Climate Planning and Transportation

How can we enhance collaboration across units of government?

METROPOLITAN COUNCIL

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Partnering on a shared vision

Making a strong system possible through planning, coordination, and operations

Long-range planning

Supporting cities and townships for the prosperity of the region

Environmental protection

Protecting public waterways and parklands to sustain our environment

Transportation services

Connecting people to places and keeping the economy moving

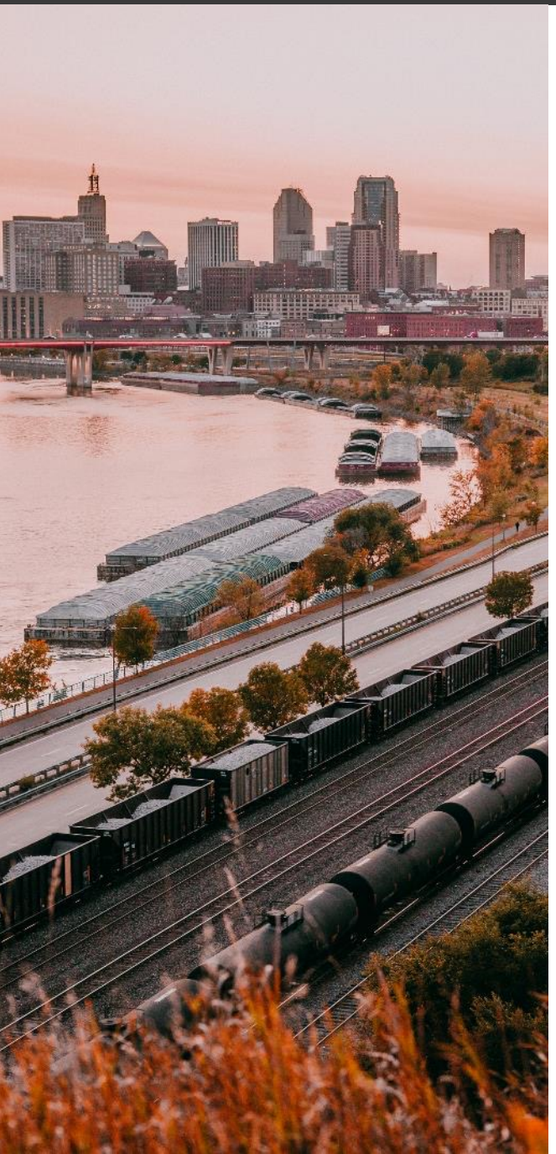
1 Climate Action Plans

- Are our climate goals aligned?

2 GHG Scenario Planning Tool

- What is the GHG Scenario Planning Tool?
- What transportation strategies are included?

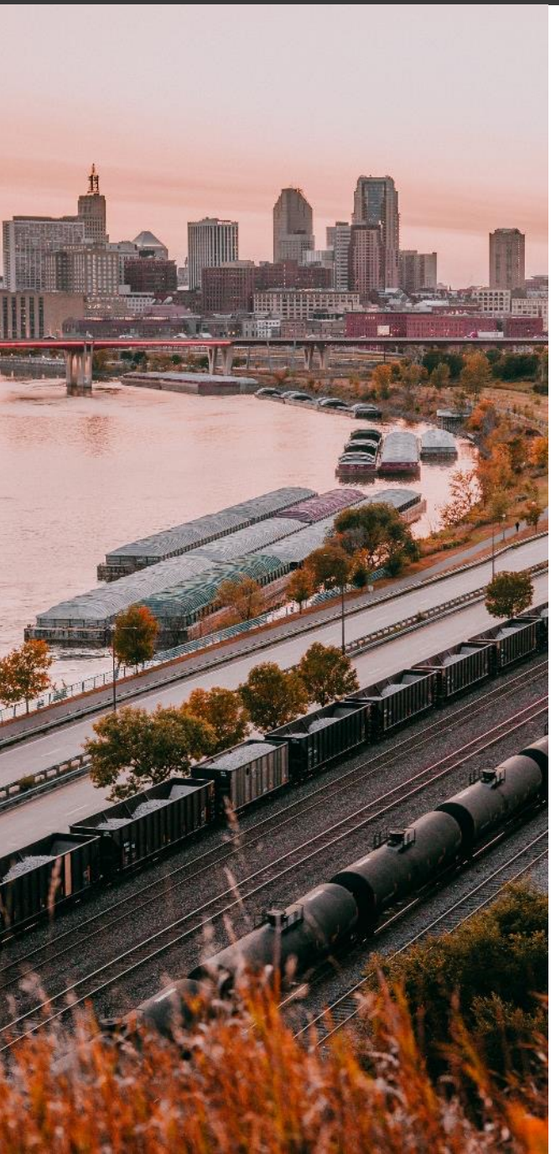
Effective Climate Change Action



Collaboration is key

- Effective climate action often involves collaboration between various stakeholders, including local businesses, community groups, and **other levels of government**.

Effective Climate Change Action



Collaboration is key

- **Shared Responsibility:** Emission reduction is a shared responsibility.
- **Efficiency:** Coordinated efforts can ***prevent redundancy*** and ***improve the efficiency of programs*** aimed at reducing emissions.
- **Consistent Regulations:** Without alignment, policies may be inconsistent or even contradictory across different jurisdictions.
- **Broad Impact:** The impact of emissions on climate change is not confined to local or state boundaries.
- **Economic Opportunities:** Collaboration across different levels of government can create more substantial incentives for businesses and industries to invest in greener technologies and practices.

The Federal Framework

US National Blueprint for Transportation Decarbonization (2023)

The Inflation Reduction Act

Beyond Electrification in U.S. Transportation Policy

- **Inflation Reduction Act (IRA):** The IRA supports transportation electrification and offers tax credits for zero-emissions vehicles, though some argue it overlooks broader environmental impacts of car dependency.

- **Electric Cars and Emissions:** Electric vehicles can reduce carbon emissions, but their impact is contingent on factors such as electricity sourcing and vehicle size.

- **Sustainable Transportation Future:** For long-term sustainability, a less car-dependent future is needed with improved public transit, incentives for electric bikes, and a focus on walkable, resource-efficient urban planning.

The State's Framework

Transportation Strategies

- Increase funding for **non-motorized** transportation
- Increase **transit** services
- Plan **land use** and transportation together
- Continue exploring opportunities for a **clean fuel standard**
- Expand **regional charging**
- Develop a Minnesota **EV** plan

Minnesota's Climate-Conscious Transportation Bill

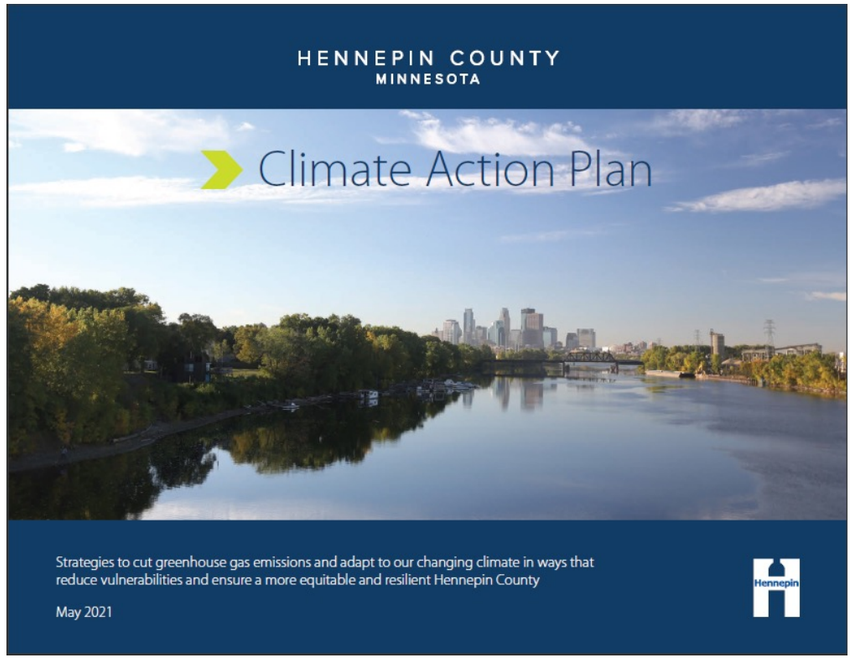
A New Direction

- The newly passed Minnesota transportation bill includes climate-conscious provisions like funding for public transit and a climate-centric approach to infrastructure planning.
- The bill aims to reduce carbon emissions through a shift towards electric vehicles and better public transit, funded by a 0.75% metro-area sales tax.
- The law requires evaluation and mitigation of greenhouse gas emissions for significant transit-related projects, supplementing efforts in cities like Rochester which is investing in EV infrastructure and public transit improvements.

Hennepin County's Framework

Transportation Strategies

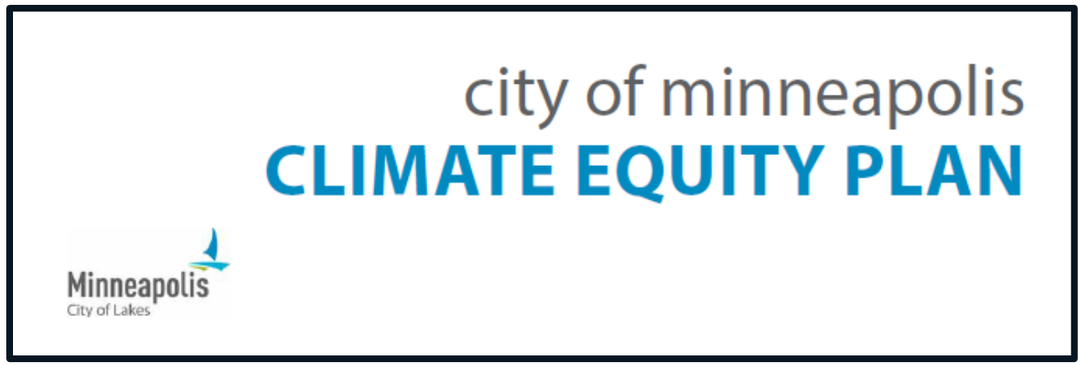
- **Reduce vehicle miles traveled** in Hennepin County and throughout the region
- Promote **electric vehicle** infrastructure regionally
- Use transportation investments to support broader county goals including **reducing disparities**, **improving health**, **enhancing livability**, and **growing the economy**



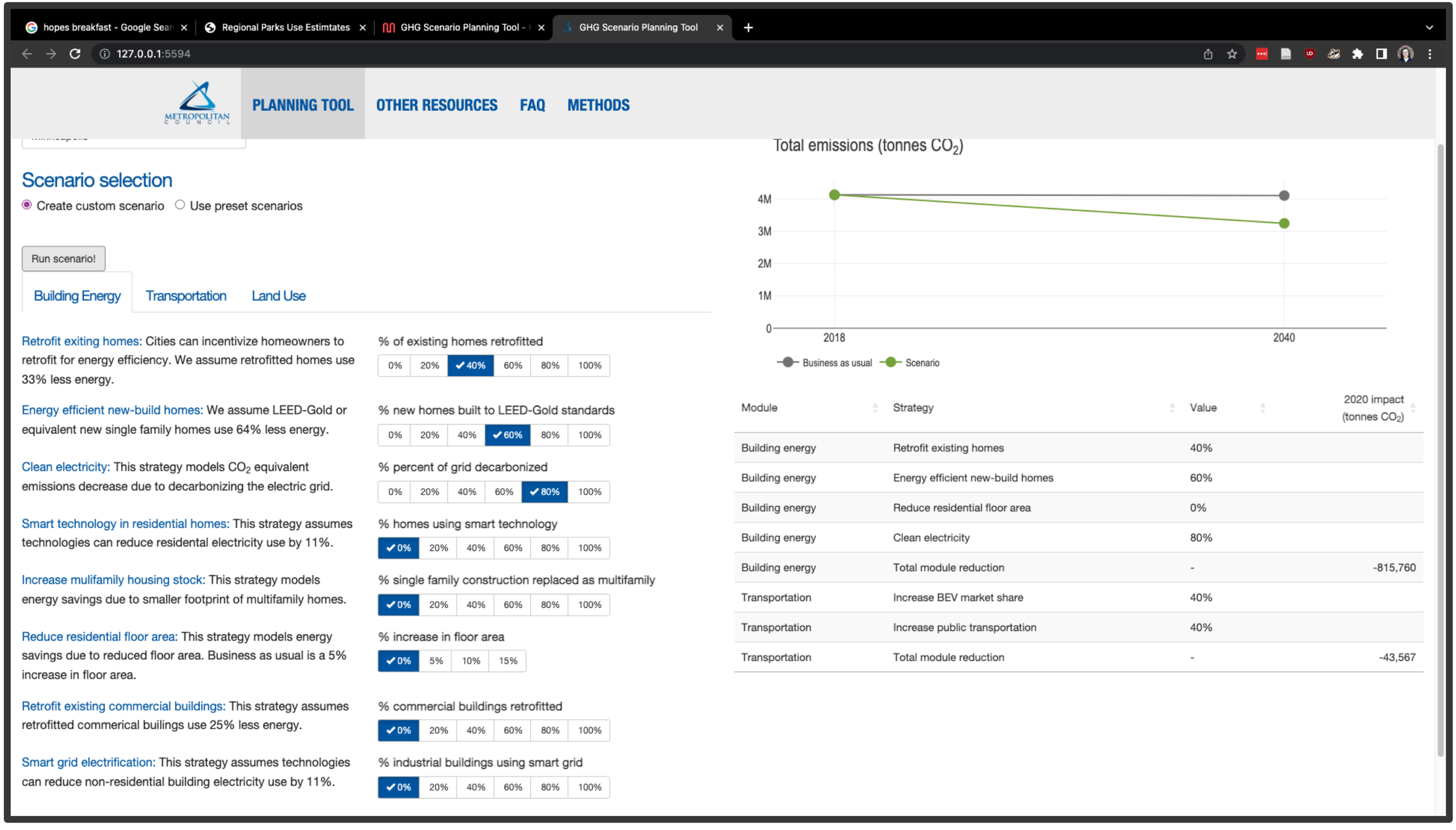
City of Minneapolis' Framework

Transportation Strategies

- Provide safe, easily accessible and low-cost **transit** throughout the City
- Reduce greenhouse gas emissions caused by vehicles by 30% by 2030 along with other harmful emissions*
- Reduce **vehicle miles traveled** (VMT) by 2.5% annually through 2030*



The Greenhouse Gas Scenario Planning Tool


hopes breakfast - Google Sear
Regional Parks Use Estimtates
GHG Scenario Planning Tool -
GHG Scenario Planning Tool
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PLANNING TOOL
OTHER RESOURCES
FAQ
METHODS
Scenario selection
Create custom scenario
Use preset scenarios
Run scenario!
Building Energy
Transportation
Land Use
Retrofit exiting homes: Cities can incentivize homeowners to retrofit for energy efficiency. We assume retrofitted homes use 33% less energy.
% of existing homes retrofitted
0% 20% ✔40% 60% 80% 100%
Energy efficient new-build homes: We assume LEED-Gold or equivalent new single family homes use 64% less energy.
% new homes built to LEED-Gold standards
0% 20% 40% ✔60% 80% 100%
Clean electricity: This strategy models CO2 equivalent emissions decrease due to decarbonizing the electric grid.
% percent of grid decarbonized
0% 20% 40% 60% ✔80% 100%
Smart technology in residential homes: This strategy assumes technologies can reduce residental electricity use by 11%.
% homes using smart technology
✔0% 20% 40% 60% 80% 100%
Increase mulifamily housing stock: This strategy models energy savings due to smaller footprint of multifamily homes.
% single family construction replaced as multifamily
✔0% 20% 40% 60% 80% 100%
Reduce residential floor area: This strategy models energy savings due to reduced floor area. Business as usual is a 5% increase in floor area.
% increase in floor area
✔0% 5% 10% 15%
Retrofit existing commercial buildings: This strategy assumes retrofitted commerical builings use 25% less energy.
% commercial buildings retrofitted
✔0% 20% 40% 60% 80% 100%
Smart grid electrification: This strategy assumes technologies can reduce non-residential building electricity use by 11%.
% industrial buildings using smart grid
✔0% 20% 40% 60% 80% 100%
Total emissions (tonnes CO2)
4M
3M
2M
1M
0
2018
2040
Business as usual
Scenario
Module
Strategy
Value
2020 impact (tonnes CO2)
Building energy | Retrofit existing homes | 40%
Building energy | Energy efficient new-build homes | 60%
Building energy | Reduce residential floor area | 0%
Building energy | Clean electricity | 80%
Building energy | Total module reduction | - | -815,760
Transportation | Increase BEV market share | 40%
Transportation | Increase public transportation | 40%
Transportation | Total module reduction | - | -43,567

Sustainable Healthy Cities

A National Science Foundation-supported Sustainability Research Network (SRN)

Anu Ramaswami

PRINCETON UNIVERSITY

Kara Kockelman

TEXAS

The University of Texas at Austin

Alireza Khani and Frank Douma

UNIVERSITY OF MINNESOTA

In Partnership With

ICLEI

Local Governments for Sustainability

LEIF

Lifecycle Environmental Impact Footprinting

GHG Mitigation Strategies

Compact Land Use and Planning

Energy Efficient Technology

Conservation and Sustainable Behavior

Clean Energy Supply

Sequestering Carbon

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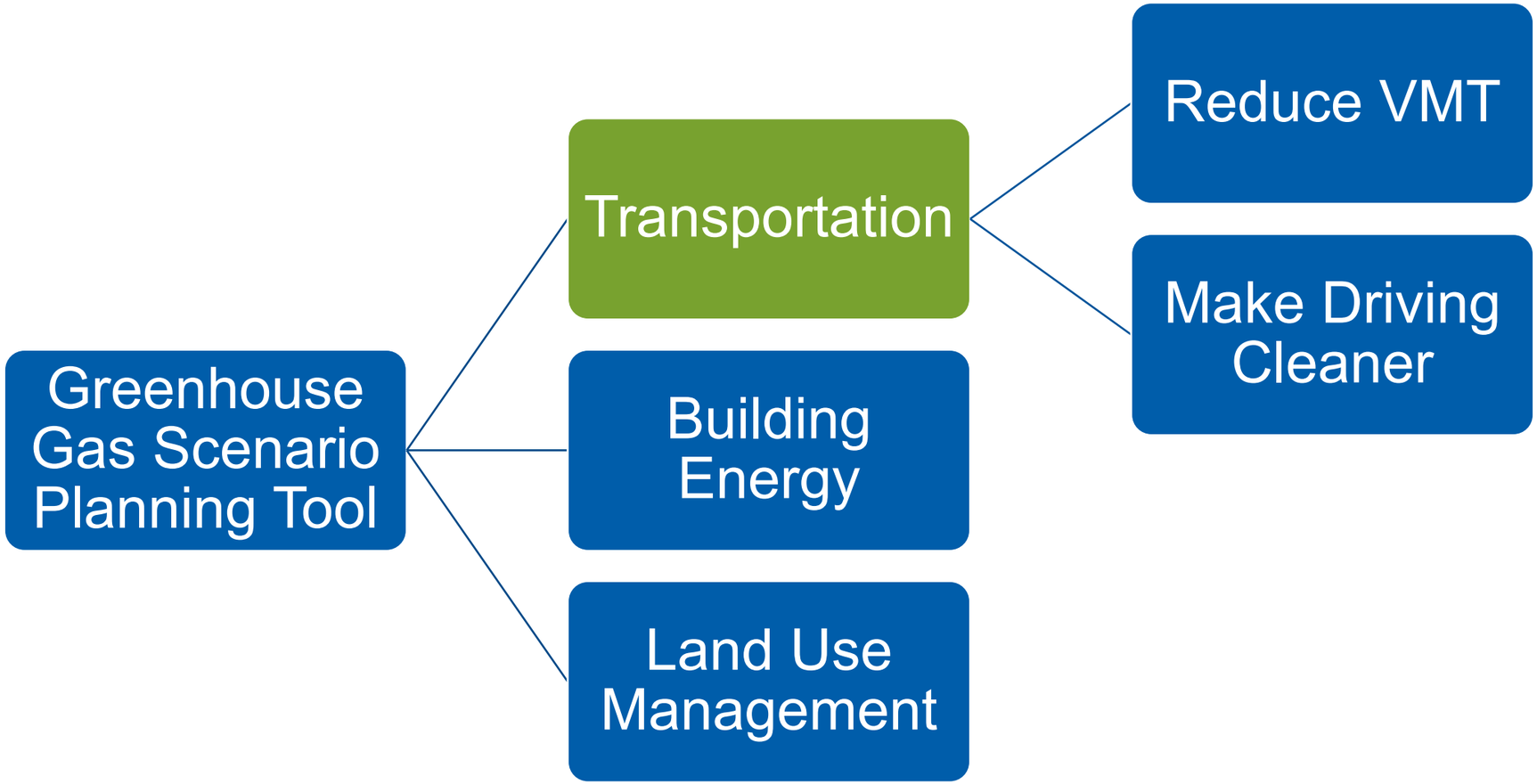
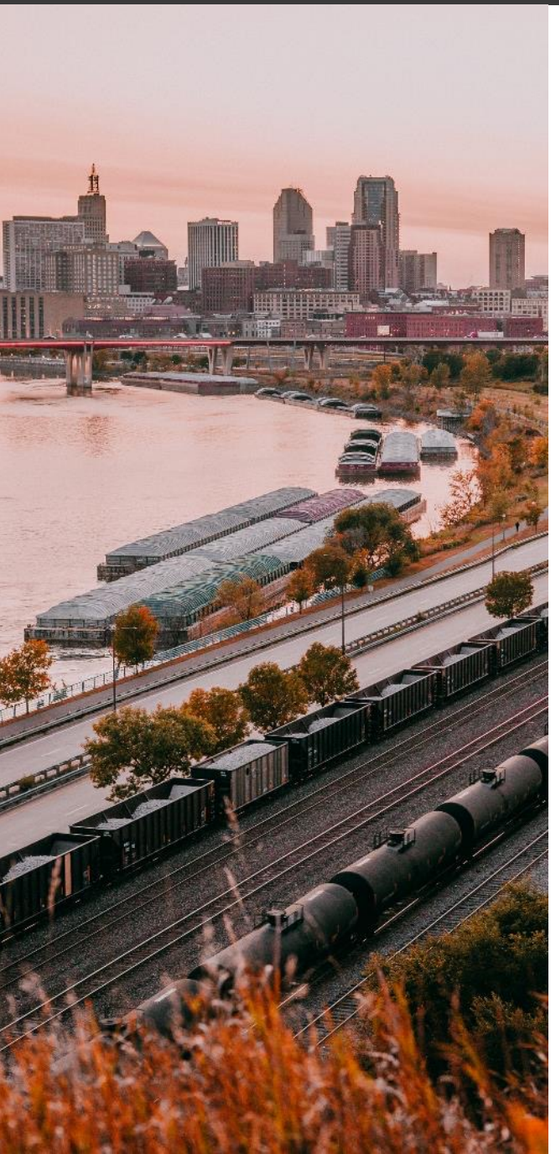

Greenhouse Gas Scenario Planning Tool
Transportation
Building Energy
Land Use Management
Reduce VMT
Make Driving Cleaner

The Greenhouse Gas Scenario Planning Tool



The Greenhouse Gas Scenario Planning Tool

vehicle electrification

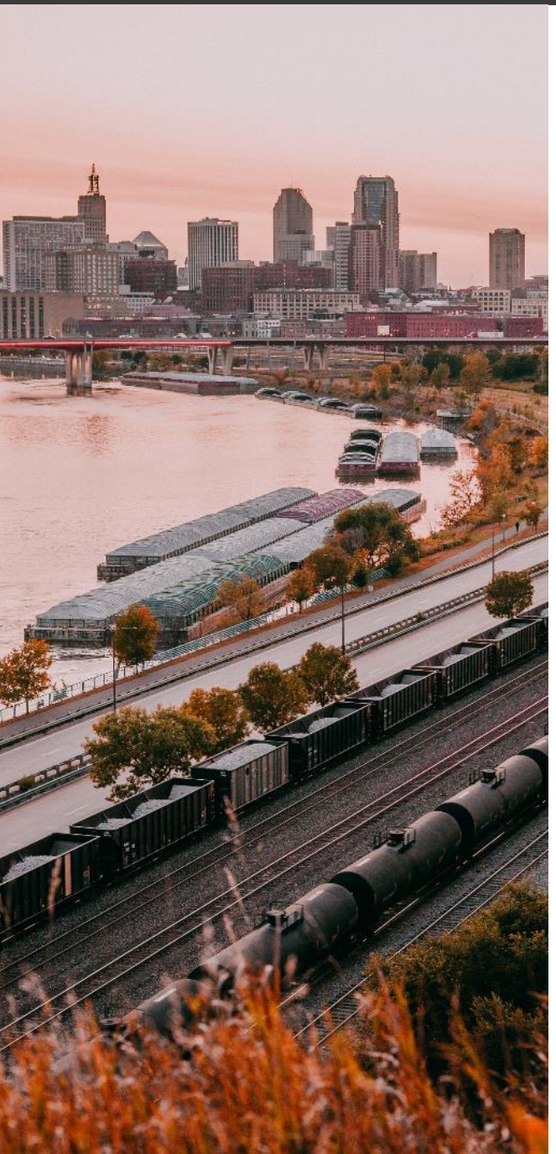
telework

road pricing

compact development

transit

What is Business As Usual?



Travel Forecasting

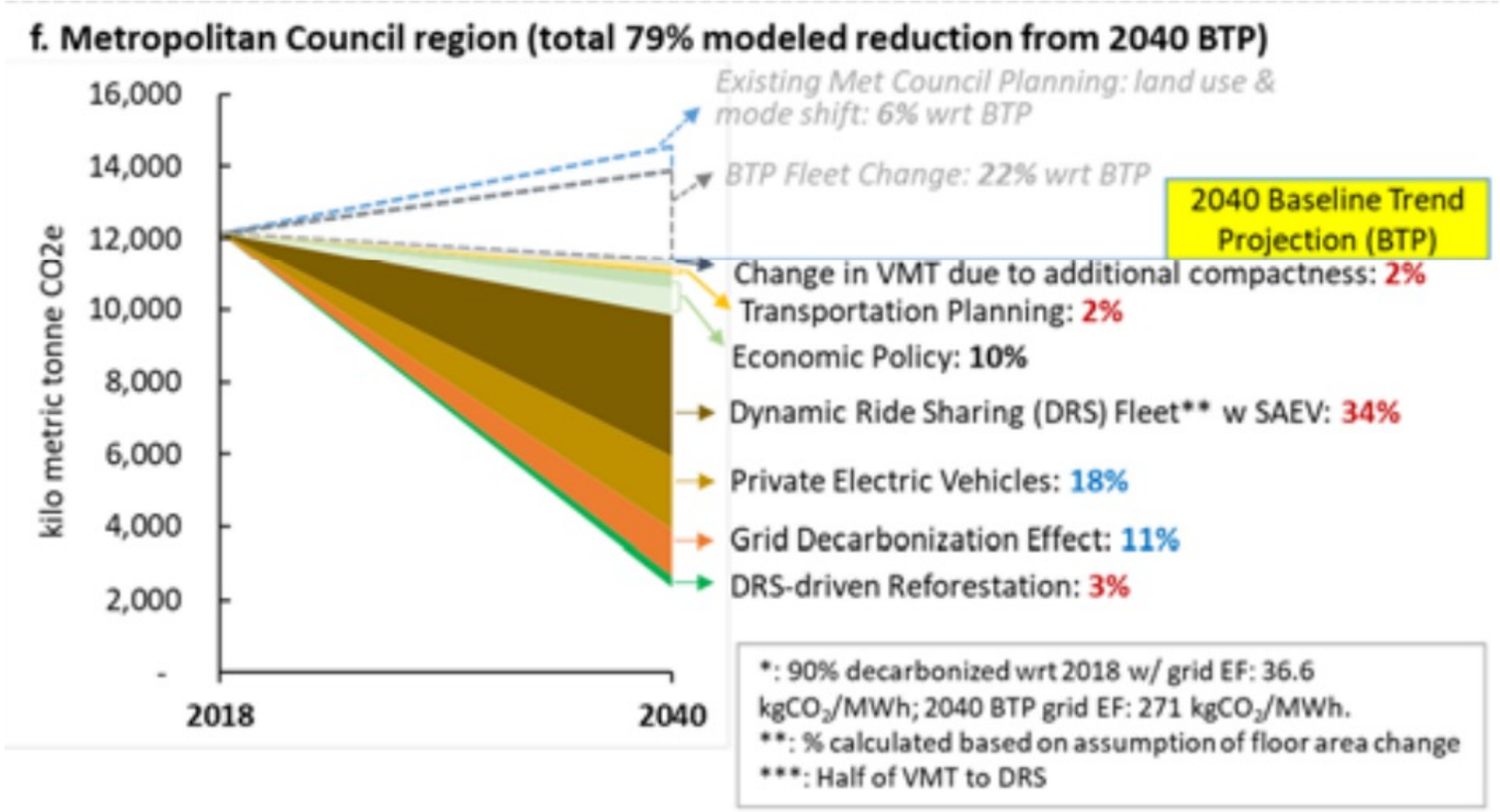
- Travel forecasting is the process of predicting how people will travel in the future. It is used to help decision-makers make informed choices about transportation investments and policies.
- The Met Council maintains a **regional travel demand forecast model**. This model is used to forecast travel for all types of transportation, including cars, buses, trains, and bicycles.
- The model is regularly updated to reflect changes in regional transportation networks, demographics, travel patterns, and best practices.
- The current regional travel demand forecast model is called an **"activity-based model."** This means that it simulates transportation decisions made by individuals, ranging from long-term (e.g., where to live and work) to short-term (e.g., how to get to work).

What is Business As Usual?

GHG Scenario Planning Tool converts transportation demand forecasts to 2040 to GHG emissions based on:

- Existing and forecasted transportation mode shares
- Existing and forecasted technology shares (i.e., gasoline, diesel, hybrid EVs, plug-in hybrid EVs, & battery EV for passenger vehicles)
- Existing and forecasted fuel efficiencies
- Well-to-wheel (W2W) GWP factors per quantity of fuel

Transportation Emissions Results from the Model



Source: Ramaswami et al., manuscript under consideration

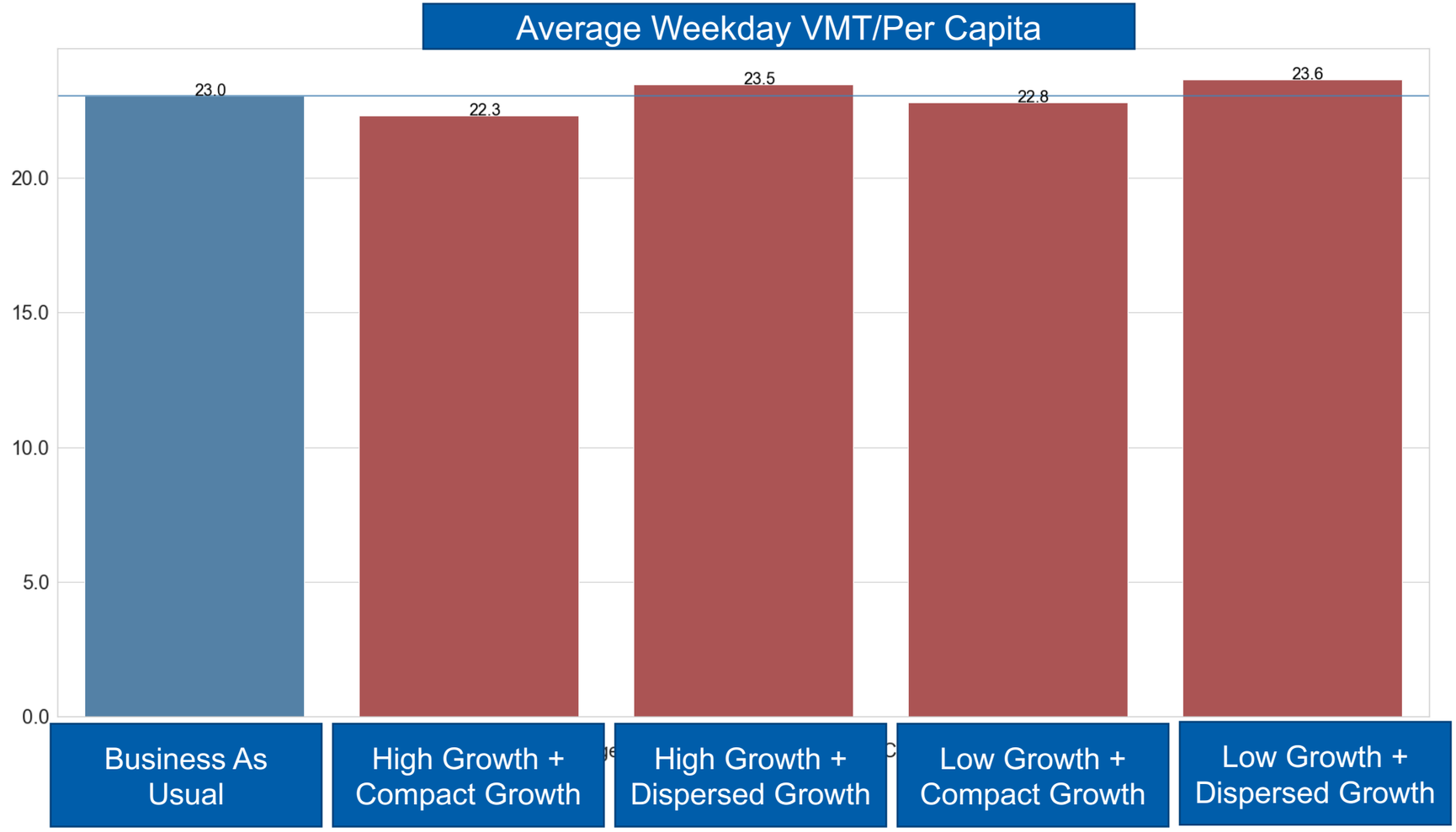
Reducing Vehicle Miles Traveled

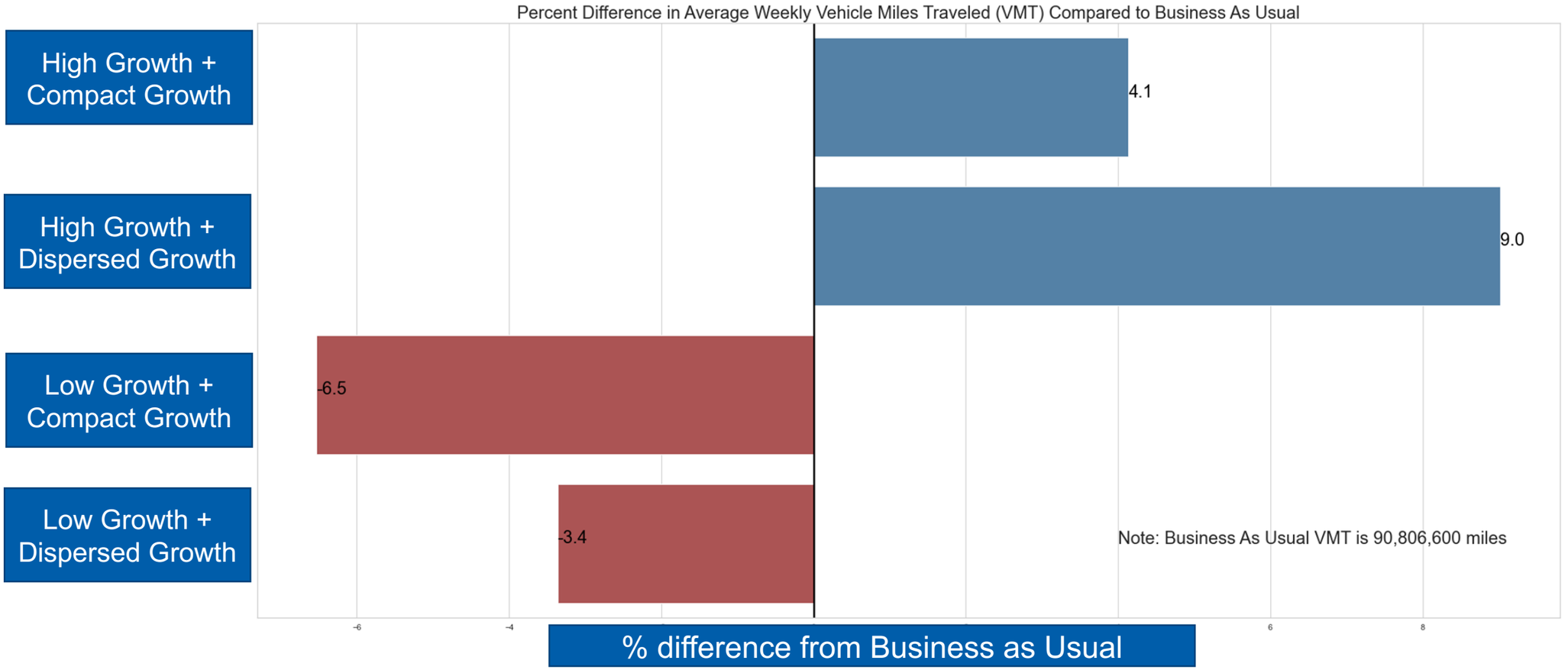
Compact Development

- Compact development can reduce vehicle miles traveled (VMT) and greenhouse gas (GHG) emissions by concentrating residential, business, and recreational areas, which **shortens travel distances** and **promotes walkability and public transit use**, thus **minimizing the reliance on personal vehicles** and the associated emissions.

- ***Examples of Actions***
  - *Multifamily Zoning*
  - *Mixed Development*
  - *Transit Oriented Development*

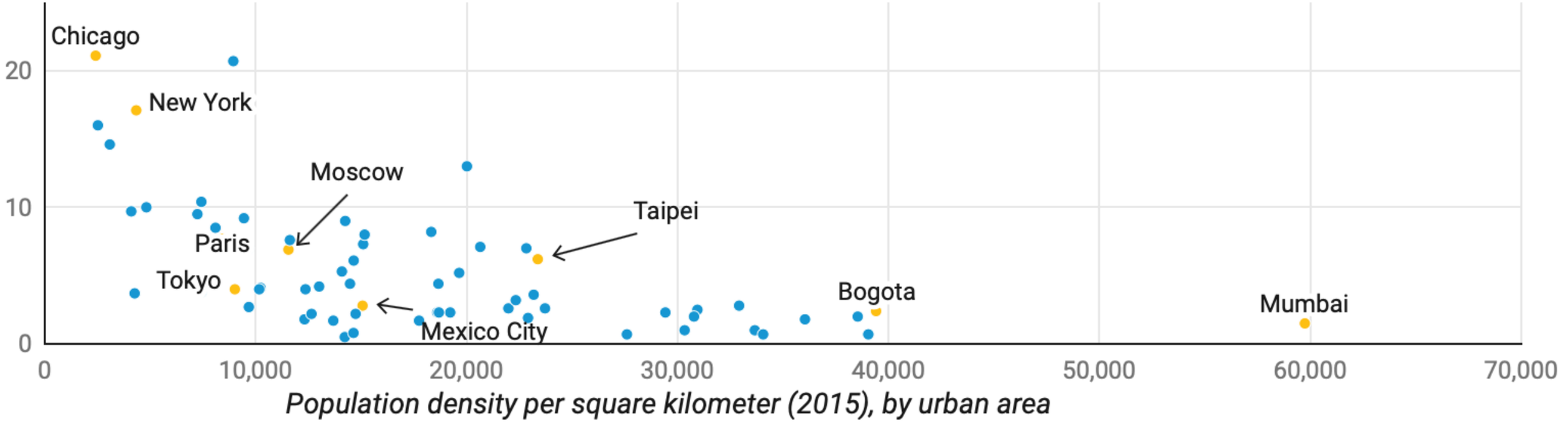
Urban Development Scenarios




Percent Difference in Average Weekly Vehicle Miles Traveled (VMT) Compared to Business As Usual
High Growth + Compact Growth
High Growth + Dispersed Growth
Low Growth + Compact Growth
Low Growth + Dispersed Growth
4.1
9.0
-6.5
-3.4
Note: Business As Usual VMT is 90,806,600 miles
-6
-4
6
8
% difference from Business as Usual

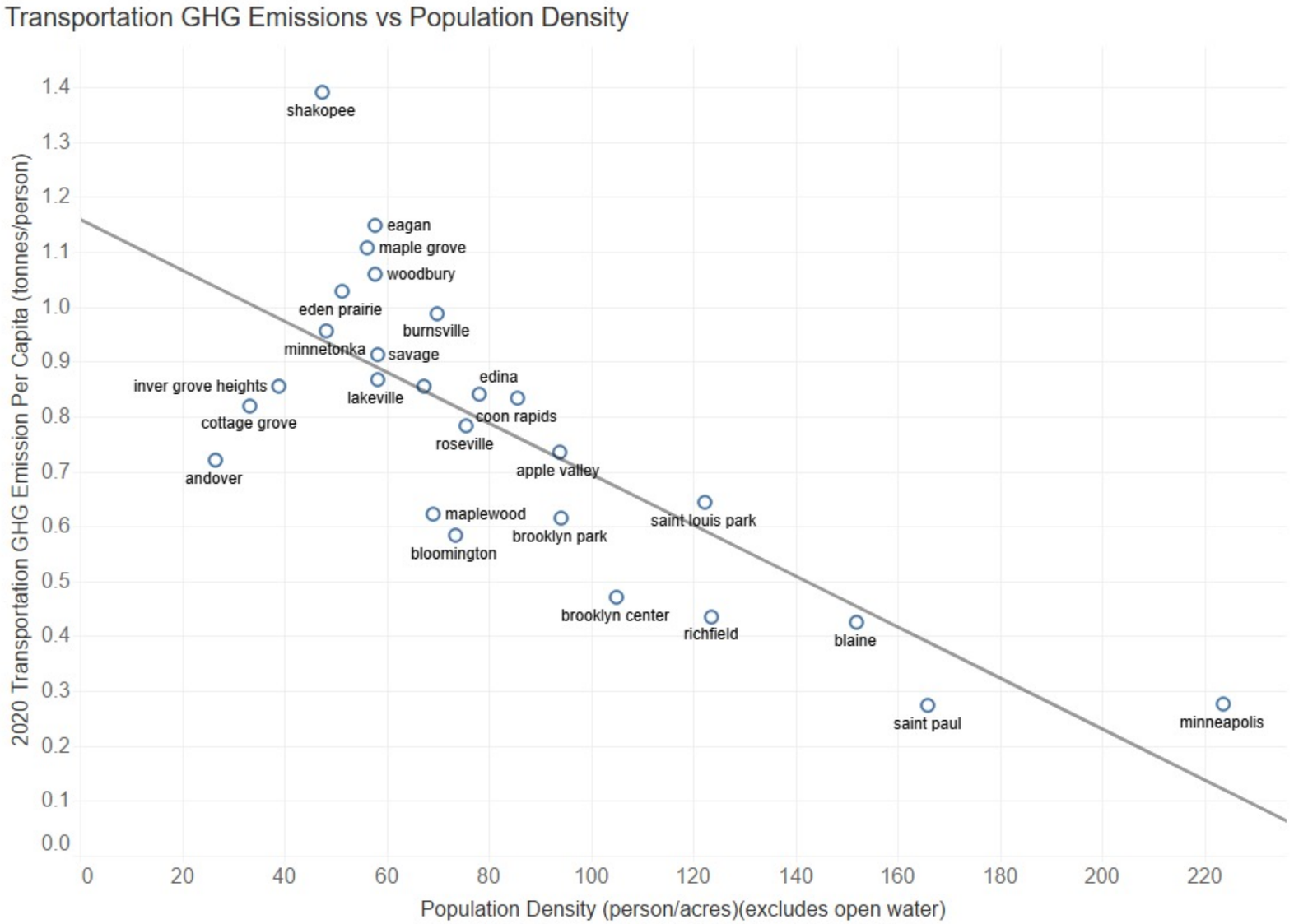
Carbon Emissions Per Capita Are Much Lower in Urban Areas with Higher Population Density

Annual carbon emissions per capita, in tons (2013)



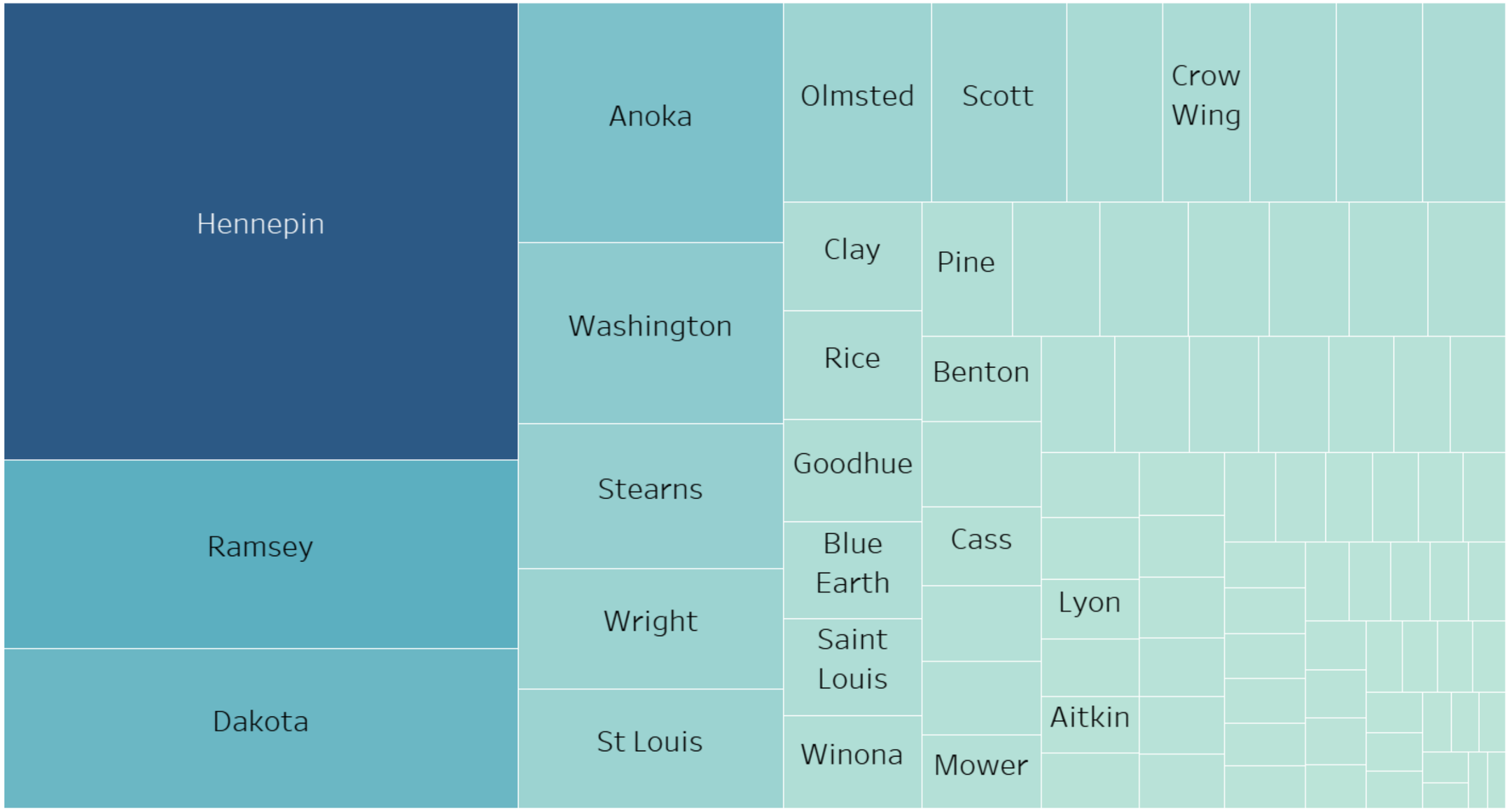
Note: *Includes all urban areas in database with populations of 5 million or more, except the Hong Kong special administrative region and the country of Singapore.*

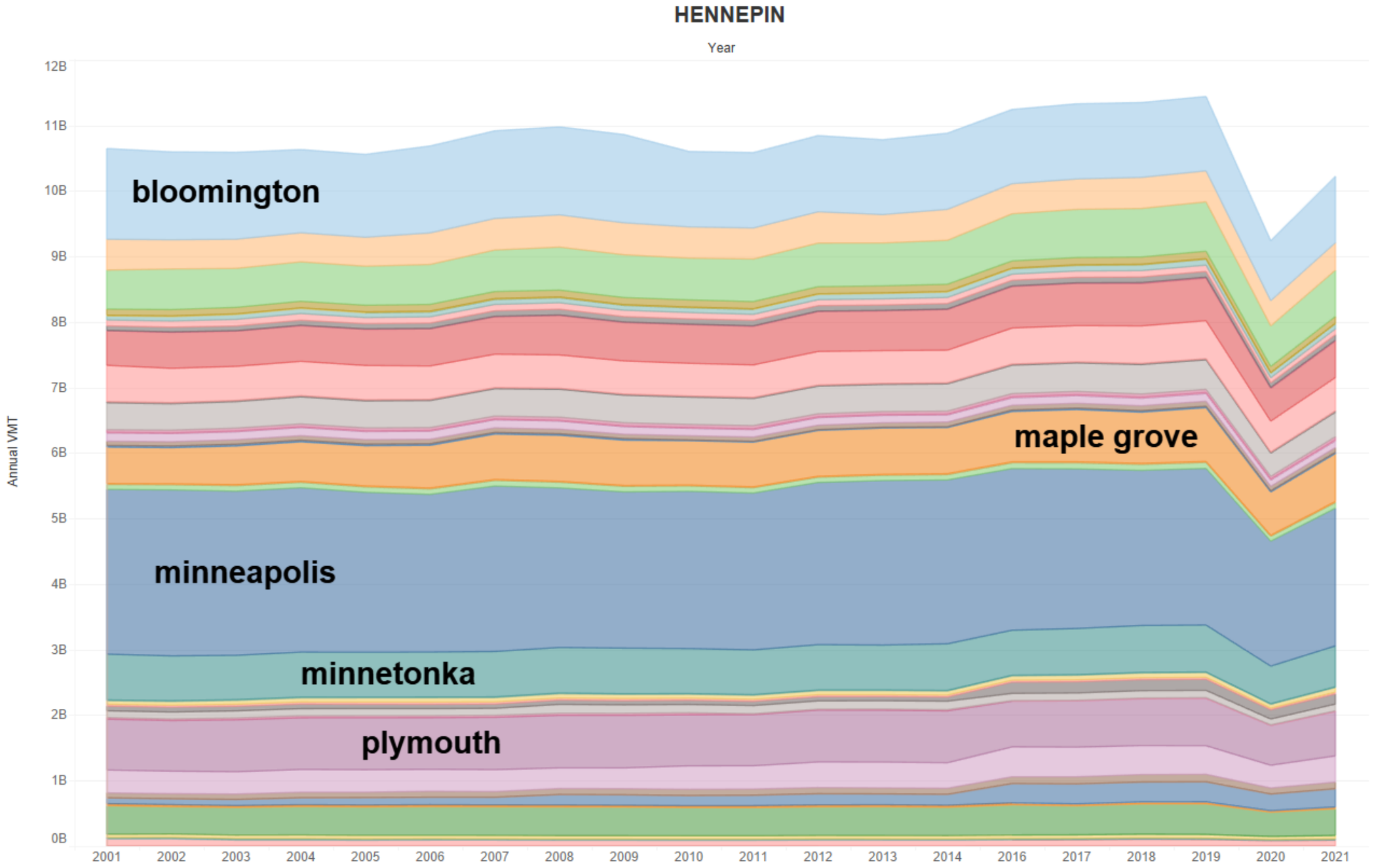
Chart: Urban Institute • Source: Author's analysis using data from Daniel Moran et al., "Carbon Footprints of 13,000 Cities," *Environmental Research Letters* 13, no. 6 (June 2018) and A. Florczyk et al., "GHS Urban Centre Database 2015," multitemporal and multidimensional attributes, R2019A (European Commission: 2019). • Get the data • Created with Datawrapper



Sources
Transportation emissions data from Google Environmental Insights Explorer
Land use and population data from the Metropolitan Council
Post not affiliated to any organization

Cumulative Vehicle Miles Traveled by County




HENNEPIN
Year
Annual VMT
12B
11B
10B
9B
8B
7B
6B
5B
4B
3B
2B
1B
0B
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2016
2017
2018
2019
2020
2021
bloomington
maple grove
minneapolis
minnetonka
plymouth

Reducing Vehicle Miles Traveled

Telework

- Telework reduces vehicle miles traveled (VMT) and greenhouse gas (GHG) emissions by eliminating commute trips, thus decreasing the use of fuel and subsequently reducing the release of harmful emissions into the atmosphere.

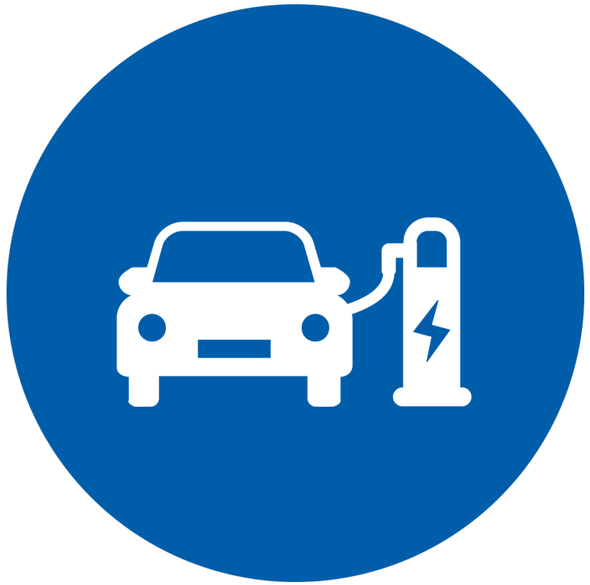
Reducing Vehicle Miles Traveled

Road Pricing

- By implementing road pricing, governments can effectively discourage excessive private vehicle usage, thereby reducing the total vehicle miles traveled (VMT) and subsequently lowering greenhouse gas (GHG) emissions.

- ***Examples of Actions***
  - *Pay-per-Mile Insurance*
  - *VMT Fees*
  - *Gas Taxes*

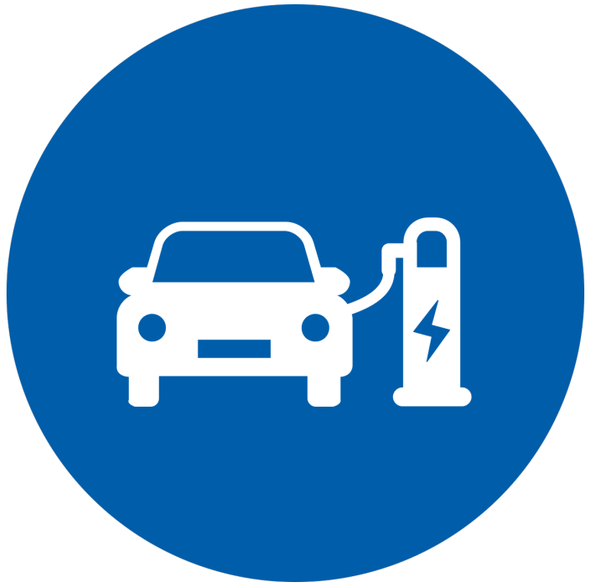
Make Driving Cleaner



Electric Vehicles

- Electric cars can significantly reduce greenhouse gas emissions as they produce no tailpipe emissions and, depending on the source of electricity used for charging, can have substantially lower well-to-wheel emissions compared to conventional internal combustion engine vehicles.

Make Driving Cleaner



New bill

- Minnesota's new climate bill mandates 100% clean energy by 2040, upping the renewable energy requirement to 55% by 2035.
- Utility companies are given "off-ramps" if meeting the targets becomes unfeasible, but also face streamlined permitting processes and pay standards for workers on large-scale projects.
- Despite opposition suggesting the bill would increase costs and reduce reliability, analyses of state-level clean energy standards show improved grid reliability and reduced costs for consumers.

Reducing Vehicle Miles Traveled

Transit

- Transit can reduce vehicle miles traveled (VMT) and greenhouse gas (GHG) emissions by offering efficient public transportation alternatives, which can **decrease the number of private vehicle trips**, leading to lower overall emissions from personal vehicles.

- ***Examples of Actions***
  - *Improve Transit Service*
    - *Frequency*
    - *Coverage*
  - *Increase Transit Ridership*
    - *Fuller Buses*

Improving Transit

Transit

- **Better Bus Route Program:** improves high ridership local routes with simplified alignments, better ADA accessibility, and adequate operator rest times.
- **Bus Lanes and Corridor Improvements Projects:** implement bus lanes and Transit Signal Priority (TSP), reducing dwell times.
- **Bus Rapid Transit** (BRT) lines like the METRO A Line, C Line, and D Line enhance speed and reliability in busy transit corridors.
- **Network Next** envisions the 2040 bus network with new BRT lines, extended service hours, and new routes in underserved areas.
- **Transit Signal Priority** (TSP) aids in reducing bus delays at signalized intersections.
- Metro Transit collaborates with cities and counties on **high-ridership corridors' improvements** including bus lanes, TSP, and bus stop consolidation.
- **Stop consolidation** and **ADA compliance** are focused areas for better bus routes.
- Waiting experiences are enhanced with **increased shelter availability** and transit information.

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