

TPEC Advisory Board Update: April 2021



Thank you for your continued support of the TPEC program. As we noted in our November 2020 meeting, we are continuing to emphasize equity, resilience, and impacts of the COVID-19 pandemic and recent civil unrest in our work. We have made important strides in all three research areas and we are pleased to share the progress we have made and what we have in store for the coming months.

A Warm Welcome to our Newest Advisory Board Members

The TPEC program has been fortunate to add new members to our Advisory Board. Nick Thompson will take the place of Meredith Vadis, representing the Metropolitan Council. Thompson is the director of Metropolitan Transportation Services.

Neal Young is a new member of the TPEC Advisory board, representing the Minnesota Department of Employment and Economic Development (DEED). Young is the director of Economic Analysis at DEED.

Thank you for your commitment to the TPEC program. We look forward to meeting with you and the rest of the Advisory Board at our next board meeting. **We hope to schedule our next Advisory Board meeting for June 2021.** We will be sure to stay in touch in the coming weeks as we organize this event.

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Research Area Updates:

Finance



Minnesota Transportation Finance Database

The [Minnesota Transportation Finance Database](#) (MTFD) is updated with the most recent data available. The most recent files added to the database include:

- Revenues from local option transportation sales taxes and excise taxes at the city level
- Revenues from municipal vehicle excise taxes at the county level
- Electric vehicles registered in Minnesota at the county level
- State highway and bridge quality at the state level
- Capitalized and maintenance costs at the state level

We are continuing conversations with staff at the Minnesota Department of Transportation to have access to more detailed data and collaborate on future data needs. We are also working with staff at the Minnesota Department of Public Safety to have access to electric vehicle registration in the state.

Data Visualization for the MTFD

We updated data visualization for the Minnesota Transportation Finance Database. Currently, we have graphs and maps for several variables from the MTFD, as well as graphs using ratios created with variables from the database (per capita, per driver, etc.).

Minnesota Roadway Funding: Revenue Sources and Distribution

The research team issued a white paper that details how roadway revenues are generated and distributed in Minnesota, as well as how funding mechanisms have evolved over time.

- The largest sources of state roadway revenue are the state motor fuel tax, the registration tax (tab fee), and the motor vehicle sales tax. Smaller amounts of state transportation revenue are generated from sources such as the motor vehicle lease sales tax and auto parts sales taxes. The purchasing power of Minnesota's gas tax has declined since it was last adjusted between 2008 and 2013, but state legislation has also increased the amount of dedicated highway funding sources in recent years.
- Nearly all state roadway revenue passes through the Highway User Tax Distribution Fund (HUTDF) and flows to roadways under state, county, and city jurisdiction across the state. About 3 percent of the total motor fuel tax revenue is attributed to non-highway activities (such as operating all-terrain vehicles and motorboats) and is transferred to designated accounts within the Natural Resources Fund. Forty percent of the VMST proceeds are dedicated to the Transit Assistance Fund. Over \$2.3 billion was distributed from the HUTDF in 2019, guided by constitutional requirements.
- Most local roadway funding comes from the general funds of counties, cities, and townships made up primarily of property taxes and special assessments. Local governments in Minnesota, particularly counties, also have some dedicated transportation taxes that raise roadway revenue such as local option sales taxes, excise taxes, wheelage taxes, and gravel taxes.

Upcoming from the Finance Research Area

Electric Vehicles Contributions to Transportation Revenues across 50 States

The research team is evaluating the contributions of electric vehicle owners and internal vehicle combustion engine vehicle owners to transportation funding. We are currently investigating the states that have adopted a fee levied on electric and hybrid vehicles, the rationale for adoption, and the use of the proceeds. In addition, we are collecting data across the state to determine the contributions of ICE vehicles and EVs in motor fuel tax (at the federal and state level) and EV fee. With the data we will be able to compare contributions to transportation funding. We believe EV fees at most compensate for the state part of the motor fuel tax, but not for the federal part.

Impact of COVID-19 on Transportation

The research team is developing multiple projects related to the impact of the COVID-19 pandemic on transportation finance and travel behavior. We are currently analyzing coverage

of the pandemic's impact on state budgets to collect data about how states are responding to the new fiscal challenges. The team is also studying the pandemic's impact on vehicle miles traveled in Minnesota and exploring opportunities for expansion of that research.

Blockchain Research

Bitcoin and other Cryptocurrency have been grabbing headlines for several years but there is less awareness about the underlying technology that supports this application called BlockChain. Blockchain technology has the potential to disrupt many industries — including transportation — and the ways in which governments conduct business.

We at TPEC believe that it is important to understand how this technology may impact the ways we conduct business and how Blockchain technology can be used and implemented. We have continued the research in this area by tracking important developments around the world. Overall, blockchain continues to be used more in freight and has not made much progress in other transportation activities. We appreciate your inputs regarding the direction of this important endeavor.

Industry Clusters and Freight



Credit: Shutterstock

Minnesota Medical Industry Cluster Research

TPEC recently completed two papers related to the medical device industry cluster and transportation. The first paper listed below was submitted to the Transportation Research Board (TRB) and presented at a poster session for the Annual Meeting in January 2021. The second paper listed below was presented at the Hawaii International Conference on System Sciences for the 54th Annual Conference in January 2021.

Minnesota Medical Device Supply Chain and Transportation Implications

The medical device industry cluster in Minnesota is essential to both the state's economic health and as a global center of innovation and production. One crucial component that enables growth and success in the cluster is transportation. The paper assessed the transportation linkages and the medical device industry's spatial development that benefits not just the seven-county Twin-Cities region but also Greater Minnesota. The research team utilized a geographic information systems (GIS) analysis to identify medical device "hot spots" and analyze surface transportation linkages to the airport with Plymouth, MN as a case study to demonstrate a "hot spot." The study concluded that first, the identification of hotspots is important in determining transportation investment opportunities. Further, the strength of the medical industry cluster in the state relies on multi-sector collaboration which could be efficiently achieved through the development of an advisory group of key stakeholders that includes transportation practitioners.

Minnesota Medical Device Cluster: Spatial Location and Air Transportation Implications

This paper assessed the medical device industry's spatial development and air transport implications, both in terms of industry cluster location and distribution of products. The spatial analysis showed that most medical device companies are located within the seven-county Twin Cities metropolitan area, but that industries linked to the medical device industry cluster are much more dispersed throughout the state. Regarding products created, the supply chain (export) of medical devices is highly dependent on Minneapolis-St. Paul International Airport (MSP), which plays a key role in their delivery of medical devices. Air Cargo analysis reveals the high value of medical device exports to various locations, while a case illustration of Mayo Medical Labs provided qualitative insight into just-in-time deliveries to support medical lab services.

Supplier Interviews

TPEC is planning to expand on its medical device industry cluster research by exploring the dynamics of Minnesota's medical device industry cluster hot spots. One such hot spot to be used as a case study is Plymouth, Minnesota. TPEC plans to conduct interviews with Plymouth medical device companies to learn about their supply chain, locational decisions, and transportation choices. Future research will involve further geospatial analysis of medical device industry hot spots and linked industries across Minnesota. Additionally, the research team plans to evaluate the implications of the COVID-19 pandemic on the medical industry cluster supply chain, and its impact on the state's economy.

Presentations

- The [TRB Annual Meeting](#) took place virtually over a series of dates in January 2021. TPEC members presented a poster on a paper entitled Minnesota Medical Device Supply Chain and Transportation Implications. The audience included practitioners from state and federal level departments of transportation.

- The [Hawaii International Conference on System Sciences](#) was virtually held between January 5-8, 2021. The accepted TPEC paper was presented at a virtual session.

Technology



Autonomous Vehicles in the East Metro

TPEC is in the process of completing a draft white paper on the research conducted on CAV implications in urban contexts with a focus on equity, with particular focus given to the Twin Cities East Metro. This project has sought to understand the needs of people in transportation-disadvantaged communities, who have limited access to transportation due to level of income, ability, or service extent, and explores whether CAV could be an appropriate solution. The research team has conducted structured interviews and hosted two virtual roundtables in May and October 2020 with public, private, and nonprofit human service providers in the East Metro. Select findings from the draft white paper include:

- Despite being an urban area, there are still major transportation gaps in the East Metro — particularly challenging for transportation-disadvantaged communities — related to access to a personal vehicle, limited transit service hours and geographic coverage, and other compounding social issues such as limited income, employment options, and accessibility options.
- While CAV may not be able to single-handedly solve long-standing equity issues, there is room for CAV to supplement the existing transportation system in ways that could benefit transportation disadvantaged communities.
- In order to ensure CAV helps, rather than hinders, transportation equity efforts, public policy needs to guide private development to prioritize equity as CAV technology develops.
- Additionally, practitioners and policymakers should explore how CAV could support non-passenger transportation services, including maintenance and delivery services.

Technology and Telecommuting

TPEC research on telecommuting has become increasingly relevant as the COVID-19 pandemic has led many members of the workforce to work remotely. TPEC researcher Adeel Lari gave a presentation in March 2021 to the University of Minnesota's Center for Transportation Studies Education and Engagement Council on the telecommuting impacts of COVID-19. This presentation highlighted some of the key research takeaways on telecommuting in the pandemic to date, including:

- Approximately 43.5 percent of households had at least one person telecommuting in Minnesota (Bureau of Transportation Statistics).
- Minnesota's traffic volume reduction is one of the largest in the country.
 - April 2020: 40 percent traffic volume reduction
 - November 2020: 10 percent traffic volume reduction
 - Urban traffic volume reduction is higher than rural areas
- The equity implications of telecommuting suggest White Americans are able to telecommute in higher numbers (29.9%) than Black Americans (19.7%) and Hispanic Americans (16.2%).
- Metropolitan Council survey results from Spring and Fall 2020 indicate there is strong preference among employees for continuing to telework (64.6%)

The research team will build on this initial information by exploring several topics regarding the overall impact of telecommuting, including:

- Potential long-term impact on vehicle miles traveled, congestion, transit, finance, emissions
- Impact on women, minority communities, low income communities, and strategies to overcome disparities
- Strategies to sustain environmental benefits
- Viability of transportation capacity improvement projects
- Strategies to maintain transit services

Upcoming from the Technology Research Area

The TPEC team plans to submit a white paper to academic journals on the CAV research done to date.

CTS Updates

State legislators hear from TPEC researchers on future of post-COVID transportation

When the coronavirus pandemic is brought under control, will telecommuters head back to the office? What role will connected and automated vehicles (CAVs) play? How do we fund infrastructure for current and future needs? The answer to these questions, and many others, will have a major impact on transportation and society.

As its members began to consider budgets and policies for the upcoming biennium and beyond, the Minnesota House Transportation Finance and Policy Committee held two informational hearings in January on the future of transportation in a post-pandemic world.

At the request of committee chair Frank Hornstein, the University's Center for Transportation Studies organized presentations by a range of experts. Three TPEC researchers presented during the January 19 hearing: Adeel Lari, Frank Douma, and Lee Munnich.

Telecommuting Impacts of COVID-19

Telecommuting became the norm for many Minnesotans during the COVID-19 pandemic, said Adeel Lari, director of innovative financing with the State and Local Policy Program (SLPP) at the Humphrey School of Public Affairs.

Telecommuting soared in spring 2020. For example:

- Of the 218,000 downtown Minneapolis workers in February 2020, just 12.5 percent were still working there in the summer. (Source: Minneapolis Downtown Council)
- Trips to the workplace fell 32 percent throughout the state—and 45 percent in Hennepin County. (Source: Google mobility report, October 9, 2020)

The main challenge today, Lari said, is that telecommuting is not equally available to everyone. Some jobs—such as those in retail, construction, and hotels—are impossible to do online. These jobs also tend to be the ones held by the 25 percent of the nation's workforce with the lowest incomes. Telecommuting also varies by gender, race, and educational attainment.

“The question I always get asked when I’m talking about this subject is whether telecommuting is a new normal or not,” Lari said. “Maybe it will form a new habit. Maybe it will be a new culture. We do not know for sure, but it is very possible.”

A new normal could have long-term impacts on vehicle-miles traveled, congestion, transit use, finance, and emissions. Strategies may be needed to overcome the impacts on women, minority communities, and those with low incomes. In addition, strategies may be needed to maintain transit services and sustain the environmental benefits that have been achieved by working

from home. “We need to understand the work-from-home future and try to fully meet the transportation needs of all our users,” Lari said.

TELECOMMUTING VARIES BY EDUCATION LEVEL:

Less than high school	4.2%
High school graduates	12.6%
Some college or associate degree	24.2%
Bachelor’s degree or higher	51.9%

—Bureau of Labor Statistics, 2018

Connected and Automated Vehicles

From a public policy perspective, safety is one of the main reasons for interest in connected and automated vehicles, said Frank Douma, SLPP director. In 2020, traffic fatalities were up in Minnesota even though miles traveled were down. Estimates are that 90 percent of crashes are due in part to human error—and vehicle technologies can help reduce the number of crashes.

CAVs, he continued, are evolving and might first appear broadly in the near future as autonomous micro-shuttles in passenger fleets. Carrying 12 to 15 passengers, these vehicles could fill last-mile transit gaps or provide service on campuses, traveling at low speeds on a preprogrammed fixed course. MnDOT demonstrated a similar test vehicle at various sites in 2017–2018.

The private sector is making significant investments in this technology. Manufacturers include Minnesota’s Polaris as well as VW, a GM and Honda partnership, and Amazon’s Zoox. “It’s important that we think about this from a public policy perspective and be ready for these developments,” Douma said.

CAVs could also appear soon for driverless package and grocery delivery—essentially, as pods on wheels. New business prospects could arise for supply chains and the freight industry. “There are many other opportunities where we’re going to see this in more of a fleet environment,” he said.

Other benefits of CAVs include improved accessibility and equity for people unable to drive. CAVs could also help address the driver shortage for transit systems, especially in rural areas, and enable increased service frequency and hours.

His closing message: “We should get this technology out in front of the public so that they can understand it’s real and that it’s going to be viable in ways they might not otherwise expect.”

Emerging Issues in Transportation Finance

Lee Munnich reviewed two emerging issues in transportation finance: distance-based fees and public-private partnerships (P3s).

With more fuel-efficient and electric vehicles on the road, Munnich explained, the fuel tax becomes less effective and equitable. An alternative user-based approach is distance-based fees, also known as mileage-based user fees, road usage charges, or vehicle-miles traveled fees.

Much has been happening in this field in recent years. Several states have completed pilot projects or are monitoring how the technology might move forward, and regional coalitions are also forming, particularly on the east and west coasts. “This isn’t happening so much in the Midwest,” Munnich noted, although MnDOT and the Mid America Association of State Transportation Officials have had some discussion.

Minnesota has been a national leader in the area of distance-based fees for decades, starting with a legislative proposal in the 1990s. In 2008 the legislature approved and funded a pilot MnDOT study, and in 2011 a user-fee policy task force was created. In 2017, MnDOT received federal funding to study the use of in-vehicle technology for collecting a distance-based fee from car-sharing companies.

“Implementing a distanced-based user fee won’t be like flipping a switch,” Munnich said. “We will have the gas tax for a long time.”

Public-private partnerships (P3s), a second finance alternative, are used by many states in various ways, Munnich said. Some states use concessions to build new facilities or convert existing facilities to private ownership. P3s transfer some of the risk and a degree of ownership to the private sector and make more effective use of private-sector investments; different types of P3s have different levels of risk.

All the presentations are available on the House archives site:

house.leg.state.mn.us/hjvid/92/893153

(Adapted from a House news post and CTS newsletter article.)

Finalists Announced for CTS Director

Two [finalists](#) were announced for the position of CTS director: Kyle Shelton, deputy director, Kinder Institute for Urban Research, Rice University, Houston, and Robin R. Cauffman, director, Administration, Metro Transit. The finalists participated in second interviews on April 2 and 9. The interview process also included a public presentation and meetings with several key groups. Recordings of these presentations will be available; for more information, please contact Lisa Warren, Office of the Vice President for Research, carls044@umn.edu.

Changes to the TPEC Team

The TPEC team welcomes a new member, Raihana Zeerak. Raihana is a research associate at the Institute for Urban & Regional Infrastructure Finance. In TPEC, Raihana's work focuses on research related to transportation funding and the collection of data for the Minnesota Transportation Finance Database.

Graduate Research Assistant Erika Shepard will graduate in May 2021 and finish her time with the TPEC program. Erika will be working at the Wisconsin Department of Transportation as a multimodal planner. Graduate Research Assistant Kim Napoline will continue working at TPEC to carry on supporting medical device industry cluster research as she finishes her Master of Public Policy and Master of Business Administration programs.

Thank You and Stay in Touch!



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