

TR NEWS

September–October 2022 NUMBER 341

DECARBONIZING TRANSPORTATION

Challenges and Pathways to 2050

PLUS

**Decarbonizing the
U.S. Power Grid with
Battery Electric Vehicles**

**Research Needs for Reducing
Carbon in Aviation**

RESEARCH PAYS OFF
**SEAHIVE: Protecting
Coastal Infrastructure**

**NATIONAL
ACADEMIES** *Sciences
Engineering
Medicine*

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Learn more about the National Academies of Sciences, Engineering, and Medicine at www.nationalacademies.org.

The **Transportation Research Board** is one of seven major programs of the National Academies of Sciences, Engineering, and Medicine. The mission of the Transportation Research Board is to provide leadership in transportation improvements and innovation through trusted, timely, impartial, and evidence-based information exchange, research, and advice regarding all modes of transportation. The Board's varied activities annually engage about 8,000 engineers, scientists, and other transportation researchers and practitioners from the public and private sectors and academia, all of whom contribute their expertise in the public interest. The program is supported by state departments of transportation, federal agencies including the component administrations of the U.S. Department of Transportation, and other organizations and individuals interested in the development of transportation.

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* Membership as of August 2022.

3 Letter from the *TR News* Editorial Board

4 Decarbonizing Transportation: Challenges and Pathways to 2050

Chris Porter and Stephen Zopf

Contributing 29 percent to U.S. carbon emissions and one-quarter of global carbon emissions, the transportation sector has a heavy carbon footprint—and that’s not counting the potential addition of more than 60 percent from associated emission sources such as vehicles, fuel, and infrastructure. The authors look at the challenges of decarbonizing transportation and outline strategies to address them.

8 POINT OF VIEW Decarbonizing the U.S. Power Grid: Are Battery Electric Vehicles Part of the Solution?

Chase P. Dowling

What if clean energy from battery-run electric vehicles could be stored and transmitted to meet the nation’s power needs? The author explains what it would take for such an effort to become an achievable goal in the drive toward zero emissions.

14 California’s Quest to Reduce Vehicle Miles Traveled

Susan Handy

The journey to reduced vehicle miles traveled is a long and winding one, but the need is great and deadlines to show significant reductions in carbon emissions are looming. What does it take to meet current goals? Can we change infrastructure—and attitudes—before we run out of time?

17 POINT OF VIEW Shifting Gears to Zero Emissions: Five Strategies for U.S. Trucks and Buses

Ray Minjares

International experience has revealed five effective policies to accelerate the shift to zero-emission vehicles. The author describes how to apply these policies to the United States. Specifically, they include setting clear goals, developing



sales requirements and performance standards, using fiscal incentives, establishing clear infrastructure plans and investments, and incorporating measures to increase demand for zero-emission vehicles.

22 Carbon Reduction in Aviation: What Are the Research Needs?

Kate Andrus and Carly Shannon

Aviation comprises approximately 2 percent of global carbon emissions, but this sector’s portion of emissions is predicted to increase, along with air freight and travel demands. The authors highlight ongoing efforts to decarbonize aviation, incorporating an excerpt from the latest E-Circular on relevant TRB research and remaining gaps.

28 POINT OF VIEW CO₂ Emissions from International Shipping: How a Global National Allocation System Addresses the Problem

Henrik Selin

The international maritime shipping sector remains challenged to reduce its CO₂ emissions. However, such emissions are excluded from national carbon budgets and are not part of domestic efforts to reduce greenhouse gas emissions. The author explains how a worldwide national allocation system could be the answer to the problem.



COVER The drive to decarbonize all modes of transportation has become urgent, but each “fill-up” with electric energy rather than carbon fuel offers the assurance that, worldwide, the transportation sector is moving with determination toward a goal of zero emissions by 2050. (iStock)

Coming Next Issue

The November–December 2022 issue of *TR News* features articles covering a variety of topics. Authors look at the most effective infrastructure approaches to keeping wildlife and traffic safely separated; integrated warning and response systems to lessen the negative effects of flooding, as well as to predict the extent and severity of a flood event; and how five state departments of transportation are training staff on and implementing a toolkit that measures the effectiveness of public involvement in transportation planning.

Elevated trains, city buses, and taxis serve the transportation needs of residents in Chicago, Illinois. More and more, state departments of transportation are looking at—and testing—ways to engage the public in transportation planning.



Camelia TWU, Flickr

RESEARCH PAYS OFF

31 **SEAHIVE: Coastal Infrastructure Protection from Hurricanes and Storm Surge**

Landolf Rhode-Barbarigos

Temperatures are rising, and coastal populations are growing denser—a perfect scenario for stronger storms and the devastation they bring to the built infrastructure and natural environment. The author introduces a sustainable estuarine and marine revetment system that can protect—and revive—vulnerable coastlines.

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Marianne Mintz, Argonne National Laboratory

Timothy Sexton, Minnesota Department of Transportation

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Milena Rangelov, Engineering and Software Consultants

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TRB COVID-19 Resources

Agencies and organizations can use TRB publications and online resources for useful and timely information to help address issues related to the COVID-19 pandemic. To read about TRB's current research and activities, and for a list of relevant publications, visit www.nationalacademies.org/trb/blog/transportation-in-the-face-of-communicable-disease.

The *TR News* Editorial Board thanks Christine Gerencher, TRB, for her work assembling and developing this issue.

TR NEWS

features articles on innovative and timely research and development activities in all modes of transportation. Brief news items of interest to the transportation community are also included, along with profiles of transportation professionals, meeting announcements, summaries of new publications, and news of Transportation Research Board activities.

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Editorial Correspondence: By mail to the Publications Office, Transportation Research Board, 500 Fifth Street, NW, Washington, DC 20001, by telephone 202-334-2278, by fax 202-334-3495, or by e-mail cfranklin-barbajosa@nas.edu.

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