Regional Transportation and Climate Change Multimodal Measures

Transportation Advisory Board

METROPOLITAN COUNCIL

March 2025 | Tony Fischer

Project Overview

- *To improve and develop methodologies for evaluating the greenhouse gas (GHG) impacts of transportation projects in the TIP, Regional Solicitation (walking, biking, transit, highways, travel demand management, and electrification) and TPP.*

- *To produce a guide for calculating GHGs in the region at project scales and identify the types of projects with the greatest potential for positive and negative impacts on GHGs.*
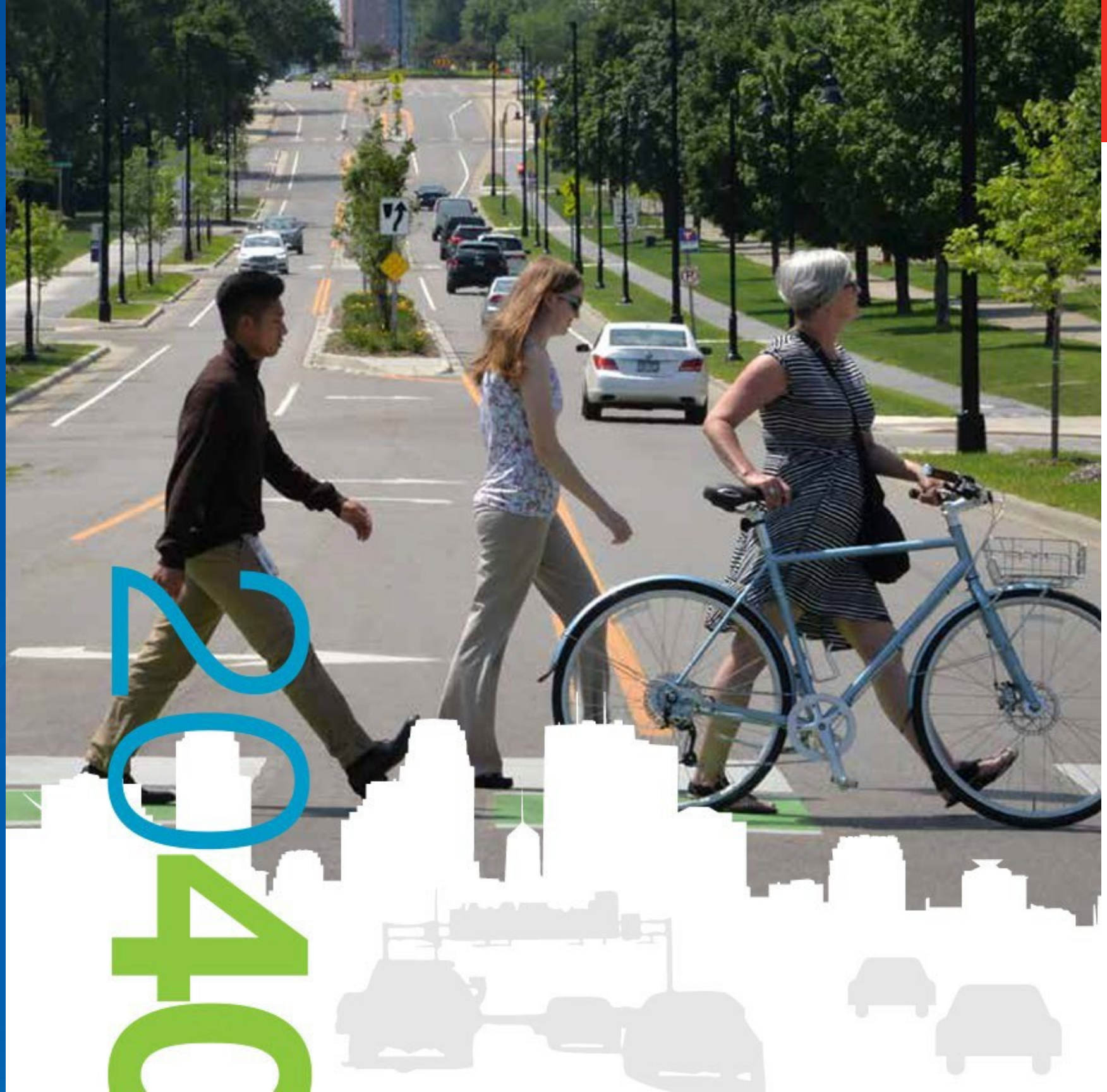
- *In consultation with the MnDOT, MPCA, technical committee, and other stakeholders.*

Project Schedule and Progress

Task 1
Project Management
(Ongoing)

Task 2
Inventory Current
Methods
(Jan 2023 – Apr
2023)

Task 3
Review Best
Practices
(Apr 2023 – Sep
2023)

Task 4
Recommended
Methodologies
(Sep 2023 – May
2024)

Task 5
Review and Update
Inventory
(May 2024 – Sep
2024)

Task 6
Implementation
(May 2024 – Jan
2025)

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Inventory
Current Methods

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Regional Solicitation

Existing Methodologies

- The existing methodologies require a low to moderate level of effort.

- No direct GHG estimates.

- For certain projects, GHG impacts are indirectly assessed with vehicle miles travelled (VMT) reduction estimates:
  - Distance from terminal to terminal and ridership data for transit services
  - Commute trip distances for travel demand management (TDM) projects

- Synchro can provide fuel consumption for roadways projects, an indirect estimate of GHG impacts.

- Traffic speed/congestion effects is an indirect proxy for induced demand but considered in reverse.

Transportation Improvement Program (TIP)

Project Examples

Project Type		Description of Project Type	Grand Total
Appurtenance	Education and Safety	Travel behavior inventory and regional model development	$3,166,000
	Historic Preservation	Study for Rondo Area Street Improvements in St Paul	$1,400,000
	Median Barrier	Cable median barrier installation and resurfacing/repair projects	$12,342,000
Bike/Ped	Bridge Pedestrian	Construction and replacement of pedestrian bridges	$9,746,640
	Coop Const Agreement	Construction of bike facility	$2,670,000
	New Trail	Construct bike/ped trail or bridge	$37,147,057
	Pedestrian Ramps (ADA Improvements)	Construct ped safety improvements, protected bikeways and multiuse trails	$52,945,442
Bridge Replacement or Construction	Bridge New	Construction of bridge	$6,050,000
	Bridge Removal	Removal of bridge	$2,574,064
	Bridge Replacement	Rehabilitation or replacement of bridges, interchanges	$53,755,895

Transportation Policy Plan (TPP)

Existing Methodologies

- The 2040 forecast model was reviewed.

- The regional model takes in the future transportation network, land uses, population and jobs, and is used to forecast future travel demand and estimate performance measures.

- GHG emissions projections come from the regional travel demand model and Motor Vehicle Emission Simulator (MOVES), high level of effort.

- The travel demand model estimates some induced demand; results in approximately half of the effect of online calculators and suggested by research literature

- Construction is not considered when estimating GHG emissions associated with the TPP.

Review Best Practices

Best Practices Review

- California Air Resources Board (CARB):   California Climate Investments Calculator Tools

- California Air Pollution Control Officers Association (CAPCOA): Handbook for Analyzing Greenhouse Gas Emission Reductions

- Federal Highway Administration (FHWA):   CMAQ Emissions Calculator Toolkit

- San Diego Association of Governments (SANDAG):   Mobility Management Toolbox – VMT Reduction Calculator Tool

- Puget Sound Regional Council (PSRC):   Project Level Emissions Estimation Tool

- Minnesota Department of Transportation (MnDOT): Carbon Reduction Strategy

Key Differences in Methodologies

- Tailpipe emissions only **vs.** Tailpipe + upstream (well-to-wheels)

- Before/after activity (ridership, bicyclists, etc.) **vs.** Change in activity calculated using elasticity

- Considers changes in transit vehicle emissions **vs.** Ignores changes in transit vehicle emissions

- Applies mode shift factor (fraction previously SOV) **vs.** Assumes all new riders/cyclists were previously SOV

- Result expressed in tons of GHG emissions **vs.** Result expressed in percent change in GHG emissions

Recommended Methodologies

GHG Quantification Recommendations Key Considerations

- Incorporate key feedback and input from technical meetings:
  - TIP discussions with MnDOT
  - A total of three meetings dedicated to TPP
  - Work groups for Regional Solicitation project categories: Electrification, Transit, Bicycle and Pedestrian, TDM, and Roadways
- Balance effort against precisions and completeness
- Account for vehicle well-to-wheel emissions
- Capture emission benefits and disbenefits throughout the entire project lifetimes
- Apply national best practices with regional-specific input parameters (updated regularly)
- Provide recommendations to collect project-related information for future methodology refinement

TPP and TIP

- TPP
  - Induced demand comparison
  - Update EV forecast integrated into baseline
  - Upstream and lifecycle emissions across all vehicle types/fuels (consistency)
  - Consider construction emissions
- TIP
  - TIP does not include sufficient information for independent GHG estimates.
  - Project sponsors could either submit GHG estimates in line with established guidelines or propose their own methods.
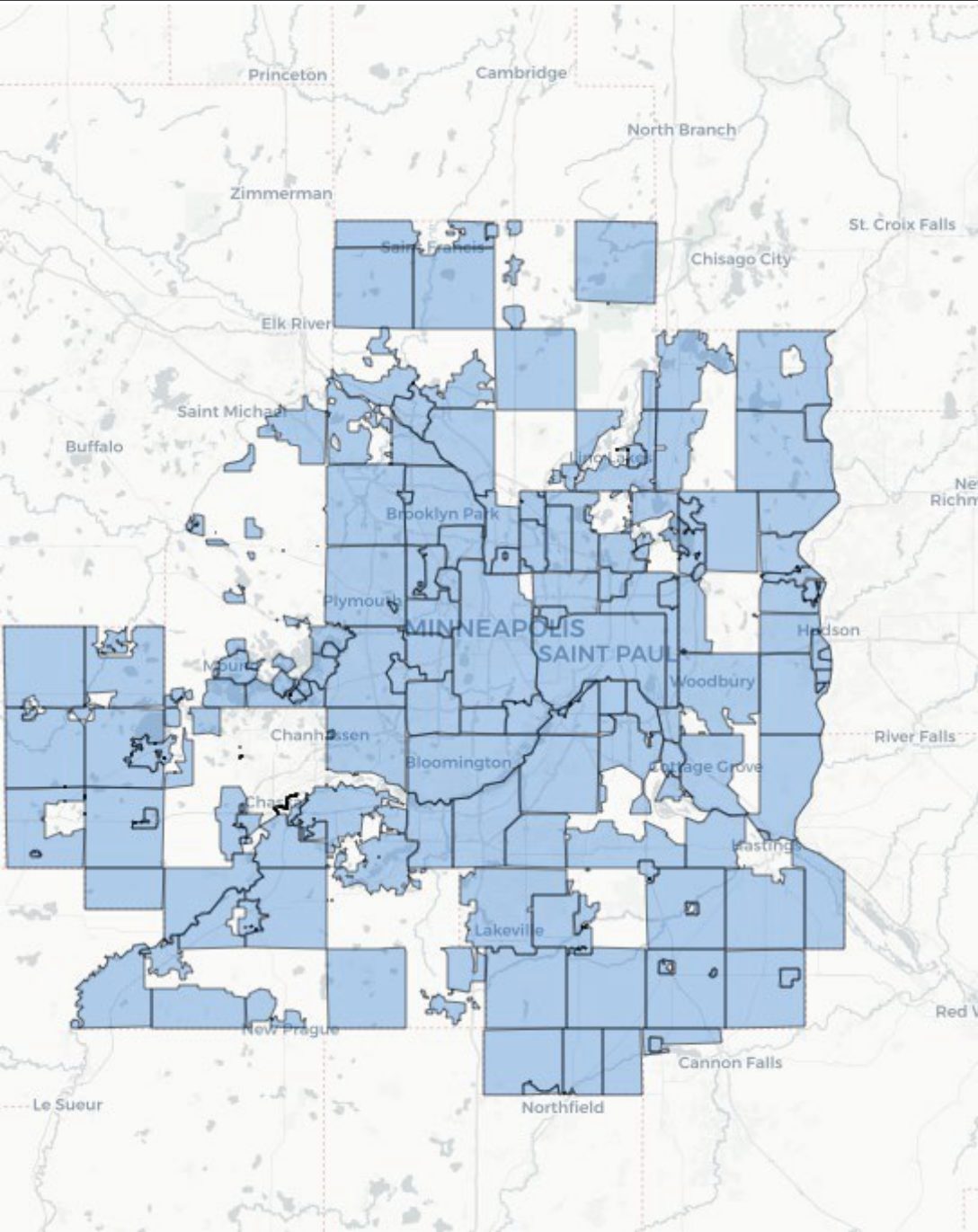 - More discussion needed.

Implementation

R-Based Transportation GHG Tool

Map-Based Tool Features

- An easy map-based tool to input and extract necessary information for project evaluations

- Calculates the residential population within a specified radius

- Enables mapping to community type which assigns the commute distances and other trip attributes

- Incorporates the defined fleet data for each city into our displaced vehicle miles traveled calculations

Currently in the beta testing phase:

https://metcouncilicf.shinyapps.io/transport-emission-shiny/

Next Steps

Regional Solicitation – What's Next?

- Beginning in spring a Regional Solicitation Special Issue Working Group for Climate will be established to dig into this topic area further.
- R-based transportation GHG tool should be utilized and incorporated into the ongoing application process to evaluate projects.
- Some projects lack region-specific data and may require data reporting from funded initiatives to better understand how the current elasticity or methodology applies to local projects:
  - Mobility hubs, EV education and outreach, and the installation of public EV charging infrastructure.
- For roadway projects, considerable discrepancies among Synchro, SimTraffic, and FHWA's CMAQ results. Consider lookup table by project type (e.g., interchange, lane expansion) and scaling parameters (e.g., AADT, level of congestion reduction)
- Construction emissions can be quantified using the Minnesota Infrastructure Carbon Estimator (MICE) tool.

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