Twin Cities
Highway Mobility Needs Analysis

Transportation Advisory Board
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Consulting Team:

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Study Background

- MnDOT's 20-year State Highway Investment Plan (MnSHIP) uses highway performance measures to distribute funding based on "need."
- Current performance measures include bridge and pavement condition and safety; there is no measure for mobility, a largely metro area need.
- In MnSHIP, mobility funding is currently allocated at $50 M per year through 2026, after 2026 no mobility funding is allocated.
- MnSHIP will be updated throughout 2022 with adoption in spring of 2023.

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Study Purpose

- Purpose: Define a mobility performance measure and quantify a range of metro area mobility funding needs based upon this measure to be used in the next MnSHIP update and future funding allocations.
- Decisions on how to spend any newly allocated mobility funding will occur as part of the regional planning processes and reside with the Council, TAB, and MnDOT, based upon public and stakeholder input.
- The range of potential mobility investments include: travel demand management (TDM), traffic management and technology investments, low-cost geometric improvements, multimodal and transit advantages, intersection improvements, E-ZPass, safety projects, and auxiliary lanes.

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Project overview

- For the first time in this region, the Metropolitan Council and the MnDOT developed a performance-based approach to highway mobility investment.
- The study focused on one of MnDOT's 14 capital investment areas, Twin Cities highway mobility, to develop an investment needs number. Similar efforts have been completed for other areas like pavements & bridges.
- The needs number is not a plan for future spending. Needs numbers are compared across the 14 investment areas and then prioritized based on stakeholder input and available resources (total 20-year needs exceeded revenues by $18 billion in 2017).
- The outcomes of five different highway mobility investment levels were modeled.
- More study is needed to quantify the connection between mobility project types, locations, and greenhouse gas emissions - this work will start in 2022.

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Met Council 2050 Forecasts (2021)

	2020	2040	2050	2020-2050 Change
Population	3,163,000 (Census)	3,476,000	4,001,000	+818,000
Employment	1,548,000	2,055,000	2,175,000	+627,000

Delay is the extra time wasted by travelers due to congestion

Current annual delay per person is 42 hours

Delay/person is projected to increase by 33% to 56 hours by 2040 with no investment in this area

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Performance target

A Twin Cities Highway Mobility target of 40-hours of annual delay per person was used to calculate MnDOT's 20-year investment needs on the state highway system

This study focused on capital highway investment.

Given the high cost of achieving the performance target by focusing only on capital highway investment, a range of solutions from travel demand management, transit/bicycle/pedestrian investment, land use changes, and other strategies will be needed to meet the target.

For instance, increased telework rates were shown to be effective in reducing delay.

Target Value	40-hours annual delay per person
Change from 2018	↓ 5%
Change from 2040 base	↓ 25%
20-year cost	$4 to $6 billion

The highway mobility need in the 2017 MnSHIP as $4.58 billion.

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Connection to TAB

1. Regional Solicitation (Project Selection in late 2022):

- Metro cities and counties have assisted in the planning and partial funding of highway mobility projects on MnDOT's system.
- 10 different cities and all 7 counties have been awarded funding for highway mobility projects on MnDOT's system (primarily new interchanges) since 2014.
- Typically, the Regional Solicitation funds part of the project cost with the local city/county and MnDOT paying the remainder.
- The Regional Solicitation helps make these locally-led, multi-agency, partnership projects possible and will also contribute to meeting the performance target.

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Connection to TAB Continued

2. Transportation Policy Plan (TPP) 2050 (Drafting Chapters in 2023)

Investment Priorities for Highway Mobility in 2040 TPP

1. Travel Demand Management (TDM)
2. Traffic Management Technologies
3. Spot Mobility (Lower Cost/High Benefit) (e.g., roundabouts or turn lanes)
4. MnPASS (E-ZPass)
5. Strategic Capacity Enhancements (e.g., new interchanges or lanes)

These investment principles were used throughout the project and contributed to the positive outcomes that were identified.

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Planning Context

- Twin Cities highway mobility
  - Requires coordinated, collaborative planning at the local, state, and federal levels
  - Is not currently guided by a performance target
  - Helps to make strategic decisions based on data and to focus limited resources on the highest priorities

Delay per Capita

Why measure highway mobility system performance in terms of delay per capita?

- Simple
- Relatable at the regional, corridor, project and person-level
- Responsive to MnDOT/Met Council highway investment strategies
- Supportive of economic analyses
- Captures the extent to which highway mobility contributes to broader transportation goals

There are many measures of highway congestion that are important to consider in fully understanding the issue.

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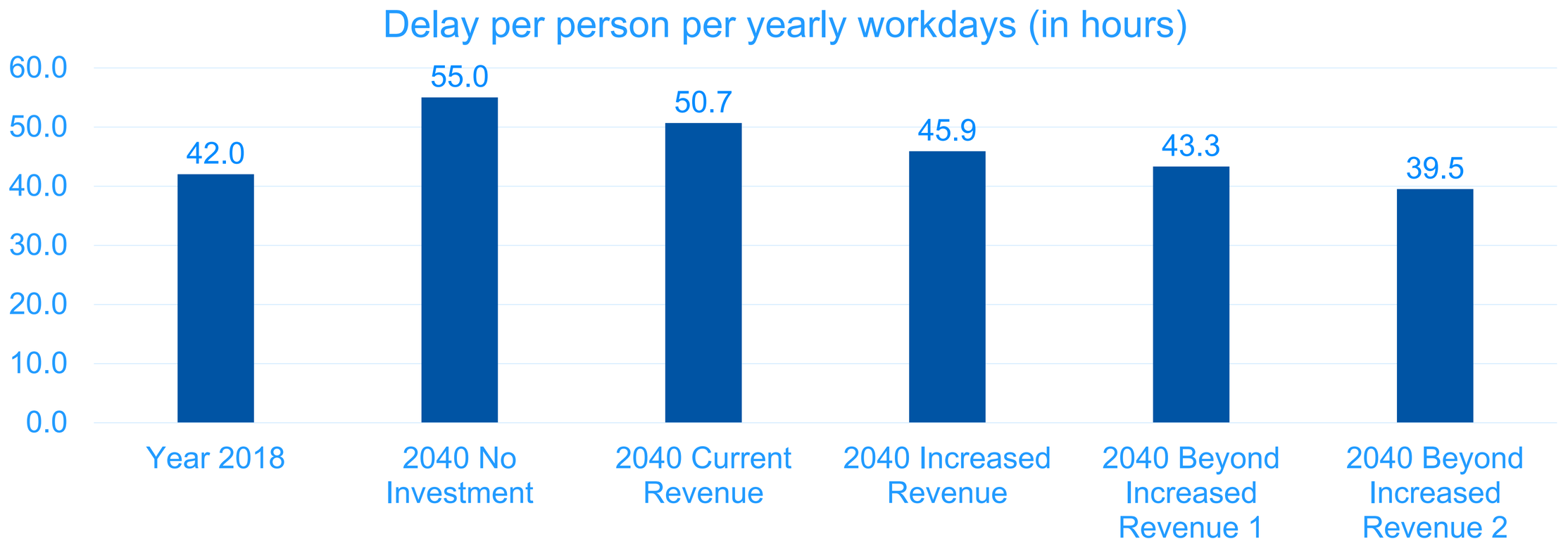
Modeled Results – Average Annual Delay



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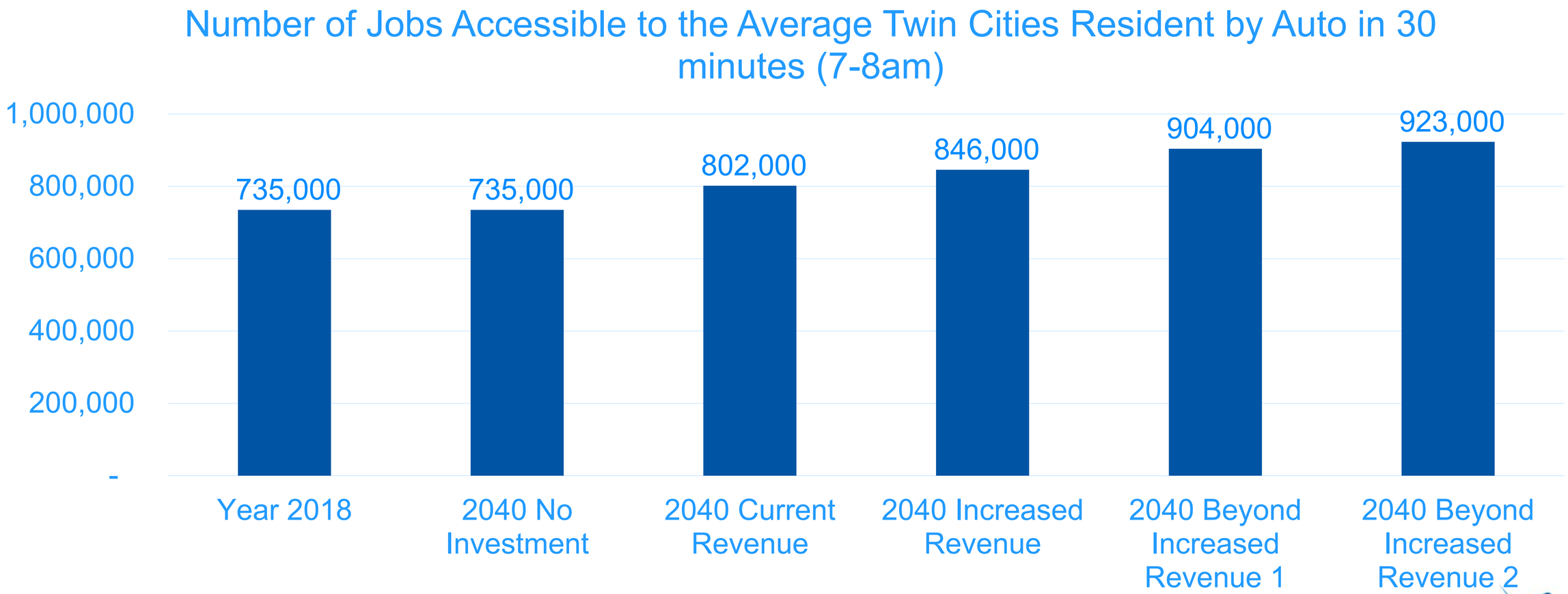
Modeled Results – Job Access



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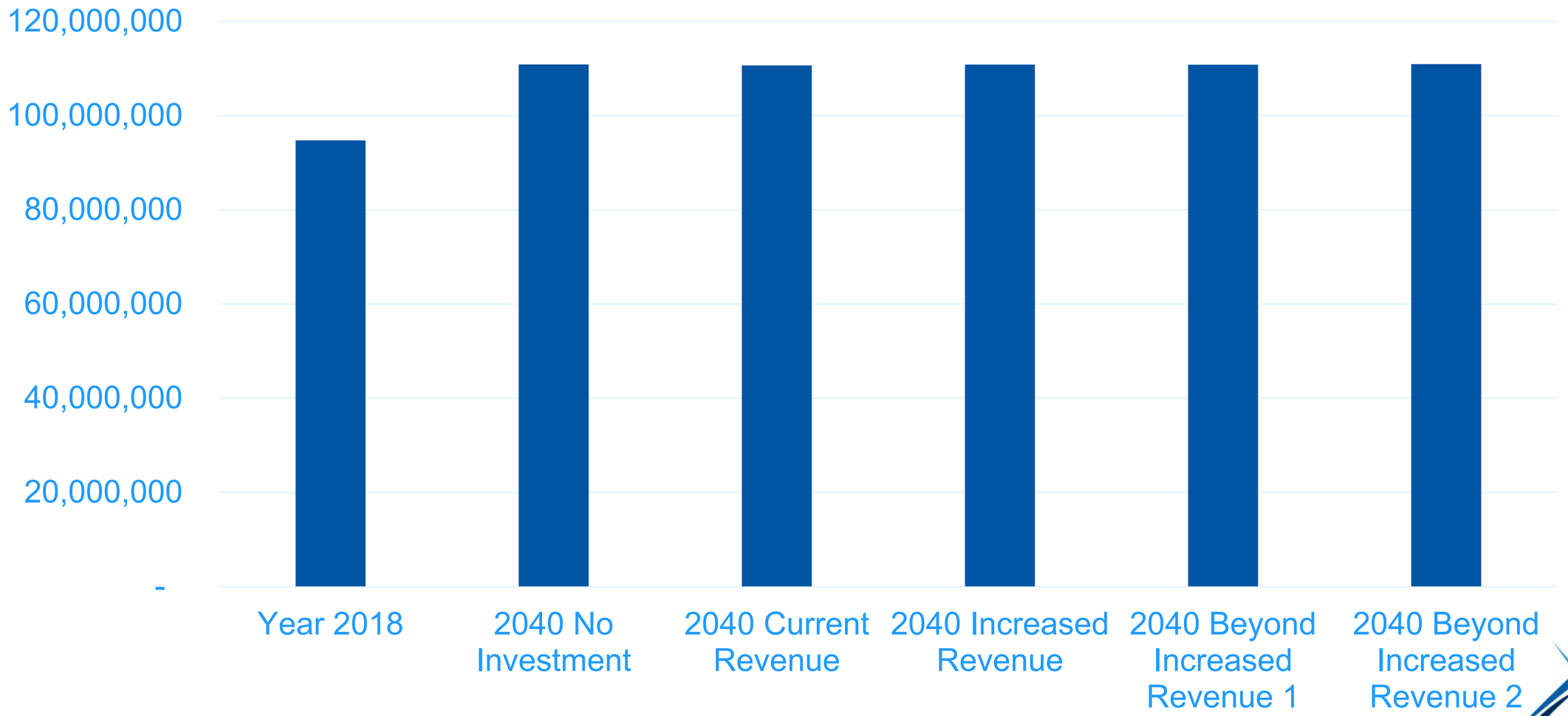
Modeled Results – Vehicle Miles Traveled



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Vehicle Miles Traveled 2040 Modeling

- Follows methodology used in the 2040 Transportation Policy Plan (TPP).
- Population growth (+550,000 more people by 2040) is the primary driver of VMT.
- Accounts for some level of induced demand (increasing roadway capacity encourages people to drive more).
- Uses 2040 regional land use allocations by city as approved by the Met Council and shown in approved, local comprehensive plans. More study is planned to examine how land use changes may result from the increased mobility investment.
- Holds 2040 land use constant and does not change further based on investment.
- Modeling uses EPA's MOVES model for assumptions for the rate of EV adoption and future fuel efficiency standards as it relates to emissions.

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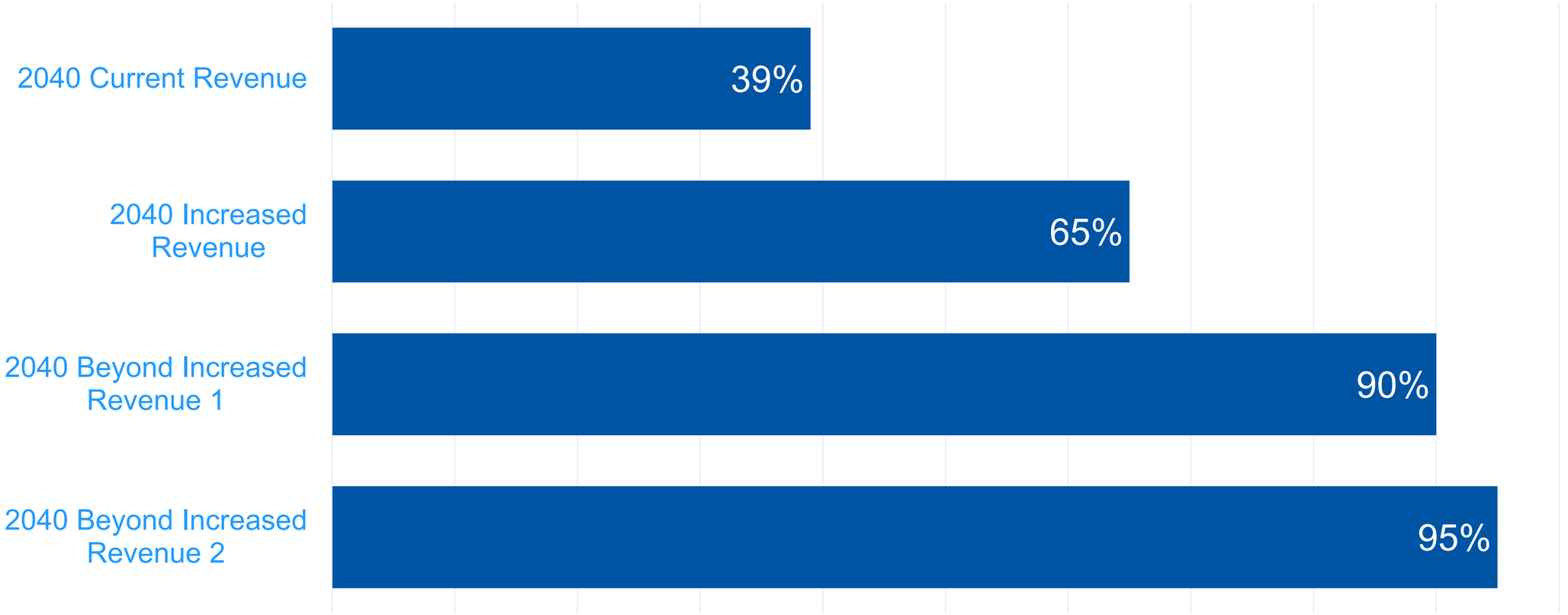
Freight Bottlenecks Improved



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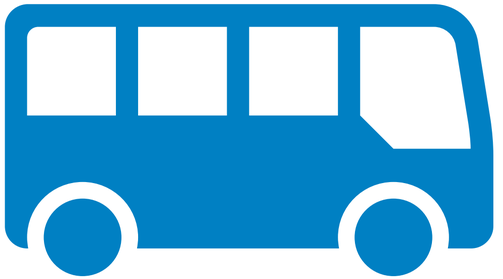
Equity analysis

- How does job access of equity populations change under each funding scenario?
  - The number of additional jobs accessible due to the highway mobility investment was similar across income, race, and ethnic groups.
- What is the impact of each funding scenario on transit delay?
  - Transit delay decreased as highway mobility investment increased.



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Telecommute Sensitivity Analysis

- Illustrative examples developed to understand outcomes at different levels of telecommuting
- Identify mobility needs with 15%, 25%, and 35% telecommuting
  - Pre-COVID, 5% of workers telecommuted at least one time per month
  - Peak of COVID, 35% of workers telecommuted at least one time per month
  - November 2021, 11% of workers telecommuted at least one time per month
- Increasing telework participation reduces the need for capital investment to meet the performance target

Twin Cities Highway Mobility Target

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Performance Target

Use a Twin Cities Highway Mobility target of 40-hours of annual delay per person to calculate MnDOT's 20-year investment needs on the state highway system

Target Value	40-hours annual delay per person
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2040 Investment Scenarios and Outcomes

Scenario	Implement Planned Investments	Extend Current Investment	Manage Decline in Regional Mobility	Sustain Regional Mobility	Improve Regional Mobility
20-Year Investment	$0-$375 million	$1-$2 billion	$2-$3 billion	$3-$5 billion	$4-$6 billion
Annual Delay per Capita = An 8 hour workday -- = Delay per capita in 2018	56 hours 14 hours more than 2018	52 hours 10 hours more than 2018	48 hours 6 hours more than 2018	44 hours 2 hours more than 2018	40 hours 2 hours less than 2018
Jobs Accessible to Typical Twin Cities Resident (within 30 minute drive during AM peak) = 200,000 jobs accessible	740k jobs Same as 2018	820k jobs 80k jobs more than 2018	860k jobs 120k jobs more than 2018	900k jobs 160k jobs more than 2018	920k jobs 180k jobs more than 2018
2040 Benefit from Travel Time Savings ($) = 100 dollars per household	N/A	$200	$400	$600	$800
Freight Bottlenecks Improved	0%	39%	65%	90%	95%
Greenhouse Gas Emissions	4 million metric tons per day in 2040 (Substantial decreases in greenhouse gas emissions through year 2040 are projected based on vehicle efficiency improvements; the overall magnitude of regional emissions in 2040 are not greatly influenced by these highway mobility investment scenarios, but further study is needed.)				
Risk of Not Reaching Delay Target	HIGH	HIGH	MODERATE	MODERATE	LOW

Key Messages

- Delay/person is projected to increase by 33% by 2040 with no investment.
- Meeting the highway mobility target value (decrease of 5%) will:
  - Provide access to 180,000 more jobs within a 30-minute drive by 2040
  - $800 in travel time savings annually per household
  - 95% of the region's freight bottlenecks improved
  - Reduced transit delay for transit users
  - Limited impact on greenhouse gas emissions; further analysis is planned in this area in 2022
- This study focused on a capital highway investment approach. A range of solutions including travel demand management, transit, bike/ped, and land use will be needed to meet the target.
- The increase of telework that resulted during COVID-19 suggests that this is an effective strategy in reducing delay per person.

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Next steps

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Next Steps

- Electric Vehicle Planning Study (being finalized)
- Congestion Management Plan Handbook (ongoing)
  - Consider a range of lower cost alternatives to improve mobility
- Travel Demand Management Study (ongoing)
- Regional Transportation and Climate Change Measures (2022 start)
  - More study needed to understand and quantify the connection between transportation project types and greenhouse gas emissions
- Transportation Policy Plan Goals, including a review of the Regional Approach to Congestion (late 2022 start)
- MnDOT's MnSHIP Update (2022/2023) with presentations to TAB planned

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More information

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