DEPARTMENT OF TRANSPORTATION

VisionEval Categories and Levers

The purpose of this document is to clearly understand what levers can be adjusted to reduce emissions levels in Minnesota. Each lever falls into a specific category: Transportation options, land use, electrification & fuels, or other levers.

Each section focuses on a category of levers. Each subsection identifies a lever with a subsequent description and five bullet points. The bullet points cover what geography changes can be modeled at, the influence on the scenario or policy, the type of value needed to input, the range of value needed for an input, and the work needed to prepare prior to inputting data for the lever.

Geography definitions

- Statewide: values only available at a statewide level (e.g., one value)
- MPO: values available for the eight MPO's urbanized areas and Greater Minnesota (e.g., nine values total)
- County: values available for each of the 87 Minnesota counties

Value definitions

- Continuous value of number
- Percentage value with a range of 0-100%

Levers and influence continuum
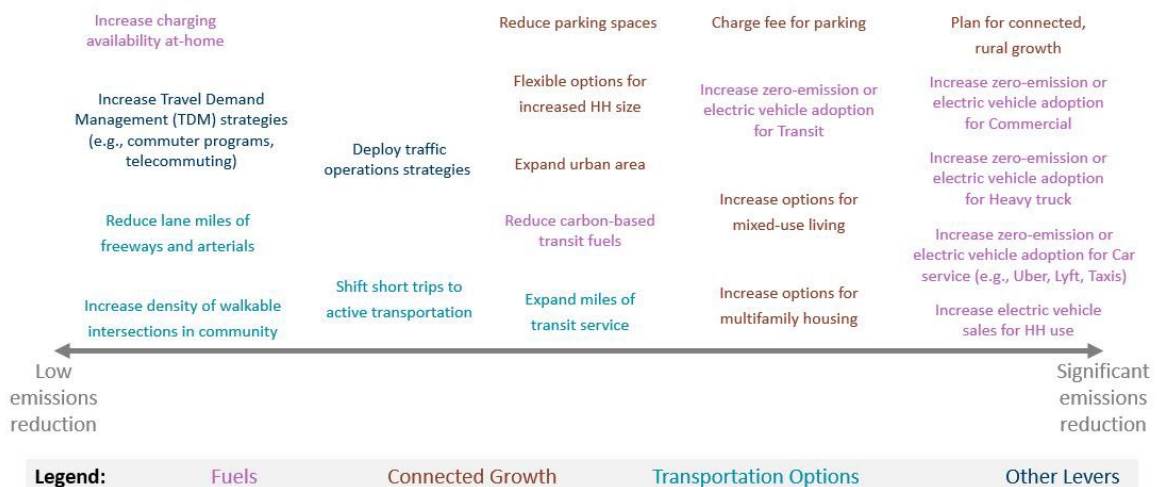
Transportation Options

Transportation options covers transit service, mode shift, walkable intersection density and lane miles. Each of these levers lead to a potential increased use of non-single occupancy vehicles.

Expand miles of transit service

The vehicle revenue miles of transit service by mode in a MPO/Greater MN.

- Geography: MPO
- Influence on scenario or policy: Adjust to simulate a change to frequency or the addition of service
- Type of value: Number (revenue miles)
- Range of values: Continuous
- Pre-work needed: Estimate revenue miles after improvements to transit service (i.e., transit network expanded, etc.)

Shift short trips to active transportation

Vehicle miles traveled that are or could be shifted to another active transportation mode due to their shortness and purpose.

- Geography: County Level
- Influence on scenario or policy: Adjust to model policies that incentivize walking/bicycling or make walking/bicycling easier
- Type of value: percentage
- Range of values: 0%-100%
- Pre-work needed: Estimate shift of small trips from SOV to active transportation modes (i.e., build-out bicycle/pedestrian network, incentives, condition improvements/maintenance plans, etc.)

Increase density of walkable intersections in community

The density of intersections with a 4-leg crosswalk and other safety/comfort additions (curb ramps, pedestrian signals, etc.).

- Geography: MPO Level
- Influence on scenario or policy: Adjust to increase active transportation infrastructure
- Type of value: weight
- Range of values: 0%-100%
- Pre-work needed: estimate of intersection improvements for ADA/active transportation purposes

Reduce lane miles of freeways and arterials

Number of lane miles for freeways and arterials.

- Geography: MPO Level
- Influence on scenario or policy: Adjust for future years to model capacity expansion or lane removal policies
- Type of value: number
- Range of value: continuous
- Pre-work needed: estimates of future lane miles added/reduced

Land Use

Land use covers parking space reductions, pay parking, mixed use portion of a neighborhood, household size, group quarters, urban area and rural activity. These levers lead to land use changes that support a reduction of per capita vehicle miles traveled.

Reduce parking spaces

Count of parking spaces available to each household

- Geography: MPO Level
- Influence on scenario or policy: Adjust to model the elimination of parking minimums/parking land use changes
- Type of value: number
- Range of value: continuous
- Pre-work needed: Optional parking space counts, though defaults have been proven to be effective for this input

Charge fee for parking

Pay parking characteristics for both cost of parking and number of spaces where pay-parking exists.

- Geography: MPO Level
- Influence on scenario or policy: Adjust to include the addition of paid parking in locations where it does not currently exist and increased parking costs
- Type of value: Number for cost of parking; percentage for pay parking frequency
- Range of value: continuous cost for cost of parking; 0%-100% for pay parking percentage
- Pre-work needed: Parking charge data

Increase options for mixed-use living

The percentage of families that live in a mixed use neighborhood.

- Geography: MPO Level
- Influence on scenario or policy: Adjust to model mixed use policies
- Type of value: percentage

- Range of value: 0%-100%
- Pre-work needed: inputs of mixed use share goals, if possible

Flexible options for increased household size

Average number of people living in a household.

- Geography: County Level
- Influence on scenario or policy: Adjust to model the addition of accessory dwelling units and other living conditions
- Type of value: number
- Range of value: Continuous
- Pre-work needed: None, unless a local partner would have a "goal" value for this

Increase options for multifamily housing

The number of people living in dormitories, military bases, group homes and sometimes apartment buildings.

- Geography: County Level
- Influence on scenario or policy: Adjust to model the addition of multifamily living arrangements
- Type of value: number
- Range of value: continuous
- Pre-work needed: None, unless a local partner would have a "goal" value for this

Expand the Urban Area

The percentage of the area of a county that is urbanized.

- Geography: County level
- Influence on scenario or policy: Adjust to model further urbanization of an already urbanized area
- Type of value: percentage
- Range of values: 0%-100%
- Pre-work needed: Goals for future urbanization percentages for MPOs could be implement, if available

Plan for connected rural growth

The number of jobs, households, and employers per acre of rural land.

- Geography: County Level
- Influence on scenario or policy: Adjust to model the addition of connected growth policies in rural areas (i.e. less restrictive zoning, etc.)
- Type of value: number
- Range of values: continuous
- Pre-work needed: none, unless policies for rural areas exist

Electrification & Fuels

Electrification covers transit fuels, transit power train, car service power trail, heavy truck power train, commercial service power train, charging availability, vehicle age, household vehicle sales and transit fuel carbon intensity. Each of these levers influence the adoption rate and shift to zero emission vehicles.

Reduce carbon-based transit fuels

The percentage of vehicles, by vehicle type, that use gasoline, diesel and combined natural gas (CNG) fuel.

- Geography: MPO Level
- Influence on scenario or policy: Adjust to model a shift to "cleaner", less carbon intensive fuels
- Type of value: percentage
- Range of values: 0%-100%
- Pre-work needed: updated numbers or projections, if available

Increase zero emission or electric vehicle adoption of transit vehicles

The percentages of vehicles, by mode, that use electric, hybrid or combustion engine powertrains.

- Geography: MPO Level
- Influence on scenario or policy: Adjust to model hybrid/electric fleet transition approaches
- Range of values: 0%-100%
- Type of value: percentage
- Pre-work needed: updated numbers or projections, if available

Increase zero emission or electric vehicle adoption of car service vehicles

The percentage of car service vehicles (Ubers and taxies, for example) that are plugin hybrid, hybrid, battery electric or combustion engine.

- Geography: Statewide (Only one set of values for the whole state)
- Influence on scenario or policy: Adjust to model implementing EV requirements for these services
- Type of value: percentage
- Range of values: 0%-100%
- Pre-work needed: updated numbers or projections, if available

Increase zero emission or electric vehicle adoption of heavy truck vehicles

The percentage of heavy freight vehicles that are plugin hybrid, hybrid, battery electric or combustion engine.

- Geography: Statewide (Only one set of values for the whole state)
- Influence on scenario or policy: Can be changed to model implementing EV requirements for heavy trucks

- Type of value: percentage
- Range of values: 0%-100%
- Pre-work needed: updated numbers or projections, if available

Increase zero emission or electric vehicle adoption of commercial service vehicles

The percentage of light duty commercial service vehicles that are plugin hybrid, hybrid, battery electric or combustion engine.

- Geography: Statewide (Only one set of values for the whole state)
- Influence on scenario or policy: Adjust to model implementing EV requirements for light duty commercial vehicles
- Type of value: percentage
- Range of values: 0%-100%
- Pre-work needed: updated numbers or projections, if available

Increase charging availability at-home

The percentage of homes with a wall port capable of charging an electric vehicle, broken down by single family, multi family, or group quarter households.

- Geography: County Level
- Influence on scenario or policy: Adjust to model increase of charging infrastructure for group quarter or multifamily homes
- Type of value: percentage
- Range of values: 0%-100%
- Pre-work needed: None

Increase electric vehicle sales for household use

Contains projections for future market share of electric vehicles (i.e., how many new vehicles are registered).

- Geography: Statewide (Only one set of values for the whole state)
- Influence on scenario or policy: Adjust to model different aggressiveness of EV transition
- Type of value: percentage
- Range of values: 0%-100%
- Pre-work needed: None, unless updated numbers are released

Other Levers

NOTE: Inputs in this section have not been modeled in a scenario but could be to test policies not highlighted in the current categories used for the modeling scenario process.

Other potential strategies include fuel and power cost, vehicle ownership taxes, pay-as-you-drive (PAYD) insurance, vehicle use taxes, congestion charges, operations deployment, travel demand management (TDM) and fuel carbon intensity. Levers with asterisks require decisions to be made at a state-level, not just at local city or county agencies.

Deploy traffic operations strategies

Contains the proportion of DVMT by functional class affected by the deployment of measures such as ramp metering, access management, signal coordination or other operations changes.

- Geography: MPO Level
- Influence on scenario or policy: Adjust to model the implementation of these measures
- Type of value: Percentage
- Range of values: 0%-100%
- Pre-work needed: future conversations on feasibility and limitations of more operations deployment measures

Increase Travel Demand Management (TDM) strategies (e.g., commuter programs, telecommuting)

Contains the percentage of workers or households that participate in employee commute options or individualized marketing programs.

- Geography: MPO Level
- Influence on scenario or policy: Adjust to model the implementation of TDM programs
- Type of value: Percentage
- Range of values: 0%-100%
- Pre-work needed: future conversations on feasibility and limitations of more employer based or individualized marketing travel demand management programs

Increase prices of fuel and power*

Retail cost of fuel per gas gallon in dollars or for electric power per kilowatt-hour in dollars.

- Geography: County Level
- Influence on scenario or policy: Adjust to model changes to prices
- Type of value: number
- Range of values: continuous
- Pre-work needed: None for present day; may be useful to get updated projected fuel cost numbers but these numbers are quite elastic to other factors and fluid

Implement vehicle ownership taxes*

Flat rate for vehicle ownership as well as a proportion of vehicle cost paid in taxes, depending on tax system.

- Geography: County Level
- Influence on scenario or policy: Adjust to model changes to ownership taxes Type of value: number
- Type of value: number for ownership costs; percentage for vehicle cost paid in taxes
- Range of values: continuous for vehicle ownership costs; 0%-100% for vehicle cost paid in taxes
- Pre-work needed: None for present day; may be useful to get updated tax numbers if available

Implement vehicle use taxes*

Tax per gas gallon of fuel in dollars AND tax per mile of vehicle travel in dollars for household vehicles.

- Geography: County Level
- Influence on scenario or policy: Adjust to model different tax policies, such as changes to the gas tax
- Type of value: number
- Range of values: continuous
- Pre-work needed: Future conversations on feasibility and limitations of gas tax changes and road mileage costs

Increase Pay-as-You-Drive (PAYD) Insurance*

Proportion of households that have pay-as-you-drive insurance for their vehicles.

- Geography: County Level
- Influence on scenario or policy: Adjust to model PAYD implementation
- Type of value: Percentage
- Range of values: 0%-100%
- Pre-work needed: Future conversations on feasibility and limitations if more PAYD is implemented

Charge per mile of vehicle travel (e.g., congestion charges)*

Charge per mile of vehicle travel by functional class and by congestion level (no congestion to extreme congestion).

- Geography: MPO Level
- Influence on scenario or policy: Adjust to model congestion pricing policies
- Type of value: number
- Range of values: continuous
- Pre-work needed: Future conversations on feasibility and limitations of congestion charging policies

Reduce fuel carbon intensity (e.g., clean fuels standard)*

Contains the average carbon intensity by grams CO_2e per megajoule of average vehicles used.

- Geography: Statewide (Only one set of values for the whole state)
- Influence on scenario or policy: Adjust to model policies that reduce fuel intensity

- Type of value: number
- Range of values: continuous
- Pre-work needed: Future conversations on feasibility and limitations of policies that reduce carbon intensity

GHG Target Setting Activity | Lever priorities

Below are the levers that we can pull on in the VisionEval model. Each of these levers have different inputs that can vary based on numeric or percentage values.
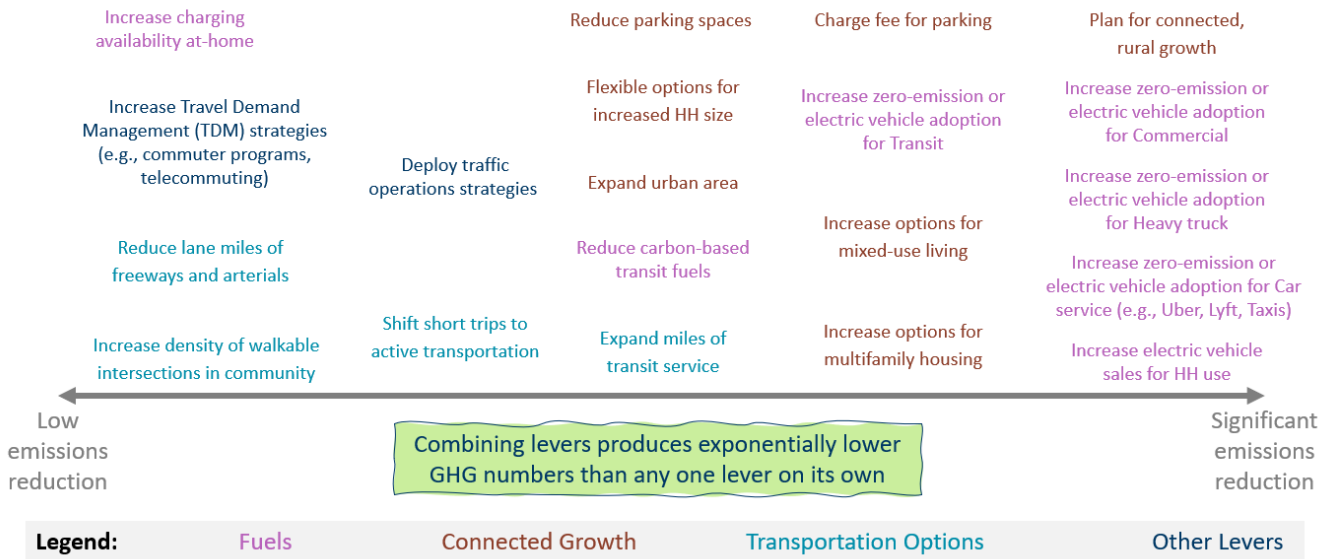
- Transportation Options
    - Expand miles of transit service
    - Shift short trips to active transportation
    - Increase density of walkable intersections in community
    - Reduce lane miles of freeways and arterials
- Land use
    - Reduce parking spaces
    - Charge fee for parking
    - Increase options for mixed-use living
    - Flexible options for increased HH size
    - Increase options for multifamily housing
    - Expand urban area
    - Plan for connected rural growth

- Fuels
    - Reduce carbon-based transit fuels
    - Increase zero-emission or electric vehicle adoption:
        - Transit
        - Car service
        - Heavy truck
        - Commercial service
    - Increase charging availability at-home
    - Increase electric vehicle sales for HH use
- Other strategies
    - Deploy traffic operations strategies
    - Increase Travel Demand Management (TDM) strategies (e.g., commuter programs, telecommuting)
    - Increase prices of fuel and power*
    - Implement vehicle ownership taxes*
    - Implement vehicle use taxes*
    - Increase pay-as-you-drive (PAYD) insurance*
    - Charge per mile of vehicle travel (congestion charges)*
    - Reduce fuel carbon intensity*

VisionEval model levers that are impacted by local and regional decision-making

- **Transportation Options**
  - Expand miles of transit service
  - Shift short trips to active transportation
  - Increase density of walkable intersections in community
  - Reduce lane miles of freeways and arterials

- **Land use**
  - Reduce parking spaces
  - Charge fee for parking
  - Increase options for mixed-use living
  - Flexible options for increased HH size
  - Increase options for multifamily housing
  - Expand urban area
  - Plan for connected rural growth

- **Fuels**
  - Reduce carbon-based transit fuels
  - Increase zero-emission or electric vehicle adoption:
    - Transit
    - Car service
    - Heavy truck
    - Commercial service
  - Increase charging availability at-home
  - Increase electric vehicle sales for HH use

- **Other strategies**
  - Deploy traffic operations strategies
  - Increase Travel Demand Management (TDM) strategies (e.g., commuter programs, telecommuting)

> Levers are able to be impacted by local and regional decision-making.

Continuum of Influence

Increase charging availability at-home

Increase Travel Demand Management (TDM) strategies (e.g., commuter programs, telecommuting)

Reduce lane miles of freeways and arterials

Increase density of walkable intersections in community

Deploy traffic operations strategies

Shift short trips to active transportation

Reduce parking spaces

Flexible options for increased HH size

Expand urban area

Reduce carbon-based transit fuels

Expand miles of transit service

Charge fee for parking

Increase zero-emission or electric vehicle adoption for Transit

Increase options for mixed-use living

Increase options for multifamily housing

Plan for connected, rural growth

Increase zero-emission or electric vehicle adoption for Commercial

Increase zero-emission or electric vehicle adoption for Heavy truck

Increase zero-emission or electric vehicle adoption for Car service (e.g., Uber, Lyft, Taxis)

Increase electric vehicle sales for HH use

Low emissions reduction → Significant emissions reduction

> Combining levers produces exponentially lower GHG numbers than any one lever on its own

Legend: Fuels | Connected Growth | Transportation Options | Other Levers

When you look at these levers…

- *Which do you feel are the easiest to increase and advance?*
- *Which do you feel is the hardest to advance?*
- *Which do you feel will reduce the most greenhouse gas emissions?*
- *Which is the highest priority for your region?*

Step 1: Circle the top 10 priorities for your region based on your understanding of your Policy Board priorities, Technical Committee priorities, and City and County priorities.

1. Expand miles of transit service
2. Shift short trips to active transportation
3. Increase density of walkable intersections in community
4. Reduce lane miles of freeways and arterials
5. Reduce parking spaces
6. Charge fee for parking
7. Increase options for mixed-use living
8. Flexible options for increased household size
9. Increase options for multifamily housing
10. Expand the urban area
11. Plan for connected rural growth
12. Reduce carbon-based transit fuels
13. Increase zero emission or electric vehicle adoption of transit vehicles
14. Increase zero emission or electric vehicle adoption of car service vehicles
15. Increase zero emission or electric vehicle adoption of heavy truck vehicles
16. Increase zero emission or electric vehicle adoption of commercial service vehicles
17. Increase charging availability at-home
18. Increase electric vehicle sales for household use
19. Deploy traffic operations strategies
20. Increase Travel Demand Management (TDM) strategies (e.g., commuter programs, telecommuting)
21. Increase prices of fuel and power*
22. Implement vehicle ownership taxes*
23. Implement vehicle use taxes*
24. Increase Pay-as-You-Drive (PAYD) Insurance*
25. Charge per mile of vehicle travel (e.g., congestion charges)*
26. Reduce fuel carbon intensity (e.g., clean fuels standards)*

*Levers with asterisks require decisions to be made at a state-level, not just at local city or county agencies.

Step 2: Looking only at the priorities you have circled, put an asterisk by the 2-3 priorities that based on your understanding of the regional priorities of your Policy Board, Technical Committees, Cities and Counties, could be advanced more quickly if there was a focus on greenhouse gas emissions reduction in priorities, investments, or projects in the next 10-25 years.