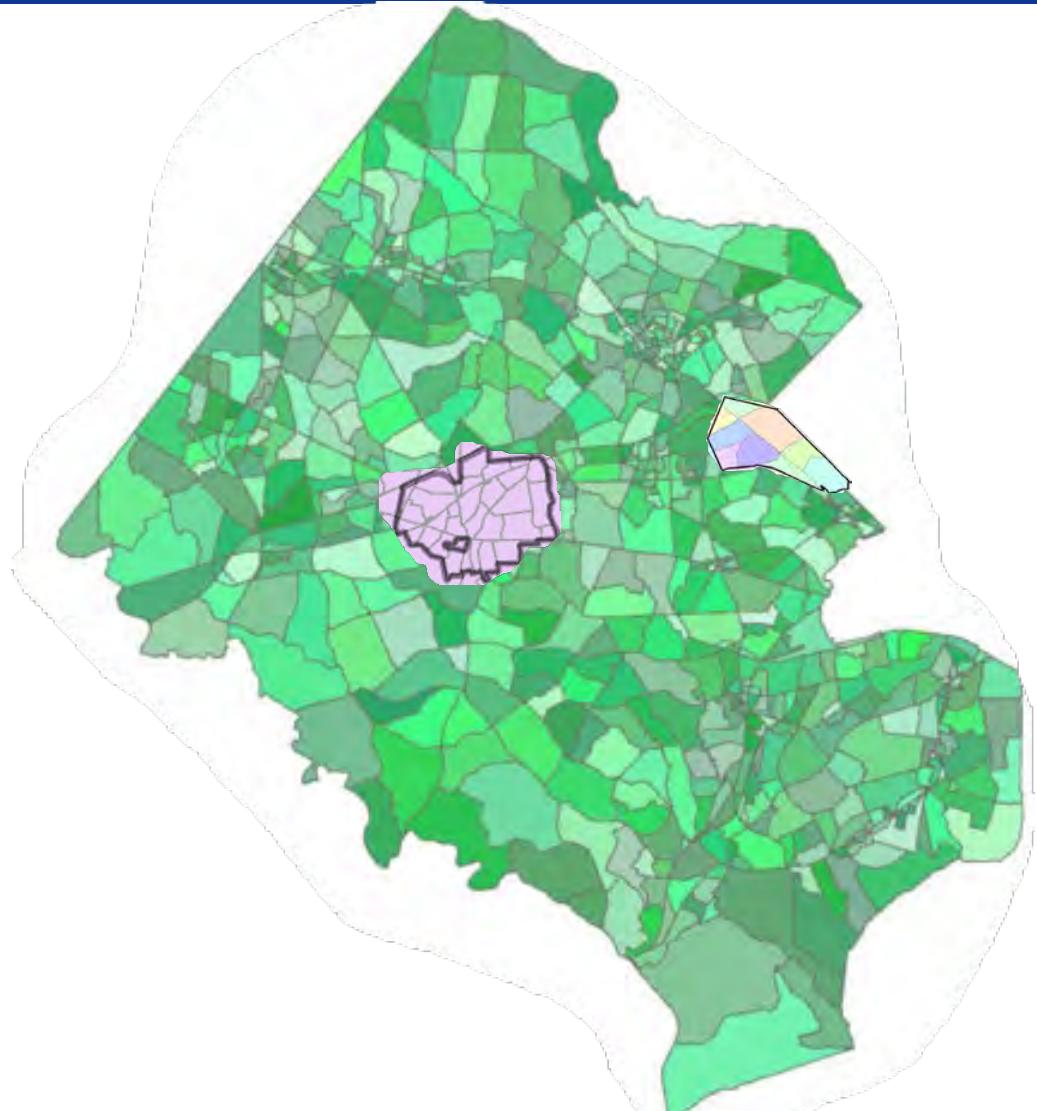




Introducing VisionEval and the new Pooled Fund

5 February 2026

Virginia's Initial Interest in VisionEval (VE)



We Need to Know Quickly...

- How might changes in **forecasts of population** affect demand?
- What about changes in development patterns?
- How can different transport policies reduce emissions?

Time required for a region of 1.4 M people: 30 minutes

Greenhouse Gas Emissions Change from 2045 Base



VE Gives High Level Results

Today's Focus:

1. What have others done with VE?
2. How can the pooled fund improve VE?

VE-RSPM (MPO) or
VE-State (state)

Webinar agenda

1. Strategic planning and VisionEval

What is VisionEval?

2. VisionEval development over the past eight years

3. How VisionEval has been used

Examples from Washington State, Minnesota, Baltimore and Houston

4. How you can use VisionEval and contribute to further development

Introductory Notes on VisionEval

Stephen Lawe

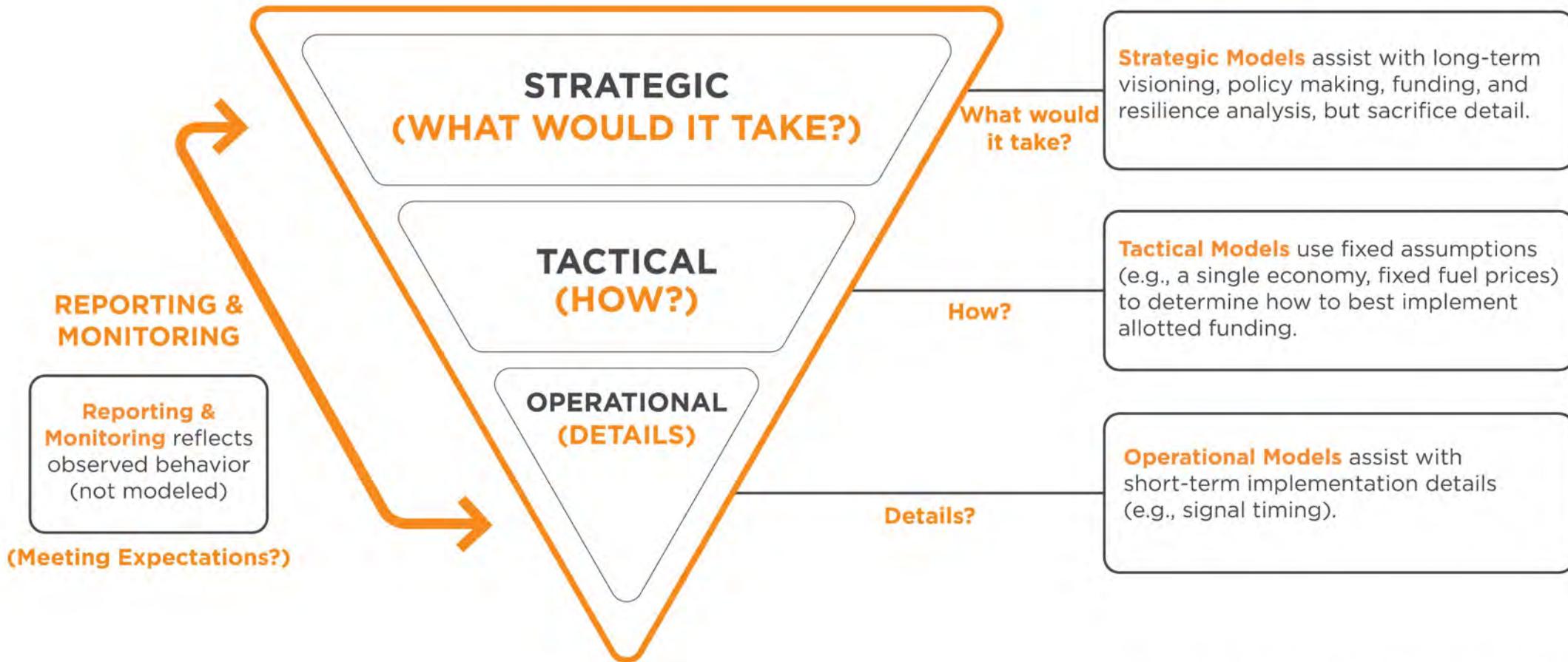
MoMo Conference, 2025

14 September 2025

Stephen.lawe@rsginc.com
802-299-7370

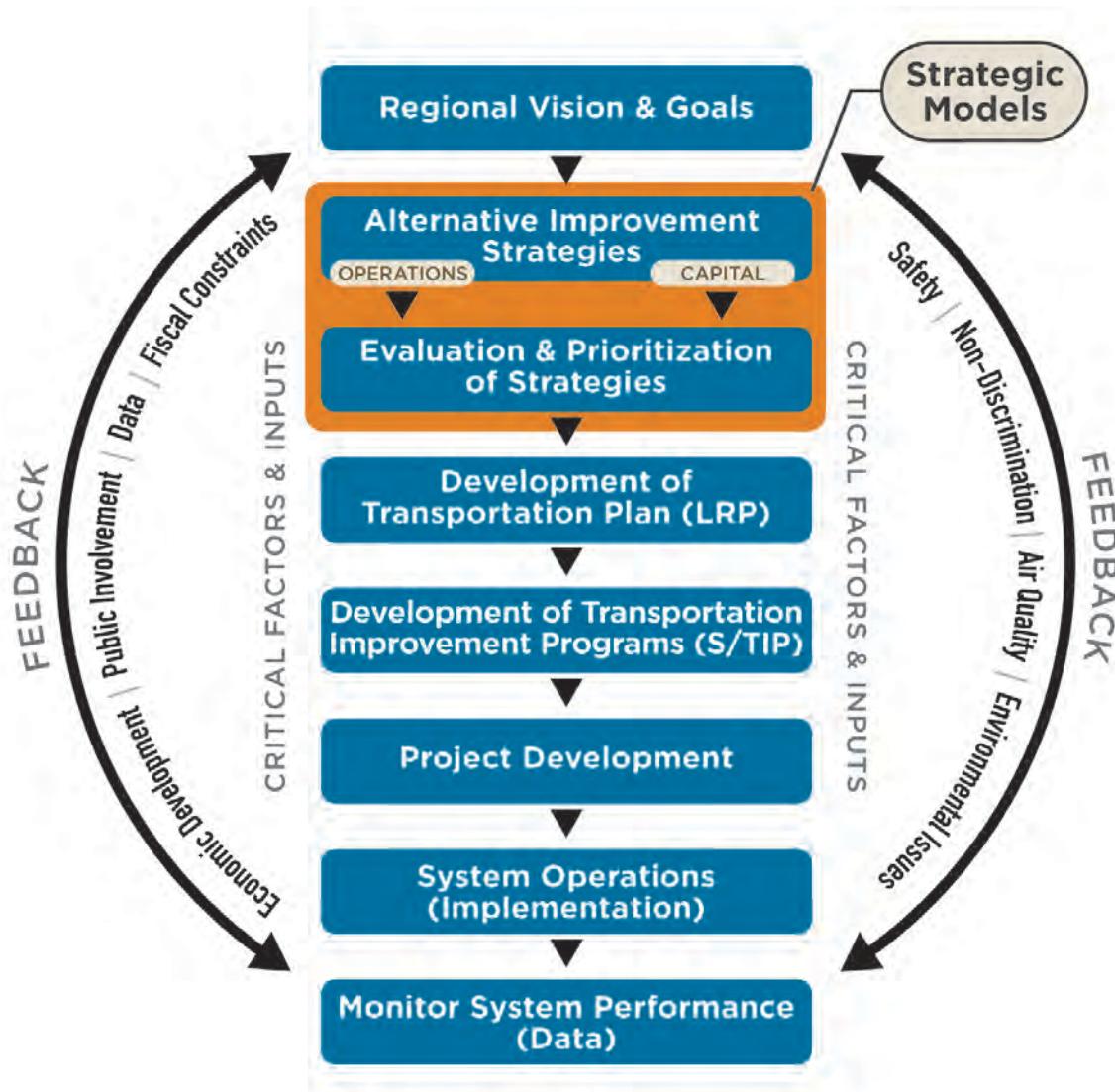


Role of Strategic Modeling (Oregon Example)

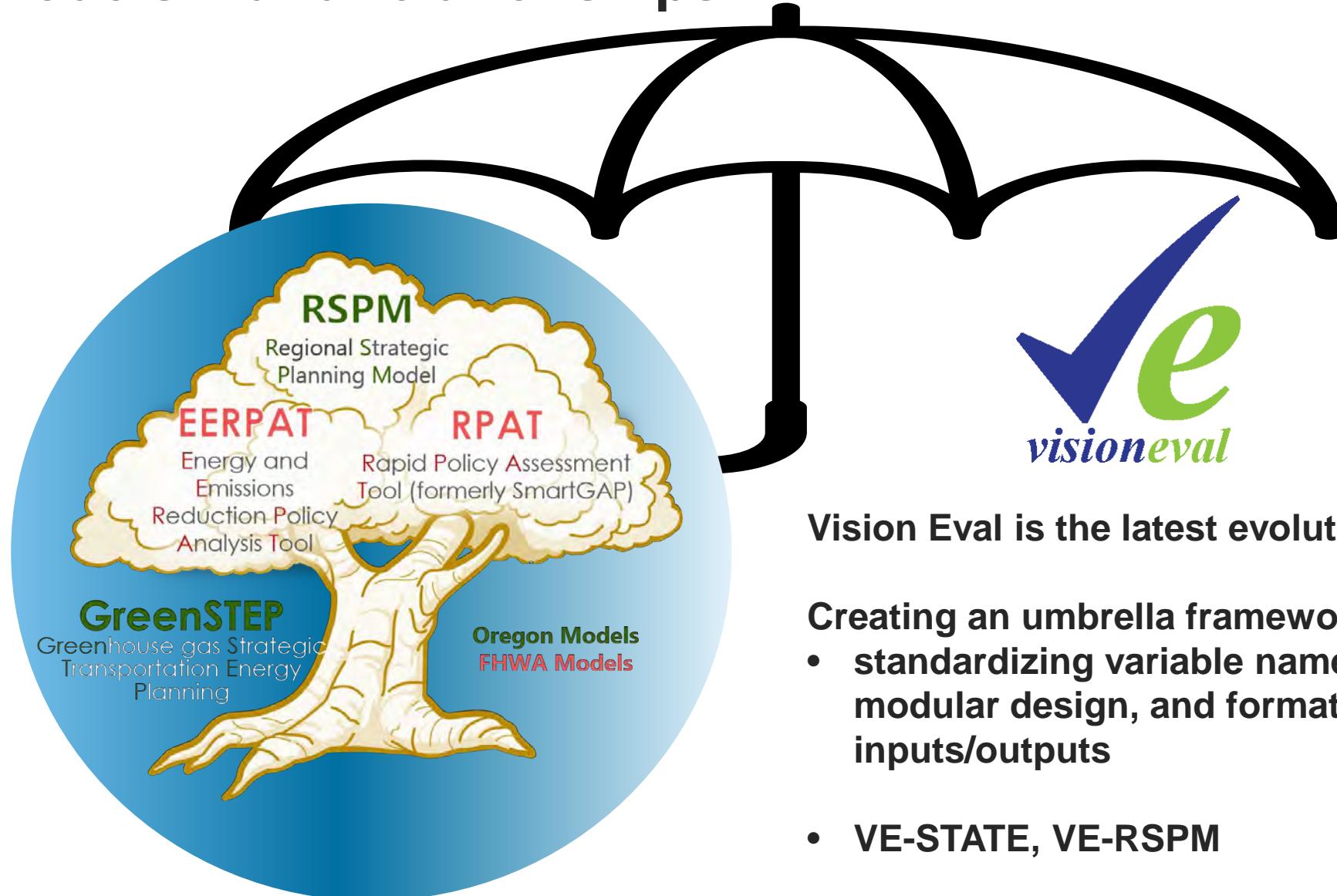


Source: Oregon DOT, adapted by RSG

Strategic Modeling in the Planning Process



The Models – and relationships



VisionEval Overview

- VisionEval is a quantitative, strategic travel model used for long range planning.
- It focuses primarily on the demand side of the transportation system. So, it runs quickly (run hundreds of scenarios in a short timeframe)
- Estimated on readily available data including National data such as the National Household Travel Survey (NHTS) then calibrated to local conditions (PUMS, HPMS, travel surveys, travel models).
- Results can be viewed in an interactive visualizer and are available in output files (CSVs, SQL, Excel, etc., for use in Python, Shiny, Tableau and upcoming PowerBI versions)
- VisionEval is open source and is supported by a Pooled Fund effort with several DOT and MPO members across the country. See
<https://visioneval.github.io/> and documentation at
<https://visioneval.github.io/docs/>



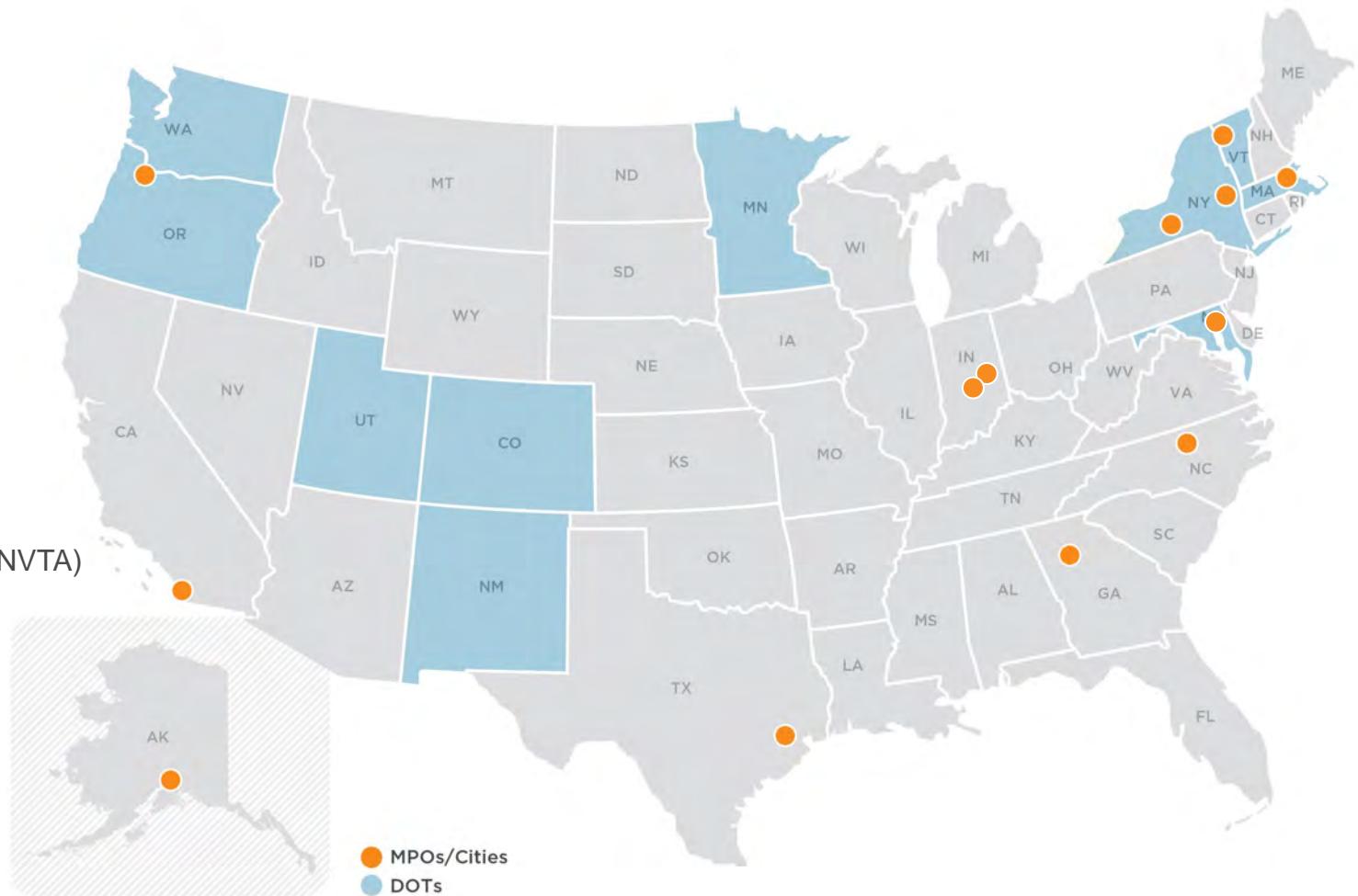
Applications of Strategic Models

DOTs

- Vermont*
 - Maryland*
 - Utah*
 - Colorado*
 - New Mexico*
 - Oregon
 - New York
 - Massachusetts

MPOs/Cities

- AMATS (AK)
 - Portland Metro (OR)
 - Ithaca (NY)
 - Capital District (NY)
 - Chittenden County (VT)
 - ARC (GA)
 - Madison Council
of Governments (MCCOG)
 - Indy MPO (IMPO)
 - H-GAC (TX)
 - MAPC (MA)
 - SANDAG (CA)
 - City of Burlington (VT)
 - City of Durham (NC)
 - Northern Virginia
Transportation Authority (NVTA)



Strategic Modeling in Scenario Planning

- **Normative:** Attempts to answer the question ***how can a specific target be reached?*** Normative planning is used for situations where the outcomes of policy actions or investment decisions are relatively certain. For example, implementing smart growth policies in response to population growth.
- **Exploratory:** Attempts to answer ***what can happen?*** Through a wide range of alternative scenarios based on possible developments and stakeholder goals. What are the effects of changing several variables. Identifying boundaries to gain confidence on the magnitude of changes.

Strategic
Modeling

Börjeson, L., et al. (2006). "Scenario Types and Techniques: Towards a User's Guide." *Futures* 38, pp. 723-739.

Introduction to VisionEval

Jeremy Raw

- Installation
- Basic Running
- Where Next?

VisionEval Prerequisites: R (optionally Rstudio)

- VisionEval requires Windows and R
- R is a free download
 - <https://cran.r-project.org/bin/windows/base/>
- RStudio is a helpful alternate interface for R
 - <https://posit.co/download/rstudio-desktop/>

Where to get VisionEval

- Once R is installed, visit the download page and follow the instructions to run a simple R script to install VisionEval
<https://visioneval.github.io/category/download.html>
- VisionEval code is hosted on Github, so you can also visit that site and build VisionEval from scratch:
<https://github.com/visioneval/VisionEval-4>

Running a VisionEval Model

- Once VisionEval is installed and running, try these commands:

```
rspm <- installModel("VERSPM", confirm=F)  
rspm$run()  
results <- rspm$results()  
results$export()
```

- Open a folder containing text files with a basic introduction

```
ve.walkthrough() # creates temporary workspace  
exit.walkthrough() # To exit temporary workspace
```

VisionEval Documentation

<https://visioneval.github.io/docs>

Documentation on building models, developing inputs, etc.

Key elements:

Model geography (zones)

Base and Future Year Inputs

Scenarios (variations of Future Year Inputs)

Getting help and more information

- Email questions to info@visioneval.org
- Join the pooled fund!
- Look out for:
 - Future VisionEval events and tutorial sessions
 - Notifications of VisionEval releases
 - Documentation updates

VisionEval development over the past 8 years

Brian Gregor

Tara Weidner, Oregon DOT

Scott Smith, US DOT Volpe Center

A Brief History of VisionEval

DATE	EVENT	MODELING RESPONSE
1973	Senate Bill 100 - Oregon's Land Use Law	
1988	West Side Bypass Litigation	
1991	Transportation Planning Rules - Coordination of land use and transportation planning - Metropolitan area goals for reducing VMT per capita	StateWide Integrated Model (SWIM) Urbansim Metroscope Land Use Scenario DevelopeR (LUSDR)
2007	House Bill 3543 - Established Oregon Global Warming Commission and GHG reduction goals	GreenSTEP
2009	House Bill 2186 - MPO Greenhouse Gas Emissions Task Force House Bill 2001 - Metropolitan scenario planning to reduce light-duty vehicle GHG	MetroGreenSTEP & Regional Scenario Planning Model (RSPM)
2010	Senate Bill 1059 - Directive to create Statewide Transportation Strategy to reduce GHG (STS) and revised metropolitan planning requirement. - 2013 Oregon Transportation Commission adopts STS	GreenSTEP enhancements and applications
2012	Energy and Emissions Reduction Policy Analysis Tool (EERPAT)	
2013	SmartGAP model → later becomes RPAT (Rapid Policy Assessment Tool)	
2014	ODOT project to prototype new software framework to replace GreenSTEP and RSPM (VisionEval beginnings)	
2016	AASHTO VisionEval project to implement RSPM and RPAT models	
2018	ODOT project to create VEState	

VisionEval Pooled Fund History



2016-2018

FHWA led + 8 agency partners

- **Community:** TRB, 2017 User Summit, video, curriculum, trainings
- **Usability** upgrades
- **Consultant work:**
 - Users Guide, Concepts Primer, Github
 - Safety & Congestion outputs
 - Output Visualizer
 - Coordination with external land use tool

2018-2023

FHWA led + 10 agency partners

- **Community:** TRB, 2024 User Summit, 2 case studies, trainings
- **Usability** upgrades
- **Consultant work**
 - Scenario Development Playbook
 - Equity Analysis
 - PopSim link with VE-RSPM
 - *Beta module:* Health (ITHIM)
 - *Research:* Accessibility/Travel Cost Index

Outside contributions

TMIP-EMAT applications (ODOT, ARC)

Beta module: MultiModal Model (ODOT, VE)

Beta module: Driverless vehicle (FHWA)

Beta module: Land Use feedback (FresnoCOG)

EERPAT freight commodity flow module

Recent Pooled Fund Partners

Federal Highway Administration

States: Delaware, Idaho, Maryland, Oregon, Pennsylvania, Virginia, Washington

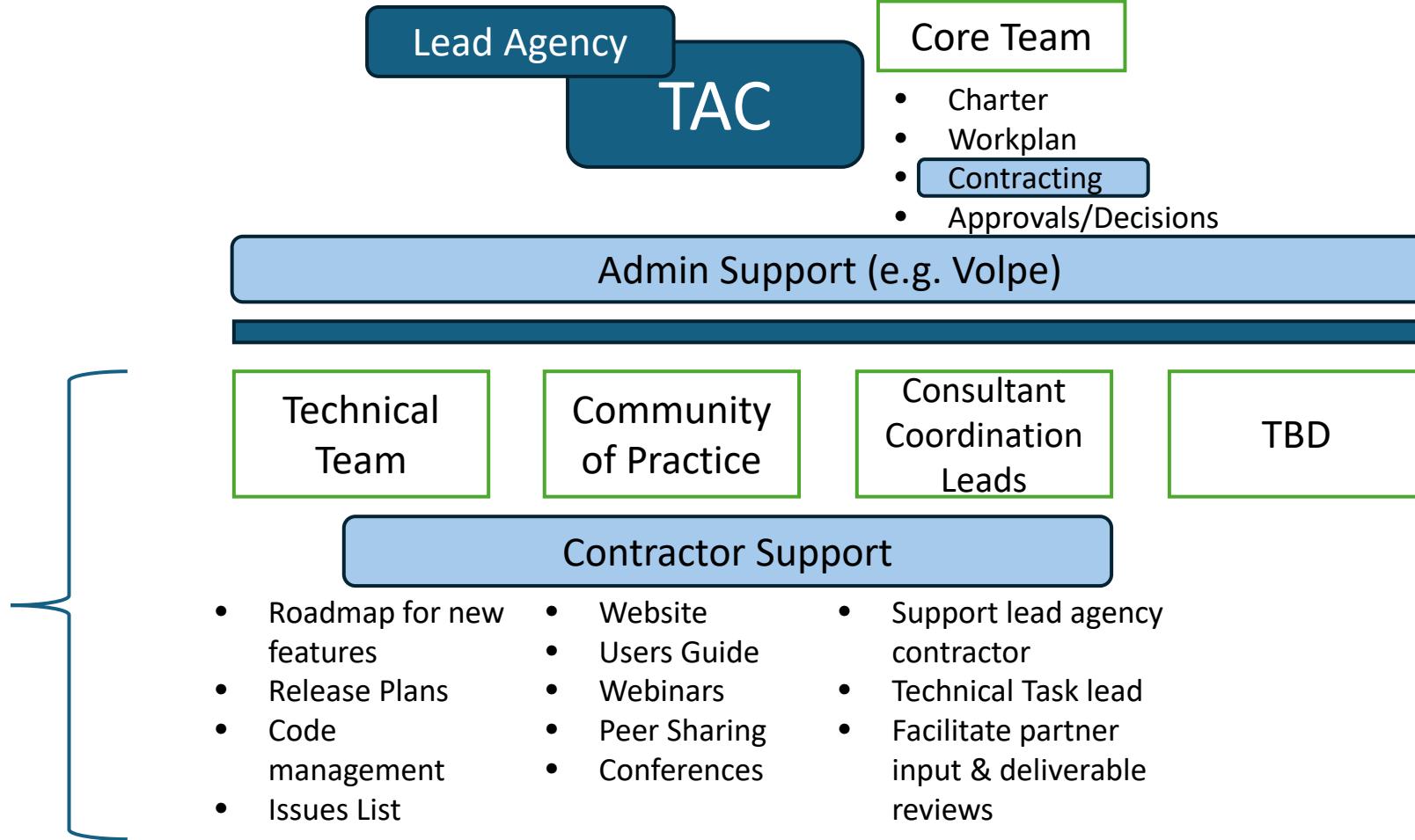
MPOs: Atlanta, Houston-Galveston

2026 VE PF Charter

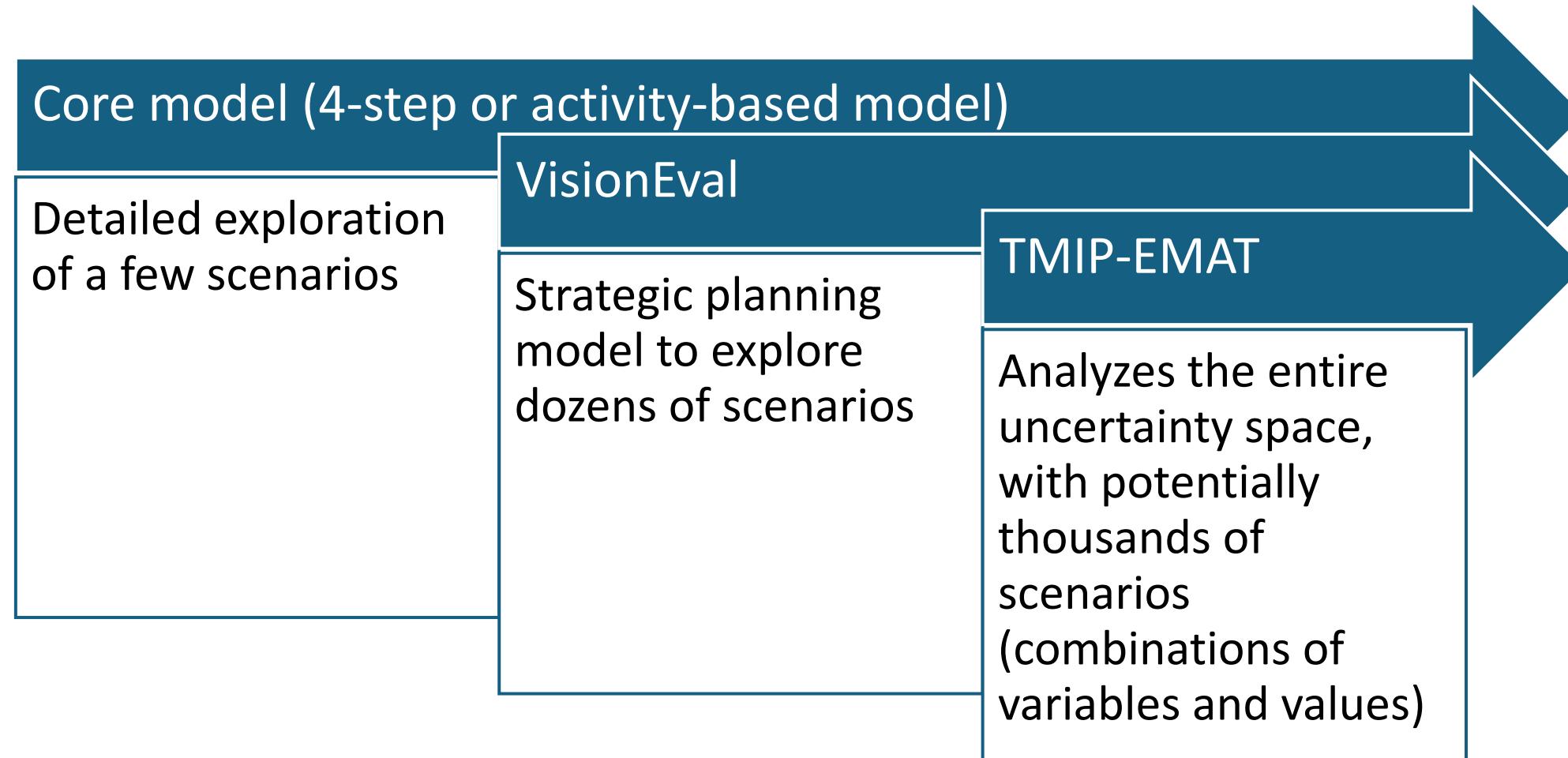
State: \$25K/year
MPO: \$15K/year



To be
determined by
Pooled Fund
members



VisionEval and TMIP-EMAT*



* Travel Model Improvement Program – Exploratory Modeling and Analysis Tool

VisionEval analysis can lead to many scenarios

This example, from
Atlanta Regional
Commission, has nine
variables

Source: ARC



Population



Employment



Road capacity



Transit service



Congestion charge



Telework



Powertrain



Fuel cost



VMT tax

Collaboration of VisionEval and TMIP-EMAT



Nine variables that affect VisionEval outputs

At least 10 samples for each variable.
Uniform and triangle distributions

180 scenarios with samples from TMIP-EMAT (one set for each distribution type)

Meta-model regression, cross validation and visualization



How VisionEval has been used

Dan Cotey, Washington State DOT

Joe Lehman, Minnesota DOT

Md. Mokhlesur Rahman, Baltimore Metropolitan Council

Sharon Ju, Houston-Galveston Area Council



VisionEval in Washington State

Dan Cotey, Performance Data Analyst
February 5, 2026

Why VisionEval Works for Washington State?

- Serves as our only statewide planning model
- VisionEval enabled us to
 - **Explore** difficult policy and investment tradeoffs
 - **Identify** preferred funding and performance levels, and
 - **Develop** a future investment recommendation

What value has Washington State added to the pooled fund?

- First state outside of Oregon to implement VE-State to support the development of a statewide plan - <https://wsdot.wa.gov/highway-system-plan>
- Active pooled fund member and contributor for several years
- Tested and helped to troubleshoot early versions of VE-State
- Developed two post-processing tools

VE-State Geography



Region

- Entire model area (State)
- Inputs shared across all geographies



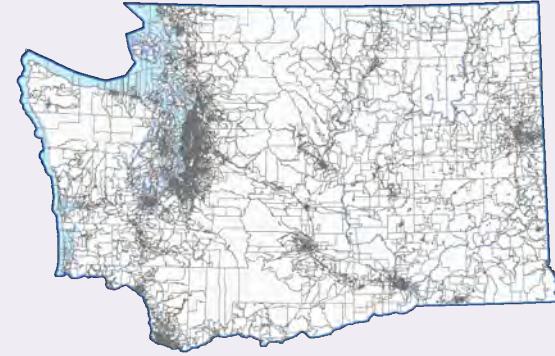
Marea

- Approximates MPOs
- Azones can only be associated with one Marea
- Input data can be challenging



Azone

- Aligned to each county
- Input data readily available
- Must be actual geographic areas



Bzone

- Subdivisions of Azones
- Synthetic
- No user defined inputs
- No real geography

Data Sources

Washington State Agencies:

- Department of Licensing
- Department of Transportation
- Office of Financial Management
- Washington State Legislature

U.S. Government Agencies:

- Bureau of Labor Statistics
- Bureau of Transportation Statistics
- Energy Information Administration
- Environmental Protection Agency
- Federal Highway Administration
- Federal Transit Administration
- Transportation Energy Data Book
- U.S. Census Bureau

Other Sources:

- American Automobile Association
- Default model data
- IHS Markit data/Business Wire

Geography



Input Data

- Demographic information
- Land Use
- Employment data
- Per capita income
- Vehicle/fuel mix data
- Car service information
- EV charging availability
- Carbon intensity of electricity
- Fuel/power cost
- Vehicle mean age
- Vehicle ownership cost
- Travel demand management
- Vehicle access times
- Congestion charges
- Traffic operations data
- Parking availability and cost
- Transit service data
- Cost of GHG emissions
- Lane-mile data
- Cost of roadways and more!

Input Data



VisionEval Modeling Process



1. Define Households



2. Assign Land Use & Other Policies



3. Assign Transportation System



4. Assign Vehicle Characteristics



5. Estimate Vehicle Miles Traveled



6. Estimate Greenhouse Gas



7. Iterate to Balance VMT with Costs



8. Non-household Travel and Emissions

Bzone

Output Data

Azone

Bzone

Region

Marea

Vehicle

Household

Global

Worker

VE-State Output Post-processing Tools

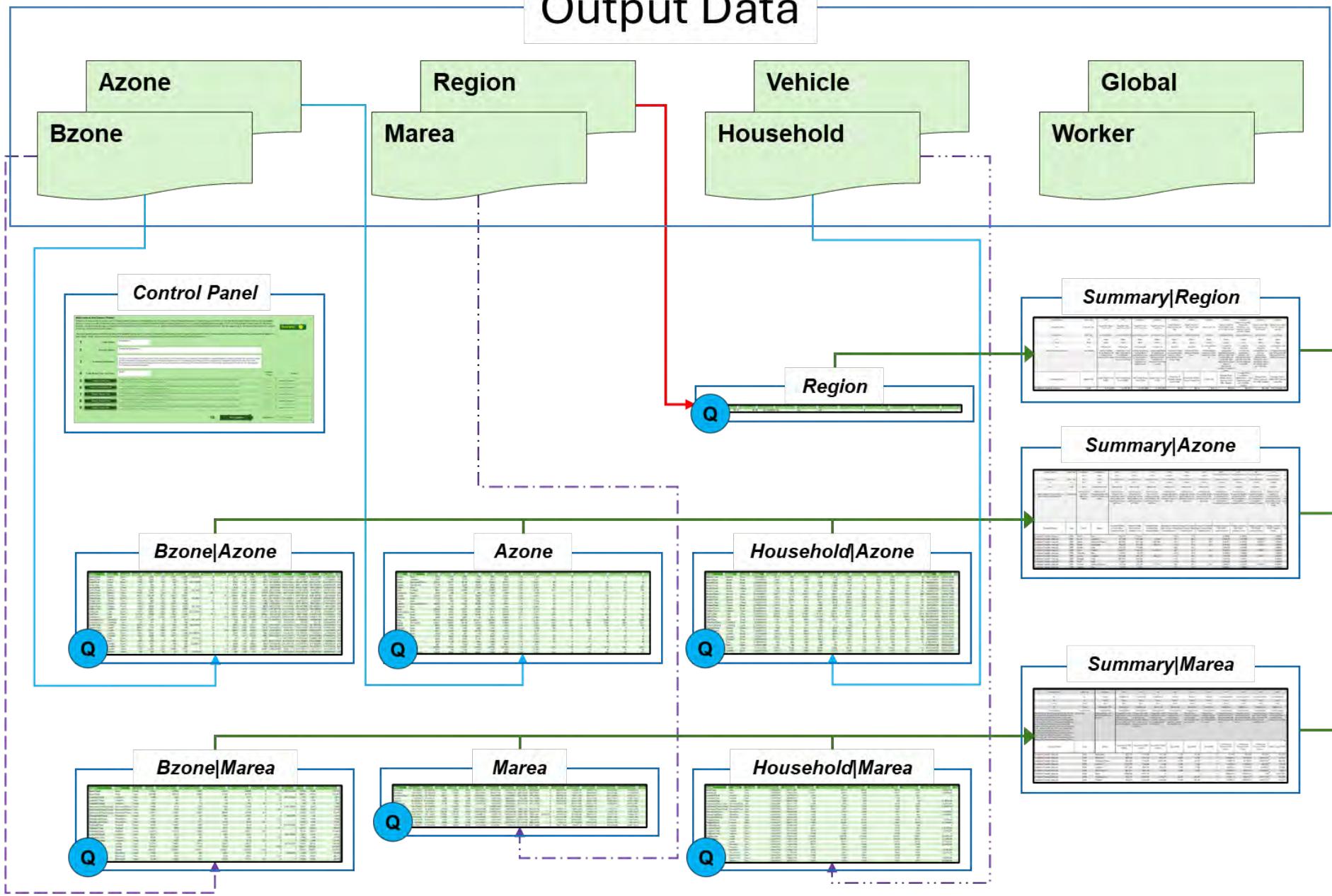
Data Extraction Tool

- Queries and formats modeled outputs
- Graphs key performance measures
- Easy to use

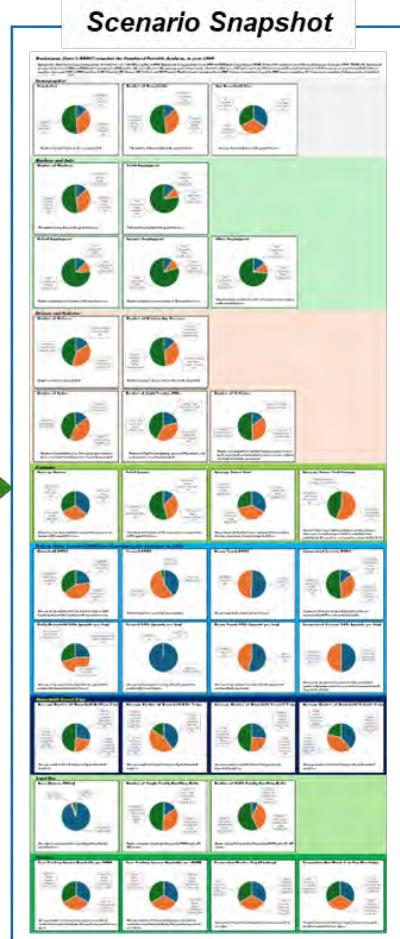
Summary Analysis Tool

- Combines scenario data for comparison
- Creates interactive graphics
- Easy to share

Output Data



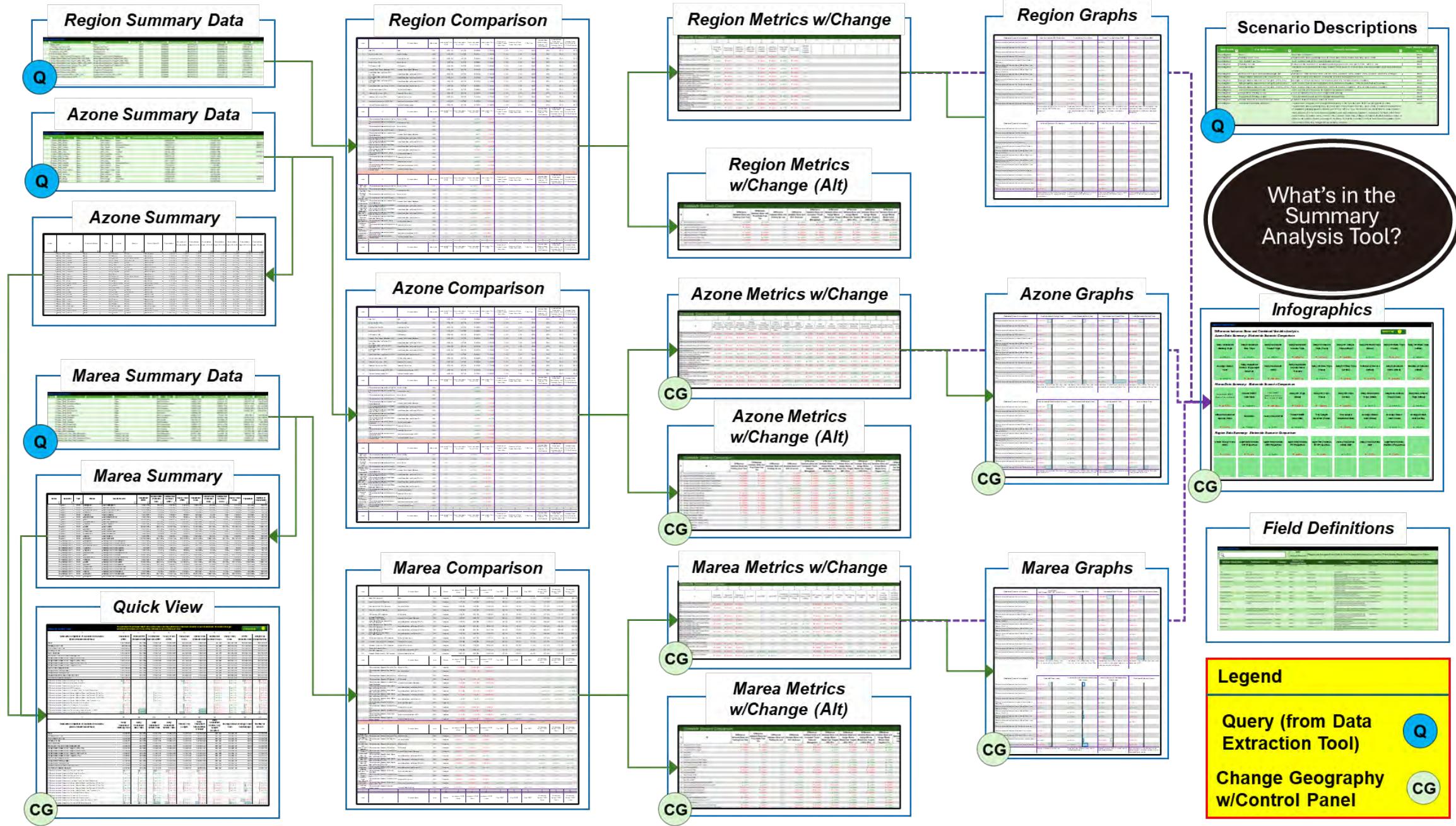
What's in the Data Extraction Tool?



Legend

Query (from ".csv" model files)





VisionEval Performance Measures Available Within WSDOT's Data Tools



What are we doing now?

- Refining data tools and analysis capabilities
- Deeper dives for sensitivity analysis made possible with analysis tools
- Building data framework for managing inputs and scenarios
- Coordinating with internal and external partners
- Participating in a new State-Led Pooled Fund to enhance VisionEval



VE Target Setting and Scenarios

Joe Lehman | Senior Planner | joseph.lehman@state.mn.us

Office of Transportation System Management

Minnesota Transportation Emissions Reduction Laws 2023 and 2024

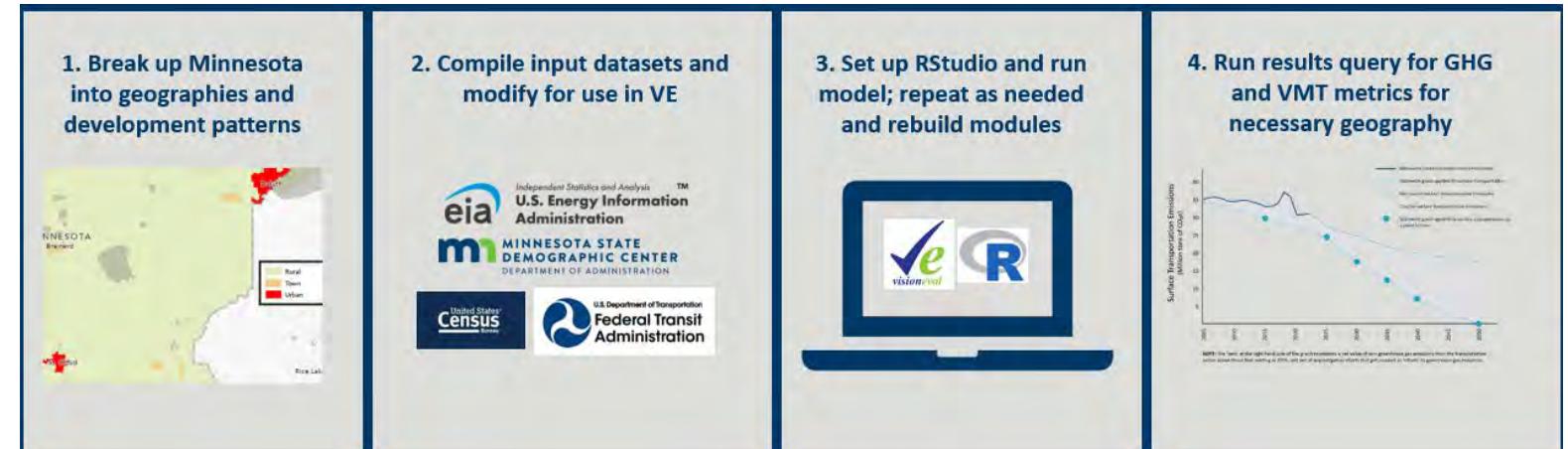
1. Regional emissions reduction performance targets for the transportation sector by 2050 **(Target Setting)**
2. Capacity expansion impact assessment and offset plan **(Scenario Planning)**



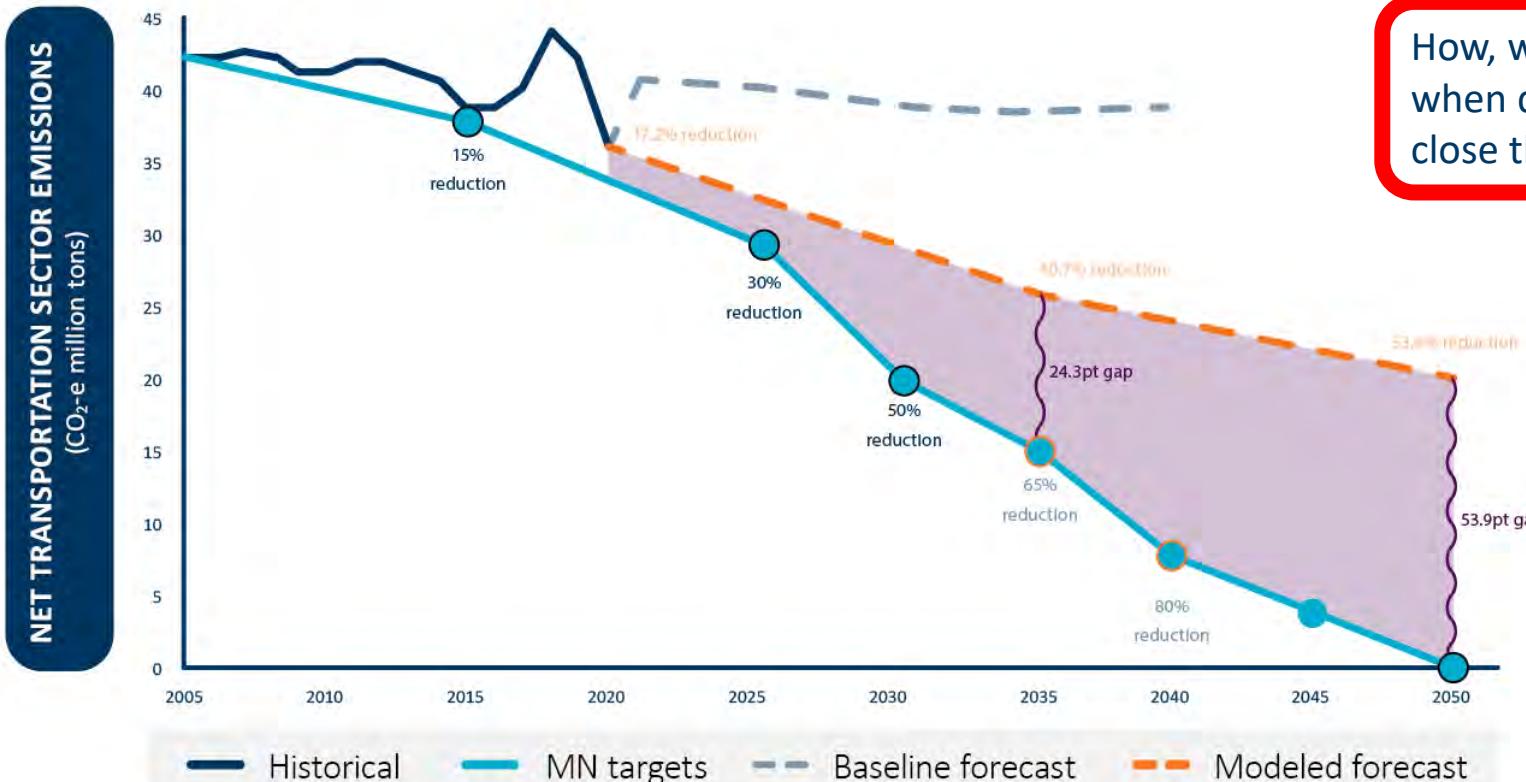
Why VisionEval For Target Setting

- VisionEval is:
 - Open source
 - Strategic in nature, allowing for quick changes to inputs and scenarios
 - A Higher, sketch level framework that can run quite quickly
 - Accommodating of a mix of geographies, making suballocation easier (counties, MPOs, cities)
 - Looks at the relationship of transportation, land use, and VMT/GHG
 - Customizable in post-processing, meaning different outcomes can be measured based on measure, geography, or unit

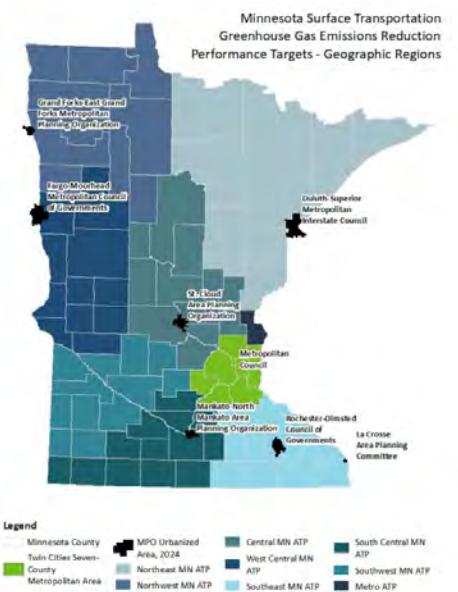
VisionEval Recipe For Target Setting



Target Setting Results



How, where and
when do we
close the gap?



NOTE: The 'zero' at the right hand side represents a net value of zero GHG emissions from the transportation sector above those that existed in 2005 (43,557,058 tons), and net of any mitigation efforts that get counted as 'offsets' to GHG emissions.

Scenario Planning

- **Goal:** Answer the question: What would it take to close the 2035 midpoint gap?
- **Strategy:** Policy being modeled to explore emissions outcomes
- **Scenario:** Implementation of a strategy or forecast that you wish to model
- Scenarios were developed by:
 - Reviewing what other states modeled in their VE runs
 - Understanding what we as a state agency can and cannot control

Many ways to run scenarios:

- Testing single policy change
- Testing policy changes compounded together
- Testing different magnitudes of policy changes
- Testing flat vs geographically/temporally specific policy changes

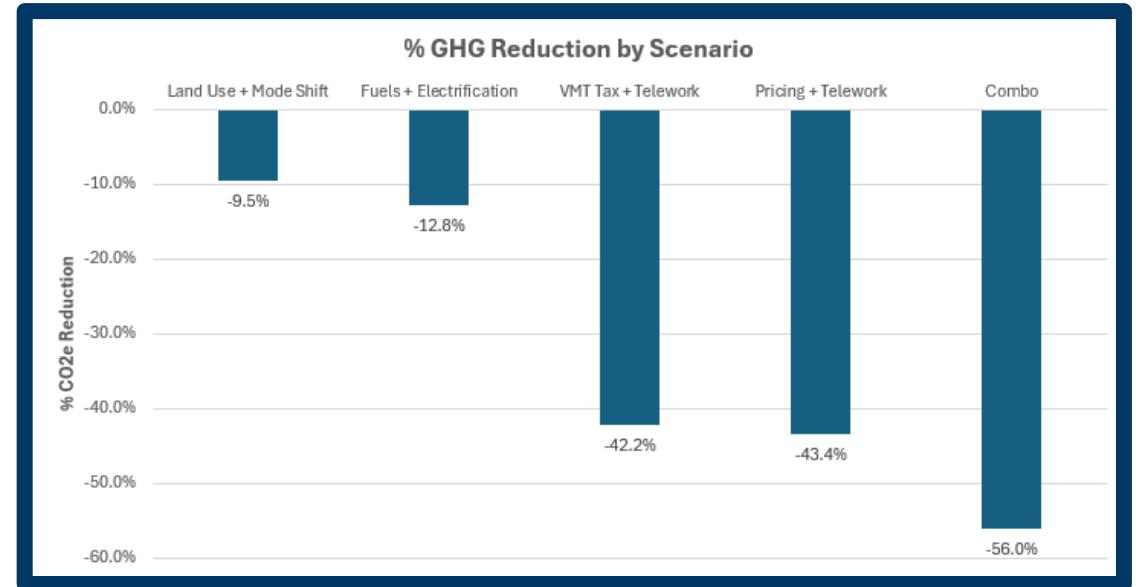
Road User Charge, Low	Road User Charge, High	Transit Investments Low	Transit Investments High
<ul style="list-style-type: none">• \$0.015/Mile	<ul style="list-style-type: none">• \$0.02/Mile	<ul style="list-style-type: none">• 20% of Short Trips in TC, 10% in GM Switch to Bike/Ped• Transit Revenue Miles 1.5X in TC	<ul style="list-style-type: none">• 40% of Short Trips in TC, 20% in GM Switch to Bike/Ped• Transit Revenue Miles 2X in TC, 1.5X in GM MPO

Vehicle Use Tax + Transportation Options	Pricing Policies + Travel Demand	Travel Demand + Transportation Options	Pricing Policies + Transportation Options	Pricing Policies + Transportation Options + Travel Demand	Combined + Electrification
<ul style="list-style-type: none">• Implement a Vehicle Use Tax• Invest in Bike/Ped Infrastructure• Increase Transit Revenue Miles	<ul style="list-style-type: none">• Raise fuel tax• Implement PAYD Insurance• Implement Congestion Pricing• Increase telecommuting growth• Increase Mixed-Use• Increase Pay Parking• Implement TDM Programs	<ul style="list-style-type: none">• Increase telecommuting growth• Increase Mixed-Use• Increase Pay Parking• Implement TDM Programs• Invest in Bike/Ped Infrastructure• Increase Transit Revenue Miles• Implement Congestion Improvements	<ul style="list-style-type: none">• Raise fuel tax• Implement PAYD Insurance• Implement Congestion Pricing• Invest in Bike/Ped Infrastructure• Increase Transit Revenue Miles• Implement Congestion Improvements	<ul style="list-style-type: none">• Invest in Bike/Ped Infrastructure• Increase Transit Revenue Miles• Raise fuel tax• Implement PAYD Insurance• Implement Congestion Pricing• Increase telecommuting growth• Increase Mixed-Use• Increase Pay Parking• Implement TDM Programs	<ul style="list-style-type: none">• Previous Scenario• Household Vehicle Electrification• Car Service Electrification• Transit Electrification• Freight Electrification

Scenario Planning Results

Scenarios Tested:

- **Business as Usual**
- **Land Use + Mode Shift:** ↑ Transit Service; ↑ SOV Trip Diversion; ↑ Mixed-Use
- **Fuels + Electrification:** ↑ Household/Car Service/Commercial EV; ↑ Transit Electrification; ↑ EV Chargers; ↑ EV Trucks
- **VMT Tax + Telework:** ADD VMT Fee; ↑ TDM; ↑ Telework
- **Pricing + Telework:** ↑ PAYD; ↑ Pay Parking; ADD Congestion Pricing; ↑ Fuel Tax; ↑ TDM; ↑ Telework
- **Combo:** All Scenarios Together



Next Steps:

- More Scenario Testing
- 2050 Modeling
- Presenting Results to Leadership

VisionEval for Regional Strategic Scenario Planning Models

Introducing VisionEval and the new Pooled Fund

February 05, 2026



Land Use and Transportation Model Vs VisionEval

Land Use and Transportation Model:

- Predict land use changes due to changes in travel patterns and infrastructure and vice versa.
- Complex, long run time, inflexible to add diverse variables, and limited to explore the future.

VisionEval:

- VisionEval is simple and designed to explore “what-if” situations, allowing comparison of hundreds of scenarios while accounting for uncertainty.
- Rapid testing of policies (e.g. land use regulations, pricing, investment) and/or external forces (e.g., economic shifts, technologies) to identify best strategies to achieve future goals.
- Open source and supported by an active user community with extensive resources.

Baltimore Metropolitan Council (BMC) Scenarios for VisionEval

Transportation Investments	Transit Investments	Land Use & Housing	Fees & Incentives
Level 0 = 2050 LRTP forecasts and assumptions			
TI-1: Active transportation	TR-1: More transit near transit	LU-1: Growth near transit	Fees-1: Higher gas tax
59% higher share of bicyclist and pedestrian trips in urban areas. 2% of urban arterial miles converted to bike/walk facilities	35% more Frequency (FR) & Vehicle Revenue Miles (VRM) near existing transit 25% more FR elsewhere 35% more VRM regionwide	90,000 additional households (HH) near existing transit <i>Added to the LRTP forecast of 165K.</i>	80 cents/gal (50% increaser)
TI-2: Commute trips	TR-2: More transit near jobs	LU-2: Growth near jobs	Fees-2: VMT fee
25% Transportation Demand Management (TDM) participation 25% Work From Home (WFH)	35% more FR & VRM near jobs 25% more FR elsewhere 35% more VRM regionwide	+90K HH near jobs	2.5 cents/mi
TI-3: Road capacity	TR-3: More transit near jobs & transit	LU-3: Growth near jobs & transit	Fees-3: Higher VMT fee
36% freeway driving with Transportation Systems Management & Operations (TSMO) controls 10% more highway lane miles	35% more FR & VRM near transit & jobs 25% more FR elsewhere 35% more VRM regionwide	+90K HH near jobs & transit	5 cents/mi
(No TI-4)	TR-4: More transit regionwide	LU-4: Growth regionwide	Fees-4: Multiple fees
	25% more FR regionwide 35% more VRM regionwide	+90K HH regionwide	5 cents/mi VMT fee 50 cents/mi congestion fee 25% higher parking fees

BMC Study Area

Variable	BMC Region	Model region
Population	2.8 M	6.4 M
Marea/Region	1	3
Azone/County or City	7	13
Bzone/TAZ	1412	3077



BMC Model Results

1. Active transportation investments had minimal impacts except for a 2.6% reduction in travel delay due to conversion of arterial lane miles to active transportation.
2. TDM/ WFH investments were effective to reduce VMT, vehicle crashes, and emissions.
3. Increasing road capacity significantly reduced emissions, and travel delay, however, increased VMT and vehicle crash rates.
4. Transit investments near transit and/or jobs boosted transit and walk trip, while slightly reduced bicycle trips.
5. Transit investments also increased active transportation crashes and reduced VMT, emissions, and travel costs.

BMC Model Results

6. Additional housing around jobs and/or transit increased job access and trips by all modes, also increased VMT, emissions, delay, and costs.
7. Added housing and increased transit investments near a mix of jobs and transit generates the highest growth in transit and active travel.
8. 50% increasing in gas tax has little effect due to an increased use of electric vehicles.
9. Multiple fee packages (5¢ VMT fee, 25% higher parking fee, 50¢ congestion fee) substantially reduce crashes, VMT, emissions, delay, increased transit and active travel.
10. Combination of TDM/WFH with a 5¢ VMT fee generates strong benefits when growth and transit investments are located near jobs or near a mix of jobs and transit.
11. Fee packages significantly increased household transportation costs.

VE-RSPM Model Enhancement

1. Does not have physical transportation network, thus may not be suitable for a specific project level analysis (e.g., a transport corridor).
2. Does not explicitly account for trips from external zones.
3. Current algorithm is insensitive to calculate changes in travel time based on distribution of additional households near jobs/transit centers that can increase job accessibility.
4. Explore the impact of cutting edge technologies on travel pattern and environment.
5. Integrate TMIP-EMAT in our VE model to enhance functional capacity of the model and improve exploratory analysis.

For More Information

Md. Mokhlesur Rahman, Ph.D. | Travel Demand Modeler

410-732-0500 x 1019 | mrahman@baltometro.org | www.baltometro.org



H-GAC VisionEval RSPM Development Highlights

Sharon Ju

VisionEval Webinar

February 5, 2026

H-GAC VE Development Achievement

- HGAC Committed to VE Pooled Fund in June 2021
- Initial VE model development took about 8 months until the first model run through complete
- Spent additional two years to refine B zones, refine scenarios, and to evaluate the results
- Compared VE results to Travel Demand Model output metrics such as DVMT, Trips, etc., The results are comparable
- Continued to experiment with new scenario development

VisionEval Next Step Pooled Fund

- Help to add new functions or improve model run efficiency
- Develop templates and scripts for scenario planning
- Develop standard query script to extract key measures, such as Dvmt, Trips, and DailyCO2e, etc.
- Develop guideline to validate VisionEval model
- Consider if AI can be incorporated to help with document search, result interpretation and visualization



How you can use VisionEval and contribute to further development

Dan Cotey, Washington State DOT

Tara Weidner, Oregon DOT

John Miller, Virginia DOT

Reasons to participate in the Pooled Fund

Help shape the future of VisionEval, to meet your needs

Peer technical support

Community of Practice

Open-Source Project Benefits

- Credible, maintained, documented tools
- Clear standards and development guidelines
- Collaborative code maintenance and updates
- Active user and developer communities
- Knowledge sharing among partner agencies

Financial Contributor Benefits

- Cost-effective tool upgrades and investment efficiency
- Voting privileges to prioritize enhancements
- Early review and use of the implemented models
- Peer-to-peer support for implementation



VisionEval enhancement ideas

VisionEval Capabilities and Planned Enhancements

- Multimodal: Car service, short trip diversion, transit
- Land use sensitivity & transit access
- Vehicle and Fuel technology adoption
- Pricing policies
- Home and Work location and attributes
- Sensitive to Telework policies (beta-version)
- Integration with public health measures (beta-version)
- Driverless Vehicles (beta-version)
- Access to destinations/Travel Cost Index (ongoing)
- Sensitivity to bike network investments & connectivity (ongoing)
- Equity analysis and other Case Study writeups

- + Usability upgrades
- + move beta-modules & research into practice

...and, your ideas!

How to Find out More—And Participate!

Topic	Source
Collaboration on Strategic Planning Models Pooled Fund	https://pooledfund.org/Details/Solicitation/1651
VisionEval website	visioneval.org leads to https://visioneval.github.io/
VisionEval documentation	https://visioneval.github.io//docs/
Reach out to current users	info@visioneval.org
Admin questions about pooled fund	john.miller1@vdot.virginia.gov, 434-293-1999 mack.frost@dot.gov

