TRANSPORTATION GREENHOUSE GAS EMISSIONS
ANALYSIS AND REPORT

City of Bloomington
Emma Struss, Sustainability Coordinator
Ash Narayanan, SRF Consulting Group
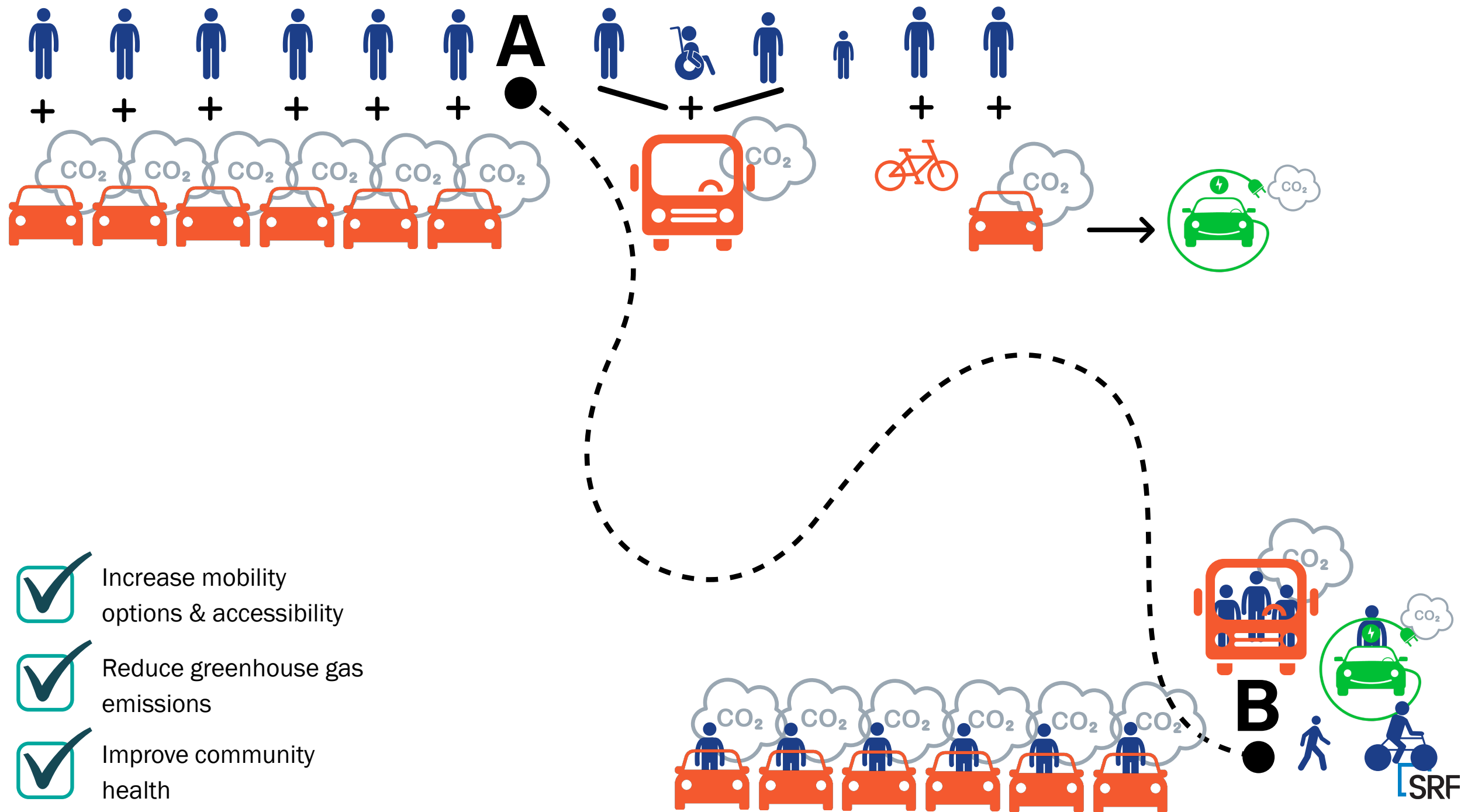
RESOLUTION DECLARING A CLIMATE EMERGENCY, JANUARY 2022

CITY GOAL OF ACHIEVING NET ZERO EMISSIONS BY 2050

A

B

CO₂

✓ Increase mobility options & accessibility

✓ Reduce greenhouse gas emissions

✓ Improve community health

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Project Team

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Project Principal

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Project Manager

Sam Ricord

Modeling and Analysis

Project Purpose

- Analyze and model pathways to reduce carbon emissions from Bloomington's transportation system.

- Understand where Bloomington is today in relation to transportation behavior and associated emissions.

- Identify high-level strategies to achieve net-zero goal.

- Find ways in which to align with other City goals identified in strategic priorities including equity and inclusion, and economic growth.
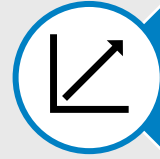
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Project Steps

- Existing Conditions
- Data Collection
- Scenario Development
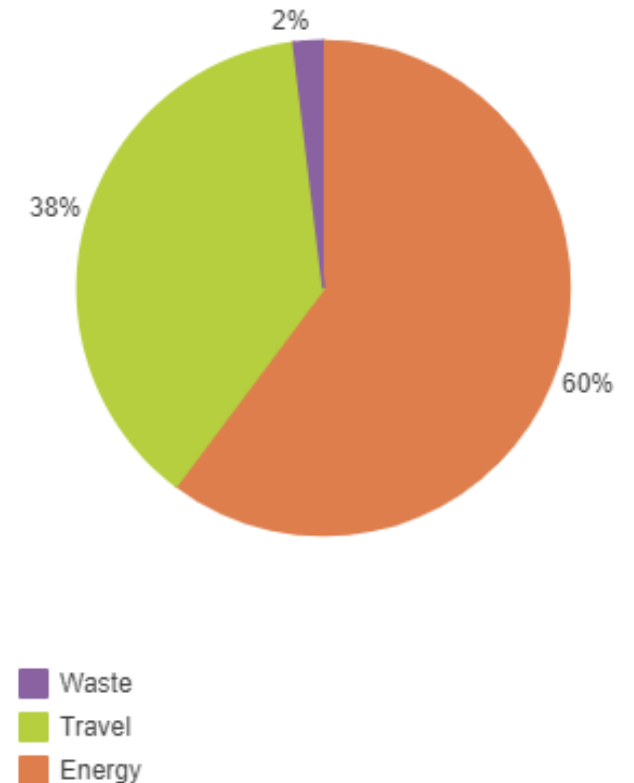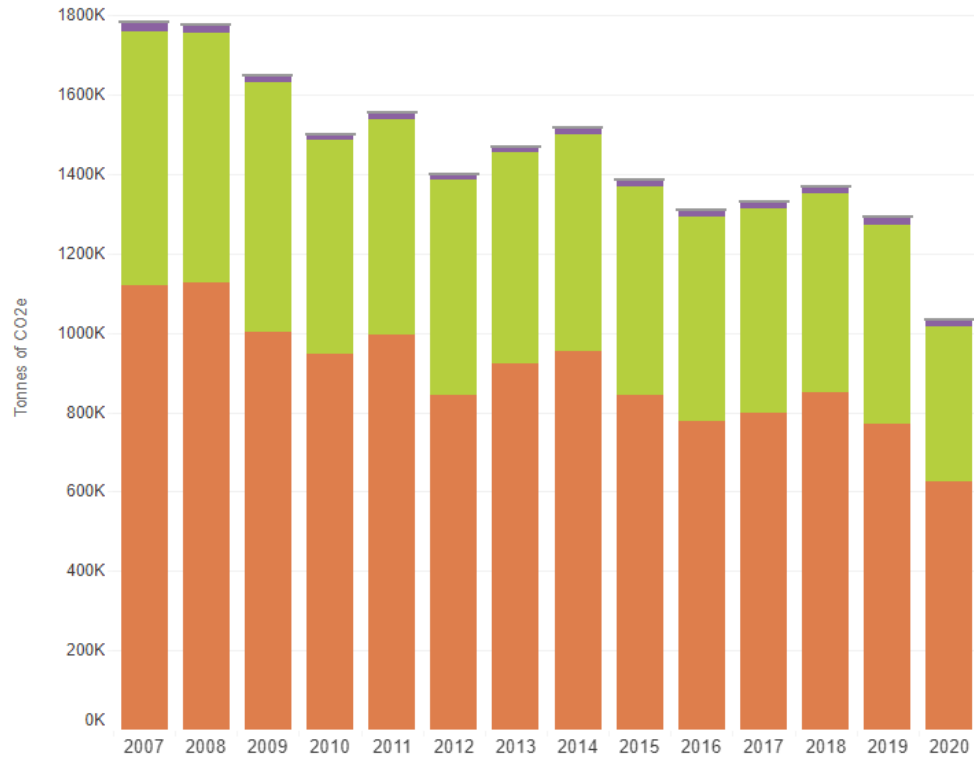- Strategy Framework
- Strategy Development
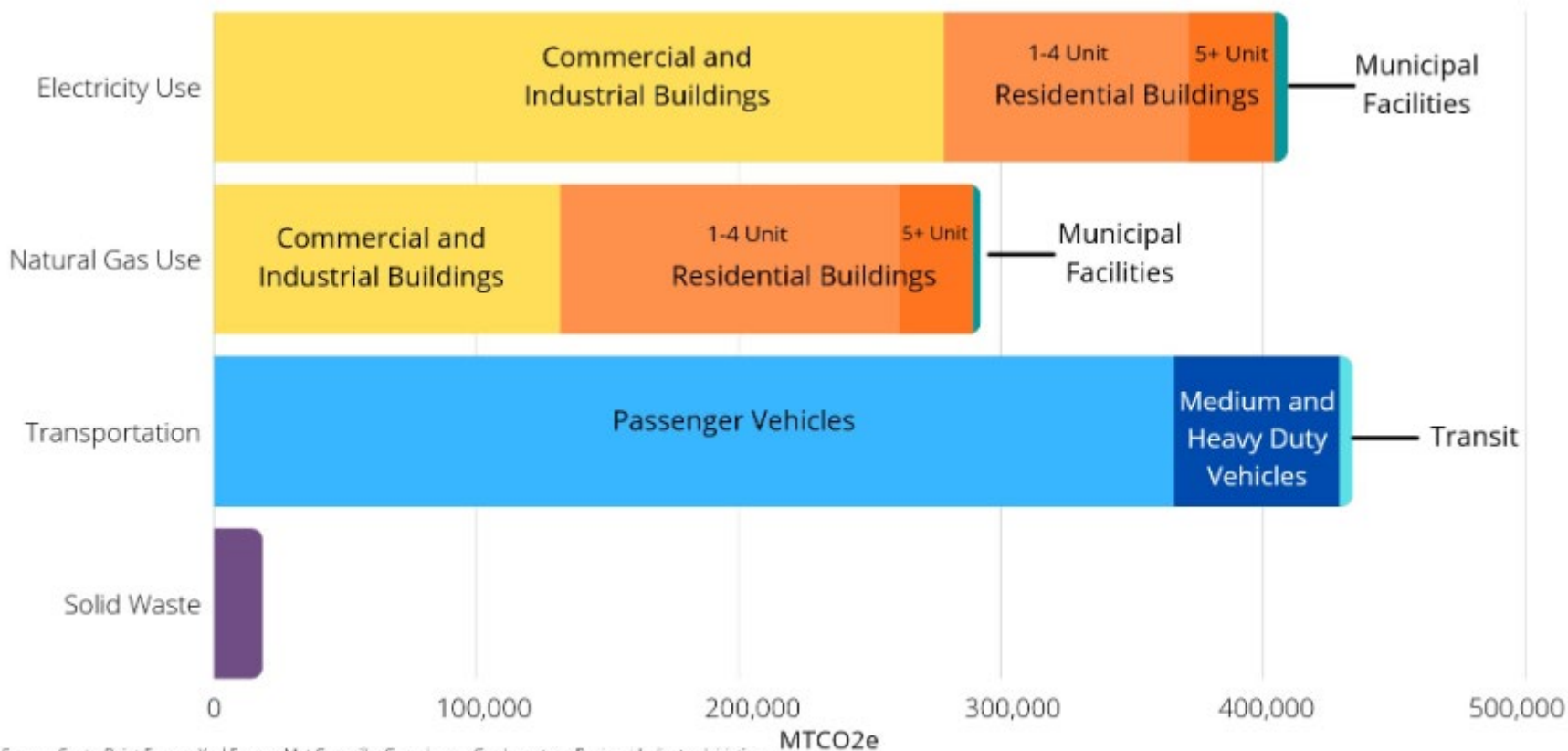- Next Steps

Carbon Emissions in Bloomington | Sectors

GREENHOUSE GAS EMISSIONS

community-wide greenhouse gas emissions from building energy, vehicle travel, and the management of municipal solid waste

Source: Regional Indicators Initiative, 2020

Sources of Bloomington's GHG emissions

Source: CenterPoint Energy, Xcel Energy, Met Council's Greenhouse Gas Inventory, Regional Indicator Initiative

MTCO2e

Existing Conditions | Transportation

Transportation Costs

In dispersed areas, people need to own more vehicles and rely upon driving them farther distances which also drives up the cost of living.

$13,918
Annual Transportation Costs

1.83
Autos Per Household

15,517
Average Household VMT

City of Bloomington

Transportation Costs

In dispersed areas, people need to own more vehicles and rely upon driving them farther distances which also drives up the cost of living.

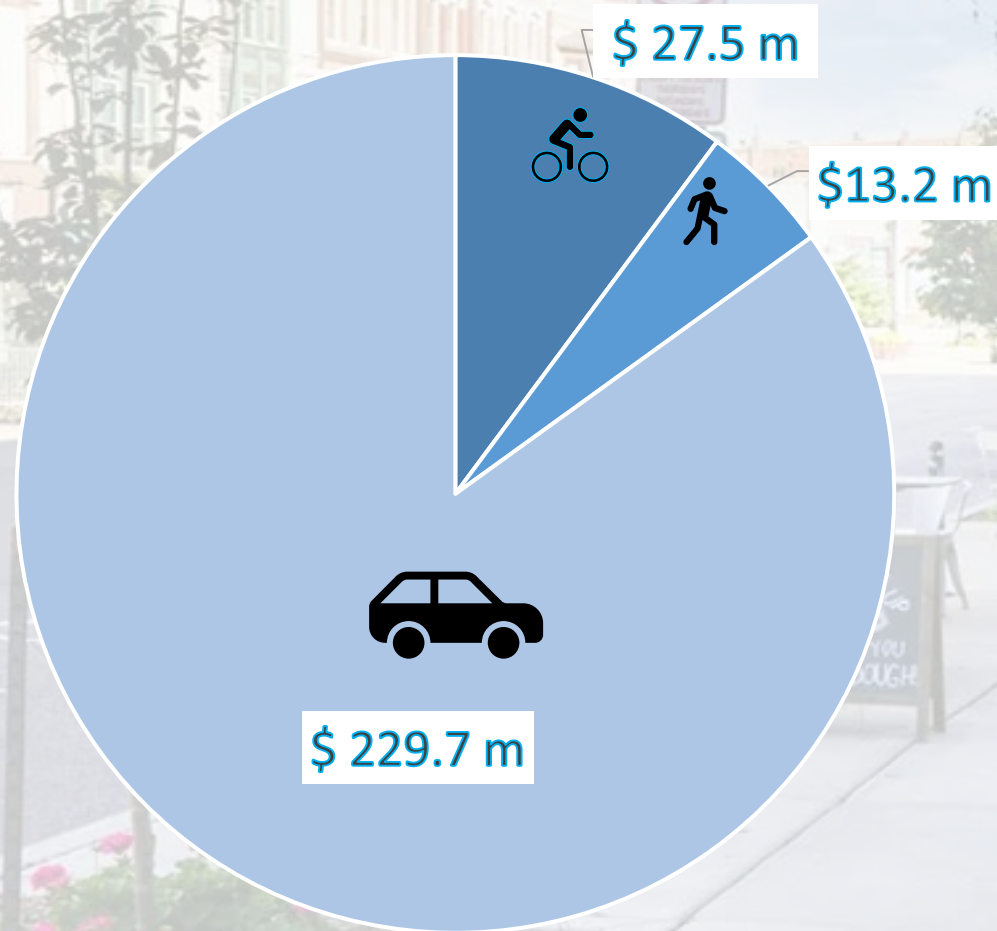$12,996
Annual Transportation Costs

1.71
Autos Per Household
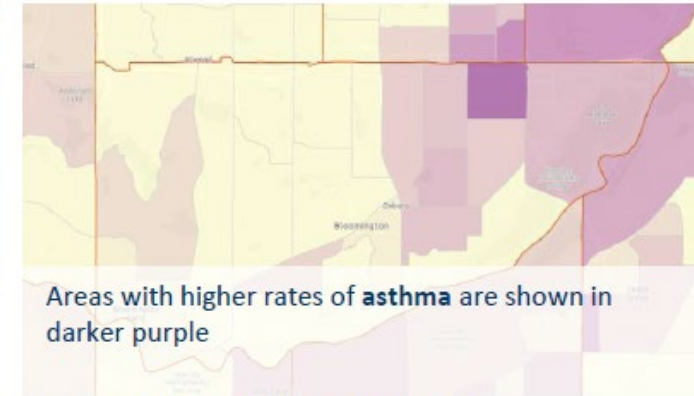
14,122
Average Household VMT

Hennepin County

Source: Center for Neighborhood Technology, Housing + Transportation Affordability Index, 2023

Existing Conditions | Transportation Investment (2024-2033)
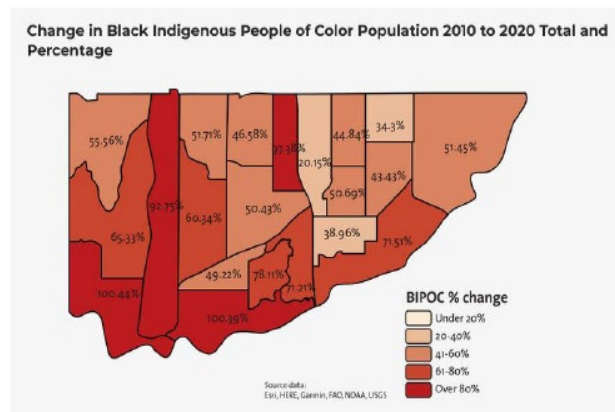
$ 27.5 m

$13.2 m

$ 229.7 m

*Source: City of Bloomington Capital Investment Plan. *No funding found for public transit*
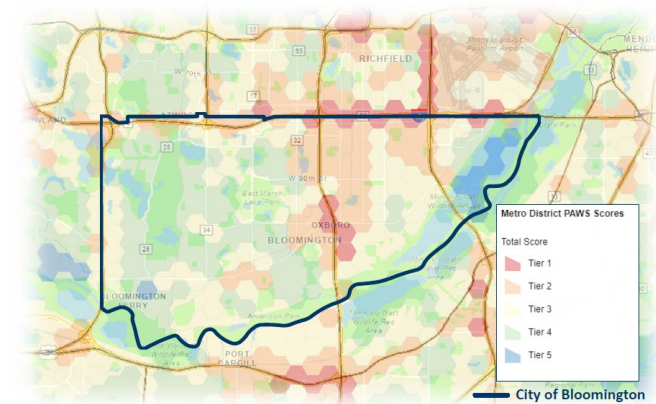
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Transportation Equity and Mobility Justice

- Past transportation decisions further marginalized those already being discriminated against

- Multimodal transportation access is key to accessing work and breaking out of poverty

- Urban freeways often negatively impact those who live alongside it—often disproportionately BIPOC and working class

- Walking and biking access is not equitably distributed: areas along 494 and 35W not only have higher % BIPOC residents, but also do not have high quality walking or biking infrastructure

- Opportunity to equitably reduce emissions from transportation and further co-benefits

Areas with higher concentrations of individuals with **fair to poor overall health** are shown in darker blue

Areas with higher rates of **asthma** are shown in darker purple

Source: CDC Places. https://experience.arcgis.com/experience/22c7182a162d45788dd52a2362f8ed65

Change in Black Indigenous People of Color Population 2010 to 2020 Total and Percentage

Source: https://www.bloomingtonmn.gov/cs/community-based-strategic-planning

Red hexagons show highest priority areas for bike/walk improvements, Source: MnDOT PAWS tool

Transportation Emissions | Key Takeaways

- Transportation emissions make up approximately **40% of total** emissions from Bloomington

- Driving in single occupancy vehicles (cars and small trucks) make up the majority of emissions within transportation

- While emissions from energy generation have declined, transportation emissions have risen or remained steady, except when the pandemic started (2020)

- Bloomington households drive more than the county average, and spend more in transportation costs
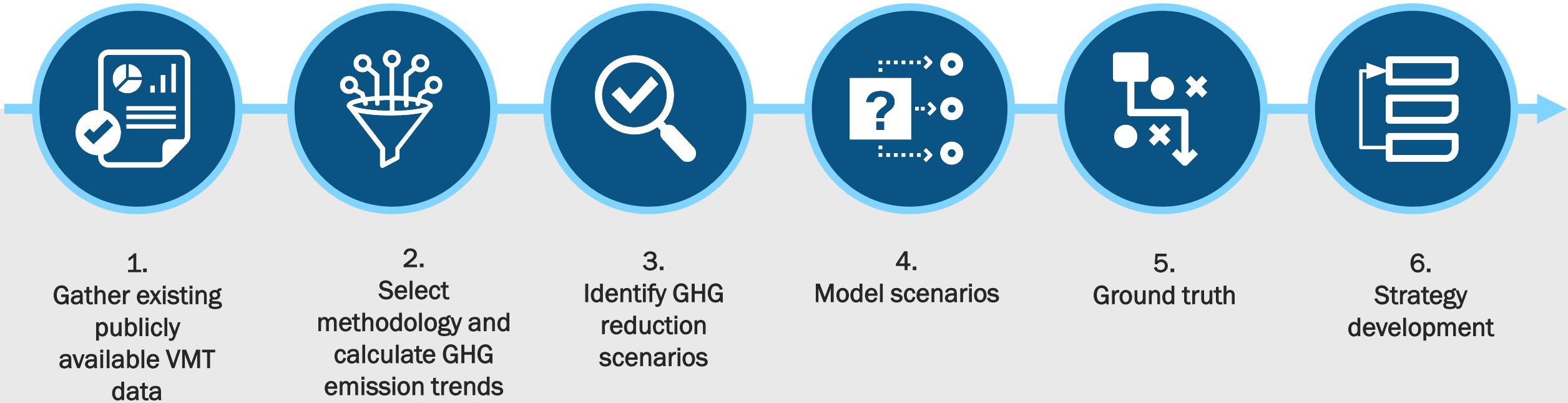
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Pathways to Carbon Neutrality

envisioning a zero-carbon transportation system

Scenario development

1.
Gather existing publicly available VMT data

2.
Select methodology and calculate GHG emission trends

3.
Identify GHG reduction scenarios

4.
Model scenarios

5.
Ground truth

6.
Strategy development

# Scenario Development | Assumptions

- Goal is to identify quantitatively how to reach the city's goal of carbon neutral by 2050

- Model a mix of different ways to reach the goal

- Two key pathways identified—electrification and reducing driving (vehicle miles traveled, or VMT)

Scenario Assumptions

- Set basic benchmark goal of transportation GHG reduction of absolute 80% reduction from current level

- 4 scenarios developed that achieve this goal
  - **High Electrification**
  - **High VMT Reduction**
  - **2 Middle of the Road Scenarios** that combine VMT reduction and electrification
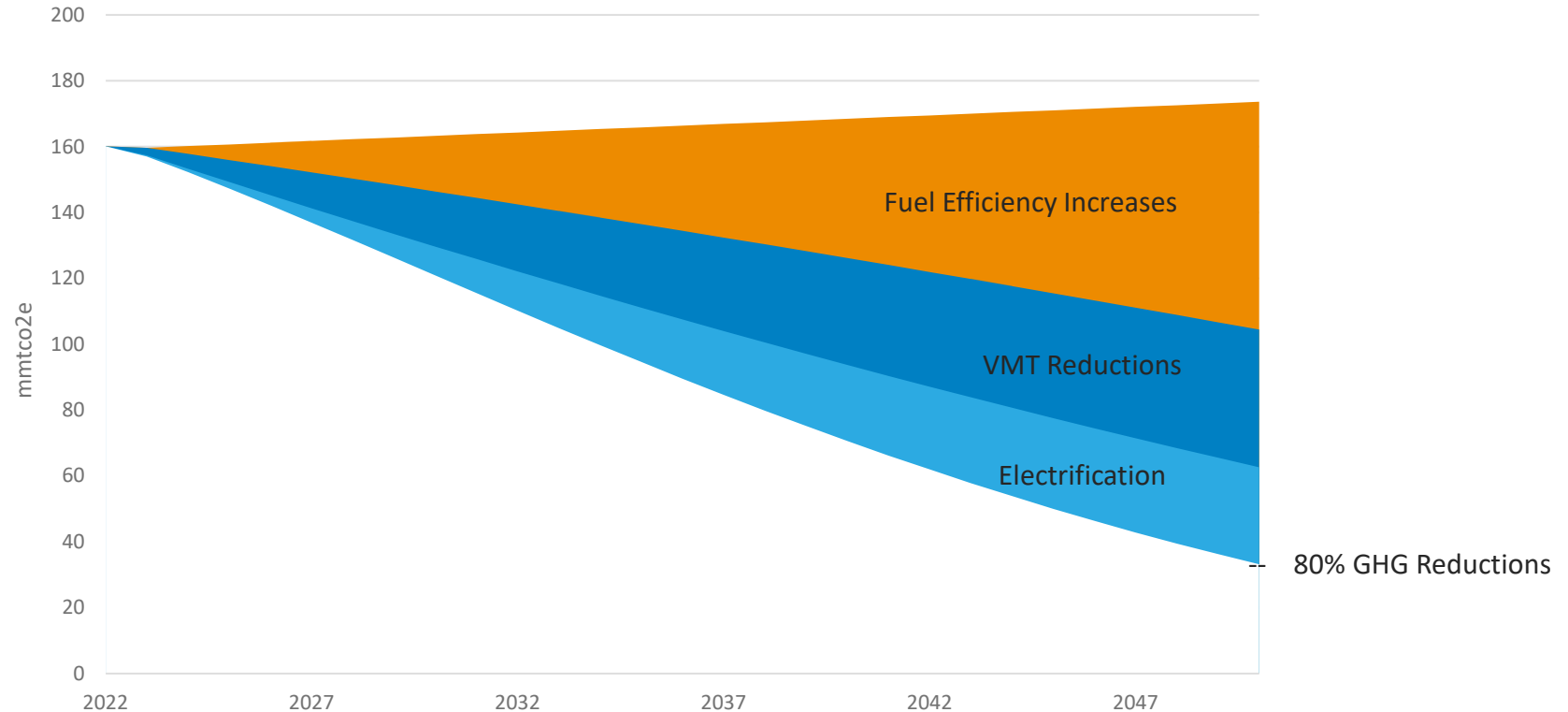
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Scenario 1 – High Electrification

- VMT – 10% Reduction by 2050
- Electrification - ~65% of on-road vehicles, all new vehicle sales EV by 2045
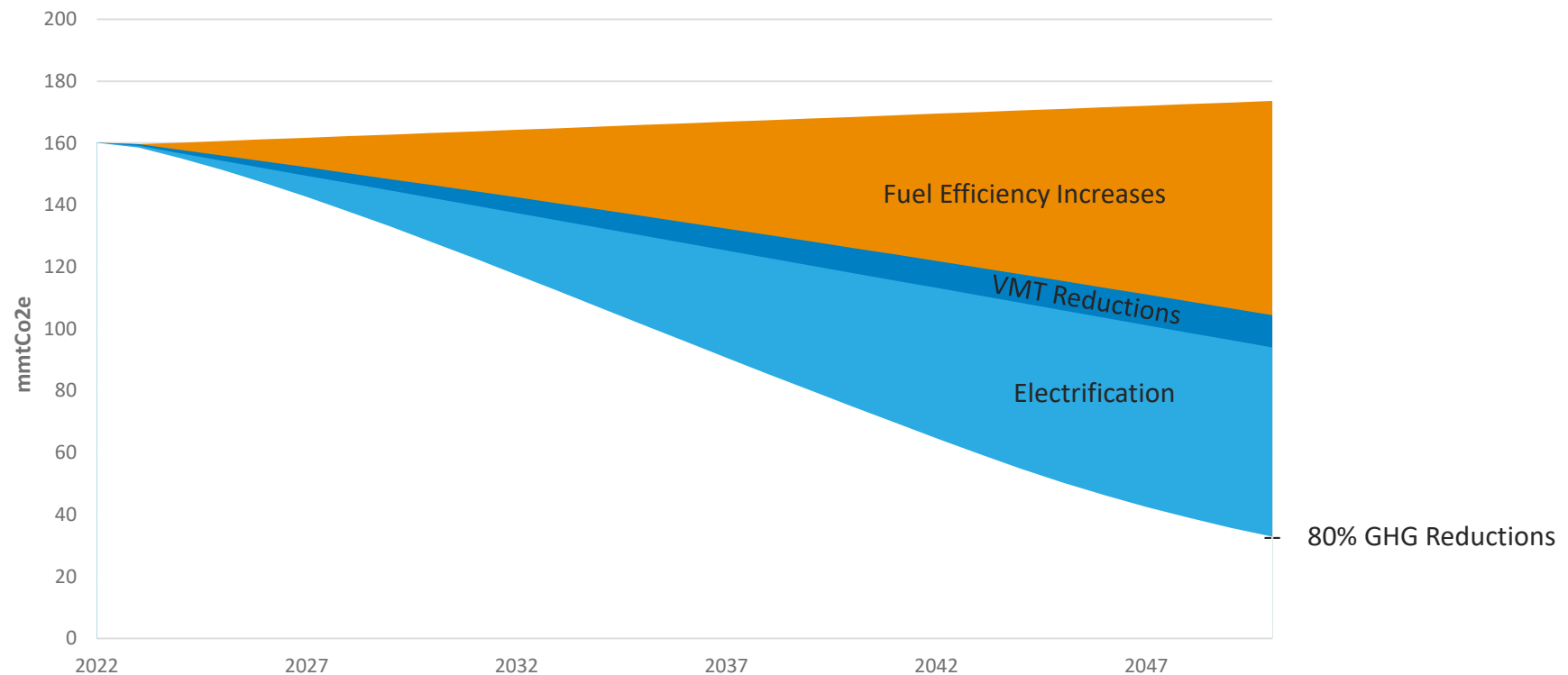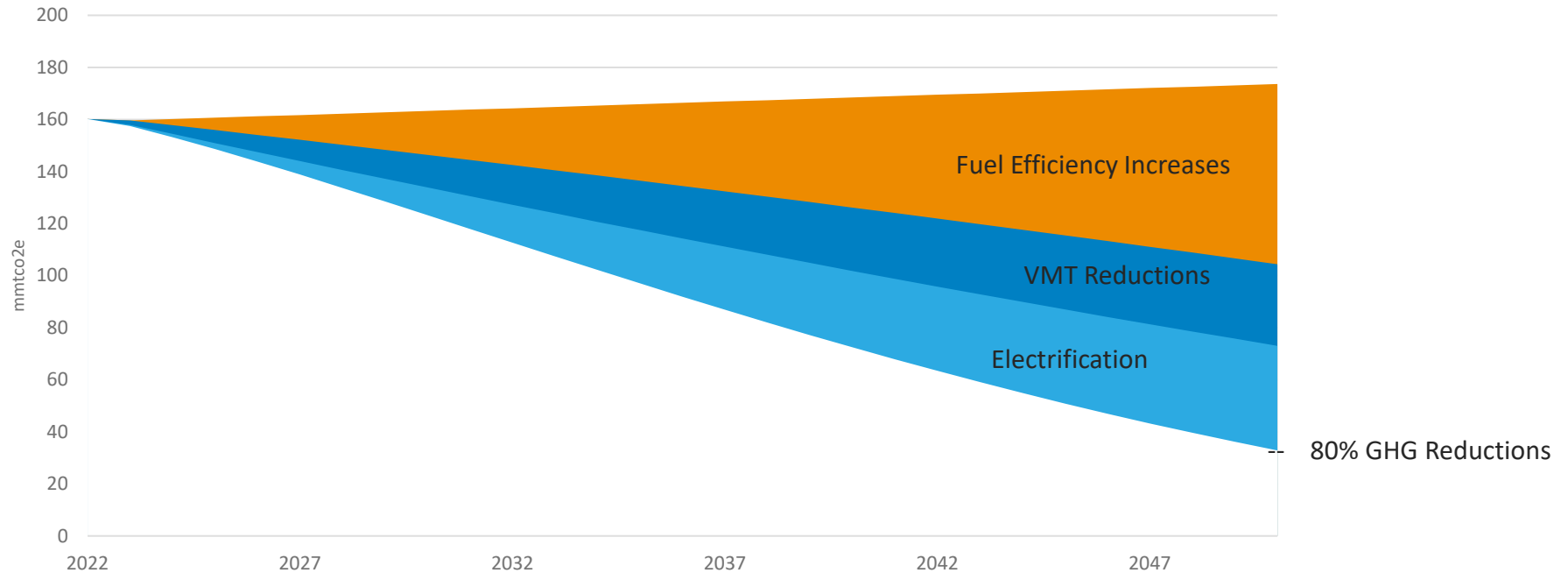
Scenario 2– High VMT Reduction

- VMT – 40% Reduction by 2050
- Electrification - ~45% of on-road vehicles, 85% new vehicle sales EV by 2050
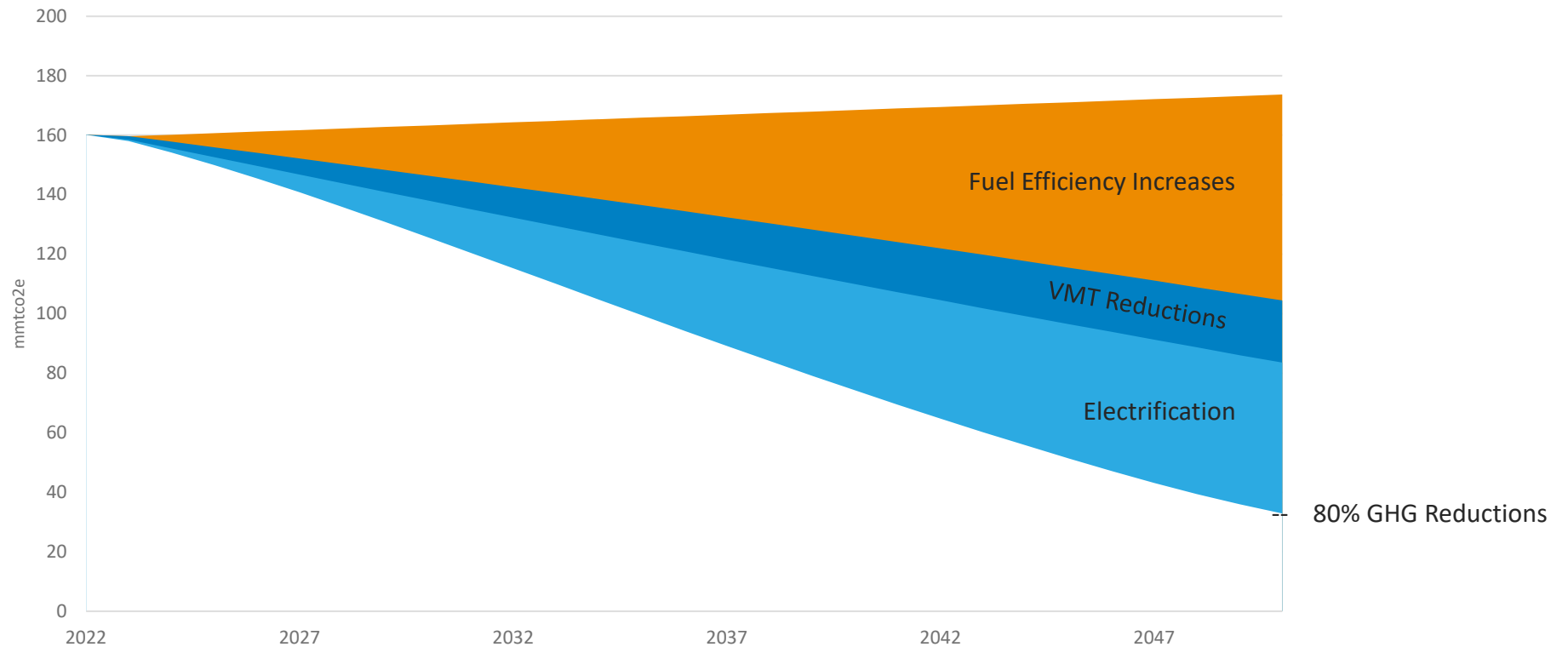
Scenarios 3 – Middle of the Road 1

- VMT – 30% Reduction by 2050
- Electrification - ~55% of on-road vehicles, all new vehicle sales EV by 2050
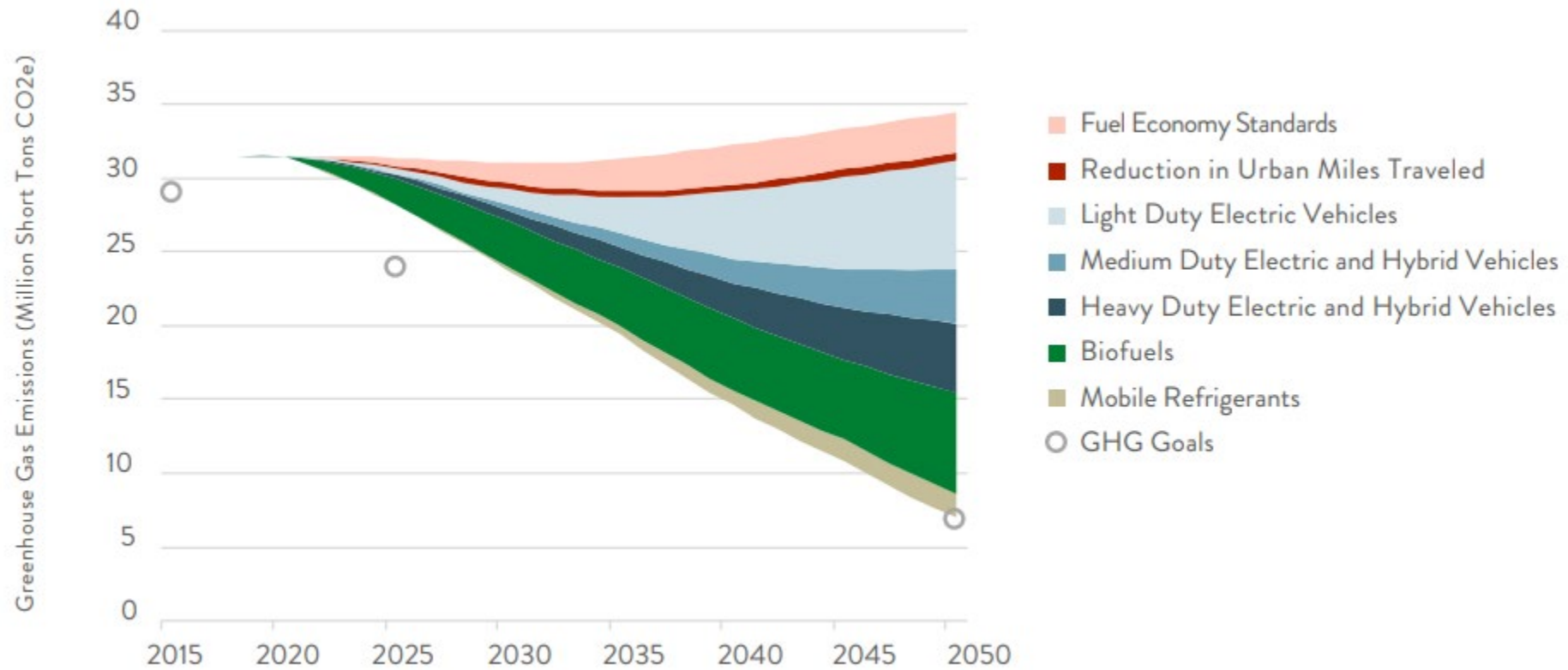
Scenario 4 – Middle of the Road 2

- VMT – 20% Reduction by 2050
- Electrification - ~60% of on-road vehicles, all new vehicle sales EV by 2047

Comparison to Regional Results and Predictions

*Pathways to Decarbonizing Transportation in Minnesota, MnDOT, 2019*

Net Carbon Neutral

o Modelling limitations to show net carbon neutral scenarios

o The remaining gap can be covered in a variety of ways

- Mandating conversion of remaining ICE vehicles to biofuel or other similar alternatives

- Carbon capture or sequestration

- 'Carbon credit' from other sectors

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Scenarios – Findings

- Achieving the carbon neutral goal by 2050 will require a multi-pronged approach, focused both on electrification and reducing VMT

- No silver bullet, but multiple strategies will layer on each other

- Findings in line with other analyses (*Pathways to Decarbonizing Transportation*, MnDOT, other cities)

- Scenario 4 chosen as the basis for recommendations provided in this presentation

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City of Bloomington Roles

- Capital Investments
- Assigning allocation of the public right of way
- Zoning and land use
- Transportation policy and incentives

|	
Capital investments	Right of way design
Zoning and land use	Policy and incentives
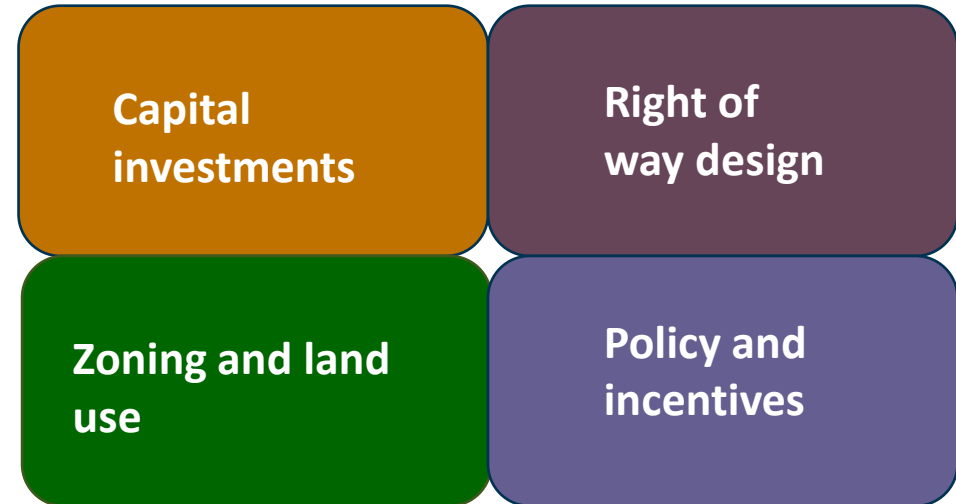
Bloomington Travel Behavior Modeling – Replica Activity Based Travel Demand Modelling

- Trips are simulated based on a combination of mobile location data, consumer/resident data, built environment data, and economic activity data

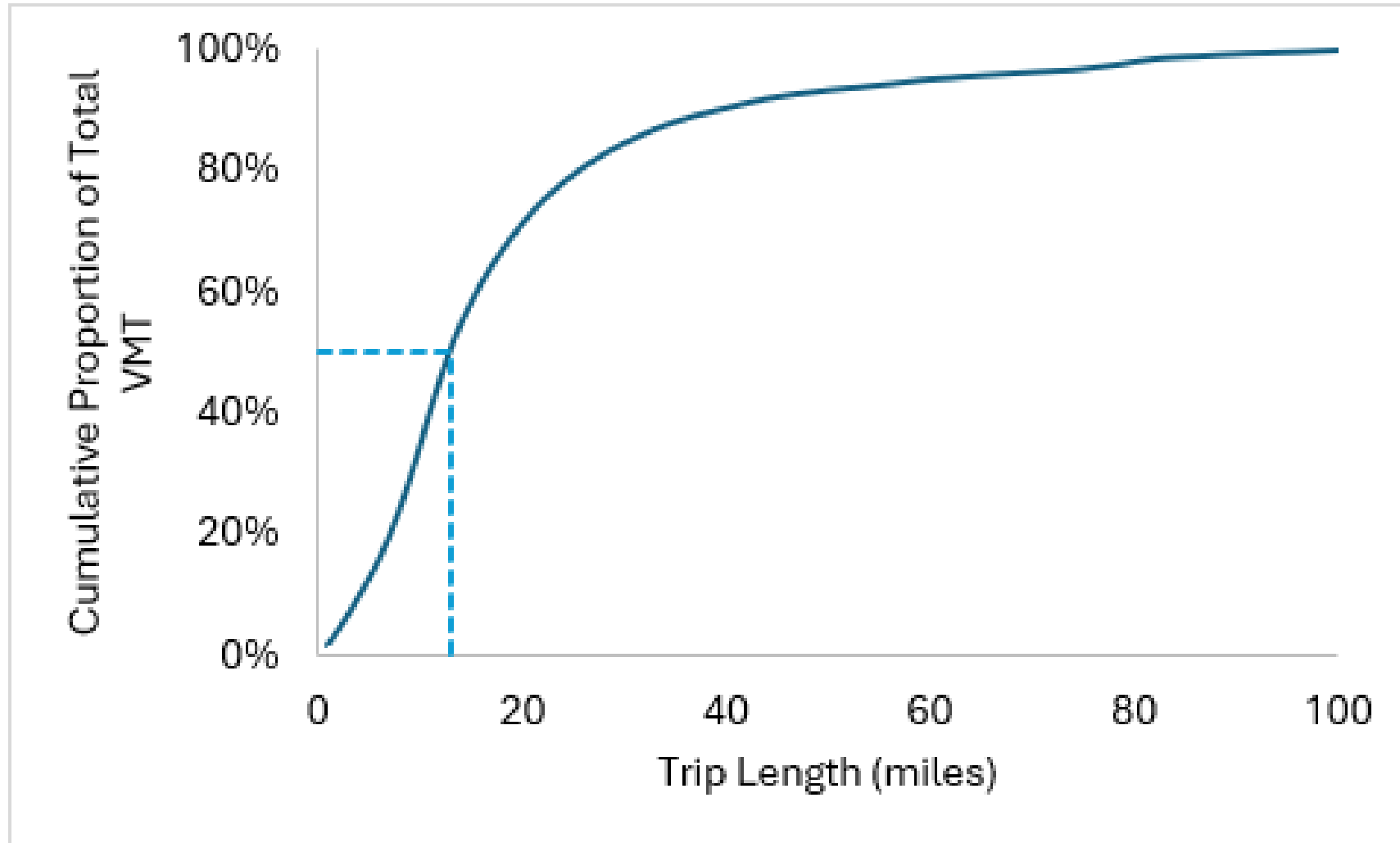- Calibrated using ground truth data

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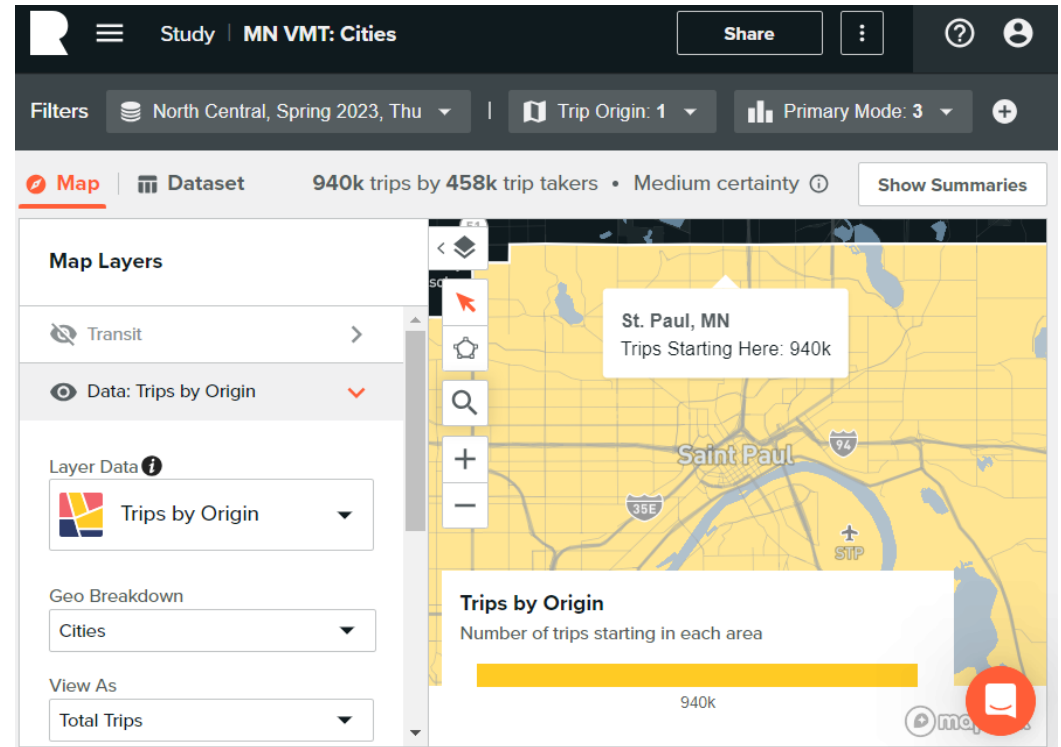
Analysis Parameters

- This analysis includes trips that either originate or conclude (or both) in Bloomington

- This analysis uses typical travel patterns for Thursday
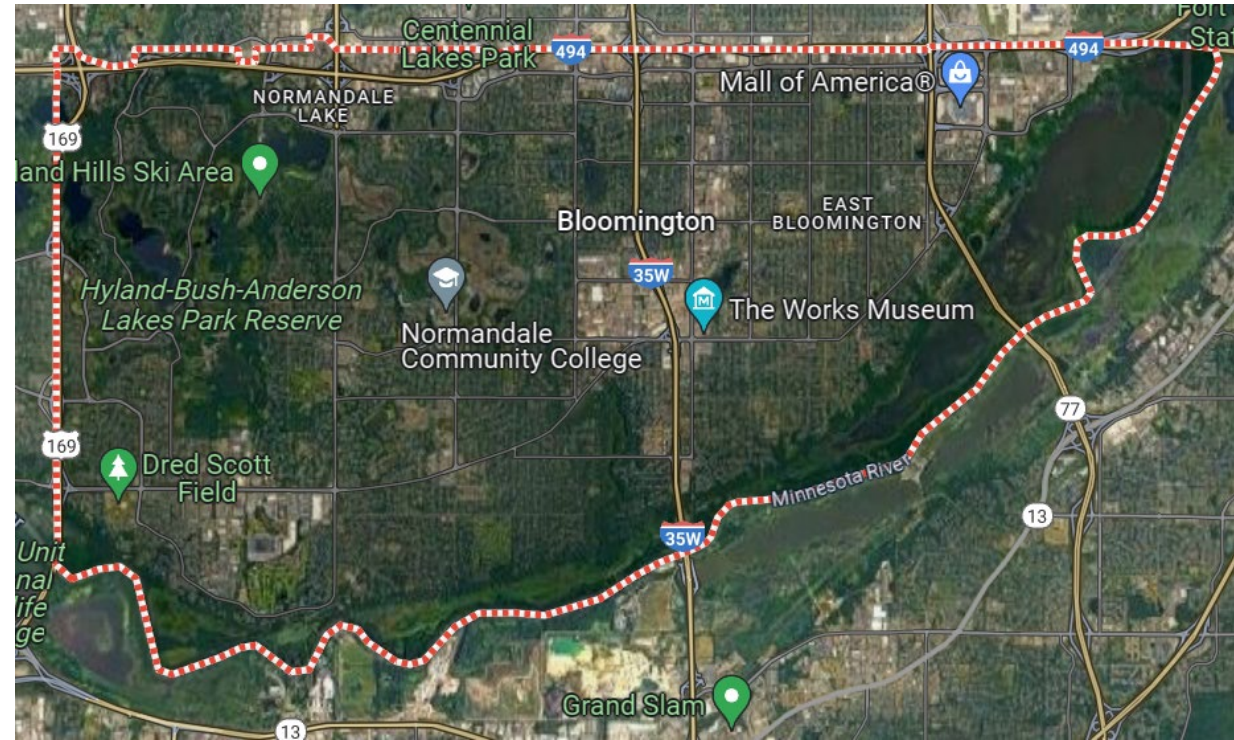
Cumulative VMT by Trip Length

VMT Percentage by Trip Length and Trip

Purpose Total	Distance Total	9%	17%	31%	43%
Purpose Total	Trip Purpose	Less Than Five	Five to Ten	Ten to Twenty	Above 20
3%	Commercial	2%	3%	2%	5%
4%	Recreation	4%	5%	4%	3%
3%	Maintenance	3%	4%	3%	2%
17%	Shop	22%	19%	16%	15%
8%	Eat	10%	9%	8%	7%
8%	Social	6%	11%	9%	6%
2%	School	5%	3%	2%	2%
4%	Other Activity Type	3%	3%	3%	3%
25%	Work	11%	16%	26%	31%
2%	Lodging	3%	4%	2%	1%
23%	Home	28%	21%	21%	24%
1%	Work From Home	2%	1%	1%	2%

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# VMT Percentage by Trip Length and Trip Purpose
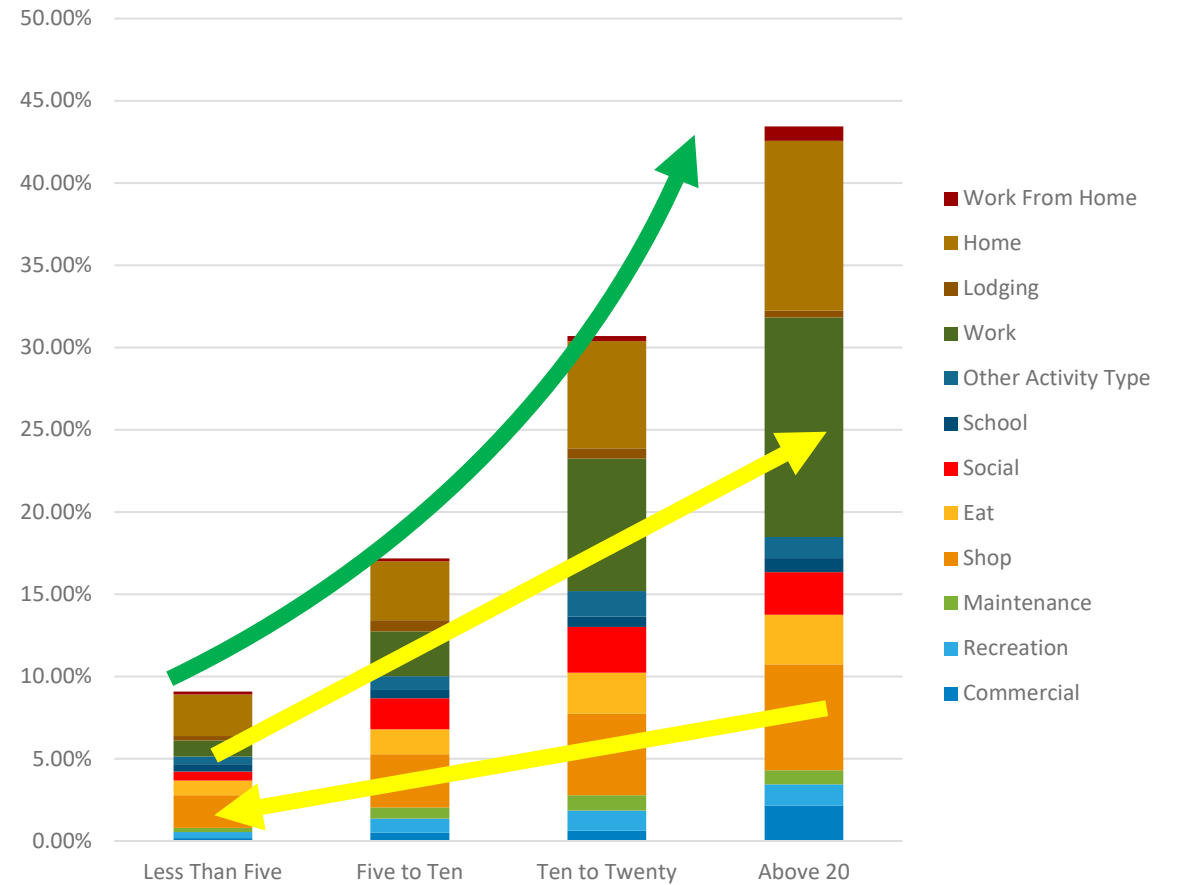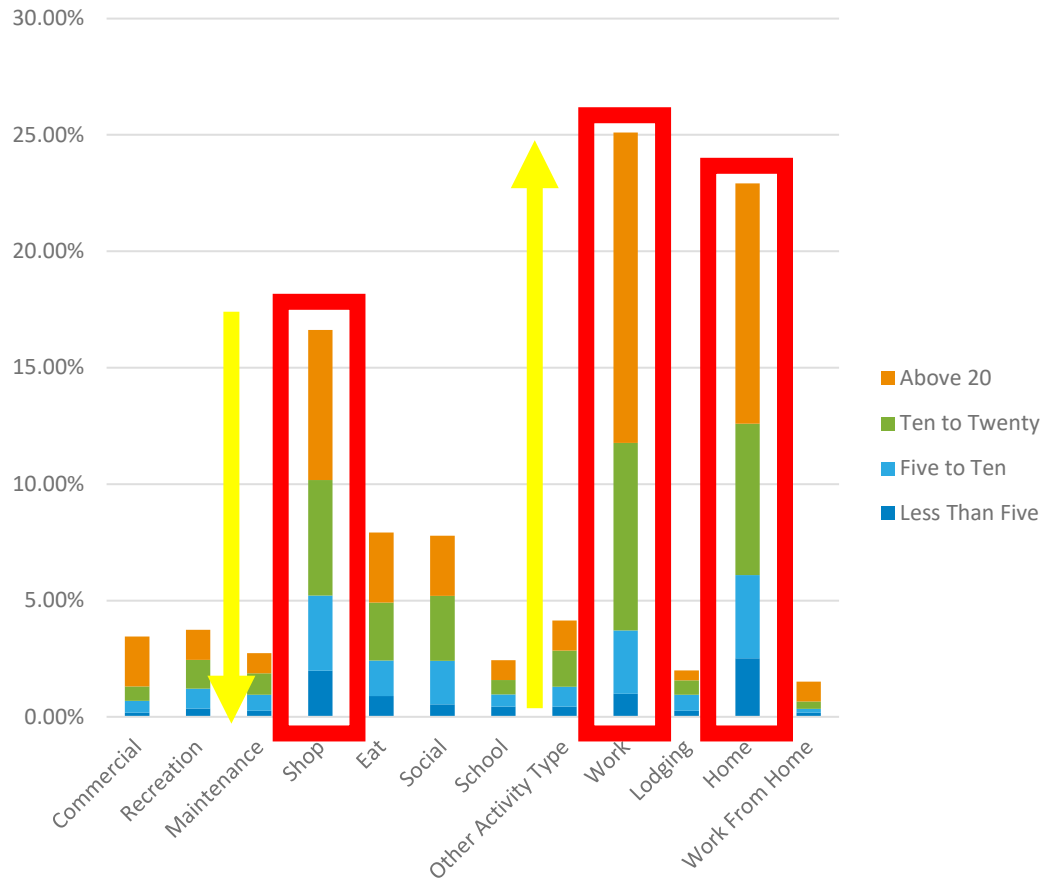
Key Takeaways

- Approximately 75% of VMT is generated by trips >10 miles

- Work trips tend to skew longer >10 miles

- Shopping, Eating, Social, and School Trips tend to skew shorter

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Framework to Achieve Carbon Neutrality

- **Shift:** Make mode shift possible

- **Avoid:** Make it possible to meet your needs without traveling in your own vehicle

- **Shorten:** Make shorter trips and trip chaining possible

- **Incentivize:** Increase incentives to drive less
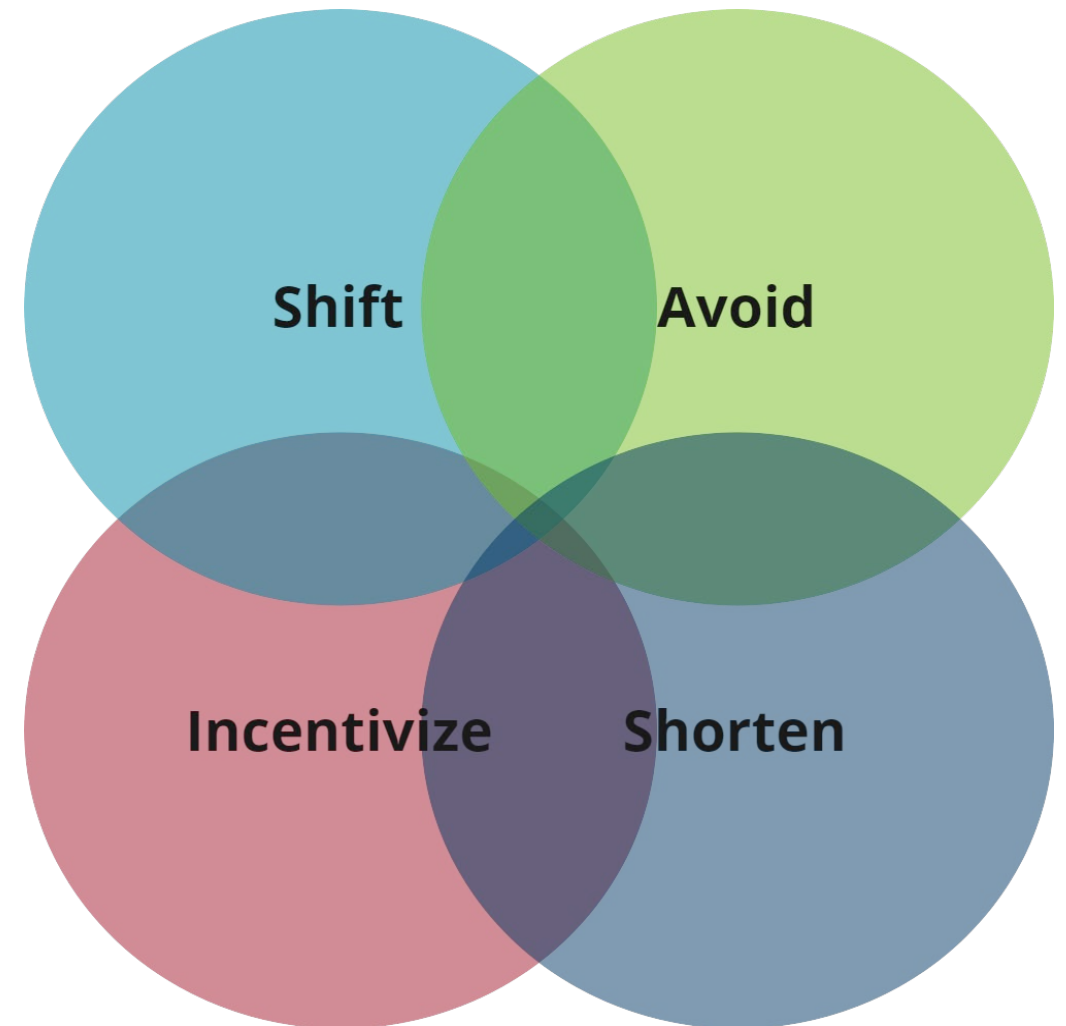
Shift

- Right-size transportation infrastructure
- Increase frequency, connectivity to destinations, and reliability of public transit
- Increase transit access and connectivity
- Increase safety, comfort, and convenience of active transportation
- Decrease economic barriers to walking, biking, and transit modes
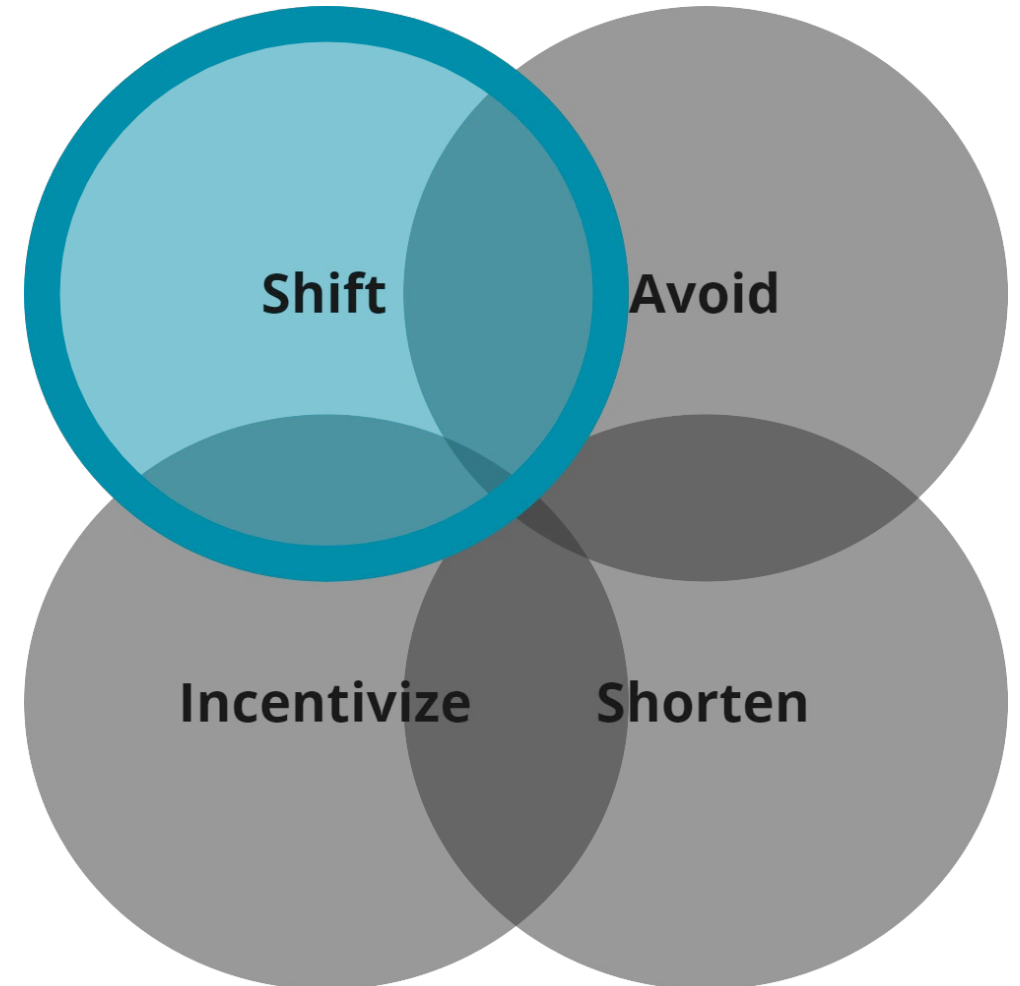
Avoid

- Encourage transportation demand management strategies
- Increase virtual access to basic needs (telework, telehealth, etc.)
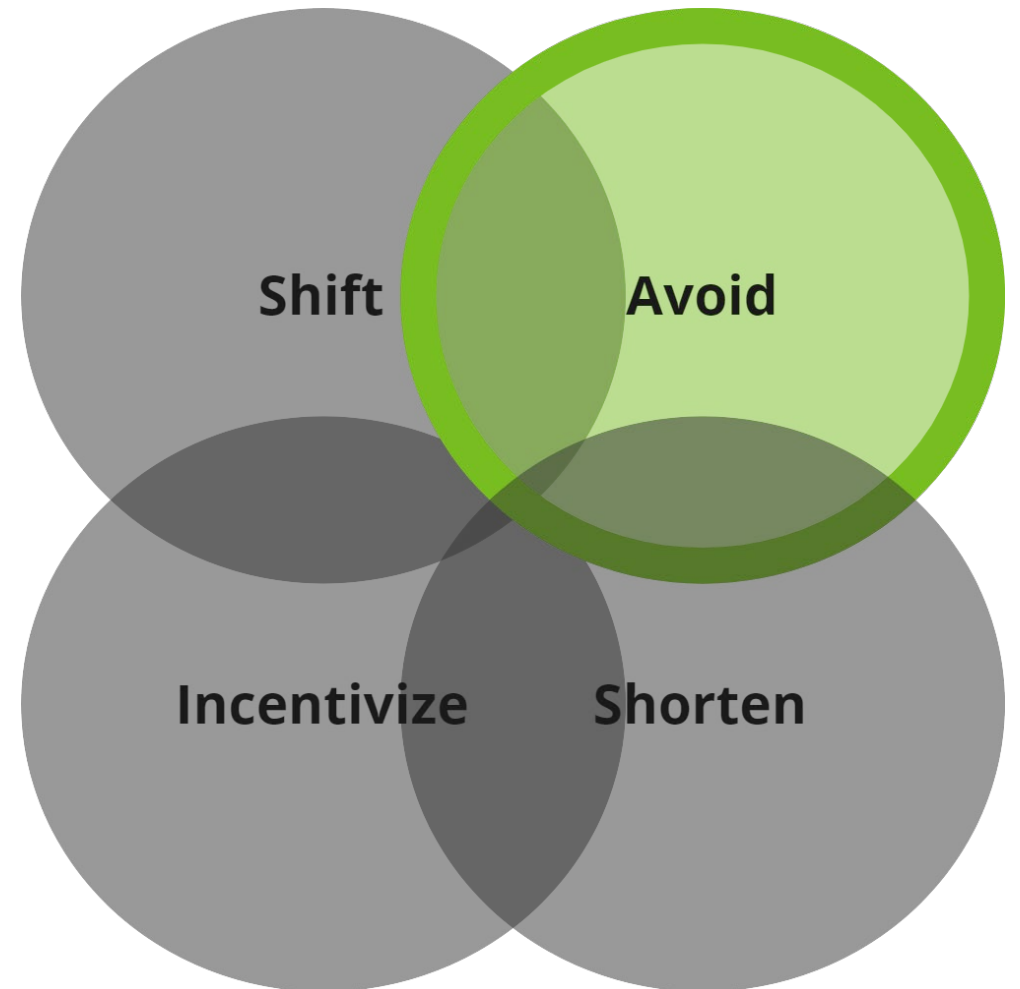
Shorten

- Encourage compact development and discourage sprawl
- Support transit-oriented development
- Increase availability of services that meet basic needs (childcare, grocery stores, healthcare, retail)
- Increase availability of specialty services
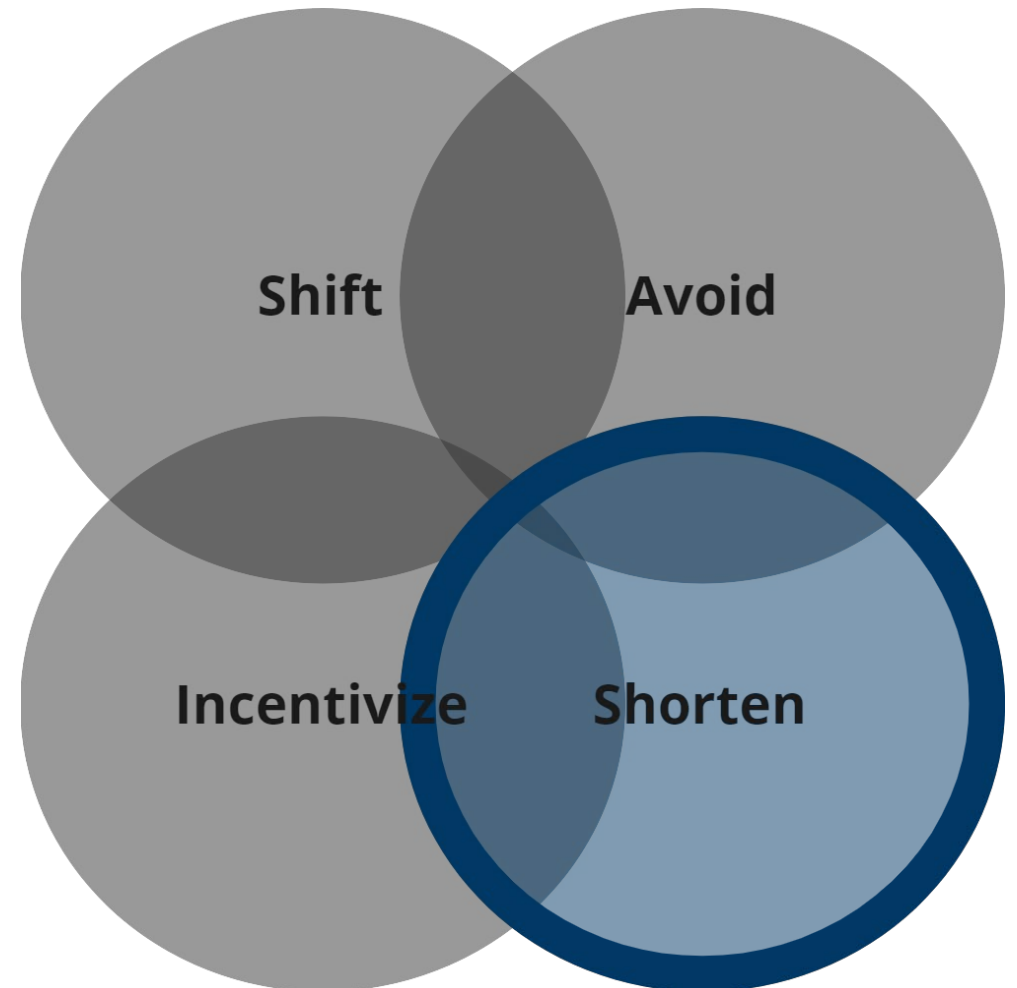
Incentivize

- Increase parking pricing (incrementally with proximity to urban centers) and/or reduce parking availability

- Provide transit passes instead of free parking

- Provide convenient parking and storage for bicycles

- Subsidize e-bike purchases
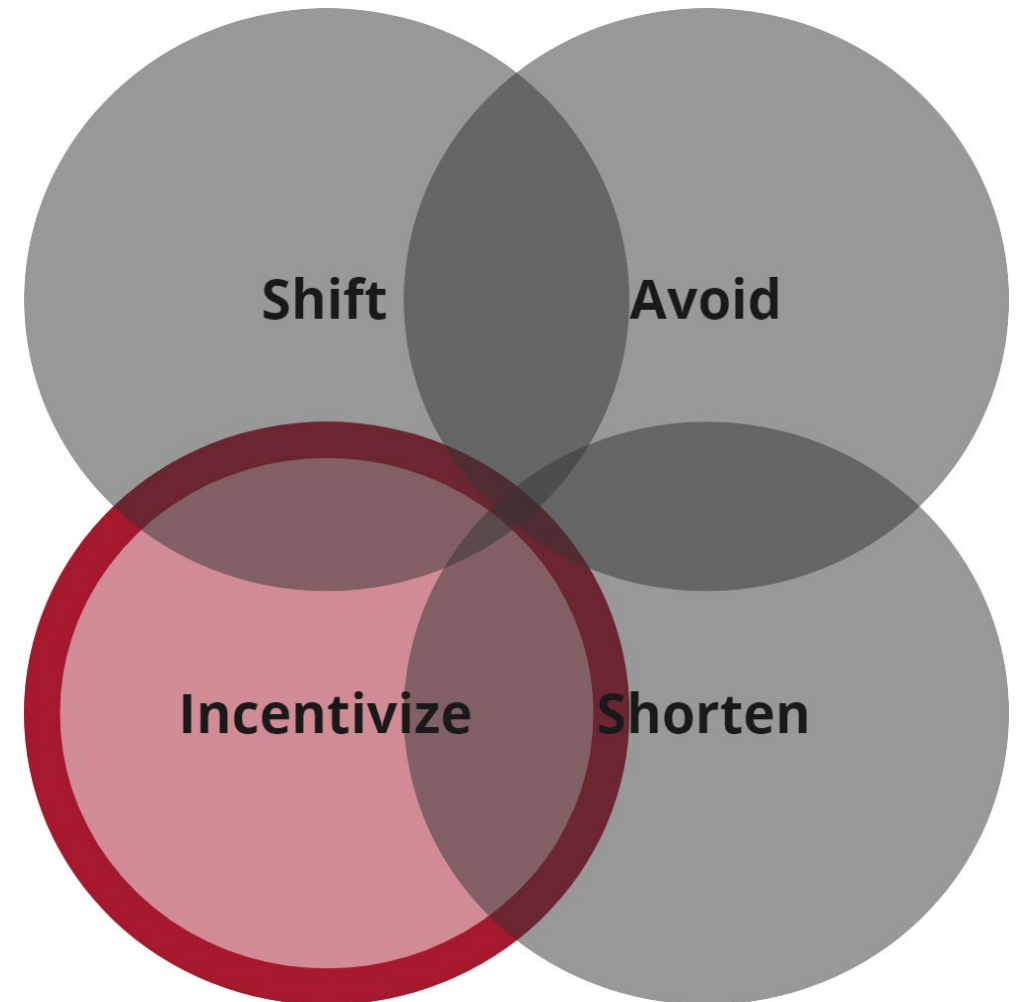
Travel Behavior

Travel behavior is influenced by transportation options: accessible, affordable, available, comfortable, and safe
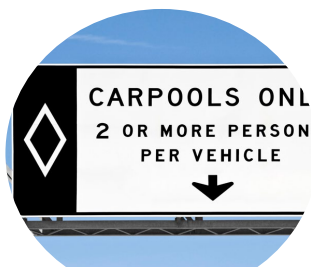

Walking

Scooters

Bicycle

Ride Hailing

Electric Bike

Car pooling

Bus

Telework

Light rail

Car Share

Transit Mobility

Wheelchair

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Scenarios | 20% VMT reduction by 2050

Instead of driving to the grocery store once a week, Gareth purchases an e-bike and uses that to make trips where he doesn't have too many bags to carry. He finds that he replaces **3 out of every 4 car trips** this way
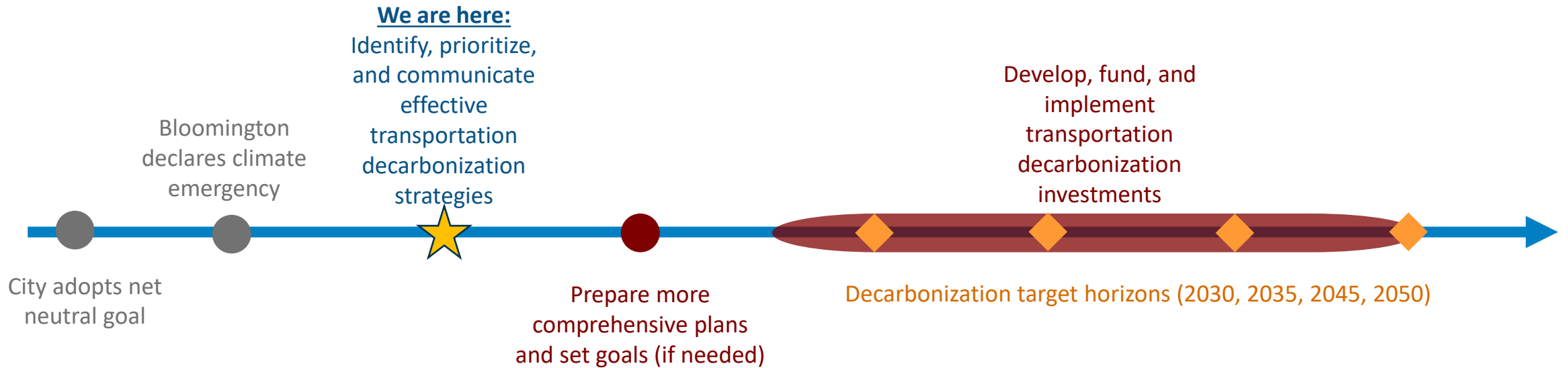

Katie discovers that BRT transit signal priority, and dedicated lanes make it faster than driving to her children's daycare. She drops them off by bus instead of driving **every other day**. Katie also saves money on fuel costs.
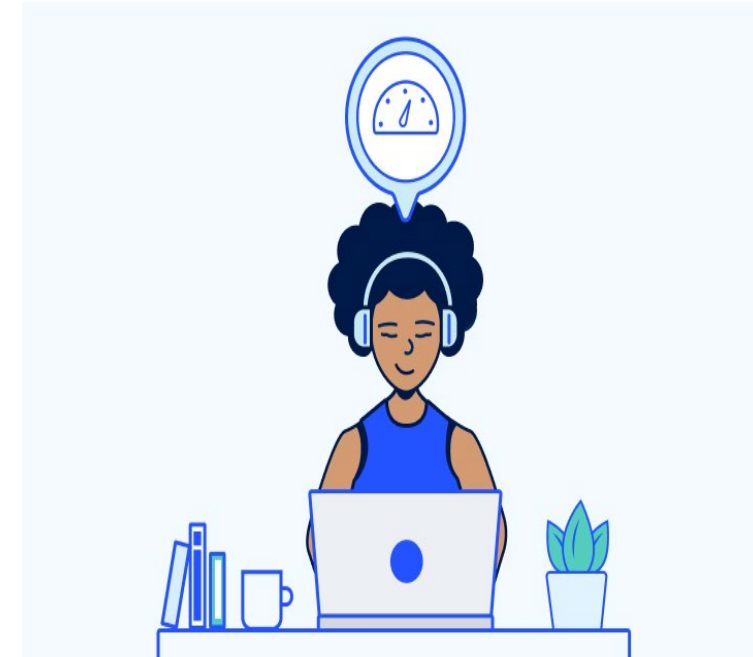
Salima goes into the office five days a week. In the future, she could work from home on **one** of those days. While at home, she often walks to her neighborhood grocery store to grab lunch.

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Project Status: Where we are in the timeline

We are here:
Identify, prioritize, and communicate effective transportation decarbonization strategies

Develop, fund, and implement transportation decarbonization investments

Bloomington declares climate emergency

City adopts net neutral goal

Prepare more comprehensive plans and set goals (if needed)

Decarbonization target horizons (2030, 2035, 2045, 2050)

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Q&A

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