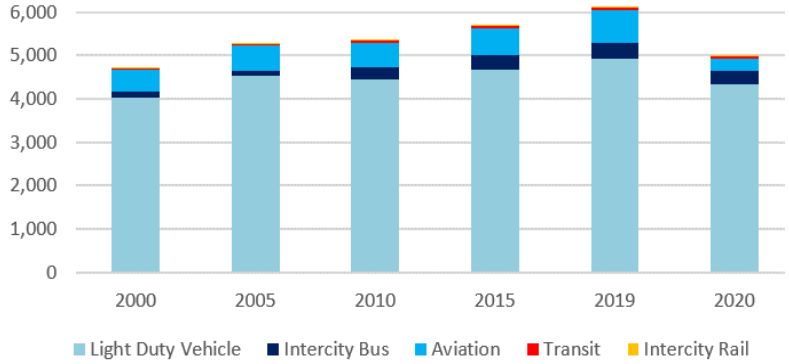


Figure 2: Passenger Miles of Travel by Mode (billions). Source: BTS, National Transportation Statistics, Table 1-40.

Passenger modal preferences have been relatively stable over time, but they have shifted some over the past two decades.[3] For example, although overall passenger miles increased 30% during this period, travel by intercity bus grew 150% and aviation grew 50%. Though the largest share by far, LDV travel grew 20%. This may be partly due to the declining share of young and middle-aged cohorts acquiring drivers' licenses.[4] Transit travel also grew 20% but has been falling from its peak of 26% growth in 2014. Intercity rail has grown 16%.

National estimates of active travel (walking and bicycling) are only made periodically and imperfectly. These modes represent less than 1% of total passenger miles, shares that remained constant when last estimated in 2009 and 2017.[5] Transit, walk, and cycling mode shares differ considerably with levels of urbanization. In metropolitan areas of 3 million

[2] For this summary, motorcycles are included with LDVs and occupants in medium and heavy trucks are excluded under the assumption that these are mostly commercial drivers.
[3] Statistics in this paragraph calculated from BTS. National Transportation Statistics, Table 1-40. U.S. Passenger Miles. https://www.bts.gov/content/us-passenger-miles
[4] Osaka, S. 2023. Why Gen Z Doesn't Want to Drive: Zoomers are Shunning Cars and Drivers Licenses—Will it Last? *Washington Post*, Feb 13. https://www.washingtonpost.com/climate-solutions/2023/02/13/gen-z-driving-less-uber/
[5] U.S. Department of Transportation. 2018. Summary of Travel Trends: 2017 National Household Travel Survey. https://nhts.ornl.gov/assets/2017_nhts_summary_travel_trends.pdf

population or more, for example, transit accounts for 5% and walking accounts for 15% of trips (although walk trips are typically quite short). Even so, private vehicles still account for 75% of trips in these areas.

A significant shift in travel has occurred in large metropolitan areas as increased working from home has persisted after many other pandemic-induced trends have reversed. In March of 2023, 50% of office space in 10 major cities remained unoccupied, long after highway and aviation passenger traffic had rebounded.[6] The trend in working from home appears to be stabilizing at about 25% of days compared to less than 5% before the pandemic.[7] Overall transit ridership remains down by about one-third from its 2019 level and appears to be leveling off.[8] Whether workers will return to the office five days a week has profound implications for downtown economies and the future of transit systems designed to deliver workers to and from city centers. Shifts in population in 2021 away from the largest metro areas accelerated population shifts that were already occurring, especially from urban core counties.[9] Low-density residence and work environments make transit and active modes less attractive for commuting and other trips due to the greater distances between origins and destinations. Moreover, increased work from home actually increases overall motor vehicle travel.[10]

Freight mode shares have fluctuated over the last 20 years. Overall, less fuel-efficient trucks have gained share while the more fuel-efficient modes of rail, pipelines, and water have lost share (Figure 3). In general, long-distance truck transport is faster and can more easily provide point-to-point service. Although depicted as individual modes, most freight is part of complex supply chains involving shippers, brokers, carriers, infrastructure, and transfers from one mode to another between origin and final destination. The COVID-19 pandemic demonstrated the fragility of supply chains, as well as the limited capability of public agencies

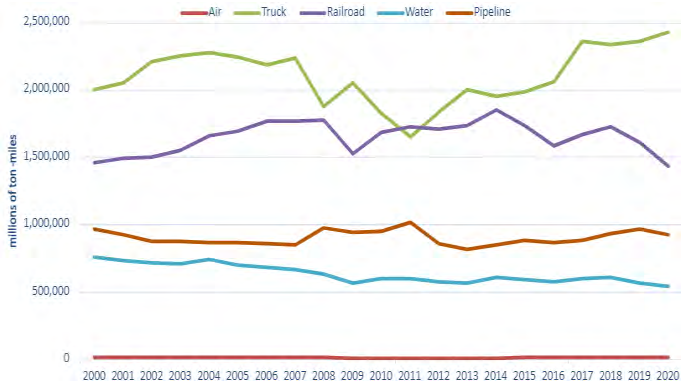


Figure 3: U.S. Ton Miles of Freight by Mode. Source: BTS, National Transportation Statistics Table 1-50.

[6] Kastle Systems. *Getting America Back To Work*. (as of March 24, 2023) https://www.kastle.com/safety-wellness/getting-america-back-to-work/

[7] Bloom, N. *The Future of Work from Home: Executive Briefing*. March, 2023, slide 8. https://www.dropbox.com/s/ynjzxh86b8gppr5/Exec_Briefing_March2023%20-%20Copy.pptx?dl=0

[8] Bloom, N. 2023, slide 31.

[9] Frey, W. 2022. *New Census Data Shows A Huge Spike in Movement out of Big Metro Areas During the Pandemic*, Figures 2 and 5. https://www.brookings.edu/blog/the-avenue/2022/04/14/new-census-data-shows-a-huge-spike-in-movement-out-of-big-metro-areas-during-the-pandemic/amp/

[10] Speroni, S. and B. Taylor. 2023. *The Future of Working away from Work and Daily Travel: A Research Synthesis*. Institute for Transportation Studies, University of California, Los Angeles.

to help restore traffic flow once severely disrupted (see further discussion in the Governance section below).

The passenger and freight travel summarized above help to create and support the economy, as described in the following section on Economy and Competitiveness. However, these economic benefits are offset by travel's harmful effects, as discussed in the sections that follow on climate change, safety, and public health.

Demand for the different passenger and freight modes has important implications for fossil fuel consumption and its effects on the climate, as discussed in a following section. The projections in Figure 4 were made before the passage of federal legislation in 2021 and 2022, discussed later, which are designed to shift transportation to renewable sources of energy. Without significant change in demand, transportation was forecast to increase fossil fuel consumption by 2050 to 14.3 million barrels per day. Most of the growth is attributable to growing demand for energy-intensive air transportation. As described later, almost of all this fossil fuel demand – roughly 90% of all U.S. petroleum consumption -- will need to shift to renewable sources to meet national climate goals and commitments.

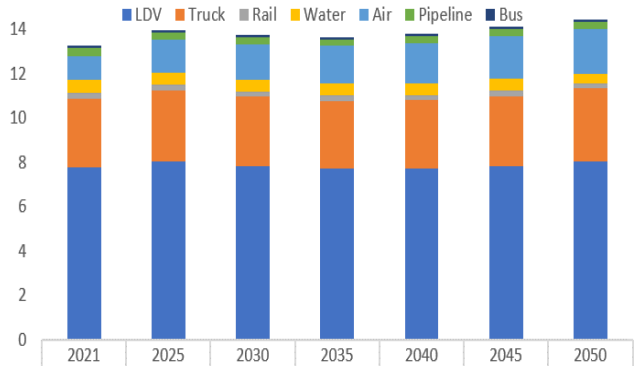


Figure 4: Transportation Fossil Fuel Consumption by Mode, 2021-2050 (millions of barrels per day oil equivalent). Source: EIA Annual Energy Outlook 2022, Table 7.

Building and Sustaining a Strong, Competitive Economy

The U.S. economy simply could not function without transportation. Goods move from producers to consumers, most workers travel from home to workplaces, and consumers travel to purchase goods and services or pay to have goods delivered. As an input to production and consumption, transport's direct costs would ideally be minimized. They are low in the United States. Even the most transport-dependent sector (Wholesale and Retail Trade) has required 10¢ or less of transportation services for every dollar of output over the last decade.[11] Natural Resources/Mining, Construction, and Manufacturing have required 4.5¢ or less, and most service sectors, including Leisure and Hospitality, have required 3¢ or less.

[11] Bureau of Transportation Statistics (BTS). Total Amount of Transportation used by Industry or Sector. https://data.bts.gov/stories/s/dk5i-ipsm/

Measuring transportation's contribution to the Gross Domestic Product (GDP) is another way of illustrating its importance to the economy (Figure 5).[12] By this measure, freight and household transportation costs have hovered near 6% of GDP for the last decade.

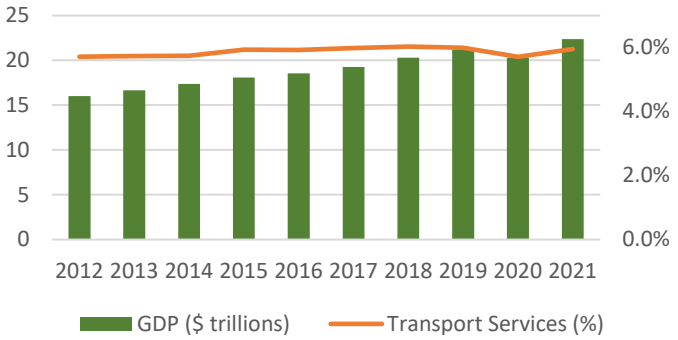


Figure 5*:* For-Hire, In-House, and Household Transportation Services Cost Share of Total GDP (current dollars)

This relative stability may be partly explained by the lack of overall growth in total factor productivity (TFP) in the transport sector since 2006 and declines in productivity growth since 2012 (Figure 6).[13] (TFP refers to real output resulting from all the combined inputs of labor and capital.) As shown, the productivity trend of transportation is similar to the general slow growth in U.S. productivity.[14]

Figure 6: Total Factor Productivity: Transportation and Warehousing and All Private Business (1987=100) Source: BLS, Annual Total Factor Productivity and Related Measures for Major Industries, October 18, 2022

The slow growth in transportation productivity is not attributable to labor productivity, which has been rising for aviation and the main freight modes.[15] The actual causes of the overall national slowdown in TFP growth have long been elusive and the consequences troublesome for future prosperity.[16]

The combined measure of transportation TFP in Figure 6 masks considerable variation across freight modes since 1987 (Figure 7).[17] Freight rail transportation TFP grew sharply compared to all private businesses until 2008, after which its growth declined. Pipeline productivity growth exceeded that of all

[12] BTS. Contribution of Transportation Services to The Economy and Transportation Satellite Accounts. Household travel based on depreciation of the household vehicle stock. https://data.bts.gov/stories/s/smrm-36nv#in-house-transportation-and-household-transportation

[13] BTS. Transportation Total Factor Productivity. https://data.bts.gov/stories/s/k65c-hne3#multifactor-productivity-1

[14] Gordon, R.J. 2016. *The Rise and Fall of American Growth: The U.S. Standard of Living Since the Civil War*. Princeton University Press. See also S. Sprague. 2021. The U.S. Productivity Slowdown: An Economy-Wide and Industry-Level Analysis. *Monthly Labor Review*, April. https://www.bls.gov/opub/mlr/2021/article/the-us-productivity-slowdown-the-economy-wide-and-industry-level-analysis.htm

[15] https://data.bts.gov/stories/s/cksf-e5wx

[16] Hulten, C.R., 2001. Total Factor Productivity: A Short Biography. In, *New Developments in Productivity Analysis*. University of Chicago Press.

[17] https://data.bts.gov/stories/s/k65c-hne3#multifactor-productivity-1

private businesses for most of the last decade. Water transportation has periods of faster and slower TFP growth that averages close to that of all businesses. Trucking TFP growth, however, after exceeding all businesses for the first decade after 1987, has been declining for the past two decades. The large share of total freight moved by truck and rail helps explain the slowdown in total transportation and warehousing TFP over the last decade shown in Figure 6.

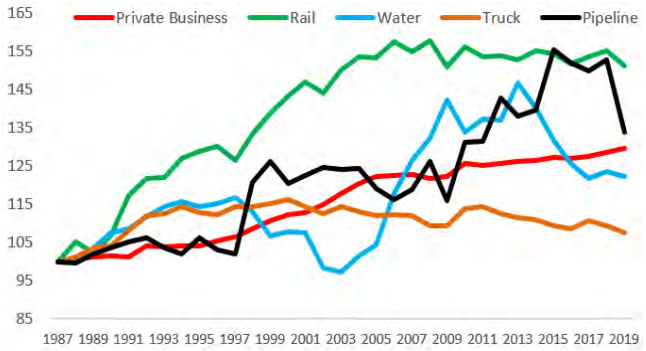


Figure 7: Total Factor Productivity: All Private Business and Freight Modes (1987=100) Source: BLS, Annual Total Factor Productivity and Related Measures for Major Industries, October 18, 2022

Explanations for these productivity trends vary, but they are important to understand. This is especially true for trucking, which moves more than two-thirds of the value of freight and almost half of ton-miles.[18] Trucking also represents the largest share of national expenditures for transportation services.[19] Between 1982 and 2019, estimates of truck congestion costs in urbanized areas have increased 10-fold, from $1.8 to $20 billion annually. [20] This is a sharp increase but nonetheless represents only 0.5% of the total cost of trucking services. (Improved measures of highway congestion have become available, but only since 2017.[21]) As described in the infrastructure section below, FHWA's forecast of freight demand indicates that if the network is not expanded, major truck routes with recurring stop-and-go conditions (as opposed to congestion only during the peak period) could grow almost five-fold by 2045.[22]

Regarding personal travel, aviation TFP growth has outpaced all other modes by far since 1987 – more than doubling before the first year of the pandemic. At the other extreme, TFP for transit, taxis, and limousines has been unchanged since 1990.[23] Measures of TFP for travel by personal vehicle would be inconsistent with the definitions of productivity measures cited above but estimates of roadway congestion can serve as proxy measures. By one estimate, between 1982 and 2019, yearly hours of delay per commuter more than doubled, from 20 to 54 hours.[24] (The improved measures for truck freight mentioned above also apply to personal auto

[18] BTS. 2022. Pocket Guide to Transportation, Table 3-1. https://rosap.ntl.bts.gov/view/dot/64803
[19] Bureau of Transportation Statistics, *Transportation Economic Trends*, available at www.bts.gov/product/transportation-economic-trends.
[20] Shrank, D, L. Albert, and B. Eisle. 2021. *The 2021 Urban Mobility Report*. Texas Transportation Institute.
[21] https://ops.fhwa.dot.gov/freight/freight_analysis/mobility_trends/index.htm
[22] FHWA. Freight Analysis Framework version 4.5 (2019) https://data.bts.gov/stories/s/Freight-Transportation-System-Condition-Performanc/vvk5-xjjp
[23] BTS. Transportation Total Factor Productivity. https://data.bts.gov/stories/s/k65c-hne3#multifactor-productivity-1
[24] Shrank et al., D, L. Albert, and B. Eisle (2021).

travel on major highways and should provide more meaningful trends to monitor as datapoints accumulate.)

The United States is enmeshed in a globally competitive economy. It ranks second in overall economic competitiveness among nations, but only 13th in the quality and extent of its infrastructure.[25] That relatively low ranking should be a cause of concern for a nation heavily dependent on international trade and trying to bolster its manufacturing base. ***It is far from clear how the U.S. might most effectively enhance the productivity and efficiency of transportation. It might occur through infrastructure investment and pricing, regulation, enhanced innovation, or some combination of all of these. Whatever the means, answers are critical for future economic prosperity.***

Mitigating and Responding to Climate Change

In 2015, 196 nations signed on to a historic climate agreement reached in Paris.[26] The United Nations treaty commits the signatories to hold further "increase in the global average temperature to well below 2°C above pre-industrial levels" and pursue efforts "to limit the temperature increase to 1.5°C above pre-industrial levels." To limit global warming to 1.5°C worldwide, greenhouse gases (GHGs) would have decline 43% by 2030 to be on a trajectory toward decarbonization by 2050. As the world's second largest current GHG emitter and largest historical emitter, the United States will have to play a central role in meeting the goals of this treaty.

Within the U.S., transportation accounts for the largest share (29% in 2019) of total GHGs emitted from all sectors of the economy (Figure 8).[27] Transportation will therefore have a prominent role in the U.S. commitment to meet the goals of the Paris agreement.

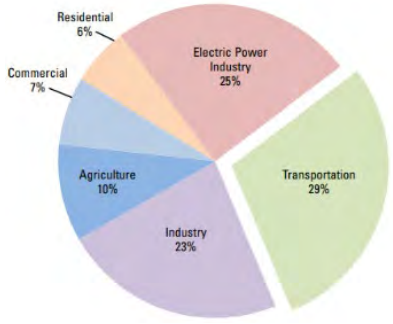


Figure 8: Share of U.S. Greenhouse Gas Emissions by Economic Sector, 2019 (million metric tons of CO_2 equivalent). Source: EPA. *Fast Facts U.S. Transportation Sector Greenhouse Gas Emissions*

Within transportation's share of emissions, on-road vehicles dominate (82%), primarily light-duty vehicles (LDVs) (58%) and medium

[25] World Economic Forum. 2019. The Global Competitiveness Report. https://www3.weforum.org/docs/WEF_TheGlobalCompetitivenessReport2019.pdf

[26] United Nations Climate Change: The Paris Agreement: https://unfccc.int/process-and-meetings/the-paris-agreement

[27] We use 2019 data here as the last year before the COVID-19 pandemic resulted in sharp declines in travel in 2020 that have subsequently mostly rebounded. Source: https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P1013NR3.pdf

and heavy-duty trucks (24%) (Figure 9).[28] Aviation is third largest (10%), but aviation's GHG emissions considerably understate its adverse role as a driver of climate change.[29]

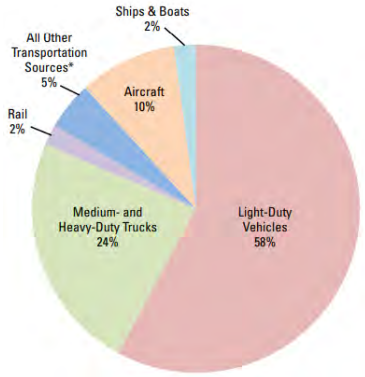


Figure 9: Share of U.S. Transportation GHG Emissions by Source 2019. Source: EPA. *Fast Facts U.S. Transportation Sector Greenhouse Gas Emissions*
*"Other sources include buses, motorcycles, pipelines, and lubricants.

Through recent legislation, the United States has taken historic steps to reduce GHG emissions in the U.S. across all major sectors [2021's Infrastructure Investment and Jobs Act (IIJA)[30] and 2022's Inflation Reduction Act (IRA)[31]]. For transportation, these steps include financial incentives for vehicle battery and vehicle manufacturing, consumer tax credits for the purchase of electric vehicles (EVs), production of low-carbon fuels, and funding for the installation of vehicle charging infrastructure. The legislation also provides incentives for clean power generation as an input to electric vehicles. As a result of these measures and earlier actions, the U.S. Department of Energy projects that U.S. GHG emissions could be 40% lower in 2030 than they were in 2005.[32] This projection does not include the consequences of EPA's 2023 proposed multi-pollutant emissions standards beginning in model year 2027 that would significantly reduce allowable GHG emissions compared with the existing standard.[33]

Consumer vehicle total cost of ownership savings from EVs will be accelerated by the IRA and IIJA and support the Administration's goal of achieving at least a 50% new LDV EV sales share by 2030.[34] Sales of electric vehicles (EVs) in the U.S. have grown rapidly in recent years, prompted in part by federal incentives and improving technologies. EVs sold in 2022 represented more than 6% of light-duty vehicle sales compared with less than 2% in 2020 and 4% in 2021.[35,36,37] Some states have acted on their own and in concert with one another. Notably, in August 2022, California established its Advanced Clean Car II (ACC II) rule that would ban the sale of new

[28] https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P1013NR3.pdf
[29] Lee, D.S. et al. 2021. "The contribution of global aviation to anthropogenic climate forcing for 2000 to 2018", *Atmospheric Environment*, 244: 17834, doi:10.1016/j.atmosenv.2020.117834, PMC 7468346, PMID 32895604
[30] The IIJA is also referred to as the Bipartisan Infrastructure Law (BIL) https://www.congress.gov/bill/117th-congress/house-bill/3684/text
[31] https://www.congress.gov/bill/117th-congress/house-bill/5376/text/rh
[32] https://www.energy.gov/articles/doe-projects-monumental-emissions-reduction-inflation-reduction-act
[33] https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P1017626.pdf
[34] https://www.whitehouse.gov/briefing-room/statements-releases/2023/02/15/fact-sheet-biden-harris-administration-announces-new-standards-and-major-progress-for-a-made-in-america-national-network-of-electric-vehicle-chargers/
[35] https://www.energy.gov/energysaver/articles/new-plug-electric-vehicle-sales-united-states-nearly-doubled-2020-2021
[36] https://www.anl.gov/es/light-duty-electric-drive-vehicles-monthly-sales-updates
[37] https://www.eia.gov/energyexplained/use-of-energy/transportation.php

gasoline-powered light-duty vehicles by 2035.[38] As importantly, up to 17 additional states tend to follow California's lead on automobile emissions standards,[39] potentially affecting about 40% of the total US market for new automobiles. In April 2023, California also announced requirements to end internal combustion engine truck sales by 2036 and phase out their use by 2042.[40] The combination of federal incentives in the IIJA and IRA, along with states' support of

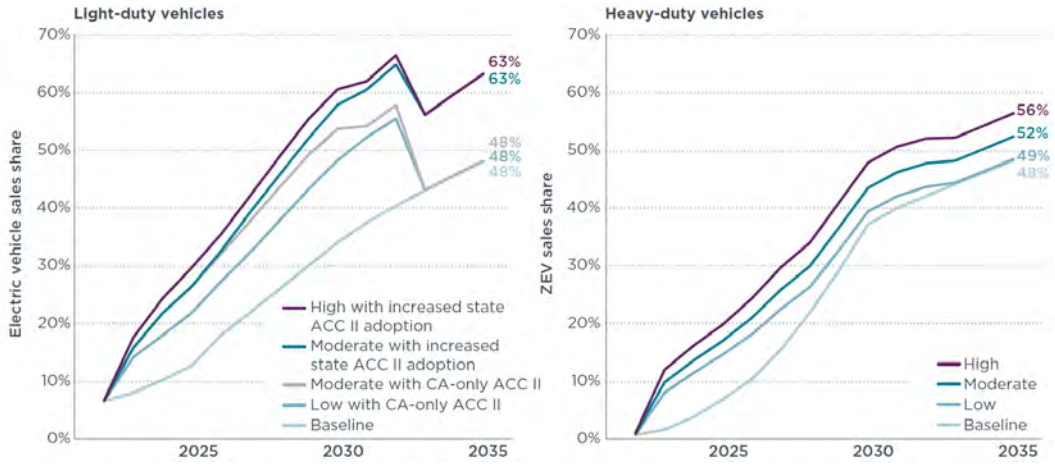


Figure 10: U.S. New Light Duty and Heavy-Duty Electric Vehicle Sales Share for Various Scenarios, 2022-2035. Note: Heavy-duty represents all Class 4-8 trucks. Source: Slowik, et al. 2023. ICCT and Energy Innovation Policy & Technology LLC

California's ACC II and truck ZEV sales goals, could shift consumer vehicle preferences in ways that meet or exceed the federal light-duty EV 50% new sales share goal by 2030 and achieve roughly 50% electric truck sales by 2035 (Figure 10). (Total EV sales are projected to decline after IRA incentives expire in 2032).[41]

As impressive as these shifts to EVs would be, they would not be sufficient for the U.S. to meet its commitment to the Paris agreements.[42] For example, even if EVs represent 50% of new light duty vehicle sales by 2030, 88% of the nation's 260 million LDVs would still be powered by fossil fuels. Decarbonizing most of the rest of transportation vehicles by 2050 depends on continued innovation and public policy.

Aside from LDVs and medium commercial trucks, transportation is a challenging sector to decarbonize. Power demand and limited onboard fuel storage for aircraft, vessels, locomotives and long-distance heavy trucks require high energy density fuels as well as distribution pipelines and storage facilities. Large volumes of net-zero liquid fuels are necessary to

[38] https://www.nytimes.com/2022/08/24/climate/california-gas-cars-emissions.html
[39] https://ww2.arb.ca.gov/resources/documents/states-have-adopted-californias-vehicle-standards-under-section-177-federal
[40] https://ww2.arb.ca.gov/news/california-approves-groundbreaking-regulation-accelerates-deployment-heavy-duty-zevs-protect
[41] Slowik, P., et al. 2023. *Analyzing the Impact of the Inflation Reduction Act on Electric Vehicle Uptake in the United States*, International Council on Clean Transportation and Energy Innovation Policy & Technology LLC.
[42] Slowik, P., et al. 2023.

decarbonize these vehicles to avoid expanding biofuels to such an extent that doing so threatens food production and natural carbon sinks.[43] Net-zero liquid fuels are technically feasible but do not yet exist at commercial scale.[44] Additional R&D to continue to improve battery design and low-carbon fuels, including cost, performance, and recycling is necessary to achieve decarbonization goals.

Without a carbon tax or much steeper fuel taxes, prospects of substantially shifting modal preferences in the near term appear limited. Longer-term trends in mode choice and vehicle emissions are well worth additional study and data gathering to address ongoing debates about their potential magnitude, costs, and benefits. For long-term passenger transportation, the declining reliance on automobiles across younger age cohorts may result in greater future demand for walkable communities, cycling, and transit. Efforts of cities and states to reduce single family zoning restrictions and parking requirements may help to reduce auto demand, although it may take decades for this shift to happen outside of a few transit-rich and relatively dense urban areas.[45] Moreover, land use plans and policies are rarely well-coordinated with transportation policies and decision making.[46] The growth in videoconferencing during the COVID-19 pandemic could reduce future passenger travel for education, medical visits, and meetings.[47] It may also further reduce commuting-related transit and walk work trips and hamper the recovery of central city economies.

Regarding freight, growing highway congestion may shift some demand to rail and water transportation, while imposing higher costs on consumers as well as external costs on the public in general. Even with the incentives in the IRA, plug-in truck models may not be cost competitive in the long-distance heavy truck market even through 2030 and assuming a high rate of technological innovation.[48] Much depends on further research, technology development, and cost reductions for both plug-in and fuel cell heavy trucks.

Climate change will continue for decades even with active mitigation thereby requiring the United States and the rest of the world to adapt to changes that cannot be undone. Investing in resilience will require innovations in transportation planning, design, construction,

[43] Larson, E. et al. 2021. Net Zero America: Potential Pathways, Infrastructure, and Impacts. https://netzeroamerica.princeton.edu/the-report

[44] NASEM Decarbonization report (forthcoming), Chapter 9.

[45] See for example, Manville, M. et al. 2023. Vehicle Access and Falling Transit Ridership: Evidence from Southern California. *Transportation*, 50. https://doi.org/10.1007/s11116-021-10245-w. See also NASEM. 2009. *Driving and the Built Environment: The Effects of Compact Development on Motorized Travel, Energy Use, and CO2 Emissions*. National Academies Press. https://doi.org/10.17226/12747

[46] Cervero, R. 2003. *Coping with Complexity in America's Urban Transport Sector*. https://escholarship.org/uc/item/4wf4n16r

[47] Polzin, Steven; and Tony Choi. (2021). *COVID-19's Effects on The Future of Transportation.* U. S. Department of Transportation, Office of the Assistant Secretary for Research and Technology. https://doi.org/10.21949/1520705

[48] Burnham, A., et al. 2021. *Comprehensive Total Cost of Ownership Quantification for Vehicles with Different Size Classes and Powertrains.* Figure 4.8. Argonne National Laboratories. ANL/EST-21/4.

maintenance, finance, and policymaking.[49] Further analysis of the parts of the transportation system that are most vulnerable to major disruptive events can help to incorporate risk-based resilience management into transportation planning and decision making. The transportation sector also needs to develop probabilistic infrastructure design standards to account for climate model uncertainty at the local scale for weather events that are sudden and severe, such as from wildfires and heavy wind and floods, as well as for gradual climate effects, such as sea level rise.

Although technological innovations, regulations, and incentives in recent legislation offer promising opportunities to greatly reduce the transportation sector's reliance on fossil fuels, a massive effort will be necessary to decarbonize hundreds of millions of vehicles, build out a charging infrastructure, and provide clean electricity by 2050.[50] As temperatures and sea levels rise and extreme weather events become more common, transportation infrastructure and operations will need to become far more resilient. These goals are achievable and affordable if U.S. society can agree to make the sustained effort necessary.

Increasing Safety

Transportation -- moving through space, often at high speeds – involves risk. Motor vehicle travel has become safer in terms of risk exposure (millions of vehicle miles traveled) over the last several decades, even though the number of fatalities has exceeded 30,000 every year since the end of WW II (Figure 11).[51] After reaching almost 55,000 deaths in 1972, fatalities began trending downward.

Total fatalities leveled out after 2008 and began increasing again as the fatality rate stopped declining. Deaths increased sharply during the first full year of the COVID-19 pandemic, when the fatality rate itself increased despite reduced vehicle miles traveled (VMT).

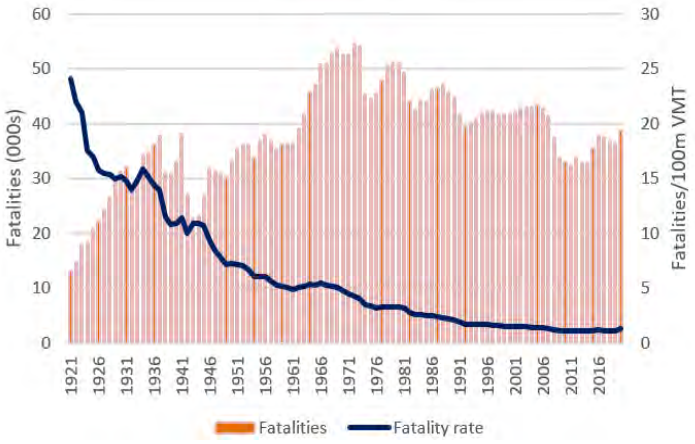


Figure 11: Motor Vehicle Fatalities and Fatality Rate 2021-2020. SOURCE: NHTSA, Transportation Safety Facts 2020.

[49] https://documents1.worldbank.org/curated/en/327581468314998260/pdf/566600NWP0D1CC10Box353730B01PUBLIC1.pdf

[50] Larson, et al. 2021.

[51] National Highway Traffic Safety Administration. Transportation Safety Facts 2020. Motor Vehicle Traffic Fatalities and Fatality Rates 1899-2020. https://cdan.nhtsa.gov/tsftables/Fatalities%20and%20Fatality%20Rates.pdf The risks of crash involvement and injury, however, are substantially higher that fatal accidents. The injury rate per 100 million VMT in 2020 was almost 60 times higher than the fatality rate. See NHTSA. Traffic Safety Facts Annual Report 2020 Table 2: https://cdan.dot.gov/SASStoredProcess/guest

Although the risk of death in the transportation system has generally been declining, stark differences exist across passenger modes (Figure 12).[52] Travel by bus or passenger train is at least 18 times safer than in a personal vehicle and travel by commercial jet is 280 times safer per passenger mile traveled.[53] Given these large differences in risk and that the vast majority of passenger travel in the United States is by personal vehicle, roughly 95% of deaths in U.S. transportation occur on roads and highways.

Figure 12: Passenger death rates, United States, 2007-2020. Source: National Safety Council

Even so, travel on US roads became significantly safer over the last century (Figure 11). Many improvements in vehicle and road design, traffic laws, as well as social adaptation appear to have contributed to this downward trend. More recently, for example, airbags and federal motor vehicle occupant protection standards have greatly reduced injuries and fatalities.[54] Other recent advancements in crash avoidance technologies, such as front and rear automatic braking and automatic braking with pedestrian detection, have proven to be roughly 30 to 50 percent effective in avoiding front and rear crashes.[55]

As much as the risk of automotive travel has been reduced over time, many people still die each year. In 2021, about 43,000 people were killed in the United States in traffic crashes,[56] about 6,500 more than in 2019. Traffic death rates are also substantially higher for American

[52] National Safety Council. 2022a. Passenger Deaths 2007-2020. https://injuryfacts.nsc.org/home-and-community/safety-topics/deaths-by-transportation-mode/

[53] National Safety Council. 2022a. Note that this discussion relies on deaths rather than injuries because of lack of long-term trend data on injuries across modes.

[54] See for example, C. J. Kahane, *Lives Saved by Vehicle Safety Technologies and Associated Federal Motor Vehicle Safety Standards,* 1960 to 2012, NHTSA, DOT HS 812 069, January 2015

[55] Flannigan, C. and A. Leslie. 2020. *Crash-avoidance technology evaluation using real-world crash data*. Report DOT HS 812 841. National Highway Traffic Administration, Washington, D.C. See also HLDI-IIHS. 2022. *Real-world benefits of crash avoidance technologies.*

[56] NHTSA. 2022. Early Estimate of Motor Vehicle Traffic Fatalities in 2021. Crash Stats DOT HS 813 283. https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/813283

Indians/Alaska Native peoples and Blacks than for Whites. [57, 58] The increase in fatalities in 2020 and 2021, especially in the first months of 2020 when travel declined abruptly as the pandemic began, is not fully understood. Indirect evidence points to faster speeds, reduced use of safety belts, and increased drug and alcohol impairment.[59] The pandemic's broader effects on mental health and social norms are also not fully understood. Clearly society and individuals have been wrenched by the pandemic, and further research may one day help explain how and why.

As VMT increased after the fatality rate leveled off, roughly 10,000 more people died in motor vehicle crashes in 2021 than in 2011. The U.S. fatality rate has leveled out at a higher point than peer countries. Seventeen other industrialized western-style nations have lower fatality rates – some have rates more than 40% lower than that of the United States. Canada and Australia, which also have large land masses and auto-dependency, have rates that are more than 30% lower.[60] Less stringent traffic safety laws and enforcement in the United States are possible reasons,[61] [62] as are the ever-increasing popularity of sport utility vehicles (SUVs) and pickups.[63] The ongoing shift to SUVs enhances safety for SUV occupants, but their higher weight and designs place greater risk on occupants of smaller vehicles, pedestrians, and cyclists.[64] Europe and Australia conduct pedestrian safety tests as part of vehicular standards, but the United States does not.[65] As more crash avoidance technologies filter through the fleet, their proven effectiveness may reduce the U.S. fatality rate. They may also help reduce the rising number of fatalities among those outside of vehicles, which reached more than 8,300 deaths in 2021.[66] Pedestrian and bicyclist death rates have steadily increased since 2010 (Figure 13).[67] Of concern

[57] Glassbrenner, D. et al. 2022. *Evaluating Disparities in Traffic Fatalities by Race, Ethnicity, and Income. National Highway Traffic Safety Administration*, U.S. DOT. DOT HS 813 188.
[58] Governors Highway Safety Association. 2021. An Analysis of Traffic Fatalities by Race and Ethnicity. https://www.ghsa.org/resources/Analysis-of-Traffic-Fatalities-by-Race-and-Ethnicity21
[59] NHTSA. 2021. *Continuation of Research on Traffic Safety during the COVID-19 Public Health Emergency: January to June 2021*. DOT HS 813 210.
[60] OECD. 2020. *Road Safety Annual Report 2020*. International Transport Forum. https://www.itf-oecd.org/sites/default/files/docs/irtad-road-safety-annual-report-2020_0.pdf
[61] World Health Organization. 2018. *Global Status Report on Road Safety*. https://www.who.int/publications/i/item/9789241565684
[62] Dixon, K. et al. 2022. *Safety Effects of Raising Speed Limits to 75 mph and Higher*. The National Academies Press. https://doi.org/10.17226/26770.
[63] Insurance Institute for Highway Safety. How Size and Weight Affect Safety. https://www.iihs.org/topics/vehicle-size-and-weight
[64] IIHS. Pedestrians and Bicyclists https://www.iihs.org/topics/pedestrians-and-bicyclists. https://www.iihs.org/news/detail/new-study-suggests-todays-suvs-are-more-lethal-to-pedestrians-than-cars
[65] https://www.tmr.qld.gov.au/safety/vehicle-standards-and-safety/vehicle-safety/australasian-new-car-assessment-program, https://www.euroncap.com/en/vehicle-safety/the-ratings-explained/vulnerable-road-user-vru-protection/aeb-pedestrian/
[66] https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/813298
[67] NHTSA. Traffic Safety Annual Report Tables 4 and 12. https://cdan.nhtsa.gov/tsftables/tsfar.htm# Note that the non-motorist death rates are on a population exposure basis given lack of annual data on the amount of travel by these modes.

are whether the crash avoidance features of new vehicles will offset their increasing weight, size, and designs that pose higher risks to occupants of smaller vehicles, pedestrians, and bicyclists.

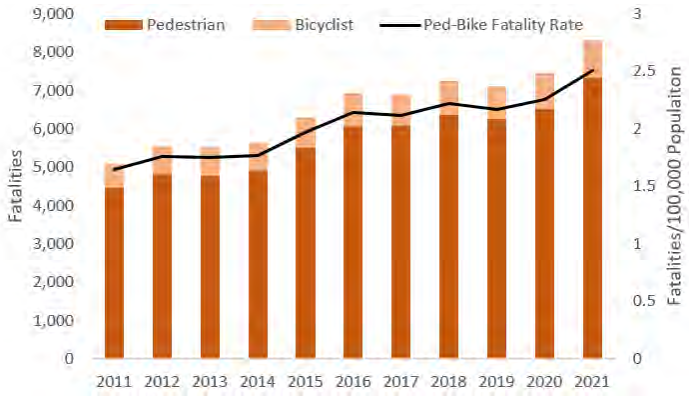


Figure 13: Pedestrian and Bicyclist Fatalities and Fatality Rate, 2011-2021 Source: NHTSA Traffic Safety Annual Reports

Understanding the reasons for the leveling out of the roadway fatality rate after 2010 is urgent as deaths will continue to rise if the rate stays flat and travel increases. Also urgent is gaining broader public support for implementing effective countermeasures. The thousands of annual avoidable deaths due to excess speed, drug and alcohol impairment, lack of safety belt use, and distraction[68] are well known but persistent problems that require additional policy innovation. New approaches such as Vision Zero,[69] Safe System Design[70] and Complete Streets,[71] which specifically address pedestrian and cyclist safety, deserve further development of data-driven standards, guidance, and applications. Further analysis of effective safety countermeasures and investments in dedicated bike lanes and sidewalk applied in other, safer nations can also inform policy choices in the United States. Also needed is a deeper understanding of the causes of the disproportionate traffic deaths among Native Americans and Blacks that could lead to effective countermeasures.

Advancing Public Health

Transportation benefits public health in many ways. It moves the food and other services people depend upon and provides access to healthcare, family, friends, education, worship, and other societal amenities. Transportation can also harm public health, primarily through vehicle emissions. By far the most harmful effects result from emissions of fine particulate matter 2.5 microns in size or smaller ($PM_{2.5}$).[72] Inhalation of $PM_{2.5}$ can enter the lungs, reach the bloodstream, and cause premature death from heart or lung disease, aggravated asthma,

[68] NHTSA. Risky Driving https://www.nhtsa.gov/risky-driving
[69] https://www.transportation.gov/utc/achieving-vision-zero-roadway-deaths-through-safe-system-approach
[70] https://www.transportation.gov/NRSS/SafeSystem
[71] https://highways.dot.gov/complete-streets
[72] Choma, E., et al. Health Benefits of Decreases in On-Road Transportation Emissions in the United States from 2008 to 2017. *PNAS* 2021 Vol. 118 No. 51

irregular heartbeats, and difficulty breathing.[73] As many as 85,000 to 200,000 premature deaths annually in the United States are attributable to $PM_{2.5}$ from all sources.[74]

Motor vehicle emissions combine with both other sources of atmospheric pollutants and natural sources of dust and other matter to form $PM_{2.5}$. Ambient concentrations vary considerably across the country depending on wind, weather, local conditions, and nearby sources, but are typically highest in the most urbanized areas.[75] Federal clean air standards have helped reduce concentrations of $PM_{2.5}$ in the United States by 37% over the last two decades (Figure 14).[76] Even with these reductions, about 20,000 premature deaths due to motor vehicle $PM_{2.5}$ emissions were estimated in 2017.[77] The number would be almost 2.5 times higher at the vehicle emission rates of 2008. Nonetheless, the current level of estimated mortality is almost half as large as those from motor vehicle crashes. Roughly two-thirds of these premature deaths resulted from emissions by light duty vehicles (LDVs), primarily in urbanized areas. This highlights the importance of (a) transitioning the motor vehicle fleet to electric power from renewable sources and (b) reducing VMT by internal combustion vehicles (see Climate Change section).

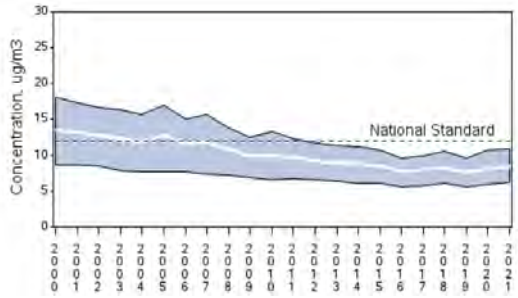


Figure 14: $PM_{2.5}$ Air Quality, 2001-2021, (National trend in seasonally weighted annual averages based on 375 sites).

Poor air quality and the presence of particulates are not the only adverse transportation influences on health. Noise, which is becoming increasingly common in urban areas, has negative effects on both physical and mental health.[78,79,80] Tires release particulates and chemicals as they are used.[81] Gasoline and diesel engines emit nitrogen oxides, which can cause or exacerbate lung diseases on their own in addition to reacting with other athosmpheric

[73] https://www.epa.gov/pm-pollution/health-and-environmental-effects-particulate-matter-pm
[74] Burnett, R. et al. Global Estimates of Mortality Associated with Long-Term Exposure to Outdoor Fine Particulate Matter, *PNAS* 2018 Vo. 115 No 38.
[75] Choma et al. (2021).
[76] EPA. https://www.epa.gov/air-trends/particulate-matter-pm25-trends
[77] Choma et al. (2021), Figure 2.
[78] Clark, C., and Stephen A. Stansfeld. The Effect of Transportation Noise on Health and Cognitive Development: A Review of Recent Evidence. *International Journal of Comparative Psychology*, 2007, Vol 20, 145-158.
[79] Münzel, T., M. Sørensen, and A. Daiber. (2021) Transportation Noise Pollution and Cardiovascular Disease. *Nature Reviews Cardiology*, 18, 619-636. https://doi.org/10.1289/ehp.1103448
[80] Dratva, J., et al. (2012) Transportation Noise and Blood Pressure in a Population-Based Sample of Adults. *Environmental Health Perspectives*, 120. https://doi.org/10.1289/ehp.1103448
[81] Tan, Z., et al. (2023) Tyre Wear Particles are Toxic for Us and the Environment. (2023) Imperial College London. https://spiral.imperial.ac.uk/bitstream/10044/1/101707/9/Tyre%20wear%20particles%20are%20toxic%20for%20us%20and%20the%20environment%200223-2.pdf

chemicals to form PM2.5.[82] Beyond the pollutants that transportation services generate, lack of transportation is often a barrier to healthcare access that negatively affects both individual and population-level health outcomes.[83]

Low income communities of color are disproportionately exposed to transportation emissions, noise, and traffic accidents and disproportionately suffer adverse health and other consequences.[84] $PM_{2.5}$ from human activities, including motor vehicle emissions, harm people of color disproportionately more than Whites.[85]

Although the mechanisms are not well understood, active travel, such as walking and cycling, is associated with important public health benefits,[86] including reduced cardiovascular disease mortality,[87] and reduced risk of breast[88] and colon cancer[89] and Type II diabetes.[90] However, it is not clear how to most cost-effectively induce substantilly more people to choose active travel when available. As jurisdictions support increasing options for walking and pedalcycling, including on e-bikes, they need greater guidance on sidewalks, paths, and bike lanes that are safe, convenient, and likely to stimulate greater active travel.

The COVID-19 pandemic interacted with transportation and public health in multiple, complex ways. Transportation serves as a disease vector, and the industry struggled to understand how to minimize that role, including through travel bans. The pandemic also caused disruptions in access to health care and substitution of tele-health, shifts from shared to solo vehicles, transit access for essential workers, supply chains for personal protective equipment and medications,

[82] Vehicle NOx Emissions: The Basics. (2021) The International Council on Clean Transportation. https://theicct.org/stack/vehicle-nox-emissions-the-basics/

[83] Syed, S.T., B.S. Gerber, and L.K. Sharp. (2013) Traveling Towards Disease: Transportation Barriers to Health Care Access. *Journal of Community Health*, 38(5), 976-993.

[84] Karner, Alex, Aaron Golub, Karel Martens, and Glenn Robinson. "Transportation and Environmental Justice: History and Emerging Practice." In *The Routledge Handbook of Environmental Justice*, 400-11: Routledge, 2017. See also H. Lane, et al. 2022. Historical Redlining is Associated with Present-Day Air Pollution Disparities in U.S. Cities. *Environmental Science and Technology Letters*. https://pubs.acs.org/doi/pdf/10.1021/acs.estlett.1c01012

[85] Tessum, C. et al. $PM_{2.5}$ Polluters Disproportionately and Systemically Affect People of Color in the United States, *Science Advances*, 2021, Vol. 17, No. 18.

[86] See Active Transportation literature summary on p. 6 of Castillo, M. et al. 2021. Quantifying the Health Benefits of Urban Climate Mitigation Actions: Current State of the Epidemiological Evidence and Application in Public Health Impact Assessments. *Frontiers in Sustainable Cities*, Vol. 3.

[87] Hamer, M., and Chida, Y. (2008). Walking and primary prevention: a meta-analysis of prospective cohort studies. *Br. J. Sports Med*. 42, 238–243. doi: 10.1136/bjsm.2007.039974

[88] Monninkhof, E. M., Elias, S. G., Vlems, F. A., van der Tweel, I., Schuit, A. J., Voskuil, D. W., et al. (2007). Physical activity and breast cancer: a systematic review. *Epidemiology* 18, 137–157. doi: 10.1097/01.ede.0000251167.75581.98

[89] Wolin, K. Y., Yan, Y., Colditz, G. A., and Lee, I.-M. (2009). Physical activity and colon cancer prevention: a meta-analysis. *Br. J. Cancer* 100, 611–616. doi: 10.1038/sj.bjc.6604917

[90] Smith, A. D., Crippa, A., Woodcock, J., and Brage, S. (2016). Physical activity and incident type 2 diabetes mellitus: a systematic review and dose–response meta-analysis of prospective cohort studies. *Diabetologia* 59, 2527–2545. doi: 10.1007/s00125-016-4079-0

and others. Documentation of these effects and development of lessons learned would be invaluable for combating both the ongoing pandemic and future ones.

Reduced transportation emissions have improved public health but tens of thousands still die annually. Adverse impacts from transportation noise on physical and mental health are inequitably distributed and, except near airports, have been largely overlooked. As jurisdictions increasingly support active transportation, they need greater data-driven guidance on designs and policies that are safe, convenient, and likely to shift behavior to cycling and walking.

Promoting Equity & Inclusion

The United States has long struggled with racial inequities arising from discrimination, and transportation systems have contributed to this longstanding problem. Racism manifests in different ways, from the biased attitudes and discriminatory behaviors of individuals to the policies, practices, and norms of institutions and society that have created and maintained racial inequalities. Many of the troubling racial inequalities that persist today are a consequence of systemic racism—an undercurrent of discriminatory policies and practices that have contributed to racial disparities in access to goods, services, and opportunities. The country's transportation enterprise is a major area of government responsibility that is central to the economy and everyday lives of Americans. As such, it warrants scrutiny both as a potential source of systemic racism and as a means of reducing the inequalities stemming from it.

Of course, racial discrimination is far from the only form of discrimination that gives rise to inequities. It can be difficult to distinguish outcomes that stem from racism from other forms of discrimination (e.g., gender, language, age, disability, and sexual preference). It can also be difficult to isolate transportation's role in contributing to inequities that exist across the broader economic, societal, and institutional landscape. The Biden Administration acknowledged these complexities in Executive Order 13985, issued on January 20, 2021.[91] The order emphasizes the need to address inequities across their many dimensions and by committing "the whole of our Government" to do so.

[91] https://www.federalregister.gov/documents/2021/01/25/2021-01753/advancing-racial-equity-and-support-for-underserved-communities-through-the-federal-government

History has shown that transportation can exacerbate inequalities by displacing and isolating people,[92,93] concentrating emissions and pollution in certain areas,[94, 95,96] and causing harm to property and businesses.[97] At the same time, transportation has helped to improve some societal disparities, such as by better connecting housing with employment, education, and healthcare. Certainly, changes in transportation alone cannot solve all the inequities that it has a role in creating. Nor can transportation changes remedy inequities attributed to other societal factors working in coordination with land use, education, law enforcement, communications systems, and more.

It is difficult to overstate the importance, and the complexity, of providing effective and affordable mobility options and improved access to people with limited resources in a manner that accounts for the differing conditions across urban, suburban, and rural settings. No single set of solutions can exist; transportation systems in different regions serve different populations and have different and evolving priorities. In addition, as planners and policy makers try to address these diverse challenges, environmental justice efforts during project selection and design are too often approached as procedural requirements instead of being weighed as important inputs along with all other considerations in reaching decisions.

Research has shown that people of color living in racially segregated communities and on reservations often face disproportionately high transportation access constraints, including cost

[92] Bullard, R.D., G.S. Johnson, and A.O. Torres, eds. (2004) Highway Robbery: Transportation Racism and New Routes to Equity. South End Press, Cambridge, MA. ISBN 0-89608-704-2.
[93] Lucas, K. (2012) Transport and Social Exclusion: Where are we now? *Transport Policy*, Vol 20, p 105-113. https://doi.org/10.1016/j.tranpol.2012.01.013.
[94] Clark, L.P, D.B. Millet, and J.D. Marshall. (2017) Changes in Transportation-Related Air Pollution Exposures by Race-Ethnicity and Socioeconomic Status: Outdoor Nitrogen Dioxide in the United States in 2000 and 2010. *Environmental Health Perspectives*, Vol 125, No. 9. https://doi.org/10.1289/EHP959
[95] A Hajat, C Hsia, MS O'Neill, Socioeconomic disparities and air pollution exposure: A global review. *Curr Environ Health Rep* **2**, 440–450 (2015).
[96] Tessum, C.W., D.A. Paolella, S.E. Chambliss, J.S. Apte, et al. (2021) PM2.5 polluters disproportionately and systematically affect people of color in the United States. *Science Advances*, Vol 7, issue 18. Doi:10.1126/sciadv.abf4491
[97] Archer, D.N. (2020) "White Mens's Roads through Black Men's Homes": Advancing Racial Equity through Highway Reconstruction. *Vanderbilt Law Review*, vol 73, no 5.

burdens.[98,99,100,101,102] As a result, they do not have good access to employment, health care, education, healthy food, and other life needs and opportunities. Transportation's importance for providing access to opportunities is a well-studied area of research, especially for access to work but also for access to quality education.[103,104,105] While this research indicates that shortcomings in transportation are seldom the sole cause of poor access to opportunity, it also suggests that improvements in transportation can play a meaningful role in helping to address the problems, for instance, by improving practices and policies for transporting city public school students.[106] More research to understand and document how transportation affects access to opportunities, particularly by people of color, is essential for designing and implementing policies aimed at improving access.

Critics of transportation planning and investment priorities, particularly in urban areas, have pointed to patterns of decision making indicative of racial bias. Examples, as noted above, include the siting of urban freeways in low-income—and often racially segregated—neighborhoods, creating dislocation, isolation, and exposure to negative externalities such as noise, poor air quality, and safety hazards.[107] Such choices are seldom made by state and local transportation agencies alone,[108] but transportation planning and implementation have largely

[98] Blumenberg, E. 2017. Social equity and urban transportation. Chapter 13 in *The Geography of Urban Transportation, Fourth Edition*, S. Hanson and G. Giuliano (eds.). The Guilford Press.
[99] McKenzie, B. S. 2013. Neighborhood access to transit by race, ethnicity, and poverty in Portland, OR. *City and Community* 12(2):134–155.
[100] Sanchez, T. W., R. Stolz, and J. S. Ma. 2003. *Moving to equity: Addressing inequitable effects of transportation policies on minorities*. Center for Community Change and The Civil Rights Project at Harvard University. https://civilrightsproject.ucla.edu/research/metro-and-regional-inequalities/transportation/moving-to-equity-addressing-inequitable-effects-of-transportation-policies-on-minorities/sanchez-moving-to-equity-transportation-policies.pdf.
[101] Probst, J. C., S. B. Laditka, J.-Y. Wang, and A. O. Johnson. 2007. Effects of residence and race on burden of travel for care: Cross sectional analysis of the 2001 U.S. National Household Travel Survey. *BMC Health Services Research* 7:40. doi: 10.1186/1472-6963-7-40.
[102] Boyles, B., E. Brinton, A. Dunning, A. Mathias, and M. Sorrell. 2006. Native American transit: Current practices, needs, and barriers. *Transportation Research Record* 156(1):103–110.
[103] Blumenberg, E. 2017.
[104] Kneebone, E., and N. Holmes. 2015. *The growing distance between people and jobs in metropolitan America.* Metropolitan Policy Program, The Brookings Institution. https://www.brookings.edu/wp-content/uploads/2016/07/Srvy_JobsProximity.pdf.
[105] Morris, E., E. Blumenberg, and E. Guerra. 2020. Does lacking a car put a brake on activity participation? Private vehicle access and access to opportunities among low-income adults. *Transportation Research Part A: Policy and Practice* 136:375–397. https://doi.org/10.1016/j.tra.2020.03.021.
[106] Perry, A. 2018. The route school buses can take toward racial equity. *The Hechinger Report*, June 19. https://hechingerreport.org/the-route-school-buses-can-take-toward-racial-equity. See also Urban Institute. 2018. *The road to school: How far students travel to school in the choice-rich cities of Denver, Detroit, New Orleans, New York City, and Washington, DC*. Urban Institute Student Transportation Working Group. https://www.urban.org/sites/default/files/publication/97151/the_road_to_school_6.pdf.
[107] Bullard, R. D., et al.). 2004.
[108] Savitch, H., and S. Adhikari. 2017. Fragmented regionalism: Why metropolitan American continues to splinter. *Urban Affairs Review* 53(2). https://journals.sagepub.com/doi/full/10.1177/1078087416630626.

been the responsibility of these institutions.[109,110] Curbing racism in the decision-making processes and power structures across all levels of government is essential to equitable transportation planning and investment choices, and understanding racial bias in transportation institutions is a critical step.

Although it had been known for decades that transportation plans and policies had disparate effects on communities of color and low-income populations, the civil rights implications were largely neglected until the 1990s.[111] More laws, policies, standard practices, and regulations are in place today to prevent and remedy such inequities. Examples range from commitments to appoint public transit boards that are more demographically representative to designing road pricing schemes that are not disproportionately burdensome to communities of color.[112] Because long-range regional transportation and land use planning can be so critical to these efforts to address past and minimize future inequities, it is a potentially useful area for research on equity-relevant data, metrics, and analytic tools.[113] Existing data and methods for measuring equity in transportation-related projects are inconsistent across jurisdictions and often incomplete, and the interactions among the many dimensions of equity concerns are complex and difficult to distill into concise terms.

Transportation networks, especially links between employment centers and residential areas, are inextricably tied to land use. The built environment, whether in areas that are sparse and rural or dense and urban, is also an important factor in equity analyses. Low-income residents and communities of color face particular mobility constraints in outlying suburban and rural areas. Myriad transit and pilot projects are under way to improve accessibility for late-night activity and in areas where transit service is infrequent; programs to improve auto access also exist. The effectiveness, including cost-effectiveness, of these myriad programs in filling mobility gaps remains an important area for further research.

Reducing transportation-related inequities requires reaching agreement on means of defining, measuring, and addressing the many ways in which groups and individuals are disproportionately harmed by transportation or excluded from its benefits.

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[109] Karner, A. 2018. Assessing public transit service equity using route-level accessibility measures and public data. *Journal of Transport Geography* 67:24–32.

[110] Karner, A., and A. Golub. 2015. Comparison of two common approaches to public transit service equity evaluation. *Transportation Research Record* 2531(1):170–179.

[111] Sanchez, T. W., R. Stolz, and J. S. Ma. 2003. *Moving to equity: Addressing inequitable effects of transportation policies on minorities*. Center for Community Change and The Civil Rights Project at Harvard University. https://civilrightsproject.ucla.edu/research/metro-and-regional-inequalities/transportation/moving-to-equity-addressing-inequitable-effects-of-transportation-policies-on-minorities/sanchez-moving-to-equity-transportation-policies.pdf.

[112] Bullard, R. D. 2003. Addressing urban transportation equity in the United States. *Fordham Urban Law Journal* 31(5):1183–1209.

[113] Twaddell, H., and B. Zgoda. 2020. *Equity analysis in regional transportation planning processes, volume 1: Guide*. TCRP Research Report 214. Washington, DC: The National Academies Press. https://doi.org/10.17226/25860.

Infrastructure Systems

Transportation infrastructure provides the backbone of the nation's transportation system, which has been built up over more than a century of economic and population growth and expansion. The infrastructure's condition and performance affect the economy, its design affects safety, its location affects equity, and its type affects development patterns, mode choice, and vehicle emissions. It is also enormous. The system includes millions of miles of roadways and pipelines and tens of thousands of miles of passenger and freight rail tracks and waterways (Table 1). In addition, there are more than 500 major airports, 600 thousand bridges, 3 thousand rail stations, and 190 ports.[114] This discussion focuses on infrastructure elements that affect the economy. Inequities resulting from the placement of infrastructure is discussed in the Equity and Public Health sections.

Table 1: Transportation Network Length (miles)

Mode	2010	2020
Highway		
Public roads	4,067,077	4,172,562
Public road lanes[a]	8,582,261	8,790,746
Pipeline		
Gas distribution	1,229,946	1,328,885
Gas transmission and gathering	324,458	319,224
Rail		
Class I freight railroad	95,700	91,773
Amtrak	21,178	20,787
Transit		
Commuter rail[b]	7,630	7,930
Heavy rail[b]	1,617	1,663
Light rail[b,c]	1,497	2,096
Water		
Navigable waterways[d]	25,000	25,000

[a]Measured in lane-miles. [b]Measured in directional route-miles. [c]Light Rail was revised beginning in 2011 and includes light rail, street car rail, and hybrid rail. [d]Estimated length of domestic waterways.

SOURCES: **Highway, Pipeline, Rail, Transit, Water**–As cited in U.S. Department of Transportation, Bureau of Transportation Statistics, *National Transportation Statistics*, tables 1-1, 1-6, and 1-10, available at https://www.bts.gov/nts as of October 2022.

Condition

The condition of the nation's infrastructure varies across modes, as does the availability of condition measures. Available metrics indicate that:

- states and local jurisdictions are reducing the percentage of pavements rated in poor condition (Figures 15 and 16).[115]
- Exceptions to freight railroad rail design standards fell from 22 to 5 per 100 miles of inspected track between 2010 and 2018.[116]
- Most airport pavements (80%) are in good condition and have been over time.[117]

Transit condition estimates are not reported annually, but in 2016 an estimated 21 percent of buses and 10 percent of rail transit assets were in marginal or poor condition.[118] As important

[114] BTS. 2022. Pocket Guide to Transportation 2023, Table 1-2. https://www.bts.gov/pocketguide
[115] Bureau of Transportation Statistics, *Freight Facts and Figures* (Washington, DC: 2019). https://data.bts.gov/stories/s/45xw-qksz
[116] BTS, Freight Facts and Figures. https://data.bts.gov/stories/s/Freight-Transportation-System-Condition-Performanc/vvk5-xjjp
[117] BTS. Pocket Guide, Figure 1-4.
[118] FHWA. 2021. Status of the Nations, Highways, Bridges, and Transit: Condition and Performance Report, 24th Edition. https://www.fhwa.dot.gov/policy/24cpr/

as they are to supply chains and freight intermodal transfers, similar measures for ports, waterways, and private infrastructure assets are not generally available.

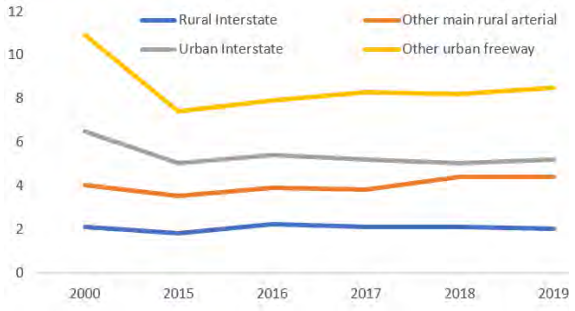


Figure 15: Percentage of major highway pavements in poor condition (IRI GT 170). Source: FN#113

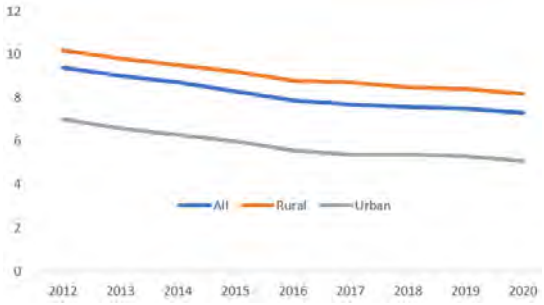


Figure 16: Percentage of bridges in poor condition. Source: FN#113

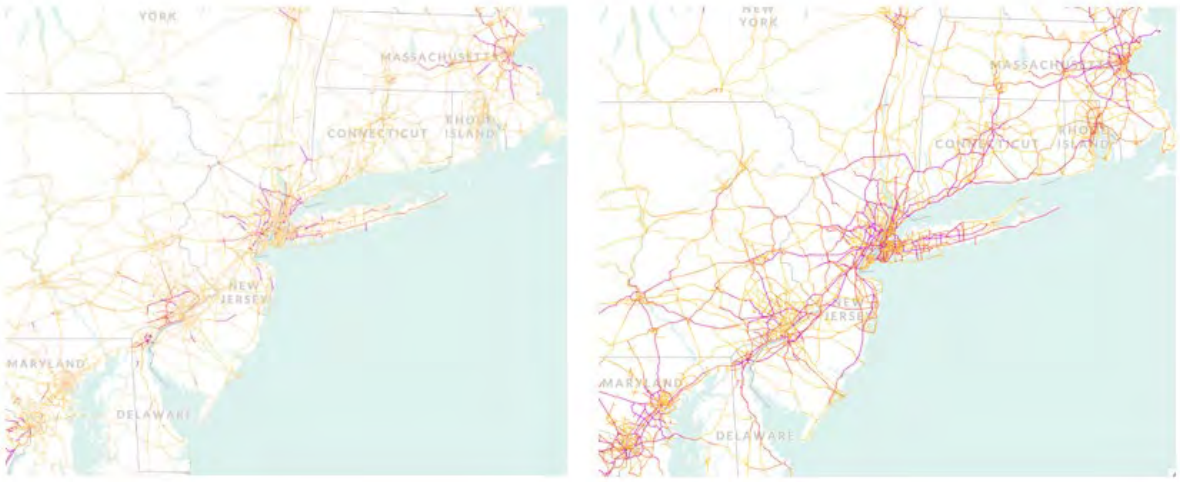
Performance

Various measures of performance provide indications of how well the system is meeting demand, which varies considerably across modes. Before the pandemic's effects on travel demand, annual hours of roadway delay more than doubled since 1985 to an average of 50 hours per commuter.[119] Airport on-time arrivals since 1995 have hovered around 80% despite a sharp increase in air travel.[120] Average lockage delays on waterways have increased from 1 to 4 hours since 2000, with half of vessels delayed.[121] Measures of freight rail and pipeline performance are limited since both modes are privately held. Meaningful measures of marine port performance are limited by a variety of data gaps, including wide variation in ownership and operation of ports and terminals across the public and private sectors.[122]

Highway congestion is an important performance indicator because of its large share of passenger and freight movement and key role in the supply chain. Improved measures of hours of delay across the highway network have only become available since 2017 and are interrupted by the pandemic.[123] Modeled estimates suggest that major truck routes with recurring stop-and-go conditions totaled 5,000 miles in 2015. The same models predict more than five-fold growth by 2045 to 27,000 miles.[124] FHWA forecasts 1.1% annual growth in overall freight tonnage over the next three decades, increasing from 0.7% in the most recent

[119] BTS. Pocket Guide, Figure 5-1.
[120] BTS. Pocket Guide, Figure 5-3.
[121] BTS. Lock Characteristics and Delays on Rivers with More Than 10,000 Lockages. https://data.bts.gov/stories/s/Freight-Transportation-System-Condition-Performanc/vvk5-xjjp
[122] BTS.2023. *2023 Port Performance Freight Statistics Program: Annual Report to Congress*. US Department of Transportation. https://www.bts.gov/newsroom/2023-port-performance-freight-statistics-program-annual-report-congress
[123] https://ops.fhwa.dot.gov/freight/freight_analysis/mobility_trends/index.htm
[124] FHWA. Freight Analysis Framework version 4.5 (2019) https://data.bts.gov/stories/s/Freight-Transportation-System-Condition-Performanc/vvk5-xjjp

decade.[125] Trends in forecasted congested mileage are illustrated for the Northeast Corridor in Figure 17.



2015 **2045**

Figure 17: Northeast Corridor Estimated Mileage of National Highway System Routes with Recurring Peak Period Congestion, 2015-2045 (Source: BTS and FHWA).

Similar patterns shown in Figure 17 are forecast around and between major metropolitan areas across the East, Midwest, Texas, and West Coast. Adding well-selected lane miles on major congested intercity highway links can generate large benefits in total trade among regions well above improvement costs.[126] Charging tolls on added lanes can avoid having induced travel swamp the benefits of capacity expansion.[127]

Aging systems require adequate funding for repair and maintenance, which can be informed by collection of better condition data and improved predictive models and other asset management tools. Decisions about how much needs to be invested to meet capacity, as well as in which modes and over what time periods, and how induced travel can best be mitigated also require R&D to develop better models, policies, and capital investment estimates.

The condition and performance of the enormous interconnected systems of U.S. transportation infrastructure are critical for the safe and efficient movement of people and

[125] FHWA. 2022. Freight Analysis Framework Commodity Flow Forecast Study (FAF Version 5): Final Forecasting Results https://ops.fhwa.dot.gov/publications/fhwahop22037/fhwahop22037.pdf Tonnage moved by truck: BTS. National Transportation Statistics, Table 1-58. Freight Activity in the United States: 1993, 1997, 2007, 2012, 2017. https://www.bts.gov/content/freight-activity-united-states-1993-1997-2002-and-2007

[126] Allen, T. and C. Arkolakis. The Welfare Effects of Transportation Infrastructure Improvements. *The Review of Economic Studies*, 89/6. https://doi.org/10.1093/restud/rdac001

[127] Milam, R. et al. 2017. Closing the Induced Vehicle Travel Gap Between Research and Practice. *Transportation Research Record: Journal of the Transportation Research Board,* No. 2653, 2017, pp. 10–16. http://dx.doi.org/10.3141/2653-02. See also C. Casady, J. Gómez-Ibáñez, and E. Schwimmer. 2020. Toll-Managed Lanes: A simplified benefit-cost analysis of seven U.S. Projects. *Transport Policy*. https://doi.org/10.1016/j.tranpol.2020.02.001

goods, but measures of them incomplete and imperfect. Lack of such information hampers decision-making about the scale of resource allocation required and how to most cost-effectively ensure the efficient movement of people and goods.

Governance

The governance of transportation directly affects the extent to which it serves or hinders social goals. However, the fragmented system of governance across public and private sectors and across levels of government makes it difficult for the transportation system to function as a whole. In some ways it does not. For example, passenger and intermodal freight transfers are not as seamless as in many western European countries. Instead, the U.S. has independent systems that don't necessarily coordinate. Some are fully private (railroads, pipelines), some fully public (transit), and some a hybrid of both (public infrastructure and private carriage in highway, air, and water transportation). The U.S. also has multiple levels of government that regulate safety, fuels, and vehicle emissions, and that fund and make decisions about transportation infrastructure that affect mode choice, system performance, and equity. These fragmented entities, however, have little scope, authority, or expertise to intervene or assist the private sector when supply chains are severely disrupted as they were during the COVID-19 pandemic.

Funding and regulatory policies at the federal level affect what private carriers, states, and local governments must, can, and cannot accomplish. Federal highway funding has become increasingly flexible over time, including allowing for investments in transit and active modes. However, federal performance requirements can constrain states' choices in pursuing their objectives. As described in the next section, metropolitan governance is divided among multiple, sometimes hundreds, of jurisdictions.[128] Suburban and exurban decisions about land use and transportation may not align with development goals and infrastructure plans of center cities. In turn, these center cities' goals and objectives may not align with those of state governments. Some large metropolitan areas even struggle to coordinate the multiple transit systems operating within them.[129]

Despite these complexities, U.S. freight transportation appears reasonably efficient, as described in the Economy and Competitiveness section. Some states and regions work together with federal agencies to achieve common goals for passenger transportation. Although they required decades of effort, examples include in agreements reached fund replacement of the Baltimore and Potomac rail tunnel and new and reconstructed passenger rail tunnels

[128] Savitch, H., and S. Adhikari. 2017. Fragmented Regionalism: Why Metropolitan American Continues to Splinter. *Urban Affairs Review* 53(2). https://journals.sagepub.com/doi/ full/10.1177/1078087416630626.

[129] Weinreich, D., et al. 2019. *Overcoming Local Barriers to Regional Transportation: Understanding Transit System Fragmentation from an Institutionalist Framework.* Center for Transportation Equity, Decisions and Dollars. The University of Texas at Arlington. https://ctedd.uta.edu/wp-content/uploads/2019/07/OvercomingLocalBarriers_Weinreich_CTEDD_2019.pdf.

connecting the Northeast rail corridor with Manhattan. However, transportation officials at all levels express concerns about working at cross purposes with other levels of governments or other agencies in pursuit of development, safety, equity, and environmental goals.

Practitioners often share transportation governance innovations without benefit of documentation about why they appeared to work in one setting and whether they are transferable to another. ***The complexities of governing transportation across national, state, and local levels – along with interactions with private sector providers – are real enough to the practitioners engaged in them. With rare exceptions, however, the complexities are largely invisible to the public and are not subjects of studies and analysis in search of implementable best practices.***

Land Use

The access provided by transportation typically increases land value and opportunities for development, whether intended or not. Few of the planners who mapped out the Interstate Highway System in the 1950s foresaw how much Urban Interstates and beltways would foster residential and commercial development on the peripheries of core metropolitan areas. Access to lower-cost land, and thus lower-cost housing and commercial space, drew residents and commercial activity away from city centers. A network of highways, mostly funded by the federal government for intercity travel, has also become a primary means of local travel that is highly congested during peak travel hours. By facilitating low-density development, this network has also created more travel and congested intercity travel.

By long-standing tradition, regulation of development patterns in the United States is delegated to local governments, although authority ultimately rests with state governments. Land use refers to how land is used; it also refers to local government plans and policies for land development and transportation, which affect the resulting development patterns. Cities, urban counties, and urbanized areas generally have specific policies and plans for future population and economic growth and development. They also have regulations designed to separate incompatible land uses (Euclidian zoning). Rural and unincorporated areas may have only zoning regulations, if even those. For example, in order to meet the burgeoning demand for e-commerce in major population centers, warehouses are being added around urban areas on land lacking controls, sometimes to the consternation of residents unexpectedly living next to them.[130]

For metropolitan areas, fragmentation of land use control across multiple local governments often leads to commuting sheds and travel patterns that encompass many jurisdictions.[131]

[130] Lee, K. 2022. As Warehouses Multiply Some Cities Say: Enough. *New York Times*. October 10. https://www.nytimes.com/2022/10/10/business/economy/warehouses-moratorium-california.html
[131] Cervero, R. 2003. *Coping with Complexity in America's Urban Transport Sector*. https://escholarship.org/uc/item/4wf4n16r

However, state, center-city, and urban county transportation agencies typically have little or no direct influence on the land use plans and zoning policies of most of the jurisdictions within their respective metro areas. Most metro areas have metropolitan planning organizations, but these typically focus on transportation and have no direct control over land use even though many develop long-range plans reflecting regional land use and transportation goals. The typical metro area growth pattern has been for housing and commercial development to become less dense on the periphery. This has led to ever-increasing reliance on a road/automobile transportation system and ever-increasing distances between origins and destinations. Moreover, as jobs and residences disperse across metro areas, it also creates the "many origins, many destinations" problem that transit cannot solve cost effectively. In most metro areas, transit cost-effectiveness is limited to a few corridors where destinations are shared by many travelers.

This fragmentation has also led to segregation by race and income. Zoning of large tracts of land for single-family housing drives up housing prices and excludes groups with lower incomes than the residents already in place.[132] Exclusionary zoning practices, such as large lot sizes, increase travel distances, as does Euclidian zoning that separates residential and commercial areas.

Most states have traditionally deferred to local governments on land use, but not all. The most prominent example of a state exerting control is Oregon, which has long had more influence over land use than other states.[133] After decades of planning, land use regulation, and investment in transit and bikeways, the Portland metropolitan area has roughly 25% lower per capita auto travel and more carpooling, transit, and active travel than other metro areas.[134] More recently, Oregon (in 2019)[135] and California (in 2021)[136] passed state laws overriding local zoning restrictions to allow conversion of existing single-family lots to up to four units. California subsequently enacted many new and modified laws to streamline permitting, increase development density, restrict parking, and other measures that could have greater impact on motor vehicle travel.[137]

Given the durability of land uses and transportation infrastructure, some argue that efforts to coordinate transportation and land use planning after infrastructure and development are

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[132] National Research Council. 1999. *Governance and Opportunity in Metropolitan America*. A. Altshuler, W. Morrill, H. Wolman, and F. Mitchel (Eds.), National Academies Press, Washington, D.C. https://nap.nationalacademies.org/catalog/6038/governance-and-opportunity-in-metropolitan-america

[133] NRC, 1999.

[134] Small, R. 2016. You are Here: A Snapshot of How the Portland Region Gets Around. https://www.oregonmetro.gov/news/you-are-here-snapshot-how-portland-region-gets-around

[135] Shumway, J. 2021. White House: Oregon Single-Family Zoning Law Could be Model for Nation. *Oregon Capital Chronicle*. https://oregoncapitalchronicle.com/2021/10/29/white-house-oregon-single-family-zoning-law-could-be-model-for-nation

[136] California Says Goodbye to Single-Family Zoning. 2021. *CaliforniaCityNews*.org https://www.californiacitynews.org/2021/09/california-says-goodbye-single-family-zoning

[137] Holland and Knight. 2022. California's 2023 Housing Laws: What you Need to Know. October. https://www.hklaw.com/en/insights/publications/2022/10/california-2023-housing-laws-what-you-need-to-know

already in place can have only marginal effects.[138] Although others concede the general rule,[139] they point to important exceptions, such as Portland, OR, Salt Lake City, UT, and Arlington County, VA.[140] The greater Salt Lake City region has responded to unprecedented population growth through a coordinated and deliberate process to integrate transportation and land use involving its cities, regional planning agency, state department of transportation, and state transit authority. However, most other metro areas, especially those in fast-growing regions of the Sunbelt, are heavily focused on low-density housing and commercial development. This results in ever-expanding geographies, segregation by race and income, and demand for roads and highways. ***The many barriers to better coordination between land use and transportation policies and investment decisions leads to missed opportunities and suboptimal outcomes for society. Documenting best practices and why they have worked will help other communities struggling to overcome these barriers.***

Funding and Finance

Public infrastructure (primarily highways and streets) had a value of $5.5 trillion in 2021 after adjusting for wear and tear (depreciation) (Figure 18). Private transportation fixed assets, also adjusted for depreciation, were valued at $1.1 trillion.[141] The robustness of mechanisms for funding or financing the expansion and upkeep of this $6.6 trillion in assets should be of great interest. Moreover, the mechanisms for funding and financing different elements of the system directly affect equity.

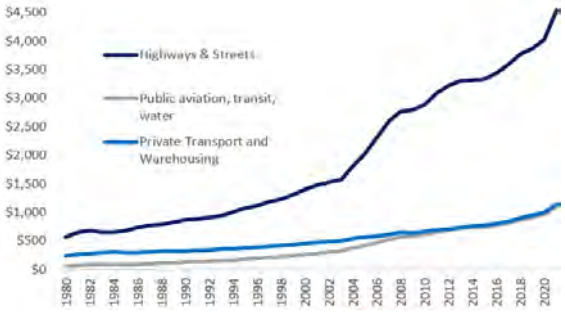

FIGURE 18: Net Government and Private Capital Stock (Infrastructure and Structures, billions of current dollars). Source: Bureau of Economic Analysis, Fixed Assets Tables 3.1S and 7.

At a highly aggregate level, growth in government and private industry infrastructure investment over the last four decades provides a mixed picture compared to economic growth (Figure 19). Growth in private investment in

[138] Giuliano, G. 1995. The Weakening Transportation-Land Use Connection. *Access* 6, Spring. https://www.accessmagazine.org/wp-content/uploads/sites/7/2016/07/access06-01-The-Weakening-Transportation-Land-Use.pdf

[139] Cervero, R. and J. Landis. 1995. The Transportation-Land Use Connection Still Matters. *Access* 7, Fall. https://www.accessmagazine.org/fall-1995/the-transportation-land-use-still-matters/

[140] Arreza, T. 2022. Arlington County Oversample and Special Analysis of the 2017/2018 MWCOG Regional Travel Survey. Arlington County, March 28. https://www.arlingtonva.us/files/sharedassets/public/commissions/documents/transportation/22_03_28_tc/2022_03_28_ml-hhts-tc-presentation.pdf

[141] Private fixed capital stock includes that of aviation, freight transportation, and warehousing. (It does in not include private provider equipment (aircraft, rail cars, trucks and so forth), which can be twice as high in some years.)

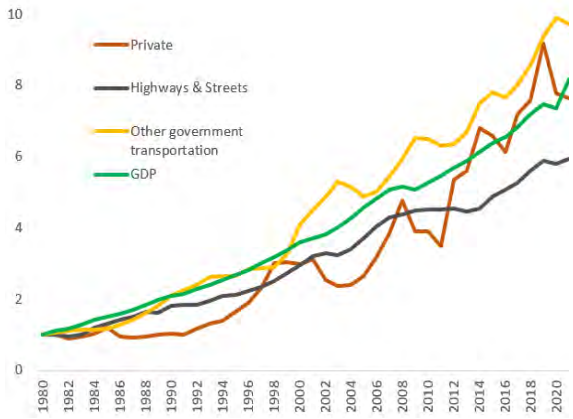

FIGURE 19: Indexed Private Industry and Government Transportation Investment in Fixed Assets Compared with GDP (billions of current dollars, 1980 = 1). Source: Bureau of Economic Analysis, Table 1.1.5 (for GDP), Table 7.5 (for government investment) and Detailed Tables -- Investments in Non-Residential Fixed Assets (for private transportation industry).

fixed assets lagged GDP growth until about the last decade, perhaps due to high interest rates (and costs of borrowing) used to combat inflation during the mid-1970s to 1980s and drops in demand in response to recessions. After demand recovered from the 2008 Great Recession, private transportation companies do not appear to have been constrained in their ability to reinvest in fixed assets.

Government investment in transportation infrastructure for airports, transit, and waterways has actually grown faster than GDP for the past two decades. This may be due to many airport expansions and new rail transit lines.[142] (Although indicated as government investment in Figure 19, improvement and expansion of commercial airport facilities are financed through bonds repaid by users and therefore does not draw from state or local tax bases.) In contrast, government investment in highways and streets, which is far larger than any other investment in transportation infrastructure, has grown more slowly than GDP since roughly 1990. This slowdown followed completion of most of the Interstate Highway System by 1992. It is not clear whether the slower investment growth since then has constrained demand. In recent decades, the economy has become more service oriented and less dependent on moving freight. However, as noted in the infrastructure section above, congestion on Interstate and other intercity highways has grown and is projected to worsen. Other analyses indicate that substantially higher investments are needed in coming decades for the Interstate System, other major highways, and transit to maintain their condition and performance.[143]

Funding and finance of highways, streets, transit, and aviation depends on myriad federal, state, and local revenue sources and forms of borrowing, which, in turn, depend on economic conditions and revenues from user fees and other taxes. Interstates and major intercity highways and transit rely heavily on federal funding for capital investments. Commercial airports are largely self-financed, but also rely on the federal Airport Improvement Program

[142] Annual airport capital investments from Federal Aviation Administration airport certification report Form 127. https://cats.airports.faa.gov/Reports/reports.cfm. Transit rail system investment from American Public Transportation Association. *2021 Public Transportation Fact Book*, Figure 3: 56 More Rail Systems than 30 Years ago.

[143] NASEM. 2019. *Renewing the National Commitment to the Interstate Highway System: A Foundation for the Future*. National Academies Press, Washington, D.C. https://nap.nationalacademies.org/catalog/25334/renewing-the-national-commitment-to-the-interstate-highway-system-a-foundation-for-the-future. See also U.S. Department of Transportation. 2022. *Status of the Nation's Highways, Bridges, and Transit: Conditions and Performance Report*, 24th Edition. https://www.fhwa.dot.gov/policy/24cpr/

(AIP) for runways, noise mitigation, and other capital expenses. Highway and transit funding comes primarily from federal transportation fuel taxes and fees that provide the revenues for the federal Highway Trust Fund (HTF). Aviation and airport funding relies heavily on a variety of user taxes and fees on commercial and general aviation that provide the revenues for the Airport and Aviation Trust Fund (AATF).[144]

Congress has not raised federal highway user fees that support the HTF in 30 years. Congressional changes to aviation user fees since the early 1990s have included a decline in the ticket tax paid by commercial aviation users from 10% to 7.5%, combined with increases to a variety of specific fees for targeted uses.[145] Rather than increase user fees to fund capital investment for state highway programs, urban transit, and aviation, Congress has increasingly relied on general funds derived from all taxes over the last decade. The Infrastructure Investment and Jobs Act of 2021, which also draws heavily on the General Fund, will significantly boost federal funding over the next several years. However, these federal commitments are being funded in part by spending far more than existing general taxes bring in. The 2023 federal budget deficit is projected to reach 98% of GDP, double the average for 1973-2022, and is projected to continue to grow through 2033.[146] Emerging efforts to constrain federal spending may well put pressure on future federal funding support for transportation infrastructure.

States depend heavily on their own highway user fees, primarily fuel taxes, which will decline as the vehicle fleet becomes more electrified. Registration fees on electric vehicles or road user charges (RUCs) may emerge as replacements for fuel taxes. RUCs currently lack broad public understanding and support, though both are growing over time.[147] Tolling of new lanes on Interstates and other highways is expanding across the country. Large cities are seeking options to pay for both the capital and operating expenses of transit systems. These options include road congestion fees in New York City to help fund in the nation's largest transit system.

The main Federal funding program for airport capital improvements – the Airport Improvement Program (AIP) – has remained flat for the past two decades at approximately $3.3B. Due to inflation, the buying power of this annual investment is about half what it was in 2002. Congress has not allowed an increase in the Passenger Facility Charge (PFC) charge on each flight ticket since 1994, and most of existing PFC revenues are required to pay for past

[144] Congressional Research Service (CRS). 2022. *Federal Civil Aviation Programs: In Brief*. CRS R42781. https://crsreports.congress.gov/product/pdf/R/R42781

[145] White, Q., et al. 2019. Taxation in the Aviation Industry: Insights and Challenges. *Transportation Research Record*, 2673(9). https://jonwms.web.unc.edu/wp-content/uploads/sites/10989/2021/06/TaxationNetworks_TRB.pdf

[146] Congressional Budget Office. 2023. *The Budget and Economic Outlook 2023-2033*, February https://www.cbo.gov/system/files/2023-02/58848-Outlook.pdf

[147] Agrawal, A and H. Nixon. 2021. *What Do Americans Think About Federal Tax Options to Support Transportation? Results from Year 12 of National Study*. Mineta Transportation Institute, 6-2021. https://scholarworks.sjsu.edu/mti_publications/361/

bond issuances. Revenues for FAA operation of Air Traffic Control, and the equipment and facilities required for it, have grown,[148] but not as fast as demand has increased.

Marine transportation depends on port facilities for transfers from ships and barges to land modes. Aside from highway access, the main source of federal funding for coastal ports is for maintaining and deepening harbors and waterways. These ports vary widely in terms of public and private ownership and operation and depend on user fees and some state and local tax revenues. Ports on the inland waterways are similarly varied, with funding for locks and dams shared between federal and user fee based revenues.

Questions about the share of investment for passenger and freight infrastructure that should rely on federal as opposed to state and local government support, be user fee based, or be privately owned and funded have long been contentious. All funding possibilities have advantages and disadvantages, particularly the equity consequences of direct user charges. Even so, reliance on publicly imposed user fees have sustained investments in essential transportation infrastructure for decades. Such revenue sources have been eroded by policymaker reluctance to increase them, resulting in increased reliance on general fund revenues with all the uncertainties associated with them. Increased evaluations of real-world experience with new and existing user fee based options and public vs private infrastructure ownership and funding will be invaluable to policy makers at all levels as they debate how to pay for the massive transportation network serving a growing population and economy.

Workforce

Transportation systems in advanced economies depend on a wide range of people with diverse expertise and perspectives while economic conditions drive the demand for employment. The 14.3 million transportation and transportation-related industry employees represent 10.2% of all U.S. employees. This share has remained steady for the last two decades.[149]

[148] CRS. 2022., Table 2.

[149] BTS. National Transportation Statistics, Table 3-23, Employment in For-Hire Transportation and Selected Industries. https://www.bts.gov/content/employment-hire-transportation-and-selected-transportation-related-industries-naics Note: the "Other" category includes miscellaneous groups such as road construction and sightseeing. Postal workers are included in BTS Table 3-23, but not in Figure W.1.

Transportation employees work in a diverse set of sectors (Figure 20). Most jobs (34% of jobs) are in vehicle sales, parts, repairs, gas stations, and so forth. The wide range of white- and blue-collar jobs in transportation results in average wages and benefits that have ranged between 15 to 20% lower than all occupations since 2005.[150]

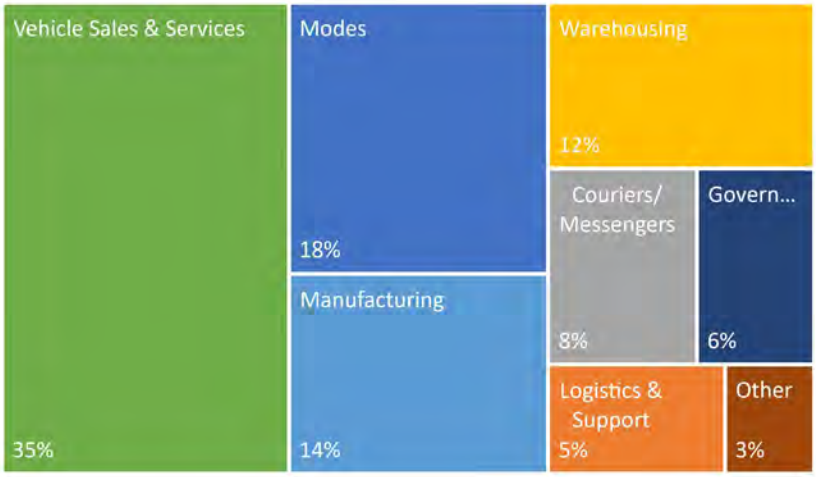

Figure 20: Transportation and Related Industry Employment by Type of Employment, 2021: Source: BTS, National Transportation Statistics Table 3-23.

Notable trends in transportation mode and warehousing employment include the relatively large and fast-growing shares of jobs in Warehousing and in Couriers and Messengers. Together these categories account for 18% of the total. Both groups have grown sharply since 2010 (Figure 21). An increasing reliance on e-commerce explains much of the growth in Warehousing jobs and the proliferation of warehouses in urban peripheries.[151] The same may only be partly true for Couriers and Messengers since, by definition, they include deliveries by foot, bicycle, or automobile, but not by delivery truck. Also, health care and legal industries use large shares of Couriers and Messengers services.[152]

[150] BTS, *Transportation Economic Trends*, available at www.bts.gov/product/transportation-economic-trends
[151] https://www.forbes.com/sites/forbesrealestatecouncil/2021/02/17/the-rise-of-warehousing-a-steam-train-with-no-end-in-sight/?sh=6494f4543486
[152] Bureau of Labor Statistics. Occupational and Wage Statistics, Couriers and Messengers. https://www.bls.gov/oes/current/oes435021.htm

The last 20 years saw steady trucking employment growth during the long economic recovery from the 2008 Great Recession. In contrast, employment in aviation and railroads has steadily declined over the same period even as their output increased. This may help explain labor productivity gains in these modes, described in the Economy/Competitiveness section, as well as increased labor unrest over wages and working conditions for sectors that have to operate day and night year round as described below.

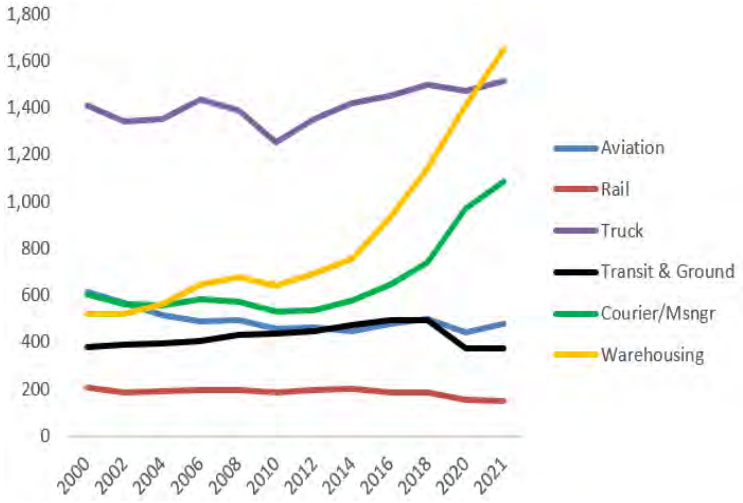

Figure 21: Employment in Selected Modes, 2000-2021 (jobs in 000s) Source: BTS, Table 3-23.

Labor issues in the Motor Vehicle Sales and Service and in the Manufacturing sectors of transportation are similar to those of the rest of the economy. However, as part of the massive efforts needed to shift to renewable energy sources and adopt electric vehicles, overall employment in motor vehicle manufacturing and fossil fuels production for transportation may fall even as other manufacturing and blue collar jobs associated with the energy transition expand.[153]

Nearly all sectors are still rebounding from declines in labor-force participation during the COVID-19 pandemic.[154] Among modal operators, companies are struggling to rebuild driver, pilot, and railroad workforces after layoffs in 2020 and 2021. Trucking firms, transit agencies, and government agencies that employ drivers currently struggle to attract and retain them. Even before the pandemic, challenges in recruiting and retaining long-distance truck drivers apparently reflected working conditions that many workers find unappealing.[155] Shortages of air traffic controllers that became acute in early 2023 result from long-standing difficulties in attracting and retaining skilled controllers to live in high-cost areas, such as within a reasonable

[153] WRI (World Resources Institute). 2022. *Federal Building Blocks To Support a Just and Prosperous New Climate Economy in the United States*. Table 4. https://files.wri.org/d8/s3fs-public/2022-09/federal-policy-building-blocks-support-just-prosperous-new-climate-economy-united-states_0.pdf?VersionId=6S8uqr9_OIpnLpz8rqEZW8i4HKll7AsE

[154] Bureau of Labor Statistics. Civilian Labor Force Participation Rate, Seasonally Adjusted. https://www.bls.gov/charts/employment-situation/civilian-labor-force-participation-rate.htm

[155] Birks, S. and K. Monaco. 2019. Is the U.S. Labor Market for Truck Drivers Broken? *Monthly Labor Review* https://www.bls.gov/opub/mlr/2019/article/is-the-us-labor-market-for-truck-drivers-broken.htm?

commuting distance of FAA's New York facility, which is also responsible for managing the nation's most challenging airspace.[156]

The resurgence of freight and passenger travel demand amid workforces that have not been rebuilt has also led to labor unrest in railroads and aviation. Congress intervened in late 2022 to avoid a nationwide strike of railroad workers.[157] The forced settlement raised average wages by 24% over five years but did not address workers' concerns about inadequate sick leave, although several major railroads and unions subsequently negotiated these concerns. Airlines report that they are unable to operate as many flights as passengers demand because of a pilot shortage.[158] At the same time, pilot unions argue that entry-level pay and working conditions are unattractive to the thousands of trained and certified pilots who are not actively employed as such.[159] ***As in any labor market, wages and working conditions are issues that management and labor will have to sort out. It is critical that they do so. Safe and efficient operations in transportation firms that operate on a 24/7/365 schedule depend on having engaged, committed workforces.***

Over the past two decades, employment in government transportation agencies has remained flat at about 850,000 employees.[160] The government transportation workforce is among the smallest of transportation labor categories. Nonetheless, it plays an outsized role in the performance of private transportation companies because government employees serve as infrastructure managers, air traffic controllers, safety and environmental regulators, and in other vital positions. As other sections of this document point out, ***the issues that government transportation professionals must address are complex and contentious. They require employees from diverse backgrounds with deep technical expertise or with a multi-faceted skill set spanning multiple fields. Public sector salaries are rarely competitive with private sector salaries for people with these skills, which complicates government agencies' ability to attract and retain such skilled staff.***

[156] NASEM. 2014. *The Federal Aviation Administration's Approach for Determining Future Air Traffic Controller Staffing Needs*. National Academies Press, Washington, D.C. https://nap.nationalacademies.org/catalog/18824/the-federal-aviation-administrations-approach-for-determining-future-air-traffic-controller-staffing-needs

[157] https://www.cnbc.com/2022/12/02/biden-signs-bill-averting-rail-worker-strike-despite-lack-of-paid-sick-days.html

[158] https://www.forbes.com/sites/oliverwyman/2023/02/02/the-pilot-shortage-may-be-easing-slightly-but-aviation-now-needs-mechanics/?sh=14f3d1542b5e

[159] See for example: https://www.alpa.org/advocacy/pilot-supply

[160] BTS. National Transportation Statistics, Table 3-23, Employment in For-Hire Transportation and Selected Transportation-Related Industries. https://www.bts.gov/content/employment-hire-transportation-and-selected-transportation-related-industries-naics

Innovation

Past critical issues in transportation were often overcome through innovation. Development of a marine chronometer in 1759 allowed 18th century navigators to more precisely determine longitude and reduce shipwrecks during an era of burgeoning maritime trade.[161] Invention of the pneumatic air brake revolutionized the growing 19th century railroad industry by allowing longer trains, higher speeds, and safer operations.[162] The first commercial jet flights of the 1950s ultimately allowed for faster, longer, and safer flights with more passengers.[163] The catalytic converter greatly reduced harmful emissions when adapted to internal combustion engines in 1976.[164] Ongoing 21st century battery innovations have enabled vehicle electrification to reduce GHG emissions with reduced costs to consumers.[165]

The Harrison HR Marine Chronometer – the "First Global Positioning System"

Innovations build on scientific advances and previous technologies, often requiring decades to unfold. Today, this applies to emerging innovations such as highly automated vehicles and trucks, which builds on incremental introduction of, and controversy about, automation in aviation that began only a few years after the first flights at Kitty Hawk.[166] Modern, complex societies and systems require both vibrant entrepreneurial conditions that foster

https://www.shutterstock.com/search/electric-vehicle-battery

[161] Sobel, Dava. 1995. *Longitude: The True Story of the Lone Genius Who Solved the Greatest Scientific Problem of His Time*. Walker and Co. See also: Estlow, Ed. 2022 (updated). *This marine Chronometer was the First Global Positioning System.* https://www.gearpatrol.com/watches/a89119/history-of-the-harrison-h4-marine-timekeeper/

[162] Library of Congress: https://www.loc.gov/collections/films-of-westinghouse-works-1904/articles-and-essays/the-westinghouse-world/the-westinghouse-air-brake-co

[163] Chaiken, A. 1997. *Air and Space: The National Air and Space Museum Story of Flight*. Bullfinch Press.

[164] National Medal of Technology and Innovation 2002: https://nationalmedals.org/laureate/john-j-mooney/

[165] Berube, M. 2021. Harnessing the Power of Battery RD&D to Battle Climate Change. https://www.energy.gov/eere/articles/harnessing-power-battery-rdd-battle-climate-change

[166] Little, B. 2019. Automation of Planes Began 9 Years After the Wright Brothers took flight But Still Leads to Baffling Disasters. https://www.history.com/news/plane-automation-autopilot-flight-302-610

inventions and intellectual ecosystems that can evaluate and provide information for the shaping of their direction. Today's vibrant entrepreneurial ecosystem in transportation is visible in development of battery electric vehicles, electric vertical take-off and landing air taxis; drone and robotic delivery of freight; and motor vehicle crash avoidance systems.

https://www.aviationtoday.com/2021/05/24/evtol-certification-now-challenges-still-lie-ahead/

Although technologies capture the public's imagination, many innovations are in processes and business models. Examples include bike, scooter, and car-sharing; ride hailing; construction of new, priced highway lanes financed through public-private partnerships;[167] slide-in bridge construction; urban curb management systems; geospatial analyses of equity impacts; cellphone-based traces of travel patterns to inform system management, investment, and safety decisions; and mobility as a service (MaaS).[168] Several of these efforts are now well-known, but their ultimate integration into the nation's enormous transportation system will require ongoing research and evaluation for well-informed public oversight and implementation.

https://www.tollroadsinvirginia.com/Facility/ExpressLanes395/

Many of the critical issues identified in the preceding sections can be addressed through continued innovation in areas such as

- Enhanced battery range and net-zero carbon fuels to address climate change;
- automation to enhance freight productivity and economic performance;
- crash avoidance, light-weighting of vehicles, and improved designs to enhance safety;
- improved measures of equity;
- enhanced asset management and construction materials and techniques to improve infrastructure condition and performance; and

[167] Fuhs, C. 2023. Re-Envisioning Mobility on Urban Freeways: The Emergence and Evolving Roles of Managed Lanes. *Transportation Research Record* Vol. 2677(2)

[168] NASEM. 2016. *Between Public and Private Mobility: Examining the Rise of Technology-Enabled Transportation Services.* National Academies Press, Washington, D.C.

- alternative road user charging systems to replace fuel taxes and fund system maintenance and expansion.

Equally important is documenting proven innovations and shortening the many years it often takes to implement them. ***Accelerating the development, evaluation, and implementation of innovative technologies and processes require developing and sustaining cultures of innovation in transportation agencies and ongoing support for research institutions. Public agencies are particularly challenged by aversion to risk of controversy or failure,***[169] ***but existing innovative organizations provide lessons for others.*** These institutions will allow for rewarding careers to attract and develop the people needed to carry out this vitally important work.

Conclusions

The preceding sections have highlighted some of the many challenges in maximizing transportation's role in serving social goals while minimizing its costs:

- *Building and Sustaining a Strong, Competitive Economy* will require better understanding of the causes of slow growth in total factor productivity of truck, freight rail, and transit modes and development of policies and innovations to address these causes.
- *Mitigating and Responding to Climate Change* will require, in less than three decades, a truly massive transition to electric vehicles – involving 260 million light duty vehicles and tens of millions of trucks and other vehicles – while building out a nationwide charging infrastructure and developing net-zero carbon fuels for aircraft and heavy vehicles and vessels that require high energy density liquid fuels.
- *Increasing Safety* depends on returning to a trend of reducing fatality and injury rates by advancing crash avoidance technologies, developing a rigorous scientific basis for policies such as Vision Zero, and building greater public consensus around policies that can change driver behavior in ways that will reduce injuries and fatalities.
- *Promoting Equity and Inclusion* spans far more than transportation, but transportation can play supportive roles by expanding access to opportunity via multiple modes; redressing past isolation of discriminated-against communities by the location, construction, and operation of transportation infrastructure; documenting best practices in expanding equity and inclusion; and developing measures of inequities and responding to them in future plans and investments.
- *Advancing Public Health and (environmental justice)* will be party achieved as the nation shifts away from fossil fuels to electric vehicles. This shift will reduce harmful emissions and noise from road vehicles but will also require mitigating the harmful emissions from alternative fuels and increasing options for active travel.

[169] Downs, A. 1967. *Inside Bureaucracy*. Little, Brown, and Company.

Success in addressing these challenges through transport programs and policies is highly dependent on aligning governance; funding and finance; land use; a diverse, skilled workforce; and innovation toward serving social goals. Doing so requires addressing the critical issues reviewed above for these foundational influences on transportation, including:

- Governance: documenting successes, failures and reasons for them in overcoming fragmented responsibilities in providing, managing, and regulating transportation infrastructure.
- Funding and Finance: developing evidence about (a) the merits of user-fee based taxes and fees to replace motor fuels taxes and options for mitigating their adverse equity impacts, (b) experience with public-private infrastructure ownership and financing; and (c) public perceptions about acceptable taxes and fees.
- Land Use: showing how transportation and land use planning and oversight can be, and is being, better aligned across institutions to serve public goals for future development patterns.
- Workforce: providing case studies of agency efforts to attract and retain a diverse, multi-skilled workforce.
- Innovation: fostering cultures of innovation in transportation agencies and private firms, including documenting how such cultures can be built and sustained.

For transportation itself, society and individuals alike would benefit from a deeper understanding of:

- How personal travel can serve or hamper individual and societal goals by providing or denying access to opportunities of all kinds;
- The many ways in which freight movement supports modern lifestyles and economic prosperity and how to improve its performance;
- The most cost-effective policies to minimize the social and environmental costs of the movement of people and goods; and
- Overall system performance in providing, maintaining, and operating the infrastructure that makes possible the safe and efficient movement of people and goods.

There are important gaps in measuring, understanding, and translating existing knowledge about why and how transportation is important to individuals, communities, firms, and society at large. Much of the engineering of transportation systems is well understood, but many breakthroughs in technology will be required to meet climate and economic goals while also improving safety, equity, and public health. The economics of where firms locate and how they expand markets and control costs through transportation is fairly well established. However, the level of market competition across and between modes that is needed to guide public policy in ensuring efficient pricing receives much less attention than in the past, even as the carriers in some modes appear to be concentrating in ways that may impede competition. Far less studied or understood is why people travel, want to travel, are inhibited in doing so, how

this affects their personal growth and happiness, and how these individual aspirations can be aggregated to represent society as a whole. Understanding these topics better would inform public policy to ensure that transportation helps lead to thriving societies.

APPENDIX: Metrics

Metrics for measuring the impact of transportation on achieving societal goals are introduced in this edition of *Critical Issues*. As desirable as such metrics are, important gaps would need to be filled in theory, measures, and data collection before such metrics could be used to measure progress toward the social goals emphasized in this document. In this appendix we raise challenges for expert practitioners and scholars regarding improved metrics for future use.

Regarding the goal of Mitigating and Responding to Climate Change, transportation's total GHG emissions can be readily tracked due to data carefully estimated and reported by EPA. The impact of recent federal legislation and transportation vehicle electrification can be monitored through electric vehicle sales and charging installations that are collected and reported by DOE. National goals have been set against which progress can be measured and credible forecasts are being produced from a variety of sources. Measures of the extent of infrastructure vulnerable to severe weather, fires, drought and flooding due to climate change are available for a few jurisdictions, but not consistently or nationally.[170] Nor do available measures usually take into the account the speed of climate change. Development of metrics in this area is still in its infancy and an important area for further research.

Transportation's contributions to a Building and Sustaining a Strong, Competitive Economy can be inferred from myriad economic statistics collected and developed by the Bureau of Economic Analysis and the Bureau of Labor Statistics. This edition focuses on transportation productivity, but this is only one possible measure. Other possible metrics might include measures of competition in private aviation, ridehailing and taxis, and freight services, including competition across modes, because competition fosters efficiency and reduces the cost of transportation.

Promoting Equity through transportation is possible, but progress is impeded by the varied, complex, and local nature of inequities and a lack of consistent metrics for assessing their scale and impacts. No single federal agency has responsibility for development and reporting of such metrics. Primary responsibility resides in EPA for measures of emissions, in the U.S. Department of Transportation for measures of accessibility to transit and personal vehicles, and in the U.S. Census Bureau for development of measures of racial, spatial, and income disparities.

Considerable progress has been made over the years in collecting detailed data to measure progress in Increasing Safety, primarily through the U.S. Department of Transportation.

[170] NASEM. 2021. *Investing in Transportation Resilience: A Framework for Informed Choices*. National Academies Press, Washington, D.C. https://nap.nationalacademies.org/download/26292#

Fatalities are well reported in all modes. Injuries, which are far larger in number, are less well measured but estimates are being developed using sampling and models. Measures of risk exposure, however, are lacking for active modes of travel. Anonymous cell phone use data available from private vendors might be able to fill some gaps. Use of such data is being explored by researchers and some jurisdictions, as is passive data collection from samples of sites using a variety of technologies.

The benefits of Advancing Public Health through reduced emissions, particularly $PM_{2.5}$, can be inferred from emissions data collected by EPA. Monitoring emissions changes serves as a proxy for changes in mortality, which can be modeled periodically to calibrate mortality estimates. If society were to commit to mitigating traffic noise near schools, residential areas and other sensitive locations, techniques and measures would have to be developed analogous to those used for monitoring and tracking aircraft noise.

Regarding travel, the U.S. DOT collects data on all modes that provide national estimates, but active travel has been measured infrequently and imperfectly. This creates a gap for both travel and safety metrics that researchers are exploring ways of filling.

Infrastructure measures of condition and performance have been improving over time and should get better for highways because of the performance measures that states are required to collect and report to FHWA. For private infrastructure, condition data can be derived from information gathered about safety (such as defects detected in inspections and reports of mechanical failures of safety devices) although not many measures are aggregated and reported at the national scale. For aviation system performance, on-time departure data are an available metric but are not particularly meaningful. The Federal Aviation Administration, as the manager of air traffic control, may have data with which to develop better estimates of trends in airport to airport trip times while accounting for weather conditions, traffic volume, and runway capacity constraints. For marine infrastructure, little comparative information is available about the physical condition of port assets, but information about the performance in moving cargo of the largest U.S. ports is available from BTS. Information about the age of locks and dams on the inland waterways is available from the U.S. Army Corps of Engineers (USACE), which can be adjusted to account for major rehabilitations.[171] Improved performance data in the form of lockage delays is available.[172]

Regarding the other main influences on transportation and its ability to serve social goals, Funding and Financing information varies widely across modes, with much more information available for roads and highways than any other mode. Even within the public sphere, it's much harder to monitor trends in financial condition and revenue sources for airports, transit

[171] NASEM. 2015. *Funding and Managing the U.S. Inland Waterway System: What Policy Makers Need to Know*, pp 40-55 and Appendices C-F. National Academies Press, Washington, D.C. https://nap.nationalacademies.org/catalog/21763/funding-and-managing-the-us-inland-waterways-system-what-policy-makers-need-to-know

[172] https://navigation.usace.army.mil/MTS/Performance/Capacity

agencies, and ports. Much of the data are available when owners are public, but they are not aggregated or reported nationally. Funding and finance trends for private infrastructure presumably tracks those of the private sector more generally.

As important as they are, the influences of Governance, Land Use, and Innovation don't readily lend themselves to metrics.

Development of meaningful metrics of transportation's role in achieving all social goals at the national, state, and local levels is an important topic for future R&D.

TRB

TRANSPORTATION RESEARCH BOARD

June 14, 2023

MEMORANDUM

TO: Members, TRB Executive Committee
FROM: Russell Houston
SUBJECT: June 28 & 29, 2023, Policy Session on Traffic Safety

The U.S. Department of Transportation's National Highway Traffic Safety Administration (NHTSA) reported 42,915 traffic fatalities during 2021, an increase of 10.5% over 2020 and 18.9% above 2019 levels. Pedestrian deaths in 2021 were at their highest in 40 years: approximately 7,500 people or 20 per day. Millions more are injured.

NHTSA estimated 47% of passengers killed in 2018 were not wearing a seat belt, and the Center for Disease Control and Prevention (CDC) reported that drugs other than alcohol are involved in 16% of motor vehicle crashes.

A report released in June 2021 by the Governor Highway Safety Association (GHSA), which analyzed data for the five-year period 2015-2019, found that traffic crash fatalities disproportionately affect Black, Indigenous and People of Color. Highlights of the report's findings include:

- Compared with all other racial groups, American Indian/Alaskan Native persons had a substantially higher per-capita rate of total traffic fatalities.
- Black persons had the second highest rate of total traffic deaths.
- White, Native Hawaiian/Other Pacific Islander, and Hispanic persons had somewhat similar per capita rates of total traffic fatalities.
- Compared with all other racial groups, Asian persons had a substantially lower per-capita rate of total traffic deaths.

A report released by the NHTSA in September 2022 explored disparities in traffic safety among different race-ethnicity groups in the United States. The report also examined economic disparities in traffic safety. The findings contribute to a growing body of evidence of racial-ethnic and economic disparities in travel outcomes. Principally, the analysis found roadway travel is less risky for white people than for people of most other race-ethnicity groups. This disparity persists even when accounting for the amount and mode of travel. The executive summary of the report is included beginning on page 5 of this memo. The full report is available online at https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/813188.

According to TRB's Racial Equity Addendum to Critical Issues in Transportation, critics of transportation planning and investment priorities, particularly in urban areas, have pointed to patterns of decision-making indicative of racial bias resulting in, among other things, safety hazards.

The Addendum notes that curbing racism in the decision making processes and power structures across all levels of government is essential to equitable transportation planning and investment choices and understanding racial bias in transportation institutions is a critical step.

This session is designed to explore the disproportional representation of Black, Indigenous, and People of Color (BIPOC) in traffic fatalities, and how to potentially address the causes from a research and policy perspective across all levels of government and community organizations.

To assist in the Thursday portion of the session, a list of past, current, and upcoming activities that TRB is undertaking related to transportation safety is included beginning on page 8 of this memo.

Session Agenda

Time (Eastern)	**Wednesday, June 28, 2023**
1:15 p.m.	Carol Lewis, Professor, Texas Southern University; and Vice Chair, TRB Executive Committee *Welcome and Session Introductions*
1:20 p.m.	Richard Retting, Senior Program Officer, TRB *Summary of TRB & NASEM portfolio of activities on this topic*
1:30 p.m.	DeReece Smither, Research Psychologist, NHTSA *Proposed changes to OMB's race and ethnicity data collection policy*
1:40 p.m.	Gabrielle Herbert, Mathematical Statistician, NHTSA *Evaluating Disparities in Traffic Fatalities by Race, Ethnicity, and Income*
1:50 p.m.	Norma Bowman, Deputy Division Director, Navajo Division of Transportation *Tribal transportation safety management*
2:10 p.m.	Laura Sonderup, Managing Director, Heinrich Marketing, Inc. *Effective multicultural communications strategies to address transportation safety*
2:30 p.m.	*Plenary Discussion* – Moderated by Carol Lewis
5:00 p.m.	Carol Lewis *Concluding Remarks & Adjourn*
Time (Eastern)	**Thursday, June 29, 2023**
8:30 a.m.	Carol Lewis *What activities might TRB and other organizations represented around the table consider as a result of yesterday's discussion?*
9:00 a.m.	End of Policy Session Discussion

Policy Session Panelists Biographies

DeReece Smither
Research Psychologist, National Highway Traffic Safety Administration

Dr. DeReece Smither is a Research Psychologist with the US Department of Transportation (US DOT), National Highway Traffic Safety Administration (NHTSA).

In 1999, she received her Ph.D. in Experimental Psychology from The University of Memphis, and thereafter, began her career as an Assistant Professor of Psychology.

Since 2007, Dr. Smither has worked at NHTSA as a project manager for a range of research projects examining driving behavior related to alcohol- and (other) drug-impairment. She also serves as the program manager for the National Cooperative Research and Evaluation Program, a cross-cutting research program which produces studies that focus on practical solutions for a range of traffic safety issues. Dr. Smither also represents US DOT and NHTSA on committees focused on equity-related issues in transportation.

Gabrielle Herbert
Mathematical Statistician, National Highway Traffic Safety Administration

Gabrielle Herbert is a Mathematical Statistician at the National Highway Traffic Safety Administration. She received her B.S. in Statistics from the Pennsylvania State University and her M.S. in Applied Statistics from the University of Delaware.

After graduating from the University of Delaware, Gabrielle began her career in public service at the U.S. Census Bureau. After almost three years at the Census Bureau, she accepted a job at NHTSA in the National Center for Statistics and Analysis.

During Gabrielle's tenure at NHTSA, she has worked on numerous statistical analyses related to motor vehicle traffic crashes and safety. She co-authored the technical report, Evaluating Disparities in Traffic Fatalities by Race, Ethnicity, and Income. Gabrielle currently resides in Alexandria, VA and enjoys baking and watching documentaries in her free time.

Norma Bowman
Deputy Division Director, Navajo Division of Transportation

Ms. Bowman is currently serving as Deputy Division Director for the Navajo Division of Transportation. Prior to the current position, Ms. Bowman worked in the Injury Prevention/Highway Safety field for 30-plus years.

As an advocate for Highway Safety, the concerted efforts for Ms. Bowman and her staff include education-based training in the areas of Child Passenger Safety, Occupant Protection, Impaired Driving, Distracted Driving, Mature Driving, Young Adult Drivers, etc.

Ms. Bowman is a National Child Passenger Safety Instructor, a National Safety Council- Defensive Driving Course Instructor, and the Safe Kids Navajo Nation Coalition Chairperson.

Laura Sonderup
Managing Director, Heinrich Marketing, Inc.

Laura Sonderup is the managing director and senior strategist at Heinrich Marketing, Inc., a full-service advertising agency headquartered in Denver, Colorado.

She is a nationally recognized ethnic marketing expert and frequent keynote speaker at conferences, including traffic safety presentations delivered at Lifesavers National Conference on Highway Safety Priorities, Governor's Highway Safety Association, the National Tribal Transportation Conference, and National Tribal Symposium to Advance Transportation. Her writings on multicultural marketing have been featured in USA Today, Denver Business Journal, American Bar Association Journal, and several other publications. She is also the author of the popular book, "Hispanic Marketing in the Heartland: A Hands-on Guide."

In addition to her writing, Laura has been the primary strategic point person on social norming and behavior modification campaigns for the National Highway Traffic Safety Administration, the Colorado Department of Transportation, the Wyoming Department of Transportation, The Colorado Department of Public Health and Environment, the Wyoming Department of Health, the Utah Department of Public Safety, and the U.S. Department of Justice.

In 2020, Laura's expertise within the traffic safety community was recognized by MADD and CDOT with the Dr. Robert E. Weltzer Outstanding Dedication to Traffic Safety award.

U.S. Department of Transportation
National Highway Traffic Safety Administration

NHTSA

DOT HS 813 188
2022

September

Evaluating Disparities in Traffic Fatalities by Race, Ethnicity, and Income

Executive Summary

Roadway travel is inherently risky, but is this risk borne equally among all members of U.S. society? In this report we undertake an examination of data collected by the National Highway Traffic Safety Administration and other Federal agencies to consider the following questions.

- Are there racial-ethnic disparities in travel outcomes?
- If so, have these disparities changed in recent years?
- What factors might be contributing to racial-ethnic disparities?
- Are there economic disparities in travel outcomes?

Our findings contribute to a growing body of evidence of racial, ethnic, and economic disparities in travel outcomes. This report investigates the disparity between various race-ethnicity groups as compared to white[1] people, unless otherwise noted. We compare to the white population as it is the largest race-ethnicity group and to highlight the historical disparities in transportation decisions, resources, and outcomes. For instance, when we present values as "disproportionate," we mean in relation to white people. Principally, we found that:

- By several measures, roadway travel is less risky for white people than for most other race-ethnicity groups; this disparity persists, even accounting for the amount and mode of travel. Among all travel modes, we found a particularly pronounced disparity for pedestrians. American Indian and Alaska Native people have by far the highest traffic fatality rates per mile and per population. They were five times more likely to die walking than white people and close to three times as likely to die in passenger vehicles, on a per-mile basis. Asian people are about half as likely to die as white people per mile. But out of total Asian fatalities, 29 percent were pedestrians; this was the largest pedestrian makeup across race-ethnicity groups, roughly double the makeup for white fatalities. Black or African American people were roughly twice as likely to die per mile as white people (fatality rates of 1.70 versus 1.04 per 100M person miles traveled).

- Traffic fatalities per 100K population decreased for American Indian and Alaska Native people relative to white people between 2014 and 2018 in the subset of States studied (2.52 to 2.07). In comparison, traffic fatalities per 100K population increased for Black or African American people relative to white people (1.05 to 1.27).
- Risky behaviors and amount of travel can contribute to traffic fatality rates. Black or African American occupants have lower observed seat belt use levels. Less than half of their passenger vehicle occupant fatalities used restraint systems (44%), compared to 55 percent for white people. American Indian and Alaska Native people traveled by passenger vehicle more than any other group, about 30 percent more than white people; this in- creased their risk exposure. Almost half of American Indian and Alaska Native driver fatalities and over half of their pedestrian fatalities had blood alcohol concentrations (BACs) of .08 grams per deciliter (g/dL) or above, the largest percentages across race- ethnicity groups. American Indian and Alaska Native fatalities also had lower levels of restraint system use, with only about one-third of their passenger vehicle occupant fatalities restrained.

- In 8 of the 50 States, traffic fatalities[2] per population decreased as the per population income of a county increased. The remaining 42 States showed no strong or moderate correlation (0.5) between traffic fatality and income rates or had too few counties to compute a reliable correlation.

Our findings have several caveats.

- Readers should interpret conclusions about American Indian and Alaska Native people with a degree of caution, as 33 percent of the race and ethnicity reporting on their death certificate classifications didn't match their responses to the Current Population Survey (Arias, Heron, & Hakes, 2016). Also, Indian reservations do not always report traffic fatalities to the State or NHTSA.
- We cannot reliably estimate the impact of traffic fatalities on multi-racial people during the period studied. Through 2018, the Fatality Analysis Reporting System (FARS) categorized fatalities identified by multiple, individual races only by the first race listed; this categorization could misrepresent some or all race-ethnicity groups.
- The FARS contains unknown values for race and ethnicity. The number of unknowns varies by State and year.
- Puerto Rico is home to 5 percent of the total Hispanic or Latino population in the 50 States, the District of Columbia, and Puerto Rico. However, we effectively treated Puerto Rico as a separate entity in this report, a common reporting practice used at most Federal agencies.
- We assessed observed seat belt use based on race observations made by data collectors. Consider the observation bias when interpreting these data or comparing them with FARS.
- Traffic fatality rates combine self-reported race-ethnicity with race-ethnicity identified by others. The answer to race and ethnicity questions for one person could vary depending on who answers.

We cover more detailed caveats in the Limitations section. These caveats notwithstanding, our report reinforces the need to address the disproportionate impact of traffic crashes

throughout all segments of society. We note that the Bipartisan Infrastructure Law contains funds to improve several of NHTSA's crash data collection systems that have the potential to improve analyses like this one.

[1] The text in this report follows the Associated Press Stylebook (AP Stylebook) to lowercase "white."

[2] Fatalities in motor vehicle traffic crashes are referred to as "traffic fatalities" in this report. The terms "motor vehicle traffic crash" and "traffic crash" are used interchangeably throughout this report.

Transportation Safety Among African American, Native American, and Hispanic American Communities

Prepared by TRB Library

Specialty Reports

Critical Issues in Transportation 2019. Transportation Research Board, 2018, 39p
https://trid.trb.org/view/1577761

COVID-19 Addendum to Critical Issues in Transportation. Transportation Research Board, 2021, 20p
https://trid.trb.org/view/1764329

Racial Equity Addendum to Critical Issues in Transportation. Transportation Research Board, 2021, 20p
https://trid.trb.org/view/1867076

Recent Reports & Publications

Airport Cooperative Research Program (ACRP)

- McNair, Amber Woodburn. Systemic Inequality in the Airport Industry: Exploring the Racial Divide. Transportation Insights, Issue 1, 2023, 71p
  https://trid.trb.org/view/2112911

- Preston, Katherine B; Nagy, Julia; Blue, Julie; DeVries, Rebecca; Crites, Jim. Measuring Quality of Life in Communities Surrounding Airports. ACRP Research Report, Issue 221, 2020, 127p
  https://trid.trb.org/view/1736394

- Krop, Richard A; Rooke, Jaime; Emil, Elise; Leahu-Aluas, Oana; McDonnell, Jon; West, Nancy K; Rosales, Mara. Guidance for Diversity in Airport Business Contracting and Workforce Programs. ACRP Research Report, Issue 217, 2020, 165p
  https://trid.trb.org/view/1727479

- Ballard, David; Garrow, Laurie A; Gosling, Geoffrey D. Using Disaggregated Socioeconomic Data in Air Passenger Demand Studies. ACRP Research Report, Issue 194, 2019, 135p
  https://trid.trb.org/view/1598141

- A Guidebook for Increasing Diverse and Small Business Participation in Airport Business Opportunities. ACRP Report, Exstare Federal Services Group; Rosales Law Partners LLP; WHP Research, Incorporated, Issue 126, 2015, 106p
  https://trid.trb.org/view/1342150

National Cooperative Highway Research Program (NCHRP)

- Programmatic Issues of Future System Performance. NCHRP Web-Only Document, WSP USA, Incorporated, Issue 346, 2022, 260p
https://trid.trb.org/view/2065627

- Semler, Conor; Sanders, Meredyth; Dartnell, Camilla; Alston, Mike; Semensky, Sophia; Ahramjian, Laura; Taylor, Katie; Sanders, Rebecca; Elbech, Mary; Vanderkooy, Zach. Guide for Roadway Cross Section Reallocation. NCHRP Research Report, Issue 1036, 2022, 199p
https://trid.trb.org/view/2054774

- Wood, Nick; McGee, Jordan; Geiselbrecht, Tina; Simek, Chris. Emerging Challenges to Priced Managed Lanes. NCHRP Synthesis of Highway Practice, Issue 559, 2020, 99p
https://trid.trb.org/view/1738034

- Thomas, Larry W. Update of Selected Studies in Transportation Law, Volume 8, Section 1: Civil Rights and Transportation Agencies. NCHRP Legal Research Digest, Issue 77, 2019, 150p
https://trid.trb.org/view/1666109

- Hanson, Lindsey. Update of Selected Studies in Transportation Law, Volume 8, Section 3: Indian Transportation Law. NCHRP Legal Research Digest, Issue 76, 2019, 87p
https://trid.trb.org/view/1643871

- Sandt, Laura; West, Alyson; Johnson, Sarah; Brookshire, Kristen; Evenson, Kelly; Blackburn, Lauren; Peach, Kara; Tartala, Margaret; Ricklin, Anna; Shah, Sagar; Rodriguez, Daniel A; Corburn, Jason. A Research Roadmap for Transportation and Public Health Management. NCHRP Research Report, Issue 932, 2019, 63p
https://trid.trb.org/view/1670448

- Keen, David; Keen, Annette Humm; Kyritsis, Janine; Monter, Blanca. Compendium of Successful Practices, Strategies, and Resources in the U.S. DOT Disadvantaged Business Enterprise Program. NCHRP Research Report, Issue 913, 2019, 215p
https://trid.trb.org/view/1650771

- Pesesky, Lawrence; Matherly, Deborah; Lane, Leigh; Aimen, David; Deka, Deva; Smart, Michael; Agrawal, Asha Weinstein; Brown, Bruce; Morris, Anne. Environmental Justice Analyses When Considering Toll Implementation or Rate Changes—Final Report. NCHRP Web-Only Document, Issue 237, 2018, 437p
https://trid.trb.org/view/1502373

- Pesesky, Lawrence; Matherly, Deborah; Lane, Leigh; Aimen, David; Deka, Deva; Smart, Michael; Agrawal, Asha Weinstein; Brown, Bruce; Morris, Anne. Assessing the Environmental Justice Effects of Toll Implementation or Rate Changes: Guidebook and Toolbox. NCHRP Research Report, Issue 860, 2018, 423p
https://trid.trb.org/view/1498380

- Rodman, Will; Berez, Dan; Moser, Sarah; Choe, James. State DOTs Connecting Users and Rides for Specialized Transportation. Volume 2: Toolkit for State DOTs and Others. NCHRP Report, Issue 832, 2016, 48p

https://trid.trb.org/view/1417842

- Rodman, Will; Berez, Dan; Moser, Sarah; Choe, James. State DOTs Connecting Users and Rides for Specialized Transportation. Volume 1: Research Report. NCHRP Report, Issue 832, 2016, 119p https://trid.trb.org/view/141784

- Agrawal, Asha Weinstein; Nixon, Hilary; Hooper, Ashley M. Public Perception of Mileage-Based User Fees. NCHRP Synthesis of Highway Practice, Issue 487, 2016, 151p https://trid.trb.org/view/1400249

- Zmud, Johanna; Barabba, Vincent P; Bradley, Mark; Kuzmyak, J Richard; Zmud, Mia; Orrell, David. Strategic Issues Facing Transportation, Volume 6: The Effects of Socio-Demographics on Future Travel Demand. NCHRP Report, Issue 750, 2014, 140p https://trid.trb.org/view/1321162

- Noyce, David A; Li, Zhixia; Chesnik, Kevin; Macy, Alyssa; Qin, Xiao. Guide for Effective Tribal Crash Reporting. NCHRP Report, Issue 788, 2014, 75p https://trid.trb.org/view/1330060

- Kyle, Deirdre D. State Department of Transportation Small Business Programs. NCHRP Synthesis of Highway Practice, Issue 448, 2013, 90p https://trid.trb.org/view/1258260

Policy Studies/Special Reports

- The Role of Transit, Shared Modes, and Public Policy in the New Mobility Landscape. Transportation Research Board Special Report, Issue 337, 2021, 191p https://trid.trb.org/view/1764328

- Achieving Traffic Safety Goals in the United States: Lessons from Other Nations. Transportation Research Board Special Report, Issue 300, 2010, 188p https://trid.trb.org/view/1083698

Transit Cooperative Research Program (TCRP)

- Franklin, Aarion; Bechtel, Elizabeth; Webb, Emily; Williams, Janai; Wiles, Amy. Inclusive Public Participation in Transit Decision-Making. TCRP Synthesis of Transit Practice, Issue 170, 2023, 82p https://trid.trb.org/view/2144212

- Viggiano, Cecilia; Stein, Naomi; Van Twisk, Allison. Partnerships for Equitable Pandemic Response and Recovery. TCRP Synthesis of Transit Practice, Issue 167, 2023, 70p https://trid.trb.org/view/2112912

- Thomas, Destiny N; Heer, Navjot; Mitchell, Imani Wyatt; Karner, Alex; Levine, Kaylyn; Shuster, Jonathan; Ma, Kendra. Racial Equity, Black America, and Public Transportation, Volume 1: A Review of Economic, Health, and Social Impacts. TCRP Research Report, Issue 236, 2022, 53p https://trid.trb.org/view/2015247

- Keen, David; Kyritsis, Janine; Meiser, Ellen; Rosales, Mara. Resource Guide for Improving Diversity and Inclusion Programs for the Public Transportation Industry. TCRP Research Report, Issue 228, 2021, 165p
  https://trid.trb.org/view/1864722

- Guidebook and Research Plan to Help Communities Improve Transportation to Health-Care Services. TCRP Research Report, KFH Group, Incorporated; NORC at the University of Chicago, Issue 223, 2021, 191p
  https://trid.trb.org/view/1748355

- Twaddell, Hannah; Zgoda, Beth. Equity Analysis in Regional Transportation Planning Processes, Volume 2: Research Overview. TCRP Research Report, Issue 214, 2020, 178p
  https://trid.trb.org/view/1725583

- Twaddell, Hannah; Zgoda, Beth. Equity Analysis in Regional Transportation Planning Processes, Volume 1: Guide. TCRP Research Report, Issue 214, 2020, 129p
  https://trid.trb.org/view/1721178

- Unger, Heather; Heller, Adrienne; Lane, Leigh Blackmon; Matherly, Deborah. Social and Economic Sustainability Performance Measures for Public Transportation: Final Guidance Document. TCRP Research Report, Issue 205, 2019, 151p
  https://trid.trb.org/view/1606091

Transportation Research Circulars

- Advancing Transportation Equity: Conference Summary and Action Brief. Transportation Research Circular, Issue E-C281, 2022, 21p
  https://trid.trb.org/view/2054780

- Grant, Michael; Bowen, Beverly. Opportunities for Research on Transportation and Equity. Transportation Research Circular, Issue E-C270, 2021, 40p
  https://trid.trb.org/view/1850482

- Grant, Michael; Bowen, Beverly. Summary of Transportation Research Needs Related to COVID-19. Transportation Research Circular, Issue E-C267, 2020, 83p
  https://trid.trb.org/view/1749833

- Shaheen, Susan; Cohen, Adam; Stocker, Adam; Martin, Elliot. Mobility on Demand: A Smart, Sustainable, and Equitable Future. Transportation Research Circular, Issue E-C244, 2019, 75p
  https://trid.trb.org/view/1628364

Current & Upcoming Projects

Current Projects

- ACRP 02-99 - Use of Equity and Environmental Justice Data to Support Airport Decision Making
- ACRP 11-08(21-02) - ACRP Insight Event--Issues on Systemic Racism
- BTSCRP BTS-13 - Communicating Safe Behavior Practices to Vulnerable Road Users
- BTSCRP BTS-15 - Highway Safety Behavioral Strategies for Rural Areas
- BTSCRP BTS-21 - Assessing and Mitigating Racial Disparities in the Enforcement of Pedestrian, Bicycle, and Micromobility Traffic-Related Laws
- NCHRP 08-142 - Virtual Public Involvement: A Manual for Effective, Equitable, and Efficient Practices for Transportation Agencies
- NCHRP 08-147 / TCRP B-49 - Improving Public Transportation in Rural Areas and Tribal Communities
- NCHRP 08-149 - Estimating Benefits of Closing Gaps in Active Transportation Networks
- NCHRP 08-162 - Guidance for Implementing Equitable Transportation Decision-making
- NCHRP 17-100 - Leveraging Artificial Intelligence and Big Data to Enhance Safety Analysis
- NCHRP 17-101 - Applying the Safe System Approach to Transportation Planning, Design, and Operations in the United States
- NCHRP 20-06/Topic 26-01 - Effects of Indian Treaties on Development and Operation of Transportation Facilities
- NCHRP 20-65/Task 81 - Best Practices in Rural Service Assessment
- NCHRP 23-13(06) - Assessing the Equity and Workforce Mobility Implications of the Expansion of E-commerce and Direct-to-Consumer Delivery Services

NCHRP Synthesis 20-05/Topic 53-01 - Practices to Promote Equity in Transportation Funding

- TCRP B-47 - Impact of Transformational Technologies on Underserved Populations
- TCRP H-59 - Racial Equity, Black America and Public Transportation
- TCRP H-60 - Lessons Learned from Covid-19: Strategies to Enhance Racial and Social Equity Through Public Transportation As A Community Lifeline
- TCRP J-05/Topic 20-03 - Policing and Public Transportation
- TCRP J-11/Task 41 - Pathways to Effective, Inclusive, and Equitable Virtual Public Engagement for Public Transportation
- TCRP J-11/Task 43 - Analysis of Public Transportation Health Impacts and Benefits
- TCRP Synthesis J-07/Topic SB-37 - Transit Agency Goals and Non-Traditional Performance Indicators Focused on Equity

Upcoming Projects

- NCHRP 08-130 - Best Practices in Coordination of Public Transit and Ride Sharing
- NCHRP 08-150 - Valuation of Transportation Equity in Active Transportation and Safety Investments
- NCHRP 08-152 - Strategies for Improving Diversity, Equity, and Inclusion in the Transportation Planning Profession

- NCHRP 08-155 - Handbook for Addressing Racial Disparities in the Project Delivery Process
- NCHRP 08-158 - A Compendium for Communicating the Value of Freight and Community Interactions
- NCHRP 08-159 - How to Assess and Address Equity of Access to Essential Goods and Services
- NCHRP 08-160 - Guide to Identify and Mitigate the Negative Effects of Gentrification Caused by Transportation Investment
- NCHRP 08-161 - Cultivating Accountability Through Meaningful Public Engagement
- NCHRP 08-166 - Racial and Economic Inequities in Active Transportation Safety
- NCHRP 08-169 - Valuing Diversity, Equity, and Inclusion in Transportation Asset Management
- NCHRP 19-22 - Equity Impacts of Transportation Revenue Mechanisms and Changing Trends
- NCHRP 20-24(141) - Administration of Highway and Transportation Agencies. The Art of Decision Making
- NCHRP 20-24 (146) - Guide to Supporting and Sustaining Transportation Grant Programs for Local Governments and Tribes
- NCHRP 20-123(19) - A Research Roadmap for Institutionalizing Transportation Equity
- TCRP D-23 – Guidebook for Planning and Constructing a Small and Rural Tribal Transit Facility
- TCRP J-05/Topic 21-01 - Update of Legal Research Digests Regarding Civil Rights, Privacy, and Other Related Digests
- TCRP J-11/Task 44 - Improving Access to Public Transportation Services and Facilities with Transit-Oriented Complete Streets

TRB Committees & Panels

TRB Standing Committees *(Search by transportation mode and committee topic)*

- AJE60 - Contracting Equity
- AJL20 – Transit and Intermodal Transportation Law
- AL000 – Legal Resources Group
- AME10 - Equity in Transportation
- AME20 - Women and Gender in Transportation
- AME30 - Native American Transportation Issues
- AME50 - Accessible Transportation and Mobility
- AME80 - Community Resources and Impacts
- AP055 - Rural Public and Intercity Bus Transportation
- B0154 - Review Evidentiary Protection for Public Transportation Safety Program Information
- B0176 - Data, Metrics, and Analytic Methods for Assessing Equity Impacts of Surface Transportation Funding Programs

Past and Upcoming Events

- International Conference on Road Weather and Winter Maintenance
  May 9-10, 2023
  Washington, D.C.
- TRB International Conference on Low Volume Roads
  July 23-26, 2023
  Cedar Rapids, IA
- TRB Conference on Women and Gender in Transportation
  2024
- Second TRB Conference on Advancing Equity in Transportation
  2024

Upcoming Webinars

- TRB Webinar: Getting the Facts Straight about the DBE Program
  July 13, 2023
- TRB Webinar: Community-Based and Equitable Transportation Response in Disaster
  July 19, 2023

Past Conferences

- TRB Transit Safety and Security Conference and APTA Mid-year Safety and Security Seminar
  November 17-18, 2020
- Conference on Advancing Transportation Equity
  September 9-14, 2021

Past Webinars

- TRB Webinar: Pedestrian Crash Factors, Trends, and Treatments
  June 13, 2023
- TRB Webinar: Equity in Artificial Intelligence Applications
  May 22, 2023
- TRB Webinar: New Minimum Pavement Marking Retroreflectivity Rule
  May 24, 2023
- TRB Webinar: Career Series #3 – Transportation Equity: Community-Building in Action
  March 22, 2023
- TRB Webinar: Advancing Transportation Equity—Key Insights from 2021 and Looking to 2024
  March 9, 2023
- TRB Webinar: How DOTs Manage to Keep Maintenance Workers Safe
  February 9, 2023
- TRB Webinar: Safer Intersections for Pedestrians and Bicyclists
  October 25, 2022

- TRB Webinar: Microtransit—Innovation in Rural Mobility
  October 20, 2022
- TRB Webinar: Enhancing Public Health Equity through Transportation
  June 8, 2022
- TRB Webinar: Chemical Treatments on Low-Volume Roads
  March 3, 2021
- TRB Webinar: Balancing the Scales--Equity Analysis in Transportation Planning
  October 22, 2020
- TRB Webinar: Advancing Transportation Equity
  October 13, 2020
- TRB Webinar: Human Trafficking and Mobility of Missing and Murdered Indigenous Women
  July 29, 2020
- TRB Webinar: Exploring equity implications of emerging transportation technologies
  March 19, 2020

National Academies of Sciences, Engineering, and Medicine Products

NASEM Resources

- Diversity, Equity, and Inclusion Collection (searchable collection back to 1989)
- Diversity and Inclusion in STEMM Collection (searchable collection back to 2014)
- Resources on Diversity, Equity, and Inclusion (website)

NASEM Publications

- Advancing Antiracism, Diversity, Equity, and Inclusion in STEMM Organizations
- Intergenerational Poverty and Mobility Among Native Americans in the United States
- Reducing Racial Inequality in Crime and Justice
- Suicide Prevention in Indigenous Communities
- Promoting Health Equity in Cancer Care
- Structural Racism and Rigorous Models of Social Inequity
- Addressing Structural Racism, Bias, and Health Communication as Foundational Drivers of Obesity
- The Impact of Juvenile Justice System Involvement on the Health and Well-Being of Youth, Families, and Communities of Color
- The Effects of Drug Control Policies on Individual and Community Health for People of Color
- Understanding and Offsetting Financial Barriers for Black Students in Science, Engineering, and Medicine
- Improving Representation in Clinical Trials and Research: Building Research Equity for Women and Underrepresented Groups

- Communities, Climate Change, and Health Equity
- Community Power in Population Health Improvement
- Service Life Assessment and Predictive Modeling for an Aging Critical Infrastructure
- Advancing Maternal Health Equity and Reducing Maternal Morbidity and Mortality
- Harnessing the Value of Co-Creating and Stewarding Places for Health, Equity, and Well-Being
- Population Health in Rural America in 2020
- Understanding and Communicating about COVID-19 Vaccine Efficacy, Effectiveness, and Equity
- Fostering Diversity, Equity, and Inclusion in Neuroscience Training
- The Future of Nursing 2020-2030 - Charting a Path to Achieve Health Equity
- Addressing the Drivers of Criminal Justice Involvement to Advance Racial Equity
- Building Educational Equity Indicator Systems - A Guidebook for States and School Districts
- Racial Justice, Diversity, Equity, and Inclusion in Neuroscience Training

TRANSPORTATION RESEARCH BOARD

June 14, 2023

MEMORANDUM

TO: Members, TRB Executive Committee
FROM: Russell Houston
SUBJECT: January 2024 & June 2024 Executive Committee Policy Sessions

The Executive Committee is asked to approve topics for both its January 2024 and June 2024 Policy Sessions. In addition to background on the Subcommittee on Planning and Policy Review's (SPPR's) policy session discussion in April, this memo includes the Subcommittee's recommendations for the topics for the next two upcoming sessions. Appendix A of this memo includes a list of past policy session topics.

Policy Sessions and Critical Issues

During the SPPR's April meeting it discussed formally tying future policy session topics to those addressed in TRB's upcoming version of TRB's Critical Issues document. The June 2023 Policy session, which addresses traffic safety, is consistent with this new strategy. In addition, the SPPR recommended that the sessions should better engage with TRB committees and other parts of the National Academies of Sciences, Engineering, and Medicine that are addressing topics related to policy sessions and, whenever possible, showcases the work TRB and the Academies has done or is doing related to the policy session topic. Finally, the SPPR recommended that the presentations at the sessions be recorded and made available as part of TRB's "Straight to Recording" Webinar Series.

January 2024, Policy Session on Workforce– *Action*

The Subcommittee on Planning and Policy Review (SPPR) recommends that the Executive Committee explore transportation workforce challenges as the topic for the January 2024 Policy Session. Workforce is one of the 12 major themes for the upcoming version of TRB's Critical Issues document.

According to the U.S. Bureau of Labor Statistics, overall employment in transportation and material moving occupations is projected to grow 6 percent from 2021 to 2031, about as fast as the average for all occupations; this increase is expected to result in about 861,800 new jobs over the decade. In addition to new jobs from growth, opportunities arise from the need to replace workers who leave their occupations permanently. More than 1.9 million openings each year, on average, are projected to come from growth and replacement needs.

NATIONAL ACADEMIES *Sciences Engineering Medicine*

Issues to be addressed during the session could include the following:

- How do we make transportation an attractive option for those entering the workforce, given that we are facing shortages of both operators and professional staff in all modes?
- How do we learn from other fields and retrain the existing workforce to use, maintain, and deploy new technologies in transportation?
- What policy issues are raised and need to be addressed to respond to changes in labor dynamics that are happening across industries?

June 2024, Policy Session on Advancing Public Health– Action

The Subcommittee on Planning and Policy Review (SPPR) recommends that the Executive Committee explore transportation workforce challenges and potential solutions as the topic for the June 2024 Policy Session. Advancing Public Health is one of the 12 major themes for the upcoming version of TRB's Critical Issues document.

Recent years have highlighted the importance of robust public health to a thriving society, in addition to the inequities inherent in access to necessary health services. Not only are infectious diseases relevant to societal health, but so are daily activity, clean air and water, and access to healthcare systems. The transportation system has the potential to affect all these factors.

This session would draw upon work done by the National Academy for Medicine and the National Research Council's Health and Medicine Division.

Issues to be addressed during the session could include the following:

- How can public health planning and outcomes, along with public health policy makers, be better incorporated into transportation planning and decision making? What are appropriate metrics for measuring health outcomes as part of the transportation planning process?
- Which pollution mitigation measures can be justified and which measures need more research to reduce health risks for those living near major transportation facilities?
- What are the risks of becoming infected, whether with covid-19 or any other virus, while traveling by shared modes? How do protection and mitigation measures, including improved ventilation and queuing models, change these risks?
- With what we have learned about alternatives to traditional healthcare-oriented transportation, such as telehealth through broadband access, are these alternatives substitutes or complements for policies focused on providing mobility for health services, including providing access to hospitals?

Attachment 1

Past Session Topics

Date	Topic	Rapporteur
1/88	Current Status & Future Outlook for Air, Rail, Trucking, Highway, Urban, & Water Transportation	Hoel & Koltnow
6/88	Small Group Discussion of Exec. Comm. Policy Initiatives	
1/89	Marine & Intermodal Transportation	Hoel
6/89	Transportation Response to Problems of Air Quality	Paaswell
1/90	High-Speed Ground Transportation	Walton
6/90	Relationship Between Transportation & Economic Development	Wolpert
1/91	The Environmental Imperative, Fuel Use, & Surface Transportation Funding	Sussman
6/91	Air Passenger Transportation: Congestion Pricing for Airports	Harris
1/92	Transportation Policy Research Priorities for the 1990s (USDOT Associate Administrators for Policy)	Lamm
6/92	International Economic Development & U.S. Transportation	Walton
1/93	U.S. & International Efforts to Assist Russia & Other Former Soviet Republics on Transportation-Related Problems	Borrone
6/93	Implications of U.S. Defense Conversion for Transportation	DeLong
1/94	Transportation Policy Priorities to Support a National Transportation System	Millar
6/94	The "Green" Car: Technological, Institutional, & Environmental Issues	Yerusalim
1/95	Intermodal Freight Transportation: Barriers, Linkages, and New Technologies	Wormley
6/95	Financing Transportation in the Post-ISTEA Era	Kelly
1/96	ISTEA: Impacts and Issues for Reauthorization	Wachs
6/96	Cross-Border Transportation Issues	Martinez
1/97	Institutional Arrangements for Transportation: Impacts of Changing Roles	Sterman
6/97	Effects of the Federal Role on the U.S. Aviation System: Current Status, Prospects for & Barriers to Change	Riniker
1/98	Zero-Car Households: Strategies To Improve Mobility & Accessibility for the Carless	Fitzgerald
6/98	Land Use and Transportation: Relationships and Trends	Gilbert
1/99	The Clean Air Act: Goals, Issues, & Impacts on Transportation	Winstead
6/99	Industry Consolidation: Regulatory Issues, Cross-Modal Comparisons	McCaig
1/00	Approaches to Achieving Advances in Transportation Safety	Canby

Date	Topic	Rapporteur
6/00	Transportation Implications of E-Commerce and Telecommunications Technology	Giuliano
1/01	A System Wide View of Transportation Finance	Campbell
6/01	Freight Transportation in the U.S. Economy: Capacity Issues and Operating Challenges	Wilding
1/02	U.S. Petroleum Dependence: Issues and Prospects for the Transportation Sector	Frosch
6/02	Work Force Development and Staffing Needs in Transportation	Meyer
1/03	Decision-Making Processes for Public Sector Transportation Investments	Kirby
6/03	Transportation Security Initiatives: Balancing Public Perceptions, Political Expectations, and Practical Applications	Rebensdorf
1/04	The Impact of Global Warming on Transportation	Kanafani
6/04	Shifting Patterns and Growth of Global Trade: Implications for the Transportation System	Shucet
1/05	Innovative International Roadway Safety Initiatives	McNeil
6/05	How Should America Pay for Transportation?	Morris
1/06	Raising the Public Profile of Transportation	Butler
6/06	20th Century Institutions Mismatched to 21st Century Missions	Miller
1/07	The Energy Component of Transportation Sustainability	Gittens
6/07	Innovative Transportation Performance Measures	Garber
1/08	Public-Private Partnerships: With an Emphasis on Equity	Rosenbloom
6/08	The Role of Transportation in Climate Change Mitigation	Johns
1/09	Key Issues in Transportation and Climate Change	N/A
6/09	Issues and Perspectives on Water Transportation	Scalzo
1/10	Dialogue with the U.S. DOT Deputy Secretary	
6/10	Definitional Issues Related to the Concept of Livability	Clark
1/11	Multimodal Freight Policy, Corridor-Level Priorities, and Funding Strategies	Conti
6/11	Financing and Funding Transportation in a Transitional Period	Seltzer
1/12	Inland Waterway Transportation: Issues, Challenges, Opportunities	Hancock
6/12	New Information and Telecommunication Technology Applications to Transportation: Opportunities and Challenges	Sperling
1/13	International Research Activities: Issues, Priorities, and Lessons Learned	Sinha
6/13	Energy: Transportation Fuels and Sources	Hendrickson
1/14	Session on Aviation Issues: Challenges and Opportunities	Arroyo
6/14	Connected Vehicles—A Pathway to Automation	Washington

Date	Topic	Rapporteur
1/15	Big Data	Fotheringham
6/15	The Intersection Between Urban Goods Movement, Smart Growth, and Public Health	Breakouts
1/16	Advancing Public Health Through Transportation: Challenges, Opportunities, and Lessons Learned	Breakouts
6/16	Cyber Security in an Age of Transformational Technology	Breakouts
1/17	Climate and Extreme Weather Resilience	Houston
6/17	Smart Cities and Transportation	Breakouts
1/18	Public Transportation: Challenges and Opportunities	Breakouts
6/18	Electric Vehicles	Breakouts
1/19	Transportation's Role in the Wellbeing of Rural Communities	Breakouts
6/19	Distraction	Breakouts
1/20	Artificial Intelligence	Breube
8/20	Urban Air Mobility	Virtual
1/21	The Impact of COVID-19 on Personal Mobility and Social Equity	Virtual
7/21	Racial Equity	None
1/22	Decarbonization of the Transportation Sector	None
6/22	Reimagining Good Movement	None
1/23	Successful Megaprojects	None

Diversity, Equity, and Inclusion (DE&I) Strategic Plan Update
Transportation Research Board

Mission
TRB's Diversity, Equity, and Inclusion (DE&I) Initiative's mission is to create and foster an inclusive environment that leads to increased diversity of participants in TRB and equitable outcomes for the transportation system.

Background
The TRB Executive Committee adopted an Inclusion and Diversity Strategic Plan in January 2018. The plan was updated to include equity in fall 2020. The TRB Special Committee on DE&I has been charged with monitoring implementation of the Plan and proposing revisions as appropriate. The Committee meets quarterly, monitors progress on the plan's strategies and action items, and reports to the TRB Division Committee and the TRB Executive Committee. The committee's membership is representative of TRB's major oversight committees and stakeholders and every effort is made to ensure racial, ethnic, gender, and ability diversity of the committee's membership. The TRB DE&I Strategic Plan, newly updated and approved at the June 2022 Executive Committee meeting, provides a roadmap and explanation for achieving this mission.

Membership
The Special Committee chair is Tanisha Hall, Fairpointe Planning, and the members are as follows:

- Gloria Bender, TransSolutions
- Alva Carrasco, WSP
- George (Avery) Grimes, Patriot Rail Company: Chair of TRB's TAC
- Joey Goldman, Kearns & West
- Chris Hendrickson, Carnegie Mellon University: Chair of the TRB Division Committee, Member of the Executive Committee and SPPR
- Hyun-A Park, Spy Pond Partners
- Kevin Pete, Texas Department of Transportation

Working Definitions
This plan uses the following definitions for diversity, inclusion, and equity:

- Diversity is defined as the broad spectrum of experiences, cultures, and physical attributes within a community, including but not limited to race or ancestry, national origin, religion, age, ability, gender, gender identity or expression, sexual orientation, socioeconomic status, or perspective.
- Inclusion means that all individuals and groups are welcomed, valued, respected, and supported equally as they contribute to the mission and success of a community.
- Equity is the absence of barriers, biases, and obstacles that impede equal access, fair treatment, and opportunity by all members of a community.

Updates on Strategies and Associated Action Items
The following are the seven strategies and associated actions that have been accomplished or are underway in TRB between the period of January 1-May 31, 2023:

Strategy 1
Ensure equitable opportunities for all involved in TRB and implement strategies and resources that are used to recruit, welcome, and actively involve more diverse committee and panel members.

- The Office of Diversity and Inclusion released a new toolkit, Inclusive Practices for Collecting Demographic Information, as part of its effort to foster a culture of inclusion and respect among staff, volunteers, and Academy members.
- Data trends from the past three years show incremental progress in diversifying committees and panels, especially among groups that have been historically underrepresented. Both staff and volunteer leadership continue to prioritize diversity when recruiting new members of committees and panels.

Strategy 2
Engage with transportation-related organizations and other appropriate organizations that serve groups that are underrepresented in TRB (e.g., minority groups, women, people with disabilities) to increase their members' awareness of and participation in TRB.

- Through TRB's MOUs with Latinos In Transit (LIT) and the Conference of Minority Transportation Officials (COMTO), TRB staff have sought to recruit volunteers for CRP panels and TAD standing committee. Other efforts include:
    - Victoria Sheehan will be speaking at the COMTO Annual Meeting, TRB staff attended COMTO's annual Women Who Move the Nation event in April, COMTO will highlight TRB's *Equity Impacts of Surface Transportation Funding* study in its *Accelerate* magazine, and COMTO's CEO is a member of a TCRP panel and attended the TCRP Oversight and Project Selection Commission meeting this month.
    - TRB is planning a transportation planning equity panel at LIT's annual Leadership Summit in September, and LIT is participating in the planning of TRB's 2024 Conference on Advancing Transportation Equity.
- In addition to TRB's MOU partners, TRB works with other organizations, including Historically Black Colleges and Universities, Intertribal Transportation Association, National Society of Black Engineers, Society of Women Engineers, National Rural Transit Assistance Program, and the Society of Hispanic Professional Engineers to recruit diverse CRP panel members and encourage participation in standing committees.

Strategy 3
Create opportunities for everyone to make connections and feel included, welcomed, and able to participate equitably at the Annual Meeting, specialty conferences, and committee meetings.

- Continued improvements in engagement of TAD standing committee members and chairs by gender, ethnicity, international status, and young professional status. Among chairs in TAD, 44% are women and 9% are American Indian/Native American, African American/Black, or Hispanic. In CRP, 40% are women and 16% are American Indian/Native American, African American/Black, Hispanic, or Native Hawaiian/Other Pacific Islander.

Strategy 4
Achieve greater diversity among TRB contractors and their lead staff, whether they are research consultants or suppliers.

- The CRPs continue to ask organizations submitting proposals about how their team would bring a diverse and inclusive approach to their research, and policies or programs that they have in place to promote diversity and inclusion.

Strategy 5
Identify and minimize barriers to achieving greater TRB staff diversity and assure opportunities for career advancement for diverse staff.

- The National Academies' Director of Workforce Diversity and Inclusion is standing up its second employee resource group (ERG) for LGBTQ+ staff and their allies. An ERG is a staff-led group of people who share any dimension of diversity.
- NASEM and TRB HR are continuing to increase staff diversity by advertising NASEM job opportunities in publications that target diverse population, piloting a program for interns from underrepresented populations, and hosting dialogues with staff around DE&I topics.
- NASEM's Office of Diversity and Inclusion (ODI) launched its first DEI-focused, customized training series for staff called DEI at the National Academies: A 5-Part Microlearning Series.
- ODI launched its 5-year DEI Action Plan for NASEM that aims to build organizational capacity by enhancing related policies and empowering staff with DEI tools and resources.

Strategy 6
Ensure that TRB's programmatic activities (e.g., convening and other technical activities, consensus activities, and research projects) address diversity, equity, and inclusion and ensure results are disseminated.

- The Executive Committee's June 2023 policy session focuses on the disproportional representation of BIPOC populations in traffic fatalities, and potential solutions across all levels of government and community organizations.

- The CRPs have a robust array of projects in progress that address DE&I-related topics. A sample includes the following:
    - Communicating Safe Behavior Practices to Vulnerable Road Users (BTSCRP)
    - Assessing and Mitigating Racial Disparities in the Enforcement of Pedestrian, Bicycle, and Micromobility Traffic-Related Laws (BTSCRP)
    - Improving Airport Organizational Practices to Enhance ACDBE/DBE Participation (ACRP)
    - Incorporating Environmental Justice and Equity Principles and Data into Airport Decision-Making (ACRP)
    - Improving Public Transportation in Rural Areas and Tribal Communities (TCRP)
    - Tactile Wayfinding in Transportation Settings for Travelers Who Are Blind or Visually Impaired (TCRP)
    - Digitizing Bicycle and Pedestrian Treatments for Promoting Active Transportation Equity and Safety (NCHRP)
    - Methodologies for Identifying and Evaluating Transportation Infrastructure that has Historically Divided Communities (NCHRP)
- Recently published reports and projects from the CRPs that address DE&I-related topics include the following:
    - Assessing Airport Programs for Travelers with Disabilities and Older Adults (ACRP)
    - Inclusive Public Participation in Transit Decision-Making (TCRP)
    - Promoting Older Driver Safety: Guide for State Practices (BTSCRP)
    - Fare-Free Transit Evaluation Framework (TCRP)
    - Developing an Airport Program to Address Human Trafficking: A Guide (ACRP)
    - Partnerships for Equitable Pandemic Response and Recovery (TCRP)
    - Systemic Inequality in the Airport Industry: Exploring the Racial Divide (ACRP)
- TRB's website continues to host DE&I-related snap searches on accessibility, social equity and underserved populations, and tribal transportation. These searches include all recent reports, projects, and other resources in those areas.
- During its spring 2023 meeting, the Marine Board discussed DE&I topics within the context of workforce education, training, development, and retention during its focus sessions and as part of a technical tour of Newport News Shipbuilding.
- The Committee on Data, Metrics, and Analytic Methods for Assessing Equity Impacts of Surface Transportation Funding Programs is wrapping up its consensus report which will be entering review in late summer 2023.
- TRB's programs that support and recognize students continue to grow and thrive: Planning for the Minority Students Fellows 15th cohort of fellows is in full swing with up to 25 fellows expected from 18 schools.

- Transportation Research Record (TRR) staff continue to maintain the following open-access collections:
    - TRB Graduate Research Award Program on Public-Sector Aviation Issues: papers from the 2010-2022 cohorts of award recipients;
    - COVID-19 and Transportation: papers covering the impact of the virus on transportation; and
    - Publications by TRB Minority Student Fellows: papers from the 2010-2023 cohorts of fellows' papers accepted for TRR publication.
- TRB hosted a three-part webinar series (first, second, and third) on attracting a diverse community of younger people to transportation careers. The series had over 300 attendees and high satisfaction ratings.
- Other DE&I webinars include: Fare-Free Transit Policies and Programs—An Evaluation Framework; Advancing Transportation Equity; and Equity in Artificial Intelligence Applications.

Strategy 7

Improve existing data, information, and communication mechanisms to support all strategies.

- TRB Communications staff and TAD standing committees highlighted transportation issues relative to nationally recognized diversity months: Black History Month (February), Women's History Month (March), and Asian Pacific American Heritage Month (May).
- *TR News* continues its regular column to highlight DE&I initiatives and leaders both in TRB and around NASEM.
- The TRB Executive Committee's Subcommittee on Planning and Policy Review and TRB staff are completing a draft of the *Critical Issues* document. It includes many DE&I-related issues, with equity woven into the document's discussions about safety, public health, the environment, workforce needs, and more. The document will be released by the end of 2023.
- The Committee on Accessible Transportation and Mobility and the Committee on Rural, Intercity Bus, and Specialized Transportation are finalizing a *TR News* theme issue that focuses on transportation needs of those with disabilities, barriers to accessible transportation, and advances since passage of the ADA. The issue is due out July 2023.
- TRB blogs, reports, and activities are regularly featured on the DEI Homepage of the National Academies.
- TRB's Communications Department released or updated the following articles on its blog:
    - Making Travel More Equitable for People with Disabilities
    - Transportation Fights Back against Human Trafficking
    - Building Socioeconomic Equity through Transportation Research
    - TRB Minority Student Fellows Program Strengthens the Transportation Community

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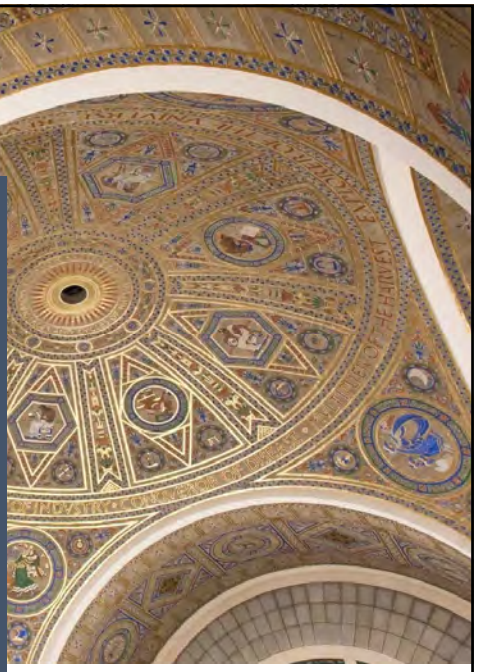
Executive Subcommittee on International Activities:

2023 Mid-Year Report to TRB Executive Committee

Randy Iwasaki, Iwasaki Consulting Services and Chair of Subcommittee



JUNE 2023 UPDATE

1

2023 Executive Subcommittee Activities, thus far

- Subcommittee meetings in January 2023
  - Discussed Annual Report of TRB International Activities
  - Reviewed upcoming events with partners
  - Explored with Victoria Sheehan subcommittee priorities for 2023
- Subcommittee meeting February 26, 2023
  - Reviewed and considered implementation of 2023 objectives for the subcommittee
  - Established a working group to define the structure, purpose, and role of the subcommittee and its members
  - Established a working group to propose criteria for evaluating new and existing agreements with international partners
- International Agreements -
  - Finalized renewed agreement with China Highway and Transportation Society (CHTS) which expires in 2023
  - Additional suggested agreements are on standby until after the evaluation criteria is approved

2

2

Subcommittee Structure, Role and Purpose

Working Group Members include:
Katie Turnbull, TTI
Dan Sperling, UC Davis
King Gee, AASHTO
Christos Xenophontos, RI DOT
Sam Elrahman, Rensselaer Polytechnic Institute
Randy Iwasaki, Iwasaki Consulting Services

Draft proposal for review was provided to Randy Iwasaki, Victoria Sheehan, Russell Houston and the Working Group on June 8th

The Purpose of the Subcommittee Remains: which was charged with advising the Executive Committee and Executive Director on TRB's international activities, reviewing partnership agreements with key international organizations, encouraging increased international elements of some cooperative research projects with an interest to increase cross-border collaboration, and proposing a five-year strategic plan for TRB international activities. A goal is to monitor how well TRB's efforts complement and support the international interests and activities of all its sponsors and of its parent organization, the National Academies of Sciences, Engineering, and Medicine—and whether those ties can be strengthened.

Structure of Subcommittee:
- Limit the number of members and ex officio liaisons
- Retains a level of expertise and knowledge to achieve its purpose and functions implementing the Strategic Plan
- Limit the number of years of service and the number of terms served
- Include qualifications for members and liaisons

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Subcommittee Structure, Role and Purpose

Subcommittee members and liaisons should –
- Advise the Executive Committee and Executive Director on TRB international activities
- Support the growth of TRB's influence globally
- Collaborate on the activities of the International Coordinating Council
- Evaluate the quantitative and qualitative effects TRB's international activities have on research and practice, TRB programs and resources, TRB Critical Issues, and TRB and NASEM missions
- Support drafting an annual report of the TRB international activities
- Attend meetings of the Executive Subcommittee

Subcommittee relationship with International Coordinating Council: To assist the Executive Subcommittee succeeds with its purpose and functions it is to coordinate and collaborate with the TRB International Coordinating Council (ICC). The International Coordinating Council concentrates on the evolution of an international perspective, practices, and research in all facets and services of all modes of transportation. The Council brings together experts from the TRB technical committees and external organizations to promote within the Technical Activities committee structure important issues affecting the safe and secure movements of goods and people in the United States and around the globe. The primary functions of the ICC are to coordinate international activities strategies into implementation, communicate with and advise committees on practice and research, and convene experts to discuss and consider the critical and emerging issues with the scope of the Council.

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Evaluation Criteria for International Agreements

Working Group Members include:

Katie Turnbull, TTI
Dan Sperling, UC Davis
King Gee, AASHTO
Chris Hendrickson, Carnegie Melon University
Stephen Kern, FHWA
Randy Iwasaki, Iwasaki Consulting Services

Draft proposal for review has been provided to Randy Iwasaki, Victoria Sheehan, Russell Houston and the Working Group before this meeting.

Industry norms are to develop criteria for evaluating partnerships based on principles aligning with an organization's mission and strategic plan.

Examples of principles for the criteria –

- Criteria lists should be simple, concise, and descriptive.
- Criteria should not contradict each other.
- Criteria should not enable an overburdening of resources, services, and staff.
- Criteria must enable action.
- Criteria should signal when an agreement should be terminated.

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Evaluation Criteria for International Agreements

Example of International partnership criteria:

1. The primary purpose of the partnership would be to leverage and share knowledge and expertise for greater international perspectives.
2. The potential partner is renowned, respected and trusted.
3. The potential partner has a similar mission and strategy.
4. The potential partner will provide its own resources and volunteers to achieve joint and multilateral activities.
5. An international agreement with the potential partner will result in mutual benefits.
6. Rate the potential impact of a partnership against existing partnerships, TRB core functions, and the strategic plan.

The draft proposal will evaluate whether to enter into a new agreement and evaluate the effectiveness throughout the life of the agreement: (1) Emerging Partnership, (2) Developing Partnership, and (3) Increasing Partnership Activities. Structured as a matrix or rubric, the assessment will show how well the two organizations –

- Share Vision and Mission
- Leverage Stakeholders
- Define Roles and Responsibilities
- Respect and Share Benefits
- Communicate and Promote Activities
- Assess/Measure Activities and Reflect on Outcomes
- Support a Sustainable Agreement

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Highlights of 2023 International Activities, thus far

TRB Co-sponsored the World Bank's *Transforming Transportation* conference held March 14-15 in Washington, D.C. Victoria Sheehan and Committee Members presented in sessions.

The World Bank agreed to support (financially sponsor) one or two international students—African students at first—in TRB Minority Fellows Program.

ITF Annual Summit, May 24-26, 2023, Leipzig, Germany

- TRB Co-sponsored: staff and volunteers participating in the planning of the agenda and TRB administered a Call for Abstracts process.
- Victoria Sheehan participating in a Plenary Session and moderated a Research Session
- Committee Members spoke in Research and Policy Sessions
- First year ITF included Research Sessions in the Summit Program; planned in partnership between ITF, European Commission, TRB, ECTRI, and WCTRS

World Road Association (PIARC):

- TRB, FHWA, AASHTO, CEDR and ECTRI partnered to organize three Foresight Session to be convened at the *World Road Congress 2023*, Prague, Czech Republic. Themes accepted include: 1) *Perspectives on the logistics sector in the 2030s; 2) Electric vehicles and charging infrastructure;* and *3) Equity*
- FHWA, AASHTO and TRB joint host the USA Booth in the Exhibit Hall: TRB is organizing and shipping booth materials; Victoria Sheehan will represent TRB in the USA Booth
- Victoria Sheehan will speak in a *Gender Inclusion Foresight Session* organized by Caroline Hays, TX DOT

WCTR Montreal 2023, July 17-21, includes Victoria Sheehan participating on a Keynote Special Session

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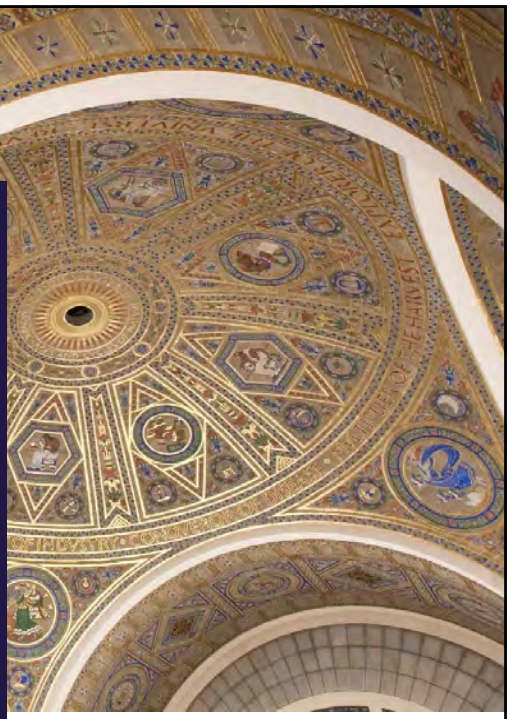

Marine Board of the Transportation Research Board

TRB Executive Committee Meeting *June 2023*

Dr. Craig Philip, NAE, Chair
Dr. Sandra Knight, Vice Chair
Scott Brotemarkle, Marine Board Program Director
Tess Austin, Marine Board Staff

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Marine Board of the TRB

Formed in 1965 to serve the national interest by providing a forum for the identification of research and development needs and information exchange concerning technologies, policies, economics, the environment, and other issues affecting the marine transportation system and offshore industries.

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Core Sponsors of the Marine Board

- U.S. Coast Guard
- U.S. Army Corps of Engineers*
- National Oceanic and Atmospheric Administration/National Ocean Service
- Bureau of Safety and Environmental Enforcement
- Maritime Administration
- Office of Naval Research/U.S. Navy
- Supervisor of Salvage & Diving, Naval Sea Systems Command/U.S. Navy

*denotes TRB Core Sponsor in addition to Marine Board Sponsor

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2023 Marine Board Areas of Interest

- Emerging Technologies and Potential Impacts on Maritime
- Environmental Justice and Social Equity in the Marine Transportation System
- Future of the Maritime Supply Chain
- Maritime Resilience
- Towards Zero Emissions Shipping
- U.S. Offshore Wind Energy Development
- U.S. Maritime Policy

Crosscutting Elements

- Human and Intellectual Capital / Workforce Diversity Equity, and Inclusion
- Safety Management, Culture and Inspections
- Cyber in the Marine Transportation System

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2023 Call for Nominations – Deadline June 30

- 3 Available Board Positions
- Rotating Members are Lee Kindberg (Maersk) and Dale Sause (Sause Bros.)
- One additional vacancy resulting from resignation of Anil Markose (Amazon)
- The Marine Board is seeking expertise in the following broad areas:
- Shipping Line Operations
- Barge Line Operations
- Maritime Transportation System Infrastructure, Policy, and Operations
- Looking ahead: 2024 Rotating Members include: Craig Philip, Hilde Meersman, Sean Pribyl, Sylvie Tran

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Marine Board Spring 2022 Meeting Agenda
Norfolk VA - April 17-19, 2023

- Current US Shipbuilding & Repair Industry and its Workforce
- Technical Tour of Newport News Shipbuilding Apprentice School and Dockside Facilities
- The Importance of Early Childhood Education for the Maritime Workforce – Mariners' Museum
- Maritime Industry Workforce Challenges - Rear Admiral Ann Phillips, Maritime Administrator, U.S. Maritime Administration
- Opportunities and Challenges for Coastal Virginia Offshore Wind – Workforce Development and Industry Partnerships
- Port of Virginia Decarbonization Plan – NetZero by 2040
- Landside Facility Tour of NIT
- Harbor Tour of Norfolk Maritime Facilities Aboard the *American Rover*
- Maritime Transportation Resilience in Hampton Roads: Sea Level Rise and Flood Risk Mitigation
- Tour of NOAA Marine Operations Center - Atlantic (MOC-A)

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Marine Board Spring 2022 Virtual Sponsor Updates
June 14, 2023

Topic: Workforce Development and Education/Training Pipelines

Participants

- USCG Talent Transformation & Prevention Workforce Efforts
  – Ms. Katie Burkhart, Senior Advisor, Prevention Policy (CG-5P)
- Briefing on BSEE's national training program which is focused on training BSEE inspectors and engineers
  – Ms. Elizabeth Kramar, BSEE National Offshore Training Center (NOTC)
- ONR efforts focused on workforce development and education/training pipelines
  – Dr. Thomas Fu, Head of the Mission Capable, Persistent and Survivable Naval Platforms Department, ONR
- NOAA Workforce Development and Education/Training Pipelines
  – Heather Gilbert, Senior Advisor, NOAA
- MARAD Workforce Development and Education/Training Pipelines
  – Todd Ripley, Office of Safety, MARAD

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Marine Board Fall 2023 Meeting
November 13-14, Keck Center, Washington, D.C.

- Build focus sessions that directly address sponsor agency research areas raised in leadership meetings
- Make this offer to all sponsors and create shorter panels that include sponsor senior leader, a Marine Board member, and an industry representative.
- Outcomes form these panels inform the development of more technically specific workshop or consensus study prospectuses directed at salient and specific issues.

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2023 Marine Board Convening Event Participation

- Seventh Biennial Conference on the Marine Transportation System Innovative Science and Technologies Toward Greater Sustainability, June 2023, Washington, D.C.
  – *Dr. Lee Kindberg, Marine Board Member, is Conference Chair.*
- Society of Naval Architects and Marine Engineers (SNAME) Convention, September 2023, San Diego, CA
- 2022 Maritime Risk Symposium – U.S. Coast Guard
  November 14-16, 2023, SUNY Maritime College, New York, NY

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Young Members Coordinating Council Report, June 2023

In its fourteenth year, the Young Members Coordinating Council (YMCC) has continued to develop and promote opportunities for involvement, resources, connections, and representation at all levels of TRB.

Organization

YMCC is one of four Coordinating Councils and continues to have representation from most TAC Groups, although, the level of participation varies. Some newly established Group level subcommittees began meeting at the 2021 January Annual Meeting and continue building momentum with various initiatives. Other new Group subcommittees are still under consideration.

Dr. Eleftheria (Ria) Kontou effectively assumed the YMCC Chair position on April 15, 2021, and is now in the final year of her term. Efforts are underway to identify the next Chair to effectively begin April 2024.

Under Dr. Kontou's leadership, YMCC continues to hold periodic meetings and to promote and maintain young professional involvement through efforts including:

- Technical feedback to encourage young members' TRB engagement and involvement shared with Group/Section leadership, TAC, and Executive Committee;
- Engaging other Coordinating Councils and Standing Committees to explore areas for collaboration and engagement of young professionals' perspectives;
- Organization of events and activities that encourage young members to increase their research visibility and practice their scientific communication skills & mentorship programs.

The YMCC Chair continues to serve as an active member of TAC and ex officio member of the Executive Committee. This action has helped establish young member representation at all levels and spheres of TRB, offering the opportunity to share young member input and to communicate directly back to young members with relevant information.

2023 Annual Meeting Activities

YMCC and the Group Subcommittees continued to be actively engaged in leading a variety of program elements during January, including:

- Meetings of Young Members Coordinating Council and the following Group-level Young Member Subcommittees: Aviation, Freight Systems/Marine, Policy and Organization, Public Transportation, Safety and Operations, Sustainability and Resilience, Transportation Infrastructure;
- YMCC organized the workshop, *Early Academic Successful Careers: Resources and Advice*, with the participation of TRB leaders.

- YMCC engaged in the *Careers in Motion Networking Fair* and the *New Attendee Engagement Session*;
- Young Member Subcommittees explored opportunities to engage with their respective Groups to engage in session planning;
- Group-level Young Member Subcommittees led or were involved in more than 13 technical sessions;
- The YMCC Chair participated in the meetings of TAC and the Executive Committee.

Strategic Planning

YMCC is embarking on a triennial strategic planning effort to reflect on what has been accomplished to date and ongoing activities, and to examine goals, objectives, and strategies for continuing forward.

Part of this planning effort will also involve review of the existing membership structure, which includes only Group Subcommittee (Co-)Chairs, to consider if additional membership would be beneficial to represent young member interests across the Committee structure.

Further, YMCC will explore new collaboration opportunities with Standing Committees and Coordinating Councils, other TRB programs, and outside young transportation professional organizations, as appropriate.

1

Goal no. 1: Mitigating and Responding to Climate Change

- Impact of pavement flooding and inundation on resiliency
- Electric vehicles and charging stations at airports
- Stormwater best practices
- Lead-free aviation fuel
- Zero emission bus fleets
- Retreat on extreme weather and climate change adaptation

2

2

Goal no. 2 - Promoting Equity

- Racial disparity in bike/ped safety
- DEI and asset management impacts and outcomes
- Gender equity in the workplace
- Women and minority airport employee
- Floating transit stops for passengers with vision disabilities

- Travel needs of women
- Planning small and rural transit facilities
- Affordable housing and transit
- Equity in transit – measuring performance

3

3

Goal no. 3 - Increasing Safety

- LED traffic signals
- Automated traffic management systems
- Traffic signal timing manual
- Roadway lighting warrants
- Increasing clear zones at hot spots
- Safety culture and safe systems
- Roadway design, speed limits, and speed management
- Linking crash data from police, EMS, and trauma registry
- Work zone crashes
- Roadside safety hardware

- Road safety audits
- Truck escape ramps
- Winter maintenance
- Teen driving performance
- Financial benefits of airport safety management programs
- Derailment of transit vehicles
- Electronic surveillance of railway grade crossings
- Driving under the influence of drugs detection methods
- Motorcycle licensing and training requirements

4

4

Goal no. 4 - Advancing Public Health

- Context-driven active transportation accommodation
- Benefit analysis of private sector investment in active transportation
- Integrating active transportation into transportation decision-making

- Preventing human trafficking
- Use of airport properties for parks and recreation
- Eliminating and mitigating PFAS impacts

5

5

Goal no. 5 - Building and Sustaining a Strong, Competitive Economy

- Economic Impact of E-Commerce on Airport Industry
- Preparing an Airport for a New Airline Starting Service

6

6

Supporting factor A - Transportation (travel and infrastructure)

- Transportation operations manual
- AI applications for systems operation and maintenance
- Effective visualizations
- Post-Implementation Evaluation of Transportation Projects
- E-Commerce impacts on travel and land-use
- Accelerated bridge construction
- Value engineering
- Quality assurance and sustainability
- Earthquake-induced bridge displacements
- Emerging technologies and airport terminal concessions
- Private wireless networks at airports
- Future of commuter rail
- Aligning utility investigations with project delivery
- Online airport parking reservation systems
- Use of Automatic Vehicle Monitoring (AVM) and Vehicle Health Monitoring/Diagnostic Systems by Transit Agencies
- Statewide and Regional Approaches to the Development of Comprehensive Transit Information Systems
- Accessible Vehicle Fleet Configuration

7

7

Supporting factor B - Governance of the system, both across the private and public sectors as well as across the different levels of government

- Practices for Statewide and MPO Coordination
- Ancillary Asset Data Stewardship and Data Models
- Examination of Transit Agency Coordination with Electric Utilities

8

8

Supporting factor C - Funding and finance as a means of paying for investment in capital assets and operating expenses

- Update of the AASHTO Practical Guide to Cost Estimating (PGCE)
- Future Equity Impacts of Existing Fuel Taxes
- New Mobility and the User Fee Concept

9

9

Supporting factor D - Workforce issues

- Knowledge management and retention
- Knowledge strategies to support research and application
- Implementing alternative delivery methods
- Training for airport firefighters
- Modernizing transit station staffing
- New tech, new skills, new jobs in transit
- Accommodating employee parking needs at airports

10

10

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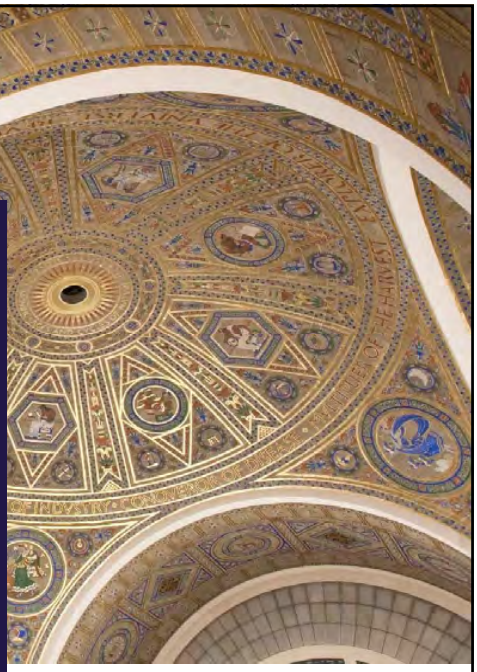
TRB TRANSPORTATION RESEARCH BOARD

Critical Issues Implementation

Victoria Sheehan

June 29, 2023



1

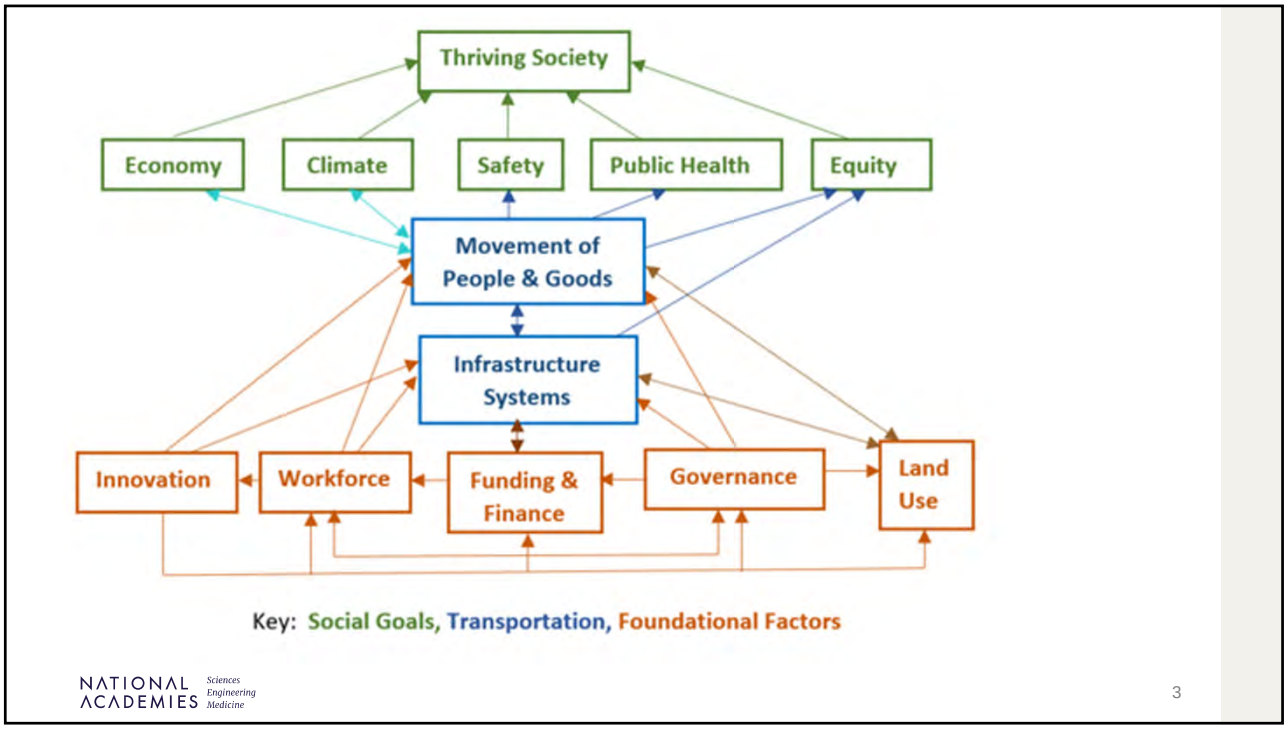
Critical Issues

The overall purpose of our transportation system is to help **develop and support a thriving society**.

NATIONAL ACADEMIES Sciences Engineering Medicine

TRB TRANSPORTATION RESEARCH BOARD

2



3

TRB Goals

1. Prepare transportation professionals and decision makers to address current and future transportation-related challenges and opportunities.
2. Expand TRB's impact and influence through its objective research, information exchange, and advisory activities.
3. Assure TRB's continued creativity, resilience, and sustainability in an ever evolving world.

4

4

Strategies For Each Goal

Goal 1. Prepare transportation professionals and decision makers to address current and future transportation-related challenges and opportunities

a. Identify current and future critical transportation-related issues and address these issues through TRB's convening, research, and advising programs and activities.
b. Educate and communicate with transportation professionals, decision makers, and the public about the critical issues identified and the work that TRB is doing to address them.
c. Identify state-of-the-art methods and data for addressing critical issue

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5

5

Proposed Actions For Each Strategy

Goal 1 a. Identify current and future critical transportation-related issues and address these issues through TRB's convening, research, and advising programs and activities.

i. Publish a new edition of Critical Issues in Transportation that addresses how transportation supports broader societal goals.

ii. Develop and highlight TRB Annual Meeting sessions related to the critical issues.

iii. Pursue sponsorship of conferences/workshops for the critical issues.

iv. Conduct research projects on the critical issues and disseminate the findings to key stakeholders.

v. Pursue sponsorship of consensus and advisory studies for critical issues, including working together with other National Academies program divisions on studies addressing these issues.

vi. Produce webinars that address critical issues.

vii. Produce Executive Committee policy sessions that address critical issues.

viii. Develop addenda to the Critical Issues in Transportation report as new or evolving issues develop between reports.

ix. Monitor and publicize research done by others, including international research, on critical issues.

x. Develop and market TRID snap searches for critical issue topics.

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6

6

Proposed Actions For Each Strategy

Goal 1 b. Educate and communicate with transportation professionals, decision makers, and the public about the critical issues identified and the work that TRB is doing to address them

i. Develop strategies for communicating within the TRB stakeholder community about critical issue topic areas through e-newsletter articles,TR News feature editions, blogs, podcasts, and TRID feature articles.

ii. Develop communications strategies for individual reports and activities related to TRB's critical issues, including Cooperative Research Program reports, consensus study reports, topical Transportation Research Record editions, conference/workshop reports, and TRID snap searches on the topics, as contained in the TRB Communications Strategic Plan.

iii. Address critical issues in collaboration with other transportation organizations, including international organizations.

iv. Develop strategies for communicating with the broader public and decision makers about critical issue topic areas, as well as specific reports on these topic areas.

v. Feature Transportation Research Record papers (e.g., special editions) on critical issues.

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7

7

Proposed Actions For Each Strategy

Goal 1 c. Identify state-of-the-art methods and data for addressing critical issues.

i. Find opportunities to use data that has been collected or will be collected using state of the art data collection methods (e.g., crowdsourced data, cell phone probe data), as well as state of the art analysis methods (e.g., artificial intelligence, advanced geographic information systems)

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8

8

Strategic Plan Implementation - Metrics

Goal 1. Prepare transportation professionals and decision makers to address current and future transportation-related challenges and opportunities

- # of downloads of Critical Issues in Transportation
- # of TRB Annual Meeting sessions on critical issues
- # of papers published in the Transportation Research Record on critical issues, including special issues focused on specific critical issue topics
    - o Measure impact of papers on individual critical issues (using measures such as journal citation factor, Altmetrics measures of citation, etc.)
- # of conferences/workshops and workshop reports on critical issue topics
- # of CRP research projects/reports on critical issues

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9

9

Strategic Plan Implementation - Metrics

Goal 1. Prepare transportation professionals and decision makers to address current and future transportation-related challenges and opportunities

- # of webinars on critical issues; attendance at these webinars
- # of TRID searches on critical issues; # of snap searches developed on critical issue topics
- # of consensus studies on critical issues
- # of blogs/podcasts on critical issue topics
- Qualitative measure: Examples of impact of TRB research, consensus studies, or published papers on critical issues, including changes in legislation, regulations, or policy

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10

10

TRANSPORTATION RESEARCH BOARD

2023 EXECUTIVE COMMITTEE

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Changes in Executive Committee Membership

New Officers

Ms. Diane Gutierrez-Scaccetti, Commissioner, New Jersey Department of Transportation

New Incoming Members

Mr. Scott C. Marler, Director, Iowa Department of Transportation

Dr. Ricardo Martinez, Adjunct Professor of Emergency Medicine, Emory University School of Medicine

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EXECUTIVE COMMITTEE MEETINGS

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EXECUTIVE DIRECTOR
Victoria Sheehan

ASSOCIATE EXECUTIVE DIRECTOR
Russell Houston

- Annual Meeting Exhibit and Patron Programs
- Committee and Panel Approvals
- Communications
- Information Technology
- Transportation Research Information Services

STRATEGIC PROGRAM DEVELOPMENT DIRECTOR
Patrice Davenport

- Revenue Development
- Strategic Initiatives

SR. REPORT REVIEW OFFICER
Karen Febey

- Report Review
- Minority Student Fellows Program
- Inclusion & Diversity
- TRB Division Committee

HR DIRECTOR
Claudette Louard-Clarke

- Human Resources
- Staff Development Training

TECHNICAL ACTIVITIES
Ann Brach

- Annual Meeting Program
- Conferences and Workshops
- Marine Board
- Standing Technical Committees
- State Visits
- Transportation Research Record: Journal of the Transportation Research Board

Consensus and Advisory Studies Division
Thomas Menzies

- Consensus Studies
- Forums and Roundtables
- Research Program Advisory Committees

ADMINISTRATION AND FINANCE
Gary Walker

- Budgets and Finance
- Affiliates Accounts
- Publications Sales and Distribution
- Administrative Services

Note: organizationally is part of the Office of the Chief Financial Officer

COOPERATIVE RESEARCH PROGRAMS
Christopher Hedges

- National Cooperative Highway Research Program
- Airport Cooperative Research Program
- Transit Cooperative Research Program
- Behavioral Traffic Safety Cooperative Research Program

DESCRIPTIONS OF TRB DIVISIONS

EXECUTIVE OFFICE
Victoria F. Sheehan, Executive Director

TRB Executive Office

TRB's Executive Office is headed by Executive Director Victoria Sheehan. The TRB Executive Office provides policy and operational guidance for programs and activities; oversees committee and panel appointments and report review; provides support and direction for human resource issues and staffing needs; directs the Board's communications and information technology efforts; operates a bibliographic database of transportation research and provides library reference services; provides staff support to the Executive Committee and the TRB Division Committee; and maintains liaison with the executive offices of the National Academies of Sciences, Engineering, and Medicine, the Board's parent institution.

Oversight Activities

The Executive Office supports the work of the TRB Executive Committee, which provides policy direction to TRB programs and activities within the overall policies of the Academies. Oversight of committee and panel appointments and of report review is the responsibility of the TRB Division Committee, which ensures that TRB meets institutional standards and that its activities are appropriate for the Academies. As part of its oversight function, the committee monitors the Board's progress in expanding the representation of minorities and women on TRB committees and panels.

Chris Hendrickson, Chair, TRB Division Committee, represents TRB as an ex officio member on the NRC Governing Board. The Executive Office processes the Board's large volume of committee and panel appointments and maintains committee membership records. A hallmark of the Academies is its institutional process to ensure the independent, rigorous review of reports. In maintaining these high standards, TRB follows Academies' guidelines that carefully match the review criteria and procedures to the type of report.

Program Development and Strategic Initiatives

In addition, the Executive Office is responsible for ensuring stable, long-term revenue streams for TRB and for coordinating strategic initiatives across the board's various divisions. To carry out these responsibilities, the EO helps facilitate the increased use of technology to deliver TRB products and services; oversees the development and implementation of action plans for strategic, long term, cross cutting, and critical issues; encourages the exploration of new and innovative ways to facilitate information transfer within the rules of the Academies; helps promote the value of TRB products and services; oversees TRB's international participation strategy; administers the Minority Student Fellows Program; and is responsible for helping to ensure the continued development of the next generation of TRB volunteers.

Communications

The Executive Office is charged with developing, coordinating, and carrying out communications activities that span the entire organization. The following communications activities conducted by the NASEM's Office of the Chief Communications Officer are overseen by the Executive Office:

- The Transportation Research E-Newsletter is a free weekly electronic service designed to keep individuals up-to-date on TRB activities and to highlight selected transportation research related activities taking place at the federal and state levels, and within the academic and international transportation communities. More than 67,000 people from around the world receive the E-Newsletter.
- The TRB Webinar Series produces approximately 100 webinars per year on a variety of topics. TRB's webinars are produced with funding received from TRB Sponsors and TRB Sustaining Affiliates. Accordingly, employees of TRB Sponsors and TRB Sustaining Affiliates may attend the session without a fee. TRB is authorized to issue Professional Development Hours (PDH) for select, live webinars. TRB is also registered with the American Planning Association's professional institute, the American Institute of Certified Planners (AICP), to provide Certification Maintenance credits.
- TRB uses Social Media such as Twitter, Facebook, and LinkedIn to help our audience stay connected to transportation research. Social media also helps TRB to better understand how its reports and products are being used.

Information Technology and Research Services

TRB has a consolidated Information Technology (IT) and Transportation Research Information Services (TRIS) department. Both groups have key responsibilities that include the development, maintenance, and application of software in support of various TRB missions.

The IT group's primary focus are systems operation, maintenance, and management. The focus aligns with the TRIS staff's responsibilities in relation to the Transport Research International Documentation (TRID) database, the Research in Progress (RiP) database and website, the Research Needs Statements (RNS) database, and the TRB Publications Index.

The responsibilities of the IT and Research Services groups include customer support for internal and external users of TRB's software systems; software enhancement and development; server and website monitoring and security; general IT support activities, such as training, documentation, and troubleshooting; and management and operation of transportation research services, bibliographic databases, and the TRB Library.

TRID

In January 2011, TRB and ITRD released TRID, the TRIS and ITRD Database. TRID is the world's largest and most comprehensive bibliographic resource on transportation research information. It is produced and maintained by the Transportation Research Board of the US National Academies with sponsorship by State Departments of Transportation, the various

administrations at the U.S. Department of Transportation, and other sponsors of TRB's core technical activities. ITRD is produced by ITRD member organizations under the sponsorship of Joint Transport Research Centre (collectively JTRC) of the International Transport Forum and Organisation for Economic Co-operation and Development (OECD) and ITRD. The records comprise published or ongoing research in English, German, French, or Spanish; more than 200,000 records link to full-text publications. The service offers simple and advanced searching and allows users to download and e-mail results, as well as to share via social media. TRID is available free of charge on TRB's website.

Publications Index

The TRB Publications Index includes more than 65,000 citations and abstracts for all TRB, Highway Research Board (HRB), Strategic Highway Research Program (SHRP), and Marine Board publications since 1923. The index offers simple and advanced searching and allows users to download and e-mail the results in a variety of formats. Records contain links to available full-text documents and to ordering information.

Research Needs Statements Database

The RNS database is a dynamic collection of highest-priority topics developed by TRB technical standing committees. The database serves as a tool for reviewing research needs, setting research priorities, and identifying gaps in current research.

Research in Progress Database

RiP is a searchable database of records of active or recently completed research projects from State Departments of Transportation, the modal administrations at the U.S. Department of Transportation, the Transportation Research Board, and university transportation centers. The current awareness service notifies users about new and updated project records in specified subject areas. TRID offers users an option for searching the RiP database or the RiP and TRID databases simultaneously.

TRB Library

The TRB Library provides research and reference services to TRB sponsors, committee members, and staff. The library subscribes to almost 250 serial titles and contains the complete collection of TRB, HRB, SHRP, and Marine Board publications.

The TRB Library participates in the Eastern Transportation Knowledge Network and in the National Transportation Knowledge Network.

TECHNICAL ACTIVITIES
Ann Brach, Director

About the Technical Activities Division

Who We Are
The Technical Activities Division provides a forum for transportation professionals to identify, facilitate, and share research and information related to transportation. The Division carries out activities on behalf of TRB sponsors and the transportation community through a network of over 200 standing committees comprised of more than 5,000 volunteers.

Our Mission
The Technical Activities Division supports TRB's mission of promoting innovation and progress in transportation through research and information exchange by identifying needed research and research in progress, and disseminating completed research results.

Our Staff
The Technical Activities Division staff consists of specialists within each transportation mode and topic, as well as specialists in publishing, meeting logistics, and business operations. They oversee the activities of the Division's network of volunteers, who carry out the following activities:

Our Activities
- **Standing committees and task forces** provide an opportunity for you to network with others in your field, and stay current on emerging issues while contributing to the continuing evolution of transportation research and practice. Learn how to get involved in standing committees.

- **Technical Activities Council**, consisting of the overall Chair and the Chairs of each of the Groups of committees, provides a forum for interchange between the Groups of committees. They assist in identifying emerging topics of interest to the transportation community and cross-cutting issues, and foster outreach efforts to other transportation organizations.

- **Conferences, Meetings, Webinars, and Workshops** are sponsored and co-sponsored by many of the Division's standing committees.

- **TRB Annual Meeting** is hosted every year and is the largest transportation conference in the world with over 700 sessions, workshops and 300 meetings that attracts over 14,000 professionals from around the globe. The Annual Meeting is held in January of every year in Washington, DC.

- **Supporting State DOT Representatives & Our Field Visit Program** serves as a major source of information collected and disseminated by TRB. Transportation professionals on the TRB staff meet on site with representatives of state departments of transportation, and with representatives of universities, transit, and other modal agencies and industry. Annual results of field visits are published each year.

- **Publications** are disseminated by the Technical Activities Division that showcase transportation research results through Transportation Research Records, Conference Proceedings, and Transportation Research Circulars.

CONSENSUS AND ADVISORY STUDIES
Tom Menzies, Director

Consensus and Advisory Studies Division

The Consensus and Advisory Studies Division conducts consensus and advisory studies at the request of the U.S. Congress, executive branch agencies, states, and other sponsors.

CONSENSUS AND ADVISORY STUDIES

With the guidance of committees drawn from the nation's leading experts, the Consensus and Advisory Studies unit produces reports examining complex and controversial transportation issues. Studies cover all modes of transportation and a variety of safety, economic, environmental, and research policy issues. The U.S. Congress and the executive branch have adopted many recommendations from the reports, attesting to the substantive value of the studies. The TRB Executive Committee's Subcommittee on Planning and Policy Review provides oversight for the unit. All completed consensus reports, dating from 1982, are posted on the TRB website, http://www.trb.org/Publications/PubsPolicyStudiesSpecialReports.aspx.

Cooperative Research Programs Division
Christopher Hedges, Director

The Cooperative Research Programs Division of the TRB, led by Director Christopher Hedges, administers a number of major research programs sponsored by other organizations.

National Cooperative Highway Research Program
Sponsored by the member departments of the American Association of State Highway and Transportation Officials (AASHTO) in cooperation with the Federal Highway Administration, the NCHRP was created in 1962 as a means to accelerate research on problems that affect highway planning, design, construction, operation, and maintenance nationwide. All of the state highway and transportation departments contribute to an annual cooperative pool to fund the program's activities. AASHTO committees and member departments and the Federal Highway Administration recommend research topics each year, and the AASHTO Special Committee on Research and Innovation (R&I) determines both the projects to be funded and the levels of funding for those projects. A close working relationship with AASHTO during execution of the

projects and the participation of experienced practitioners on project panels help ensure the application of completed NCHRP study results.

Transit Cooperative Research Program

The TCRP was initiated in 1992 by three cooperating organizations: the Federal Transit Administration, the program sponsor; the Transit Development Corporation, a nonprofit educational and research organization established by the American Public Transportation Association, which provides program governance through the TCRP Oversight and Project Selection (TOPS) Committee; and the National Academies of Sciences, Engineering, and Medicine, acting through TRB, which serves as program manager. Under TCRP, the transit industry develops innovative near-term solutions to operating problems and adapts appropriate new technologies and approaches to help meet the demands placed on the nation's public transit systems. The program's research covers topics relating to all aspects of public transportation, including planning, service configuration, equipment, facilities, operations, human resources, maintenance, policy, and administrative practices. Each year, the TOPS Committee selects a program of research from the large number of candidate research problem statements submitted by organizations and individuals in the transit community.

Airport Cooperative Research Program

The ACRP was authorized in federal aviation legislation and funding is made available through the annual federal appropriations process. ACRP, which began in 2006, is an industry driven applied research program that develops near-term, practical solutions to problems faced by airport operators. The program is sponsored by the Federal Aviation Administration (FAA). Research topics are selected by an independent governing board appointed by the U.S. Secretary of Transportation that includes individuals from airports, universities, FAA, and the aviation industry.

PURPOSES AND DUTIES OF THE TRB EXECUTIVE COMMITTEE

The TRB Executive Committee is the senior policy body of TRB, composed of approximately 25 members appointed by the Chairman of the National Research Council (NRC). These members are selected so as to provide balanced representation of transportation modes, academic disciplines, private and public sectors, levels of government, geographical regions, and other relevant factors. Members are appointed for a term of three years and may be reappointed for one term. In addition, approximately 20 *ex officio* members serve on the Executive Committee; these members have no vote but otherwise participate fully in Executive Committee activity. *Ex officio* members include the representatives of the Board's various sponsoring organizations.

The Executive Committee meets twice a year, once at TRB's Annual Meeting in Washington each January and once in June. The Chair of TRB's Executive Committee, appointed by the Chairman of the NRC, serves a one-year term, and presides over the Committee discussions, which are directed toward obtaining consensus on issues wherever possible. When formal rules of debate are required, Roberts' Rules of Order are employed.

The Executive Committee performs a number of functions in serving four different constituencies — the National Research Council (NRC), TRB, TRB's sponsors, and itself.

Executive Committee Responsibilities to the NRC

The TRB Executive Committee is officially an advisory group to the Chairman and the Governing Board of the NRC, who look to the Executive Committee to provide oversight of TRB's activities. Such oversight is intended to ensure that TRB's activities are appropriate for the NRC and constructive to the transportation system and the nation. Reports (both written and oral) regarding ongoing and proposed TRB projects are brought to the Executive Committee at each meeting and are approved, rejected, or accepted after modification. The Board is also expected to note new opportunities for TRB to provide its services or projects and, where appropriate, to find ways to bring such projects into being.

The TRB Division Committee is charged to ensure that NRC procedures and policies are faithfully employed with respect to study and project committee appointments and report review. The membership of the TRB Division Committee is drawn from the membership of the TRB Executive Committee. The Division Committee is chaired by the TRB Division Chair, who must be a member of the National Academy of Sciences or the National Academy of Engineering and a member of the TRB Executive Committee. The TRB Division Chair serves as an *ex officio* member of the NRC Governing Board.

The Executive Committee has a Subcommittee on Planning and Policy Review (SPPR), which reviews and approves proposed projects and studies, develops lists of Critical Issues in Transportation, plans and develops opportunities for new Executive Committee initiatives, and generally handles those substantive transportation issues that require action during the interval between the twice-yearly meetings of the Executive Committee. The SPPR generally meets in April and October in Washington, DC.

The Executive Committee has a Subcommittee on International Activties, which provides oversight of TRB's international activities, including review of Memoranda of Understanding and Letters of Intent with international organizations, and monitoring progress in implementation of the Executive Committee's Strategic Plan for International Activities.

The Executive Committee has also established a Special Committee on Diversity, Equity, and Inclusion, which provides oversight of implementation of the Executive Committee's Diversity, Equity, and Inclusion Strategic Plan.

TRB's Expectations of the Executive Committee

Most TRB projects and activities are conducted by expert volunteers who agree to serve on TRB technical standing committees, study committees, panels, task forces, and other similar groups. At any one time, about 500 such groups are in existence, composed of more than 7,000 professionals serving without compensation. The Executive Committee, either directly or through the TRB Division Committee or the CAAS, provides oversight on the formation, termination, and membership of committees and on the review of projects undertaken and reports produced. The Executive Committee can also influence committee and other TRB activities by developing and monitoring strategic plans, preparing the critical transportation issues, and undertaking special activities of its own. From time to time, Executive Committee members are also called on to perform special duties, such as assisting with report review or fundraising for special projects.

The Executive Committee also serves as a symbol of the prestige attached to serving on TRB committees. Executive Committee members are selected in part because they occupy some of the most prestigious and influential positions in the industry. Their participation on the Executive Committee demonstrates support for research and cross-modal dialogue at the highest levels, and thereby provides motivation for the uncompensated service of otherwise highly paid experts on whom TRB depends for its products and services.

Sponsors' Expectations

At the core of TRB, and perhaps its most visible feature, is a collection of Technical Activities, which include more than 175 TRB standing committees, the TRB Annual Meeting, publications programs, field visits to organizations conducting transportation research, and information services. About $17 million—approximately one-fifth of TRB's total budget—is spent annually on these activities, supported by funding from individual states, federal agencies, private transportation organizations, local governments, individual affiliates, publication sales, and conference registration fees. These funds are pooled and spent in accordance with budgets approved by the Executive Committee. TRB's sponsors look to the Executive Committee to ensure that these funds are spent in ways appropriate to TRB's mission and in ways that encourage research and its dissemination.

Executive Committee's Own Expectations

Although the responsibilities summarized above indicate that the Executive Committee has more than enough duties for a group that only assembles twice a year, members often comment that their greatest personal satisfaction in serving comes from participating in discussions of substantive transportation issues and that they would like to devote more time at meetings to such discussion. The caliber and diversity of talent represented on the Executive Committee make serving on it a unique experience for most members, providing an unusual opportunity to share different perspectives in far-reaching

discussions of major transportation issues. Thus, an effort is made to conduct the Executive Committee's official business expeditiously at meetings, in order to leave time for these other important activities of the Board. Executive Committee policy sessions and other discussions of substantive issues have led to the initiation of important TRB projects and other activities.

Last updated January 3, 2023

TRB STANDING OVERSIGHT COMMITTEES

TRB Division Committee

Composition

The Division Committee's membership, drawn from the TRB Executive Committee, consists of a chair who is an *ex officio* member of the Governing Board, a member of one of the Academies, the chair of the TRB Executive Committee, and a representative from a state department of transportation. The chair of the TRB Executive Committee serves a one-year term as a full member, while the other full members serve three-year terms. The Division Committee also includes the TRB Executive Committee's vice chair and immediate past chair as *ex officio* non-voting members who serve one-year terms.

Function

To ensure that TRB meets NRC standards for objectivity and that its activities are appropriate for the NRC; to monitor TRB with respect to specially funded project committee and panel appointments, report review, and the summary of Division programs presented to the NRC Governing Board. The Division Committee Chair serves as the TRB Division Chair for NRC Oversight and as an *ex officio* member of the NRC Governing Board.

Appointment Procedure

Appointed by NRC Chair upon recommendation of Executive Director in consultation with NRC and Chair of TRB Executive Committee, subject to approval of the NRC Governing Board. Appointment letters signed by NRC Chair. Selection of members complies with TRB *Terms of Reference*.

Subcommittee on Planning and Policy Review (SPPR)

Composition

Subcommittee of the TRB Executive Committee, composed of 11 members. The Chair and 10 other members serve 3-year terms.

Function

To advise the Executive Committee and staff on matters relating to selection, scope, and execution of policy-oriented studies within TRB; establish goals and directions for those parts of TRB engaged in policy studies; plan and develop opportunities for new Executive Committee initiatives; identify critical transportation issues warranting TRB consideration; act for Executive Committee on all matters requiring its attention between regular Executive Committee meetings; advise the Chairs of the Executive Committee and the Division Committee of actions taken; and report to the Executive Committee on all of its activities at each Executive Committee meeting. The SPPR is also charged to identify major transportation problems, with particular attention to multimodal and intermodal issues; propose action plans for TRB that address these problems; and suggest sources for the funds needed to pursue these plans. The SPPR also oversees TRB's strategic planning process,

including development of TRB Strategic Plans, and develops policy session agendas and other program initiatives of the TRB Executive Committee.

Appointment Procedure
Appointed by Chair of the TRB Executive Committee following guidelines approved by the Executive Committee. Bias/conflict-of-interest statements are not required.

Technical Activities Council (TAC)

Composition
The Technical Activities Council consists of the overall Chair, the Chairs of each of the eleven Groups, and one or more at-large members. All serve 3-year terms. Members who are in the second year of their 3-year term serve as the Council's representatives to the TRB Executive Committee, along with the Technical Activities Council Chair.

Function
Program Function: Provides a forum for interchange and interaction among the Groups, between the Groups and the TRB Executive Committee, and between the Groups and TRB staff. Assists in identifying emerging topics of interest to the transportation community and cross-cutting issues. Facilitates interaction among Groups, Sections, and committees to address cross-cutting issues and opportunities. Fosters outreach efforts to other transportation organizations and groups.

***Administrative Function*:** Plays a significant role in refining and implementing processes and techniques for improving the quality of meetings and publications emanating from Technical Activities Division volunteer activities. Serves as a focal point for the continuing review in each of the Group Executive Boards of the need for establishing new committees and for discharging those that are no longer necessary.

Appointment Procedure
Appointed by the TRB Executive Director with approval by Division Committee Chair. Bias/conflict of interest statements are required.

MARINE BOARD

Composition

15-20 members. The Chair and the other members serve 3-year terms.

Function

To identify research and policy study needs and provide a forum for the exchange of information relating to new technologies, laws and regulations, economics, the environment, and other issues affecting the marine transportation system, port operations, coastal engineering, and marine governance. Also, to oversee standing technical committees in related areas.

Appointment Procedure

Appointed by NRC Chair following recommendation of TRB Executive Director in consultation with NRC and members of Marine Board. Appointment letters are signed by the TRB Executive Director. Bias/conflict of interest statements are required.

COOPERATIVE RESEARCH PROGRAM OVERSIGHT COMMITTEES

Composition

Varies according to program and origin. Some oversight bodies (NCHRP, TCRP, and ACRP) are entities that are appointed and exist outside the NRC/TRB. Others may be internally appointed.

Function

To select research problems and program the funding for them, on behalf of the constituent user groups associated with the program.

Appointment Procedure

Varies according to program and origin. Internally appointed committees are appointed by TRB Executive Director following approval by SNO Chair and, as appropriate, by NRC Chair. Appointment letters are signed by the TRB Executive Director. Bias/conflict of interest statements are required.

TRB PROJECT APPROVAL PROCESSES

Policy Studies and Program Reviews

Description
Projects conducted by NRC-appointed committees that provide consensus findings, recommendations, advice

Approval Steps
Approval by TRB Executive Committee or Subcommittee on Planning and Policy Review; approval by Executive Committee of NRC Governing Board

Product
Full-length study reports, interim reports, letter reports

Conferences and Workshops

I. Organized by TRB Standing Technical Committees

Description
Outgrowth of standing committee activity; no significant outside funding; often self-supporting; no consensus findings, recommendations, or advice

Approval Steps
Approval by TRB Executive Committee or Subcommittee on Planning and Policy Review

Product
Transportation Research Circular

II. Organized by Other Organizations and Cosponsored by TRB

Description
Conference formats vary, but TRB must have a role in conference planning

Approval Steps
Approval by TRB Executive Committee or Subcommittee on Planning and Policy Review

Product
No TRB publication

III. Organized by Specially Appointed ("Ad Hoc") TRB/NRC Committee

Description
Supported by outside funding; may or may not lead to consensus findings, recommendations, or advice (most are not authorized to do so)

Approval Steps
Approval by TRB Executive Committee or Subcommittee on Planning and Policy Review; approval by Executive Committee of NRC Governing Board

Product
Conference or workshop report, summary, or proceedings (in the TRB Conference Proceedings series)

Cooperative Research Program Projects

Description
Supported by NCHRP, TCRP, ACRP, NCFRP, or HMCRP funding; projects selected by NRC/TRB-appointed oversight committees or by non-NRC/TRB entities representing the user communities; research conducted by contractors selected by individual project panels, which oversee the work and review final report

Approval Steps
Approval by the TRB Division Committee Chair of research problems selected by the non-NRC/TRB entities (SCOR, TOPS, and AOC Committees)

Product
CRP Reports, Research Results Digests

Synthesis Projects

Description
Supported by NCHRP, TCRP, ACRP, or FMCSA funding; projects selected by oversight panels representing the user communities; research conducted by contractors under the guidance of individual topic panels. Umbrella panels review final documents.

Approval Steps
Approval by the TRB Executive Director of research topics selected by oversight panels.

Product
Synthesis report

TRB POLICY ON EXECUTIVE COMMITTEE PARTICIPATION IN COOPERATIVE RESEARCH PROGRAM (CRP) PROJECTS
Revised 1/8/2021

In the administration of its contract research programs, TRB wishes to maximize both the substance and the appearance of fairness in the selection and management of its contractors, at the same time ensuring the quality and expanding the number of potential researchers as much as possible.

It is in TRB's interest to use the expertise of the best qualified individuals and organizations available to perform its research programs, where no actual or apparent conflicts of interest exist. However, conflicts may arise or appear to exist if members of TRB's Executive Committee or organizations with which they are affiliated submit proposals on projects.

To prevent such problems in the administration of the Cooperative Research Programs (CRP) administered by TRB, members of the Executive Committee are not permitted to serve as principal investigators on any CRP projects. Additionally, the following rules will apply to all members of the Executive Committee:

1. No involvement is permitted in the selection process for CRP contractors, where the individual Executive Committee member or an affiliated organization is being considered.

2. No involvement is permitted in TRB's administration of a contract in which the individual or an affiliated organization is involved.

3. No involvement is permitted in setting or modifying administrative policies that would directly or materially affect either the administration of existing contracts with the individual or affiliate organization, or the individual's or affiliate organization's ability to submit proposals.

The Chair of the TRB Executive Committee, serving a one-year term; the Chair of the TRB Division Committee, serving a three-year term; and the Vice Chair of the Division Committee, serving a three-year term, have close ties to the Executive Director and to the activities of TRB. Neither of the Chairs nor the Vice Chair has any role in the selection of contractors for CRP projects. Nevertheless, because of these special relationships, the following additional rules also will apply to their activities on CRP projects during their terms as Executive Committee Chair, Division Committee Chair, and Division Committee Vice Chair:

4. Individuals serving in these positions may not personally propose on any CRP project during their years of service as Executive Committee Chair, Division Committee Chair, and Division Committee Vice Chair. This limitation on their right to propose on a CRP project as an individual does not extend to a governmental or academic entity with which they are affiliated provided that the individuals in question do not hold a significant financial interest (other than their salaries) in the governmental entity or academic institution of higher learning. Affiliated organizations in which an Executive Committee Chair, Division Committee Chair, or Division Committee Vice Chair holds a significant financial interest, other than a salary derived from a position in a governmental entity or an academic institution of higher learning, may also propose, but only in accordance with case-specific guidelines established by the Division Committee in advance of that individual's appointment as Executive Committee Chair, Division Committee Chair, or Division Committee Vice Chair to ensure that there is neither actual nor perceived conflict of interest.

5. They may not be personally consulted or participate in any way in the preparation of a proposal, or otherwise provide information that would be advantageous to a proposal team.

6. They may not work on a project as a member of the research team or as a consultant to the team.

Where a newly appointed Chair of the Executive Committee, Chair of the Division Committee, Vice Chair of the Division Committee, or other member of the Executive Committee has existing activities or commitments covered in the foregoing list of rules on a CRP project at the time of appointment, those activities will be reviewed and recommendations made on a case-by-case basis by the members of the Division Committee (exclusive of a newly appointed chair, vice chair, or member if his/her activities are being considered).

January 3, 2023