



Memorandum

To: IDOT

From: CDM Smith

Date: December 13, 2024

Subject: Memo 6: Future Trends

Overview

This memorandum reviews a selection of ongoing and future trends and considerations relevant to IDOT and other transportation system stakeholders, summarized in the table below. Additional considerations and areas of focus are included in **Appendix A**.

	Trend/Consideration	Relevance to IDOT and transportation stakeholders
Safety	<ul style="list-style-type: none">▪ Increase in crashes vs. pre-COVID levels, particularly severe and fatal crashes, with impacts on all road users	<ul style="list-style-type: none">▪ National adoption of “Safe System Approach”▪ Increased levels of funding available for system-wide safety actions▪ Federal performance measures
Equity	<ul style="list-style-type: none">▪ Focus on addressing equity issues, including racial equity	<ul style="list-style-type: none">▪ Expanded initiatives and investment at the state and federal level (e.g., DDD Tool, Justice40, USDOT Equity Action Plan, Reconnecting Communities)
Climate Change	<ul style="list-style-type: none">▪ Increasing demand for strategies that can accelerate greenhouse gas reduction across sectors▪ Growing focus on and need for resilience	<ul style="list-style-type: none">▪ Increased levels of discretionary/formula federal funding available for greenhouse gas reduction and resilience strategies (e.g., NEVI, CRP, PROTECT)▪ Shifts in infrastructure needs, e.g., greater drainage capacity, higher temperature standards.
Technology	<ul style="list-style-type: none">▪ Growth in electrification for both passenger and commercial vehicles▪ Emerging deployment of automated and connected vehicle technologies▪ Proliferation of new large-scale data resources, complemented by emerging analysis tools like AI	<ul style="list-style-type: none">▪ Implications for transportation system funding (e.g., declining motor fuel tax revenues)▪ Opportunities to leverage new technologies like AVs to address state priorities (e.g., safety) while mitigating the impacts of other shifts (e.g., potentially increased VMT)▪ Opportunities to leverage new data sources in system operations, planning, and programming
Travel Demands	<ul style="list-style-type: none">▪ Shifting personal travel patterns (e.g., hybrid work)▪ Aging population and slow/no population growth▪ Growing freight and e-commerce	<ul style="list-style-type: none">▪ Impacts of shifting demands on system usage and capacity needs (e.g., lower transit ridership, fewer passenger car trips during peak periods, growth in off-peak travel)
Inflation	<ul style="list-style-type: none">▪ Transportation system cost increases in the U.S., higher than overall inflation, especially since 2021	<ul style="list-style-type: none">▪ Reduction in spending power of local, state, and federal capital investments, making it harder to address long-term capital investment backlogs▪ Negative implications for system operating budgets (e.g., costs of hiring staff such as bus drivers and snowplow operators)

Safety

Addressing a Worsening Traffic Safety Crisis

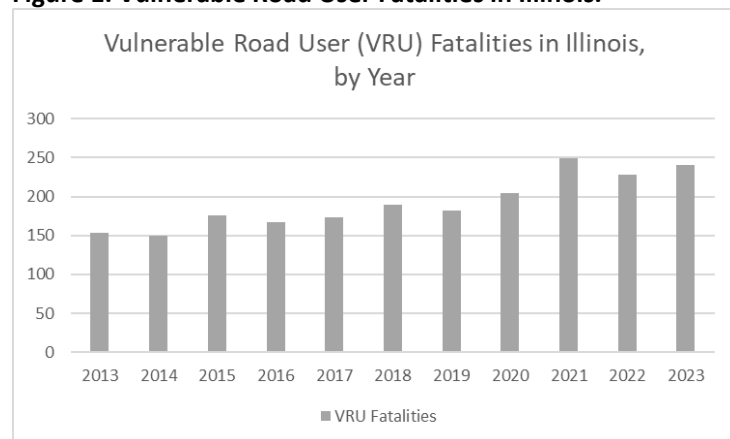
Nationwide traffic fatality rates surged during the pandemic, growing 18% from 2019 to 2021. They have since fallen back slightly but remain elevated from pre-COVID levels.¹ Illinois has seen similar trends, with fatalities increasing by 32% from 2019 to 2021. Fatalities in the state have since dropped but remain 23% higher than 2019 rates as of 2023.²

Nationally, 2021 also saw a relatively large rise of fatalities in key sub-categories, including in pedestrian and bicycle fatalities.³ While pedestrian fatalities fell slightly in 2023, they increased by 4% for bicycle crashes, highlighting ongoing roadway safety issues.⁴

These issues are also clear in Illinois, where:

- Vulnerable Road User Fatalities are well above historic levels (see **Figure 1**). They have begun to decline from the historic highs of 2021 but remain 24% higher than 2019 as of 2023.⁶
- Pedestrian fatalities have increased by 18% from 2018 to 2023.
- Bicyclist fatalities have increased by 46% from 2018 to 2023.⁷

Figure 1. Vulnerable Road User Fatalities in Illinois.⁵



There are also intersections between these transportation safety concerns and other trends discussed in this memorandum, such as equity. For example, the National Highway Traffic Safety Administration (NHTSA) has identified disparities between fatality rates for travelers depending on race and ethnicity. Compared to white travelers, people of color have a 22% higher fatality rate for every mile they travel.⁸ Another example is that in Illinois, more than half of the state's "High-Injury Network," i.e., roadways

¹ National Highway Traffic Safety Administration (NHTSA), "Crash Stats: Early Estimate of Motor Vehicle Traffic Fatalities in 2023." April 2024, <https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/813561>.

² Illinois Department of Transportation (IDOT), "Illinois Fatal Crash Historic Data." Accessed August 2024, apps1.dot.illinois.gov/FatalCrash/historicsnapshot.html.

³ NHTSA, "Crash Stats: Early Estimates of Motor Vehicle Traffic Fatalities And Fatality Rate by Sub-Categories in 2021." May 2022, <https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/813298>.

⁴ NHTSA, "Crash Stats: Early Estimates of Motor Vehicle Traffic Fatalities And Fatality Rate by Sub-Categories in 2023." May 2024, <https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/813581>.

⁵ NHTSA, "Data from Traffic Safety Performance (Core Outcome) Measures for Illinois." Accessed August 2024, <https://cdan.dot.gov/stsi.htm#>.

⁶ Illinois Department of Transportation (IDOT), "Illinois Fatal Crash Historic Data." Accessed August 2024, apps1.dot.illinois.gov/FatalCrash/historicsnapshot.html.

⁷ IDOT, "Illinois Vulnerable Road User Safety Assessment 2023." November 2023, <https://idot.illinois.gov/transportation-system/transportation-management/planning/other-plans/shsp.html>.

⁸ NHTSA, "Evaluating Disparities in Traffic Fatalities by Race, Ethnicity, and Income." September 2022, <https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/813188>.

with a high concentration of bicycle and pedestrian safety concerns, are within areas identified as historically disadvantaged by the federal Justice40 Initiative criteria.⁹

The recent increase in severe crashes may be at least in part a result of changes in traveler behavior. NHTSA has noted that a potential cause for the spike in traffic fatalities during the pandemic is an increase in risky behavior, e.g., speeding, driving without wearing a seatbelt, and driving under the influence.¹⁰ IDOT's Highway Safety Plan found that roughly one third of fatal crashes in Illinois in 2022 were speed-related.¹¹

Both the state and federal government have continued to emphasize the importance of safety in messaging, priority actions, and programming. This increased focus, which has been enabled in part by federal funding changes, reflects a broader goal of institutionalizing the "Safe System Approach" nationwide. For example, the Infrastructure Investment and Jobs Act (IIJA) authorized a series of safety programs and actions for USDOT through 2026.¹² One of these programs is the \$5 billion Safe Streets for All (SS4A) discretionary program, which funds safety projects and planning activities.¹³ Illinois has received awards under this program in 2022 and 2023, for the development of comprehensive safety action plans across the state and infrastructure improvements in the City of Chicago.¹⁴

IDOT has also worked to address the ongoing traffic safety crisis through its own investment and planning activities. For example, IDOT's Strategic Highway Safety Plan and its recently released assessment on safety for vulnerable road users identify strategies, partnerships, and investments that can help IDOT achieve its goal of zero fatalities for all transportation users.¹⁵ IDOT also develops and implements a triennial Highway Safety Plan, which leverages NHTSA funding to address behavioral highway safety concerns.¹⁶ IDOT investments through programs like HSIP, ITEP, the Data Driven Decisions Tool, and more also support data-driven projects to reduce safety incidents on the system. As IDOT continues its work to address safety, these programs (and others) provide an important foundation for future efforts, including when applying for competitive funding opportunities.

⁹ IDOT, "Illinois Vulnerable Road User Safety Assessment 2023." November 2023, <https://idot.illinois.gov/transportation-system/transportation-management/planning/other-plans/shsp.html>.

¹⁰ NHTSA, "2020 Fatality Data Show Increased Traffic Fatalities During Pandemic." June 2021, <https://www.nhtsa.gov/press-releases/2020-fatality-data-show-increased-traffic-fatalities-during-pandemic>.

¹¹ IDOT, "2024-2026 Illinois Triennial Highway Safety Plan." Accessed October 1, 2024, <https://idot.illinois.gov/content/dam/soi/en/web/idot/documents/transportation-system/reports/safety/hsp/plans/24-26-3hsp.pdf>.

¹² Library of Congress, "H.R.3684 - Infrastructure Investment and Jobs Act" Accessed August 2024, <https://www.congress.gov/bill/117th-congress/house-bill/3684>.

¹³ U.S. Department of Transportation (USDOT), "Safe Streets and Roads for All Fact Sheet." April 2024, <https://www.transportation.gov/grants/SS4A/fact-sheet>.

¹⁴ USDOT, "All Years' SS4A Grant Awards." Accessed August 2024, <https://www.transportation.gov/grants/ss4a/cumulative-awards>.

¹⁵ IDOT, "Illinois Vulnerable Road User Safety Assessment 2023." November 2023, <https://idot.illinois.gov/transportation-system/transportation-management/planning/other-plans/shsp.html>; IDOT, "2022 Illinois Highway Safety Plan." June 2022, https://www.nhtsa.gov/sites/nhtsa.gov/files/2021-10/IL_FY22_HSP%20%281%29.pdf.

¹⁶ IDOT, "2024-2026 Illinois Triennial Highway Safety Plan."

Equity

Focusing on Equity

The last decade has seen an increasing focus on inequities in society, including a focus on healthcare equity during the COVID-19 pandemic response and racial equity after the 2020 death of George Floyd. The Illinois General Assembly recognized the importance of equity in the transportation system and included “racial equity” as an area for the Blue-Ribbon Commission on Transportation Infrastructure Funding and Policy (BRC) to consider. Equity concerns also extend to include other disadvantaged and vulnerable populations, including but not limited to: people of color; members of religious minorities; lesbian, gay, bisexual, transgender, and queer (LGBTQ+) people; people with disabilities; people living in rural areas; and people otherwise adversely affected by persistent poverty or inequality.¹⁷

Research shows that those who live nearest major infrastructure are most impacted by noise, pollution, and other effects while seeing relatively fewer benefits from access to the system. For example, many low-income and minority communities lack access to efficient and reliable public transportation, making them more likely to have longer commute times and higher transportation costs.¹⁸ Nationally, the lowest income households spend as much as 37% of their after-tax income on transportation compared to 11% for high-income households.¹⁹ These kinds of equity concerns are also present in Illinois. For example, in a recent analysis of its region, the Chicago Metropolitan Agency for Planning (CMAP) found significant variations in travel times by race and ethnicity. They noted that, “Black residents in [northeastern Illinois] had significantly longer trips to work, health care, and routing shopping than those of other residents.” These disparities have multiple causes, including increased reliance on modes with a lower average speed like public transportation and walking. However, disparities remain even when controlling for the mode used to travel, highlighting that the transportation system also interacts with larger structural challenges, e.g., mismatches between home locations and opportunities.²⁰

Inadequate pedestrian and bicycle infrastructure in these communities can limit transportation options, further exacerbating safety, transportation costs, and travel time disparities.²¹ These communities are also more likely to be near highways and truck routes, disproportionately exposing them to congestion and pollution.²² These trends are often connected, e.g., as shown in Error! Reference source not found., a reas with the most vulnerable communities (Districts 1, 2 and 8) also have the most demand for active transportation.²³

An equity-based approach has become the focus of many federal actions, including through the programs created by the IJJA. Across sectors, the Justice40 Initiative has outlined that 40% of the overall benefits of certain federal climate, energy, housing, and infrastructure investments (including IJJA) flow

¹⁷ USDOT, “Planning Topics: Equity in Transportation.” Accessed August 22, 2024, https://www.planning.dot.gov/planning/topic_transportationequity.aspx.

¹⁸ Chicago Metropolitan Agency for Planning (CMAP), “Improving equity in transportation fees, fines, and fares.” April 8, 2021, <https://cmap.illinois.gov/news-updates/improving-equity-in-transportation-fees-fines-and-fares/>

¹⁹USDOT, “U.S. Department of Transportation Equity Action Plan.” January 2022, https://www.transportation.gov/sites/dot.gov/files/2022-04/Equity_Action_Plan.pdf.

²⁰ CMAP, “Demographics inform disparities in travel around northeastern Illinois.” October 2021, <https://cmap.illinois.gov/wp-content/uploads/My-Daily-Travel-demographics.pdf>.

²¹ USDOT, “Health and Equity.” December 2013, <https://www.transportation.gov/mission/health/health-equity>.

²² PolicyLink, “Healthy, Equitable Transportation Policy: Recommendations and Research.” January 2009, <https://www.preventioninstitute.org/publications/healthy-equitable-transportation-policy-recommendations-and-research>.

²³ Illinois Environmental Protection Agency (IEPA), “State of Illinois Priority Climate Action Plan.” March 2024, <https://www.epa.gov/system/files/documents/2024-03/illinois-priority-climate-action-plan.pdf>.

to disadvantaged, marginalized, and overburdened communities.²⁴ Roughly three in ten Illinois residents live in census tracts designated as “disadvantaged” by USDOT.²⁵

USDOT’s Equity Action Plan (EAP) has outlined changes in requirements for grant recipients. The EAP, which includes an enhanced community participation plan and quantitative equity screening component, highlights new expectations for data and engagement in Statewide Transportation Improvement Plans.²⁶

These expectations could inform future project selection processes. They could also inform and build on IDOT’s ongoing work to include equity in its investment considerations, such as its Data Driven Decisions Tool (DDD Tool) and other programs discussed in the companion memoranda on *Performance-based Programming and Improving Investment Impacts*. As noted above, IDOT also incorporates equity screening into its ongoing planning activities, such as its ongoing work to develop an active transportation plan.²⁷

Discretionary grants programs for reducing transportation inequities continue to emerge, including:

- The Rebuilding American Infrastructure with Sustainability and Equity (RAISE) program, a federal program for multimodal projects that prioritizes investments in disadvantaged areas.²⁸
- The Reconnecting Communities Pilot Program, a federal program to invest in projects that overcome barriers to community connectivity created by transportation infrastructure, prioritizing projects in economically disadvantaged communities.²⁹
- The Rural Surface Transportation Grant program, which invests in increasing access to industrial facilities that support the economy and bringing flexible transit services to rural areas, prioritizing projects that improve equity outcomes.³⁰

²⁴ The White House, “Justice40 Initiative.” Accessed August 2024, <https://www.whitehouse.gov/environmentaljustice/justice40/>.

²⁵ CDM Smith analysis of data from the Climate and Economic Justice Screening Tool, available at: <https://screeningtool.geoplatform.gov/en/downloads#3/33.47/-97.5>.

²⁶ USDOT, “U.S. Department of Transportation Equity Action Plan.” February 2024, <https://www.transportation.gov/priorities/equity/equity-action-plan>; Federal Transit Administration, “Statewide Transportation Improvement Program (STIP).” November 2022, <https://www.transit.dot.gov/regulations-and-guidance/transportation-planning/statewide-transportation-improvement-program-stip>.

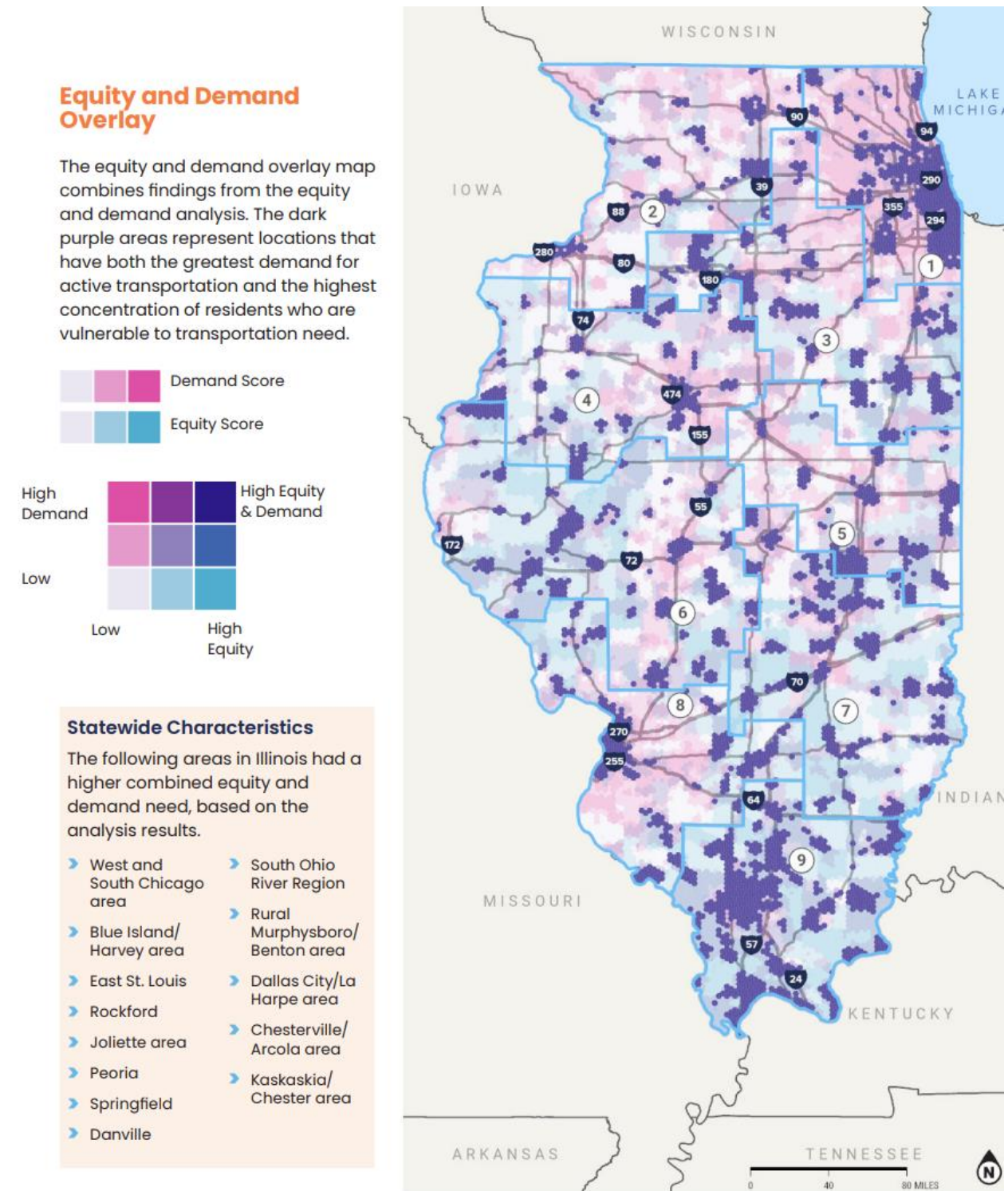
²⁷ IDOT, “walk.roll.illinois. State of Active Transportation in Illinois.”

²⁸ USDOT, “Rebuilding American Infrastructure with Sustainability and Equity (RAISE).” June 2024, <https://www.transportation.gov/RAISEgrants>.

²⁹ USDOT, “Reconnecting Communities Pilot Grant Program.” Accessed August 2024, <https://www.transportation.gov/reconnecting>.

³⁰ USDOT, “The Rural Surface Transportation Grant Program.” January 2024, <https://www.transportation.gov/grants/rural-surface-transportation-grant-program>.

Figure 2. Demand for Active Transportation and Equity Characteristics in Illinois.³¹



³¹ IDOT, “walk.roll.illinois. State of Active Transportation in Illinois.”

Climate Change

This section includes an overview of two related climate change trends:

- Efforts to reduce greenhouse gas emissions from the transportation system, and
- Efforts to adapt to the impacts of climate change (e.g., precipitation, heat) through more resilient infrastructure and systems.

Supporting Reductions in Greenhouse Gases

The United States has set a goal of reducing emissions to roughly half of 2005 levels by 2030 and to have net-zero emissions by 2050, pushing all sectors to consider the steps they must take to achieve decarbonization.³² The transportation sector is the single-largest source of greenhouse gas emissions in the United States. The transportation sector consequently must play a significant role if these decarbonization efforts are to succeed.³³

As of 2021, the transportation sector is also the largest source of greenhouse gas emissions in Illinois, accounting for 25 percent of the state's overall emissions. These emissions are concentrated in the state's population centers, reflecting the role personal travel and economic activity (e.g., truck movements) play in creating emissions. However, the highest per capita emissions rates are in more rural and less populated areas. There are especially high levels of emissions in corridors that reflect Illinois's position as a hub of the nationwide logistics network via the interstate highway system.³⁴

The IDOT Carbon Reduction Strategy and other complementary planning activities (e.g., the Illinois 2023 State Freight Plan)³⁵ include many strategies to reduce GHG emissions, including work to support the adoption of electric passenger, light commercial, medium- and heavy-duty electric vehicles through incentives and infrastructure investments (discussed in greater detail later in this memorandum). Among other strategies, IDOT has also identified opportunities to expand access to lower-carbon mobility options.

Emissions are not on track to meet 2050 targets (see **Figure 3**),³⁶ and transportation stakeholders are continuing to consider new strategies that can accelerate their reduction. New funding sources are also now in place to support decarbonization strategies at both the state and federal levels. For example:

- The federal Carbon Reduction Program (CRP) provides discretionary funds to reduce emissions through improved traffic management, active transportation, electrification, and more.³⁷

³² IEPA, "State of Illinois Priority Climate Action Plan."

³³ EPA, "Fast Facts on Transportation Greenhouse Gas Emissions." Accessed August 2024, <https://www.epa.gov/greenvehicles/fast-facts-transportation-greenhouse-gas-emissions>.

³⁴ IDOT, "Illinois Department of Transportation Carbon Reduction Strategy." 2023, https://idot.illinois.gov/content/dam/soi/en/web/idot/documents/transportation-system/memos---letters/environment/IDOT%20Carbon%20Reduction%20Strategy_with%20Appendices_FINAL.pdf.

³⁵ IDOT, "Illinois 2023 State Freight Plan." December 2023, https://idot.illinois.gov/content/dam/soi/en/web/idot/documents/transportation-system/reports/opp/freight/Illinois_2023_State_Freight_Plan.pdf.

³⁶ IEPA, "State of Illinois Priority Climate Action Plan."

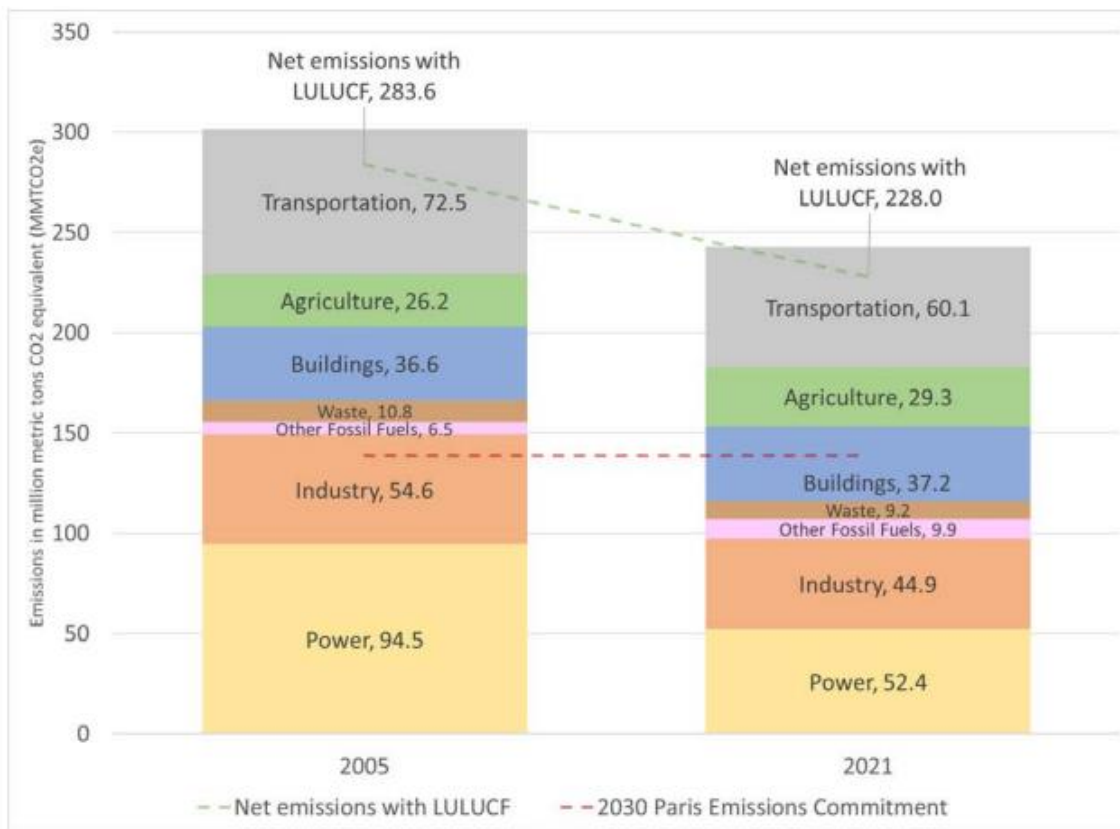
³⁷ USDOT, "Carbon Reduction Program." May 2024, <https://www.transportation.gov/priorities/climate-and-sustainability/carbon-reduction-program>.

- The Illinois Commerce Commission has overseen the development of Beneficial Electrification Plans, which supports investments in electric vehicle adoption, charging infrastructure, and other strategies to reduce emissions from transportation.³⁸

Requirements for using federal funds continue to develop. For example, USDOT announced in 2023 that state DOTs would be required to monitor and report GHG emissions from the transportation system. The outcome of that rule remains uncertain pending ongoing litigation, but IDOT and other transportation stakeholders may be subject to that or other rules in future years.³⁹

Finally, IDOT and other stakeholders could continue to maximize investment impact and funding options through internal processes in project and partnership selection. For example, IDOT’s DDD Tool and other programs such as the Competitive Freight Program include environmental impact criteria as part of their evaluation process.

Figure 3. 2005 and 2021 Illinois greenhouse gas emissions compared to Paris commitment.⁴⁰



³⁸ComEd, “ComEd’s Beneficial Electrification (BE) Plan: New EV Rebates and Customer Tools.”

May 2024, <https://il-act.org/wp-content/uploads/2024/05/Denise-Munoz-ComEd-Green-Drives-Alsip-2024.pdf>.

³⁹ FHWA, “GHG Performance Measure.” July 2024, https://www.fhwa.dot.gov/environment/ghg_measure/.

⁴⁰ Source: IEPA, “State of Illinois Priority Climate Action Plan.”

Note: Emissions are expressed in total MMTCO_{2e}, not as percentages. The upper dotted line in green shows net emissions for each year, including sinks from Land Use, Land-use Change, and Forestry (LULUCF), which account for -18.1 MMTCO_{2e} in 2005 and -14.9 MMTCO_{2e} in 2021. The lower dotted line in red shows the 2030 emissions target in the Paris Climate Agreement: 139 MMTCO_{2e}, a 51% reduction from 2005 levels.

Responding to Greater Needs for Resilience

Even if the U.S. and other countries meet their greenhouse gas reduction targets, there will still be climate-related disruptions and impacts to infrastructure and transportation systems that necessitate mitigation efforts.

Climate change has already made Illinois both wetter and warmer. Average daily temperatures have already increased by 1 to 2 degrees (Fahrenheit) over the past 120 years.⁴¹ The Nature Conservancy in Illinois projects that by the end of the century, the number of extreme heat days—where the daily maximum temperature is 95 degrees or higher—will at least triple even in a scenario where greenhouse gas emissions fall.⁴² Annual precipitation has also grown by 12 to 15% over the past 120 years, and the number of extreme precipitation events⁴³ has increased by 40% over the past century (see **Figure 4**).⁴⁴ These extreme precipitation and temperature events will continue to increase even if emissions fall.⁴⁵

Extreme weather hazards can damage infrastructure and pose transportation system disruptions. For example, flooding, changing lake levels, and other precipitation-related events can cause local traffic disruptions and damage roads, bridges, and railways.⁴⁶ Extreme heat events can also damage roads and rails. They can also make it difficult or more uncomfortable for travelers to rely on active modes that involve time spent outside, such as biking, walking, and public transit.⁴⁷ Increasing climate disruptions are also leading to higher infrastructure repair and maintenance costs. They will also have negative economic impacts, e.g., through supply chain interruptions.⁴⁸

Resilience planning can mitigate climate impacts. The resilience planning approach requires taking proactive measures during planning and design to ensure infrastructure can withstand climate hazards. IDOT's All-Hazards Transportation System Vulnerability Assessment found that 18.5% of Illinois's assets are a high priority for resilience activities given their risk and importance.⁴⁹ The federal government is placing an increased focus on these kinds of resilience efforts. For example, IJJA established the Promoting Resilient Operations for Transformative, Efficient, and Cost-saving Transportation (PROTECT) Program. PROTECT provides formula and discretionary funding for resilient planning, design, or improvement of a surface transportation asset.⁵⁰

⁴¹ Illinois State Climatologist, "Climate Change in Illinois." Accessed August 2024, <https://stateclimatologist.web.illinois.edu/climate-change-in-illinois/>.

⁴² D. Wuebbles, J. Angel, K. Petersen, and A.M. Lemke, (Eds.), "An Assessment of the Impacts of Climate Change in Illinois." The Nature Conservancy, Illinois, 2021, https://doi.org/10.13012/B2IDB-1260194_V1.

⁴³ Extreme precipitation events are days when precipitation is 2-inches or greater.

⁴⁴ Illinois State Climatologist, "Climate Change in Illinois."

⁴⁵ Wuebbles et al, "An Assessment of the Impacts of Climate Change in Illinois."

⁴⁶ EPA, "Climate Change Impacts on Transportation." November 2023, <https://www.epa.gov/climateimpacts/climate-change-impacts-transportation>.

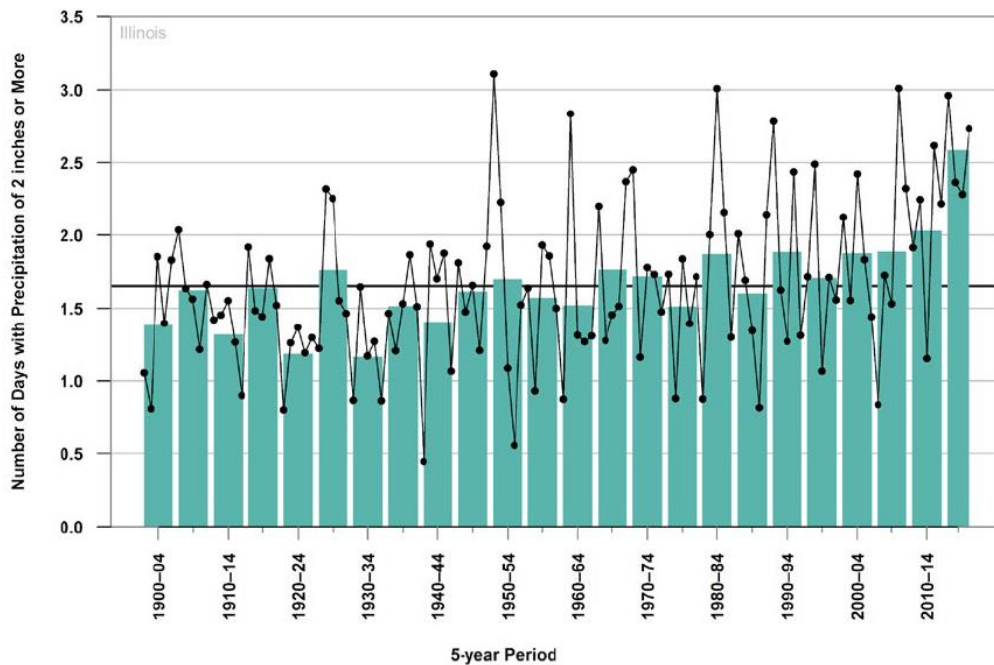
⁴⁷ EPA, "Climate Change Impacts on Transportation."

⁴⁸ EPA, "Climate Change Impacts on Transportation."

⁴⁹ IDOT, "Long Range Transportation Plan: Resiliency." Accessed August 2024, <https://idot.illinois.gov/content/dam/soi/en/web/idot/documents/about-idot/misc/planning/idot-lrtp-5-resiliency-final.pdf>; IDOT, "Illinois All-Hazards Transportation System Vulnerability Assessment."

⁵⁰ FHWA, "Promoting Resilient Operations for Transformative, Efficient, and Cost-Saving Transportation (PROTECT) Program." August 2023, <https://www.fhwa.dot.gov/environment/protect>.

Figure 4. Observed Number of Extreme Precipitation Events in Illinois (1900-2018).⁵¹



The emissions targets under discussion could limit the scale of warming but are not likely to eliminate its effects altogether. IDOT and other stakeholders could prepare for the expected range of federal, state, and local funding opportunities by:

- Assessing need in Illinois by identifying communities and regions most vulnerable to climate impacts through risk and vulnerability assessments.⁵² For example, CMAP is creating a regional transportation resilience plan that will prioritize investments to build resilience equitably.⁵³ While resilience plans are not currently required at the federal or state level, there are incentives for their adoption, including lower local match requirements for PROTECT.⁵⁴
- Reviewing and reevaluating agency plans and policies (e.g., design standards) to identify impacts of future climate hazards.⁵⁵
- Reevaluating agency project selection and project development processes to ensure that resiliency is appropriately accounted for in capital project selection, planning and design.⁵⁶

⁵¹ Wuebbles et al, “An Assessment of the Impacts of Climate Change in Illinois.”

⁵² American Planning Association, “Planning for Infrastructure Resilience.” December 2019, <https://www.planning.org/publications/report/9192800/>.

⁵³ CMAP, “Climate & Natural Resource: Climate Resilience.” Accessed August 2024, <https://cmap.illinois.gov/focus-areas/climate/climate-resilience/>.

⁵⁴ The White House, “FACT SHEET: Biden-Harris Administration Releases Agency Climate Adaptation Plans, Demonstrates Leadership in Building Climate Resilience.” June 2024, <https://www.whitehouse.gov/briefing-room/statements-releases/2024/06/20/fact-sheet-biden-harris-administration-releases-agency-climate-adaptation-plans-demonstrates-leadership-in-building-climate-resilience/>.

⁵⁵ IDOT, “Manuals and Guides.” Accessed August 24, 2024, <https://idot.illinois.gov/doing-business/procurements/engineering-architectural-professional-services/consultant-resources/highways/manuals-and-guides.html>.

⁵⁶ American Planning Association, “Planning for Infrastructure Resilience.” December 2019, <https://www.planning.org/publications/report/9192800/>.

Technology

This section includes an overview of three technological trends:

- Electrification of the transportation system, including for both passenger and commercial vehicles,
- Recent, ongoing, and future efforts to deploy autonomous vehicles, and
- High-level implications of artificial intelligence and growing data infrastructure needs for the state's transportation system.

Transportation System Electrification

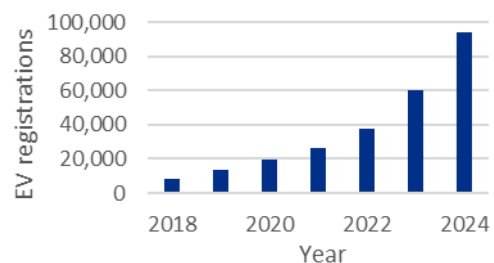
In recent years, transportation system users have begun to transition away from fossil fuels and toward electrification and other low-/no-emissions propulsion strategies. For example, as shown in **Figure 5**, the number of electric vehicles (EVs) in Illinois has grown, rising from less than 10,000 in 2018 to almost 100,000 today. EVs remain a small share of the overall vehicle fleet, both for passenger cars and other transportation system users (e.g., transit buses and freight vehicles). However, based on current purchasing data, and despite slower increases in EV sales growth in 2024 compared to 2023, their market share will grow significantly in the coming years. As a share of all light-duty vehicle sales in 2023, battery-electric EVs accounted for 7 percent nationally⁵⁸ and 8 percent of Illinois.⁵⁹ Nationally, hybrid and plug-in hybrid vehicles accounted for an additional 9 percent.⁶⁰

In addition to consumer interest and falling prices, federal incentives and other programs are supporting EV adoption. These include tax credits for EV buyers,⁶¹ federal grants to support investments in EV charging infrastructure,⁶² federal and state grants to support transit bus electrification,⁶³ and more.

The electrification of the transportation system could also have effects relevant to IDOT and other transportation stakeholders, including the need to

- Address reductions in Motor Fuel Tax (MFT) revenues as average fuel economies continue to increase and a greater share of the vehicle fleet transitions away from fossil fuels.

Figure 5. Illinois electric vehicle registrations.⁵⁷



⁵⁷ Source: Illinois Secretary of State data, available at <https://www.ilsos.gov/departments/vehicles/statistics/electric/home.html>. Figures represent statewide totals as of January for each year.

⁵⁸ U.S. Energy Information Administration (EIA), "Electric vehicles and hybrids surpass 16% of total 2023 U.S. light-duty vehicle sales." January 31, 2024, <https://www.eia.gov/todayinenergy/detail.php?id=61344>.

⁵⁹ Alliance for Automotive Innovation, "Get Connected: Electric Vehicle Quarterly Report," Fourth Quarter, 2023, <https://www.autosinnovate.org/posts/papers-reports/Get%20Connected%20EV%20Quarterly%20Report%202023%20Q4.pdf>.

⁶⁰ U.S. Energy Information Administration (EIA), "Electric vehicles and hybrids surpass 16% of total 2023 U.S. light-duty vehicle sales."

⁶¹ U.S. Department of Energy (DOE), "Electric Vehicles." Accessed August 23, 2024, <https://www.energy.gov/save/electric-vehicles>.

⁶² DOE, "Alternative Fuels Data Center: National Electric Vehicle Infrastructure (NEVI) Formula Program." Accessed August 23, 2024, <https://afdc.energy.gov/laws/12744>.

⁶³ State of Illinois, "Illinois EPA Announces \$17.7 Million Notice of Funding Opportunity for Electric School Buses." April 24, 2024, <https://www.illinois.gov/news/press-release.29925.html>.

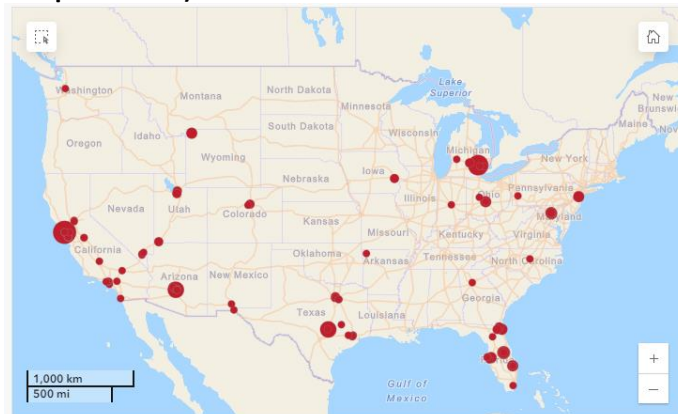
- Identify funding for the capital costs necessary to electrify both public and private fleets, including not only vehicles but also supporting infrastructure (e.g., public investments in buses and bus garages, coordination of public and private investments in passenger vehicle EV charging facilities, private sector investments in trucks and charging facilities).
- Ensure that low-income travelers are not left out of broader system electrification benefits.⁶⁴
- Monitor the secondary effects of system electrification, including the impacts of increased vehicle weights on system wear-and-tear and the potential for reduced emissions in some but not all categories of air pollutants (e.g., lower emissions from exhaust but not from tires).

Deploying Autonomous Vehicle Technology

In recent decades, automakers have begun to deploy increasing levels of automated driver supports, including adaptive cruise control, lane detection technology, collision warnings, and many more.⁶⁶ Automation has also not been restricted to on-road vehicles, e.g., urban rail systems e.g., the Washington D.C. Metro⁶⁷ and the Philadelphia-area PATCO system⁶⁸ began automated operations in the 1960s and 1970s. However, there has recently been an increased focus on the partial or full automation of on-road vehicles like passenger cars and trucks.

Recently, companies such as Alphabet's Waymo and Amazon's Zoox have begun to offer so-called "robo-taxi" services in select locations in the U.S, as have companies such as China's Baidu.⁶⁹ The most advanced of these systems operate fully autonomously in specific regions and under specific conditions (e.g., local travel in San Francisco).⁷⁰ **Figure 6** shows a map of active U.S. testing sites for AV technology.

Figure 6. Active AV testing locations in the United States (size corresponds to number of programs; not necessarily comprehensive).



Source: NHTSA.⁶⁵

⁶⁴ USDOT, "Equity Considerations in Planning." Last modified May 5, 2023, <https://www.transportation.gov/rural/ev/toolkit/ev-infrastructure-planning/equity-considerations>.

⁶⁵ NHTSA, "AV TEST Initiative." Accessed August 24, 2024, <https://www.nhtsa.gov/automated-vehicle-test-tracking-tool>.

⁶⁶ NHTSA, "Driver Assistance Technologies." Accessed August 23, 2024, <https://www.nhtsa.gov/vehicle-safety/driver-assistance-technologies>.

⁶⁷ WMATA, "Metro and Automatic Train Operation (ATO)." Accessed August 23, 2024, <https://www.wmata.com/initiatives/plans/Automatic-Train-Operation-ATO/index.cfm>.

⁶⁸ PATCO, "About PATCO." Accessed August 23, 2024, <http://www.ridepatco.org/about/history.html>.

⁶⁹ Edward Ludlow, Bloomberg, "Waymo, Cruise and Zoox Inch Forward Ahead of Tesla Joining Robotaxi Race." April 15, 2024, <https://www.bloomberg.com/news/newsletters/2024-04-15/waymo-cruise-and-zoox-inch-forward-ahead-of-tesla-joining-robotaxi-race>.

⁷⁰ Megan Rose Dickey, Axios, "Waymo receives approval to operate on San Francisco freeways." March 5, 2024, <https://www.axios.com/local/san-francisco/2024/03/05/waymo-self-driving-cars-california-freeway-approval>.

Given the pace of recent activities, it appears likely that the scale of both driver-assist and circumstance-specific automation will increase.⁷¹ Full automation in all circumstances remains aspirational. As AV technology continues to evolve, IDOT and other transportation system stakeholders could evaluate how these technologies could be deployed to address agency priorities, including:

- Maximizing the safety benefits of AV technologies (e.g., reduced human error) while addressing potential risks (e.g., difficulties with pedestrians and bicyclists). It will also be important to assess interactions between deployment models and safety impacts, e.g., AVs could reduce safety incidents per VMT, but the benefits could be offset if total VMT increases.
- Assessing the impacts of AVs on transportation system capacity. If deployed at scale, AVs could increase system throughput as vehicles behave closer to optimally. However, these benefits could be minimized or entirely offset by human-AV interactions in a mixed-deployment scenario.
- Pursuing opportunities to deploy AV technologies in transportation system operations, e.g., bus operations or truck shipping. Such deployments could help to address existing labor shortages, improve operational efficiency, and free up available staff resources to address other priorities.
- Understanding how AV deployments would interact with existing statutes and providing appropriate regulatory and statutory guidance to accommodate systems that vary from existing paradigms (e.g., insurance, vehicle registration).

Growing Reliance on Data Infrastructure and Artificial Intelligence

With the proliferation of connected devices, sensors, and other technologies, there is now more data available than ever. Organizations across sectors are confronting the challenge of how to manage these ever-growing data resources, whether they are related to asset conditions, customer interactions, geospatial information, or other categories. To respond, organizations have had to make investments in both the infrastructure required to hold and access the data (e.g., cloud computing) and capabilities to analyze the data (e.g., machine learning and artificial intelligence).

As discussed in the companion memorandum on *Data Needs*, the transportation sector is already adapting to these emerging data challenges. Among other data sources, transportation agencies must now consider how to either build or acquire the infrastructure to support data from:

- Longstanding data gathering processes, e.g., pavement condition and traffic counts.
- Increasingly granular data on vehicle movements, travel speeds, and trip origins and destinations, e.g., from both current and future devices like cell phones and connected vehicles.
- More detailed assessments enabled by new technologies, e.g., drones and connected sensors.

IDOT and other transportation agencies have already adopted a wide variety of analytical tools and platforms to leverage their many data sources. For example, IDOT's Traffic Count Data System provides a unified platform through which transportation stakeholders can access traffic count data with built-in

⁷¹ McKinsey & Company, "Autonomous vehicles moving forward: Perspectives from industry leaders." January 5, 2024, <https://www.mckinsey.com/features/mckinsey-center-for-future-mobility/our-insights/autonomous-vehicles-moving-forward-perspectives-from-industry-leaders>.

analysis.⁷² As emerging tools like artificial intelligence (AI) mature, there will likely be opportunities to extend on these and other platforms, allowing for greater synthesis and understanding of transportation needs and system performance. This is also an area of ongoing work at all levels of government, including a recent federal request for information on challenges and opportunities related to AI in transportation.⁷³

There are several considerations for IDOT and other agencies related to these trends. Examples include:

- Managing the staffing needs to acquire, maintain, and leverage current and new data resources and analysis tools (e.g., AI).
- Leveraging these resources to enhance real-time information sharing, state and local planning activities, and programming decisions.
- Identifying on-system opportunities to support data needs, e.g., fiber optic cable installation.
- Mitigating concerns and risks related to cybersecurity and data privacy, e.g., to protect sensitive data about asset vulnerabilities.

Travel Demand

This section includes an overview of three trends that are affecting travel demands in Illinois:

- Demographic changes in the state, including the rapid aging of the state's population and long-term projections for population stability or modest decline,
- Other factors that have contributed to changes in personal travel patterns, including growing levels of remote work and the effects of alternative travel options (e.g., Uber and Lyft), and
- Ongoing changes in the state's freight system and impacts related to trends like e-commerce.

Responding to Shifting Demographics

State transportation officials will soon confront challenges created by the demographic trends of an aging population and a low or negative statewide population growth rate.

The population of Illinois continues to age, mirroring national trends.⁷⁴ According to the Illinois Department of Public Health, the proportion of people over sixty-five will increase to over 20% by 2035.⁷⁵ Other forecasts have come to the same conclusion. **Figure 7** shows population projections from Woods & Poole for the state through 2050, which show that the share of 65+ residents will grow from 12.5% in 2010 to more than 20% in 2040 and 2050.

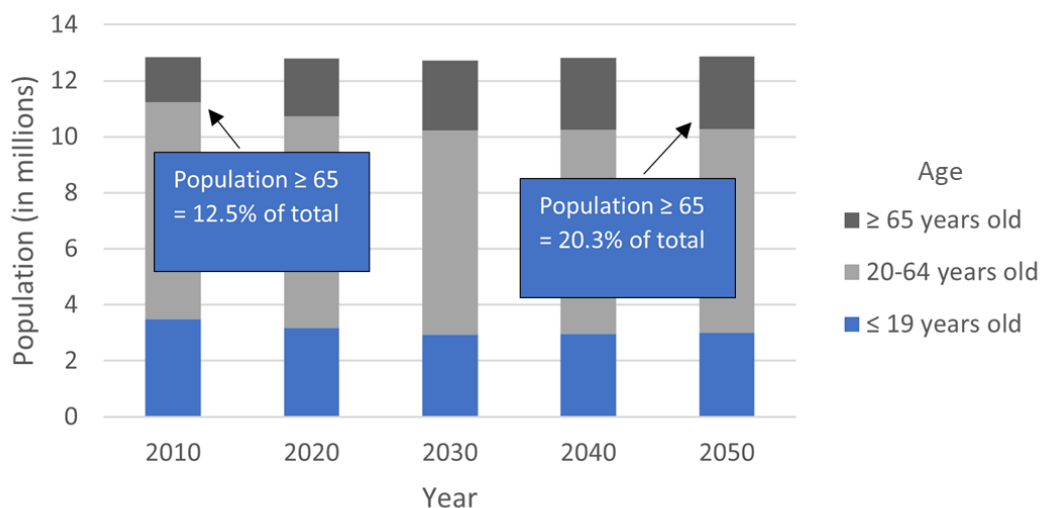
⁷² IDOT, "Traffic Count (TCDS)." Accessed August 23, 2024, <https://idot.public.ms2soft.com/tcds>.

⁷³ Federal Register of the United States, "Opportunities and Challenges of Artificial Intelligence (AI) in Transportation; Request for Information." May 3, 2024, <https://www.federalregister.gov/documents/2024/05/03/2024-09645/opportunities-and-challenges-of-artificial-intelligence-ai-in-transportation-request-for-information>.

⁷⁴ Zoe Caplan, U.S. Census Bureau, "U.S. Older Population Grew From 2010 to 2020 at Fastest Rate Since 1880 to 1890." May 25, 2023, <https://www.census.gov/library/stories/2023/05/2020-census-united-states-older-population-grew.html>.

⁷⁵ Illinois Department of Public Health (IDPH), "Population Projections (2023 Edition)." May 2024, https://dph.illinois.gov/content/dam/soi/en/web/idph/publications/idph/data-and-statistics/vital-statistics/illinois-population-data/population-projections_202035.pdf

Figure 7. Illinois population by age over time.⁷⁶



An older population will lead to changing transportation needs and concerns. Considerations for IDOT and other transportation stakeholders will include:

- Accounting for the changes in travel patterns that accompany changing life circumstances, e.g., fewer commute and peak-hour trips for those who have retired from full-time employment.
- Providing transportation options to travelers who can no longer drive a personal vehicle.
- Addressing mobility challenges (e.g., difficulty walking or using stairs) that can affect how and whether travelers can access different transportation options and can lead to a greater reliance on services like paratransit.

To manage these changing demands, transportation stakeholders will need to consider both existing and emerging mobility strategies. For example, greater investments in public transportation, paratransit, sidewalks, and other non-car modes could support travelers as they transition away from personal cars. Emerging technologies like autonomous vehicles could also eventually provide more widely available alternative options, analogous to the role played by taxis and services like Uber and Lyft today.

Figure 7 also shows that the state’s total population is also forecasted to stabilize or even decline. A flat or declining population has significant implications for transportation, including:

- System usage, with potentially lower growth in VMT, transit ridership, and total trip-making. This could impact overall system capacity needs, as a stable or shrinking population faces different travel challenges than a growing one.
- Revenue, as current revenues rely substantially on user fees. Declining revenue will likely be exacerbated by the aging population. For example, an aging population may lead to fewer drivers, decreasing revenue from user fees (e.g., motor fuel taxes, vehicle registrations).

⁷⁶ Woods & Poole, Complete Economic and Demographic Data Source (CEDDS).

Shifting Personal Travel Patterns

IDOT and other transportation system stakeholders must also confront changes in how, when, where, and why people travel.

Even before the COVID-19 pandemic, there were travel pattern shifts underway. For example, the practice of “remote work” goes back decades, accounting for a small share of worker behavior in the state. However, the pandemic accelerated this trend. Remote work grew from 2019 to 2023, especially in areas like the Chicago region and Bloomington-Normal. Statewide, the total grew from 5.4% to 14.0%.⁷⁷ These figures also do not account for growth in so-called “hybrid” work arrangements. Hybrid work has a non-uniform effect on the transportation system because behaviors vary by day, with both Mondays and Fridays seeing greater remote work behavior.⁷⁸

Despite its growth, remote work remains a minority practice, and its long-term implications remain uncertain. An analysis of the Chicago region found that more than 60 percent of the jobs located there could **not** be done remotely.⁷⁹ This share is likely similar statewide, with modest variations due to the state’s employment industry composition.

Transit ridership has also changed in recent years. While it has regrown from the trough of COVID-era closures, ridership remains well below 2019 levels. Transit ridership was falling prior to COVID-19, as travelers responded to factors like additional travel options (e.g., Uber and Lyft), less frequent bus service, and increased car ownership. Ridership levels are now growing, but in the near term appear unlikely to reach pre-COVID levels without a significant shift in travel markets (e.g., serving more non-commute trips) or population/employment growth in proximity to transit. These lower ridership levels pose financial risks to transit systems that rely heavily on fare revenue as part of their operating funding, such as the Regional Transportation Authority and its service boards (CTA, Metra, and Pace).⁸⁰

Other travel pattern shifts that could be relevant for IDOT and other stakeholders include:

- Greater interest in active modes, such as bicycling. Bike ridership has grown significantly in recent years, a trend that appears likely to continue in tandem with growing public investments in bike infrastructure and increased consumer interest in options like electric bicycles.⁸¹
- The continued growth of alternative and emerging modes, such as transportation network companies (e.g., Uber, Lyft), electric scooters, and other potential future technologies, such as advanced air mobility. While these modes are likely to remain relatively small elements of the overall transportation system, they can and have had systemic impacts – as the interaction between TNCs, taxis, and transit ridership demonstrated even prior to COVID-19.
- Changes in travel purposes. For example, as e-commerce has grown in popularity, the number and destination of shopping trips has shifted. There could be similar changes due to other

⁷⁷ U.S. Census Bureau American Community Survey 1-Year Estimates for 2019 and 2023.

⁷⁸ Anna Brainard, INRIX, “Return to Office Travel Patterns Vary Across the US.” June 5, 2023, <https://inrix.com/blog/reutrn-to-office-varies-across-us/>.

⁷⁹ CMAP, “Mobility Recovery.” January 6, 2023, <https://storymaps.arcgis.com/stories/88db4e4032674cdd893908446329f229>.

⁸⁰ CMAP, “Plan of Action for Regional Transit.” December 2023, https://cmap.illinois.gov/wp-content/uploads/Plan-of-Action-for-Regional-Transit_Dec2023.pdf.

⁸¹ Laura Bliss, Bloomberg, “US Bike Trips Have Soared Since 2019.” September 22, 2023, <https://www.bloomberg.com/news/articles/2023-09-22/us-bike-trips-have-soared-since-2019>.

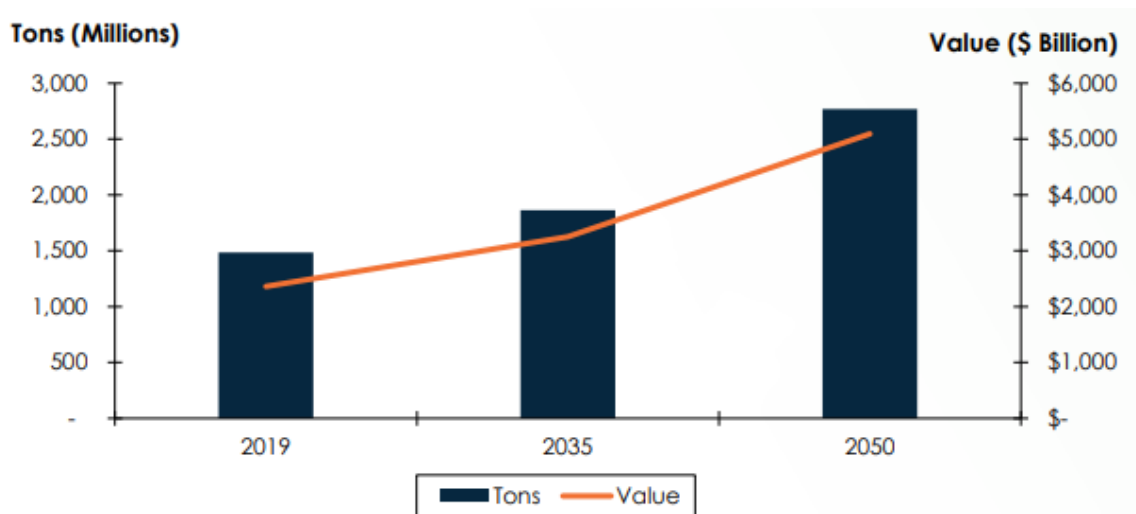
societal trends, including lower birth rates (e.g., fewer trips to and from school or child-related activities) and the adoption of telehealth (e.g., changes to the time and frequency of healthcare trips). Other trends discussed above (e.g., aging) will likely magnify the impact of these changes.

Changing Demands on Freight and Supply Chains

Illinois’s freight system is among the largest nationwide, ranking third by value and fourth by tonnage. That system is growing, further positioning Illinois as a national hub for freight. Current projections are that by 2050, the system will account for more than 2.8 billion tons of freight (valued at \$5.1 trillion), roughly double 2019 levels.⁸² See **Figure 8** Figure 8.

To accommodate these demands, the state has a robust network of infrastructure and systems, including its highways, railroads, navigable waterways, airports, pipelines, and specialized workforce. However, addressing the growing demand for freight will require continued investment in these systems, as well as mitigation of the impacts posed by increasing freight volumes.

Figure 8. Illinois total freight flows, all modes (2019 to 2050).⁸³



Source: 2019–2050 S&P Transearch and 2019 STB Carload Waybill Data.

In response to these growing freight needs, IDOT and other transportation stakeholders will need to consider how best to:

- Address the capacity needs posed by increased freight volumes on both the highway system (e.g., freight system bottlenecks, truck parking) and other modes (e.g., at-grade rail crossings).
- Mitigate the safety impacts of increased freight volumes, especially when large vehicles pass through local communities.

⁸² IDOT, “Illinois 2023 State Freight Plan;” note that the overall increase in freight volumes reflects the net effect of commodity-specific trends. While the volume and value of coal and petroleum products is expected to fall significantly as the economy transitions away from its reliance on fossil fuels, this will be more than offset by growth in other categories, e.g., food, chemicals, and consumer goods.

⁸³ IDOT, “Illinois 2023 State Freight Plan.”

- Reduce emissions (both GHG and air pollutants) from freight systems, including through mode shift and the adoption of low-/no-emissions vehicles. IDOT and others have already demonstrated potential areas for public sector engagement, such as through the recently announced funding for Illinois from the federal Climate Pollution Reduction Grants (CPRG) program. Among other initiative, these CPRG funds will support a \$115 million investment in heavy-duty vehicle electrification.⁸⁴
- Monitor and respond to downstream implications of an evolving freight sector. For example, consumer expectations for convenience and delivery speed in the growing e-commerce sector are not well-served by “traditional” warehousing, e.g., due to size and/or location. As a result, the demand for new warehouses and distribution centers has continued to increase.⁸⁵ In addition to new and different kinds of truck trips, these facilities also create new employment nodes, alter tax revenue collections, and potentially affect the value and suitability of neighboring land uses.

Inflation

Growing Costs to Invest in Transportation and Infrastructure

IDOT and other transportation agencies must account for their increasing costs, both in system operations and in maintaining, enhancing, and expanding their capital assets.

Like other sectors of the economy, there has been sharp inflation in transportation system costs since the COVID-19 pandemic. Some of this stems from the same factors driving national and global trends, including one-off pandemic challenges, supply chain disruptions, and the effects of economic stimulus (including in the transportation sector, e.g., IIJA).

However, as shown in **Figure 9** below, inflation has been more dramatic within transportation than in the economy overall. For example, since the end of 2020, the federal government’s National Highway Construction Cost Index (NHCCI), which tracks the overall cost of capital investments based on winning highway construction contract bids, has grown by 19 percent annually. In comparison, the Employer Cost Index (ECI), which tracks overall labor compensation costs, has grown by a lower rate of 4 percent annually, while the Consumer Price Index (CPI) grew at 6 percent annually. Recent analyses from national organizations like the Eno Center for Transportation have found that increased construction costs have more than offset the increase in available funding, leaving state transportation agencies with *lower* spending power after IIJA than before.⁸⁶

There have also been similar increases in the costs of operating the transportation system. Agencies that provide public transportation services have seen significant growth in their costs of labor and other inputs (e.g., materials). For example, while their costs remain competitive relative to peers,⁸⁷ the Regional Transportation Authority’s (RTA) service boards have seen their operating cost per hour grow

⁸⁴ Office of the Governor JB Pritzker, “Gov. Pritzker Announces Illinois Has Been Awarded Over \$430 Million Climate Pollution Reduction Grant.” July 2024, <https://gov-pritzker-newsroom.prezly.com/gov-pritzker-announces-illinois-has-been-awarded-over-430-million-climate-pollution-reduction-grant>.

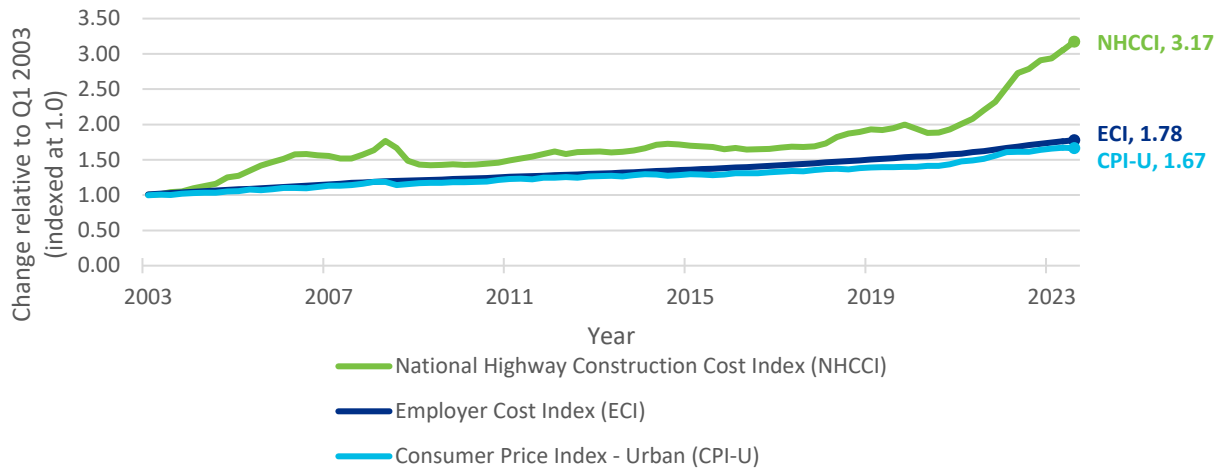
⁸⁵ IDOT, “Illinois 2023 State Freight Plan.”

⁸⁶ Jeff Davis, Eno Center for Transportation, “FHWA: Highway Construction Costs Continued to Grow at 24% Annual Rate.” March 27, 2024, <https://enotrans.org/article/fhwa-highway-construction-costs-continued-to-grow-at-24-annual-rate/>.

⁸⁷ Regional Transportation Authority (RTA), “Modal Peer Review: Report Year 2022.” 2024, https://rtams.org/sites/default/files/documents/2024-02/RTA_ModalPeerReview_2022.pdf.

faster than the rate of inflation since 2022.⁸⁸ Some of the increases in costs reflect the fact that some transportation system positions, such as bus drivers⁸⁹ and snowplow operators,⁹⁰ have been difficult to fill at existing compensation levels. The trends also reflect some long-term increases that were occurring even prior to the COVID-19 pandemic, such as the growth in operating costs for especially labor-intensive segments of the transportation system, e.g., paratransit service.⁹¹

Figure 9. Construction costs and inflation over time.



Note: NHCCI and ECI are both seasonally adjusted. ECI is for total compensation, all civilians.
Source: FHWA and BLS.

It remains uncertain whether transportation cost inflation will continue at these high rates or return to pre-pandemic levels. If the increased federal (e.g., through IIJA) or state (e.g., Rebuild Illinois) spending becomes a new baseline level, it is possible that the transportation sector will adjust accordingly. For example, either the public sector, the private sector, or both could increase their staffing levels and capabilities to match these new baseline demands. Continued attention to the challenges of cost inflation may also highlight new best practices and opportunities to achieve greater efficiencies, including by learning from the approaches in other developed countries with substantially lower costs.⁹²

However, regardless of the future shape of inflation, it appears unlikely that costs will *decline* in the near term. As a result, IDOT and other transportation agencies must now grapple with a substantial reduction in the relative spending power of their funds. This decline will likely magnify the impact of other trends discussed in this document and other memoranda, such as the erosion of MFT and other revenue sources, the backlog of capital maintenance investment needs, and the challenges of meeting the desire for increased investments in an improved transportation system.

⁸⁸ Calculated in October 2024 using data from <https://www.arcgis.com/apps/dashboards/4fd29dfd7e7a40818ad0b0dfb48c59b4>

⁸⁹ RTA, “Chicagoland agencies ramp up hiring efforts amid nationwide transit workforce shortage.” October 18, 2022, <https://www.rtachicago.org/blog/2022/10/18/chicagoland-agencies-ramp-up-hiring-efforts-amid-nationwide-transit-workforce-shortage>

⁹⁰ Colin Baillie, KFVS12, “IDOT District 9 still in need of full time temporary employees for snowplow drivers.” <https://www.kfvs12.com/2023/12/08/idot-district-9-still-need-full-time-temporary-employees-snowplow-drivers/>.

⁹¹ Via, “Cost of providing paratransit continues to grow, while efficiency declines.” November 16, 2021, <https://ridewithvia.com/resources/cost-of-providing-paratransit-continued-to-grow-while-efficiency-declines>.

⁹² Romic Aevaz, Eno Center for Transportation, “Eno Releases Major Report on U.S. Transit Costs and Project Delivery.” July 30, 2021, <https://enotrans.org/article/eno-releases-major-report-on-u-s-transit-costs-and-project-delivery/>.

Appendix A: Specific Areas of Focus for IDOT and Local Transportation Agencies

	IDOT	Local transportation agencies
Safety	<ul style="list-style-type: none"> Investments and policies that reduce fatalities and serious injuries, especially for pedestrians and cyclists Opportunities to leverage federal investment to improve traffic safety 	<ul style="list-style-type: none"> Identification of local facilities and corridors that warrant safety interventions
Equity	<ul style="list-style-type: none"> Opportunities to integrate equity into project selection processes Identification of state-level equity concerns Increased need for equity-related data and community engagement 	<ul style="list-style-type: none"> Identification of local equity concerns and investment opportunities
Reducing greenhouse gas emissions	<ul style="list-style-type: none"> Opportunities to accelerate decarbonization efforts Monitoring and adoption of emissions performance measures and goals 	<ul style="list-style-type: none"> Identification of projects that can support statewide decarbonization goals
Climate mitigation and resilience	<ul style="list-style-type: none"> Assessment of resilience needs in Illinois Integration of climate resilience into project selection and planning 	<ul style="list-style-type: none"> Proactive planning to address resilience needs
Electrification	<ul style="list-style-type: none"> Erosion of MFT revenue Creation of statewide EV charging network Understanding the business case for electrification as a factor that will impact private sector actions 	<ul style="list-style-type: none"> Erosion of MFT revenue Capital investment to electrify fleets and services (e.g., buses)
Automation	<ul style="list-style-type: none"> Identifying opportunities for AVs to address system goals (e.g., safety, freight) without compromising other IDOT/state priorities Working with partner state agencies to address licensing, regulations, and insurance related to AVs (including Secretary of State and Department of Insurance) 	<ul style="list-style-type: none"> Monitoring impact on local transportation networks Considering automation in public fleets, e.g., buses]
Data and artificial intelligence	<ul style="list-style-type: none"> Managing ever-growing volumes of data from current and emerging sources (e.g., staffing, infrastructure) Integrating with statewide approach to data, AI, and cybersecurity 	<ul style="list-style-type: none"> Identifying appropriate uses of data sources to inform agency activities Managing staffing and infrastructure needs
Shifting demographics	<ul style="list-style-type: none"> Adapting to changes in system usage and accessibility/ mobility needs Monitoring and responding to population shifts and demographic changes 	
Shifting personal travel patterns	<ul style="list-style-type: none"> Adjusting to new peak travel demands and equilibrium in home/work locations Adapting funding programs to reflect new and changing travel demands 	<ul style="list-style-type: none"> Responding to changing transit ridership Facilitating new interest in active modes Monitoring new and emerging modes
Freight	<ul style="list-style-type: none"> Freight volumes on the state system (truck, rail, etc.) Considerations for zero-emissions freight (e.g., charging infrastructure) 	<ul style="list-style-type: none"> Community impacts (e.g., safety, emissions, blocked crossings) Location and amount of truck parking Changes in job access (e.g., access to new freight/logistics employment sites)
Inflation	<ul style="list-style-type: none"> Reduction in spending power of local, state, and federal capital investments Implications for system operating budgets (e.g., costs of hiring and maintaining staff such as bus drivers) Adjustments to private-sector capacity based on ongoing and future public investment levels 	