

Twin Cities Highway Mobility Needs Analysis

Transportation Advisory Board
October 20, 2021

Consulting Team:

SRF Consulting Group



Sambatek, Inc.

Texas A&M Transportation Institute (TTI)

Associated Consulting Services (ACS)

Performance recommendation

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
Change from 2018	 5%
Change from 2040 base	 25%
20-year cost	\$4 to \$6 billion

Project overview

- The Metropolitan Council and the Minnesota Department of Transportation (MnDOT) developed a performance-based approach to mobility investment on highways in the Twin Cities
- This approach
 - Sets a **highway mobility target**
 - Estimates a 20-year capital **investment need** on metro-area state highways

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

Stewardship | Prosperity
Equity | Livability
Sustainability

Maximize the health of
people, the environment
and the economy

- Transportation System Stewardship
- Safety and Security
- Access to Destinations
- Competitive Economy
- Heathy and Equitable Communities

- Open Decision-Making
- Transportation Safety
- Critical Connections
- System Stewardship
- Heathy Communities

Outcome Measures
Access | Travel Time | Emissions

Performance Measure
Delay per capita

Transportation Policy Plan 2040

Investment Priorities for Highway Mobility

1. Travel Demand Management (TDM)
2. Traffic Management Technologies
3. Spot Mobility (Lower Cost/High Benefit) (e.g., roundabouts or turn lanes)
4. MnPASS
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.

Connection to Regional Solicitation

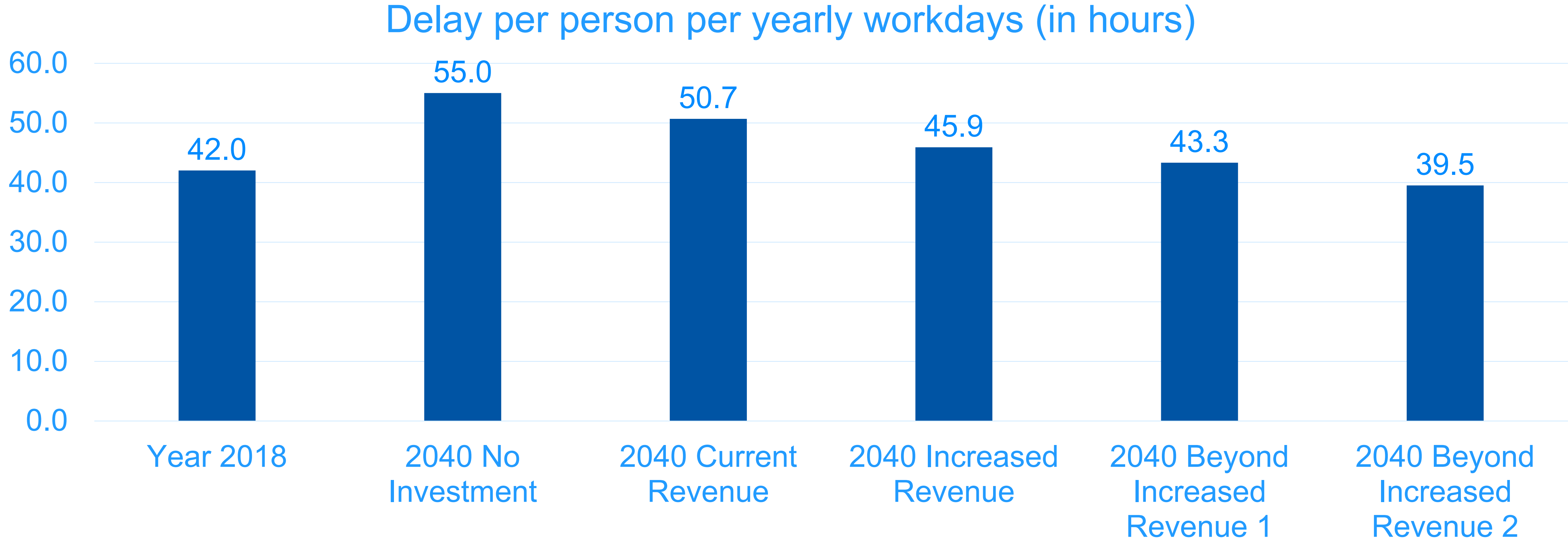
- Metro cities and counties have assisted in the planning and partial funding of highway mobility projects on MnDOT's system.
- Since the Regional Solicitation redesign, 10 different cities and all 7 counties have been awarded funding for highway mobility projects on MnDOT's system (primarily new interchanges).
- Typically, the Regional Solicitation pays 1/3 of the project cost, the local city/county 1/3, and MnDOT 1/3.
- The Regional Solicitation helps make these locally-led, multi-agency, partnership projects possible.

Delay per Capita

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

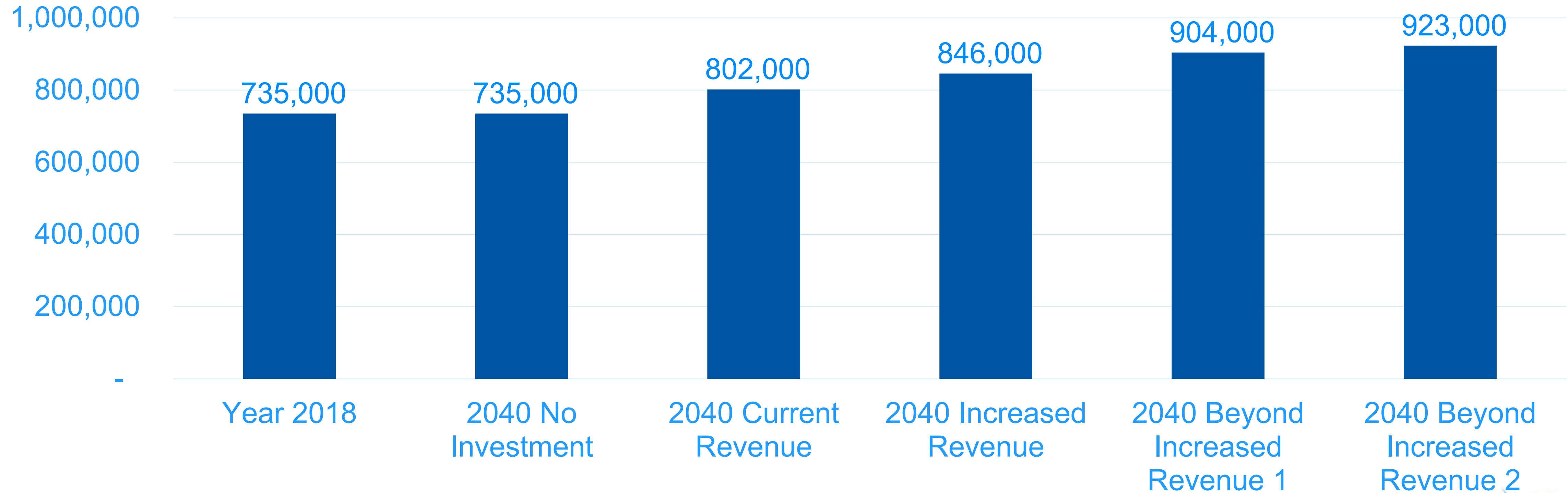
- Simple
- Relatable at the regional, corridor, project and person-level
- Responsive to MnDOT/Met Council highway investment strategies
- Supportive of economic analyses
- Captures the extent to which highway mobility contributes to broader transportation goals

Modeled Results – Average Annual Delay

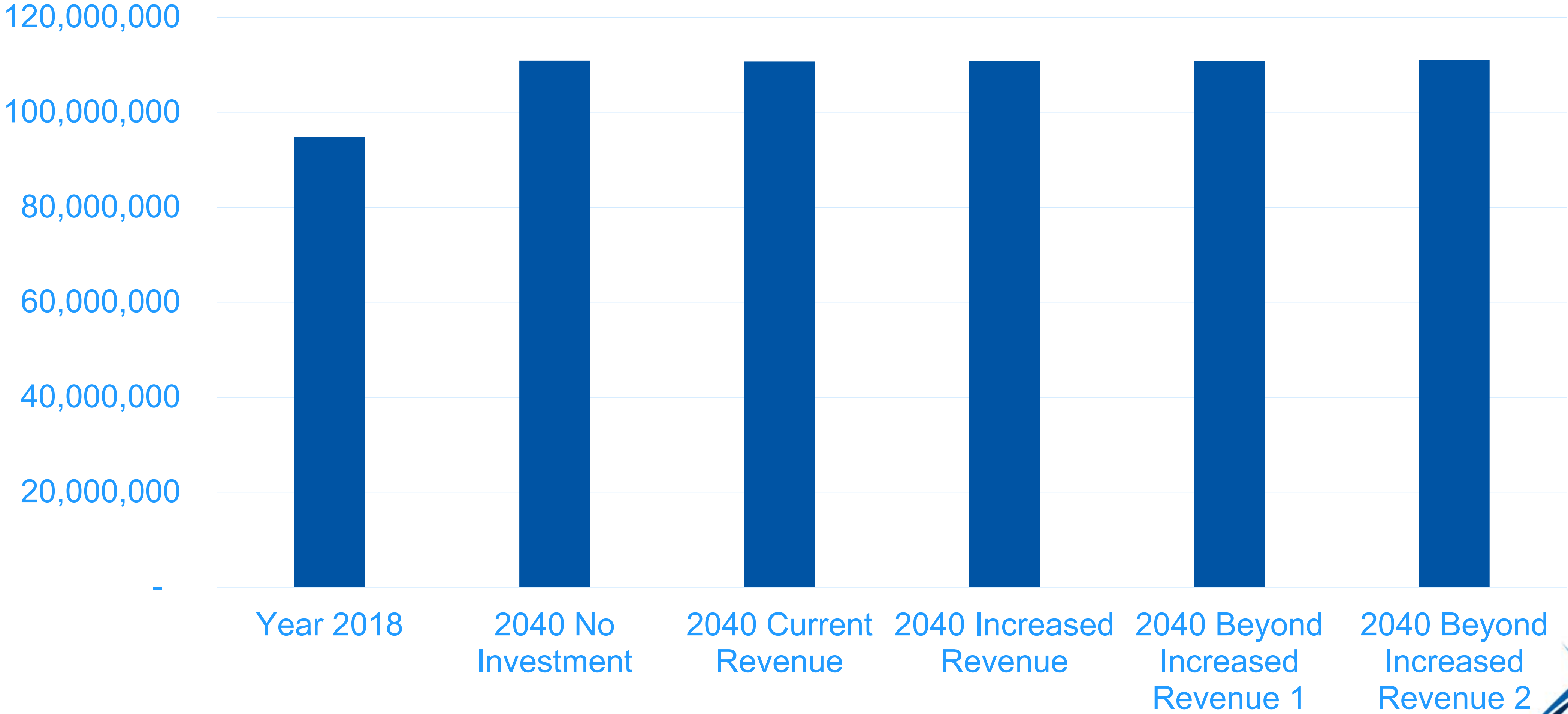


Modeled Results – Job Access

Number of Jobs Accessible to the Average Twin Cities Resident by Auto in 30 minutes (7-8am)



Modeled Results – Vehicle Miles Traveled

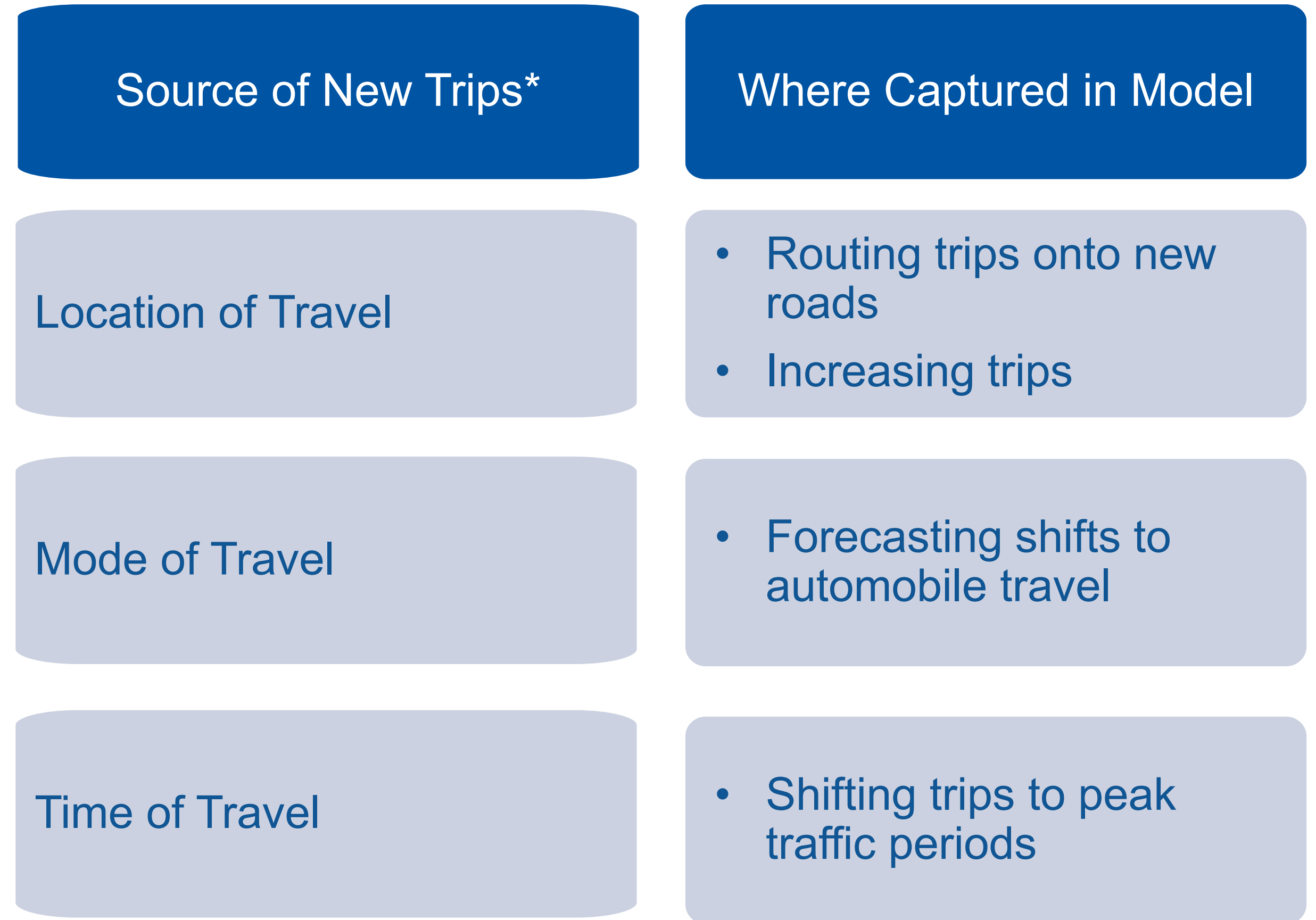


Vehicle Miles Traveled 2040 Modeling

- Follows methodology used in the 2040 Transportation Policy Plan (TPP).
- Population growth (+500,000 more people by 2040) is the primary driver of VMT.
- Accounts for some level of induced demand.
- 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.
- Modeling uses EPA's MOVES model for assumptions for the rate of EV adoption and future fuel efficiency standards as it relates to emissions.

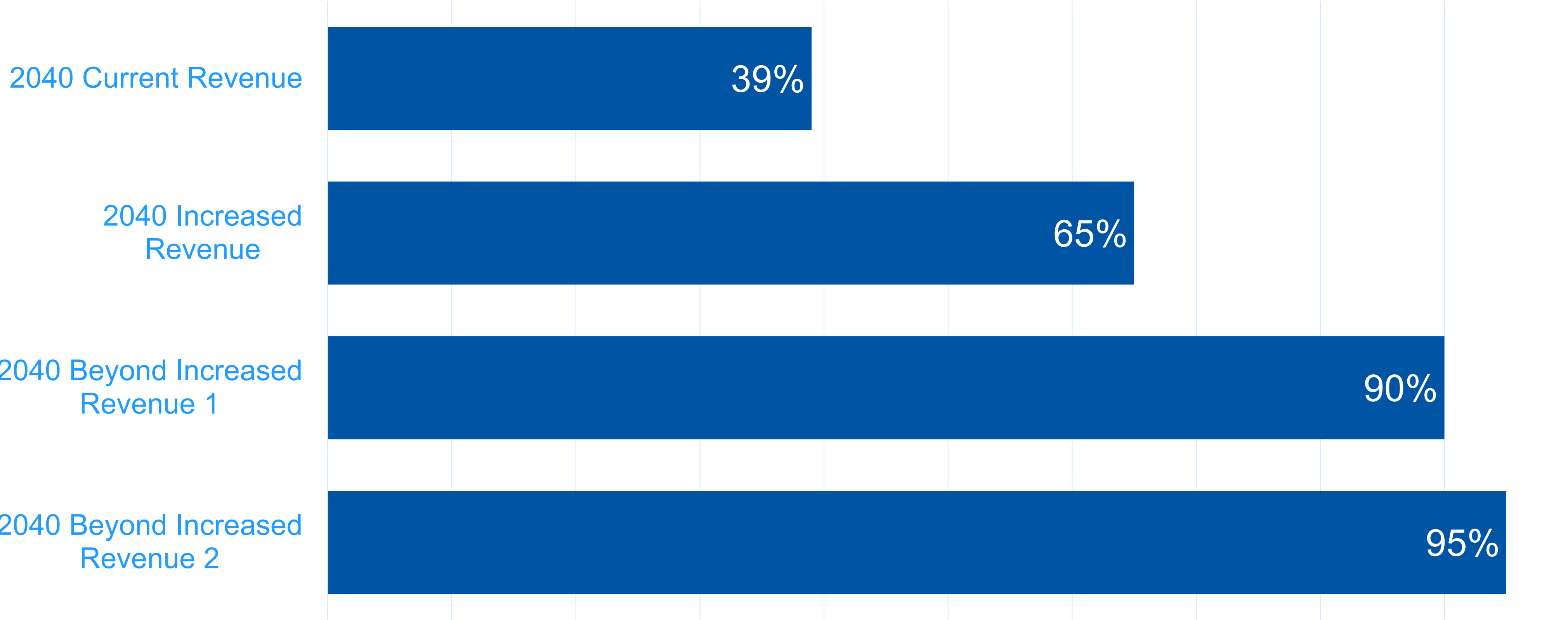
Induced Demand in Regional Model

- “...induced demand refers to the idea that increasing roadway capacity encourages more people to drive...” Citylabs
- The Council’s Activity Based Model does capture some aspects of induced demand
- Not covered:
 - How roadway expansion might change future land use



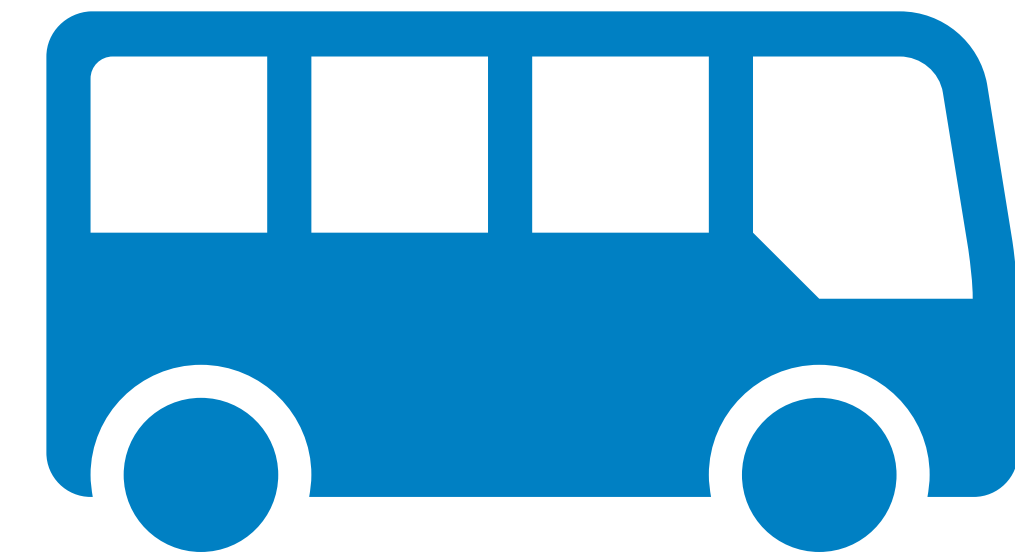
* Source: Anthony Down’s theory of triple convergence

Freight Bottlenecks Improved



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.





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
 - August 2021, 13% 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 Recommendation

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
Change from 2018	 5%
Change from 2040 base	 25%
20-year cost	\$4 to \$6 billion

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 <small>📅 = An 8 hour workday -- = Delay per capita in 2018</small>	🕒 56 hours <small>14 hours > 2018</small>	🕒 52 hours <small>10 hours > 2018</small>	🕒 48 hours <small>6 hours > 2018</small>	🕒 44 hours <small>2 hours > 2018</small>	🕒 40 hours <small>2 hours < 2018</small>
Jobs Accessible to Typical Twin Cities Resident <small>(within 30 minute drive during AM peak) 📁 = 200,000 jobs accessible</small>	👤 740k jobs <small>Same as 2018</small>	👤 820k jobs <small>80k jobs > 2018</small>	👤 860k jobs <small>120k jobs > 2018</small>	👤 900k jobs <small>160k jobs > 2018</small>	👤 920k jobs <small>180k jobs > 2018</small>
2040 Benefit from Travel Time Savings <small>💰 = 100 dollars per household</small>	N/A	💰💰 \$200	💰💰💰💰 \$400	💰💰💰💰💰💰 \$600	💰💰💰💰💰💰💰💰 \$800
Freight Bottlenecks Addressed	🚛 0%	🚛 39%	🚛 65%	🚛 90%	🚛 95%
Greenhouse Gas Emissions	4 million metric tons per day in 2040 <small>(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.)</small>				
Risk of Not Reaching Delay Target	HIGH	HIGH	MODERATE	MODERATE	LOW

Key Messages

- Delay/person is projected to increase by 33% by 2040.
- 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.

Next steps

Next Steps

- Electric Vehicle Planning Study (ongoing)
- Travel Demand Management Study (fall 2021 start)
- Regional Transportation and Climate Change Measures (2022 start)
 - More study needed to understand 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)

More information

- Project website: metro council.org/mobility
- Contact us:
 - Steve Peterson, Metropolitan Council
Steven.Peterson@metc.state.mn.us
651-602-1819
 - Paul Czech, MnDOT
paul.czech@state.mn.us
612-505-7831