

Vision Eval (TMIP-EMAT)



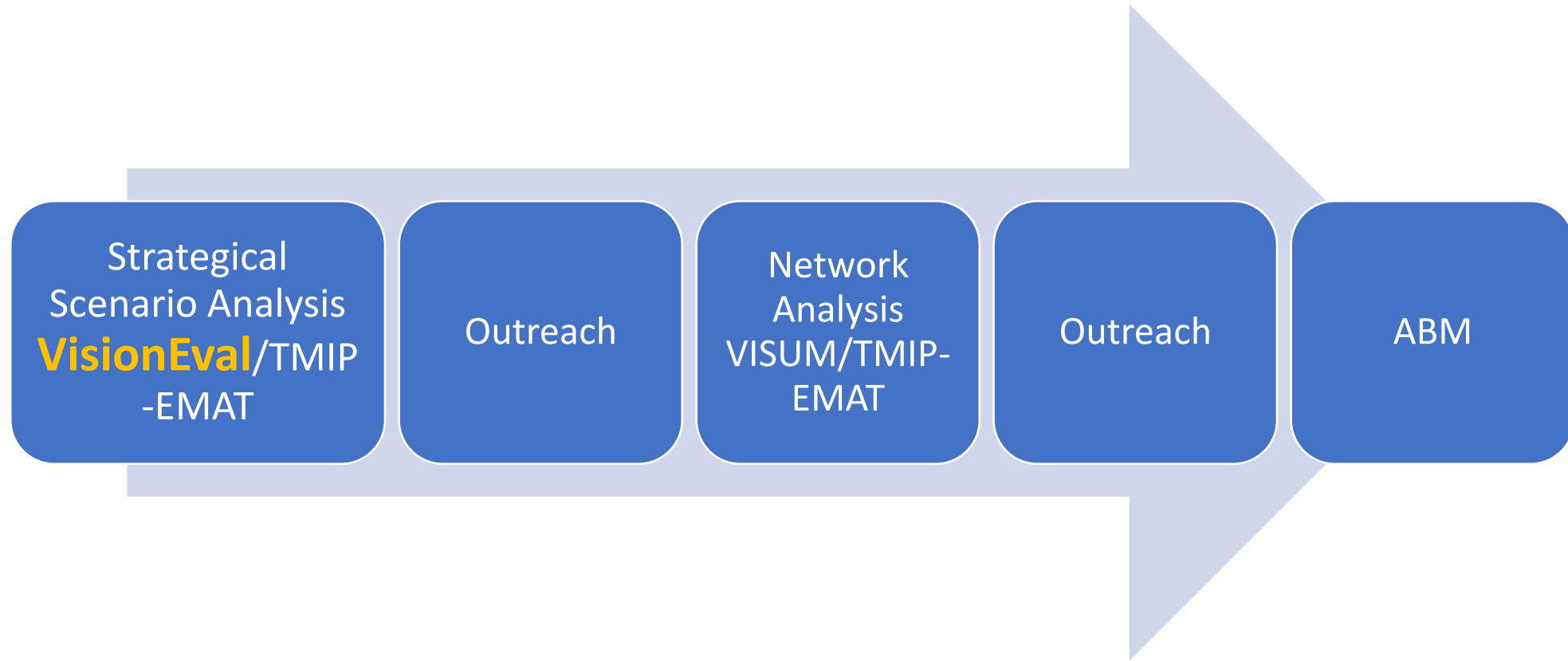
Partners: FHWA , RAND



U.S. Department
of Transportation
**Federal Highway
Administration**



Understanding Future



VisionEval Variables



Population



Employment



Road capacity



Transit service



Congestion charge



Telework



Powertrain



Fuel cost



VMT tax

VisionEval Variables (Phase 1)



Population

- 15% growth in population from 2050 base model



Telework

- 50% of telework



Employment

- 60% growth in employment from 2050 base model



Electric vehicles

- 95% of battery electric vehicles (BEV) in households



Road capacity

- 50% growth in freeway and artery miles from 2050 base model



Fuel costs

- Fuel cost: \$8.00 per gallon (retail cost before tax)
- Power cost: \$0.30 per kilowatt-hour (retail cost before tax)



Transit service

- 50% growth in all transit revenue miles from 2050 base model



Fuel/VMT tax

- Fuel tax: \$0.90 per gas gallon equivalent of fuel
- Vehicle Miles Traveled (VMT) tax: \$0.90 per gas gallon equivalent of fuel



Congestion charges

- \$1.00 per vehicle traveled mile on freeways during periods of severe and extreme congestion

2⁹ = 512 future scenarios



VisionEval Variables (Phase 2)



Population

- 50% growth in population from 2050 base model



Telework

- 50% of telework



Employment

- 20% growth in employment from 2050 base model



Electric vehicles

- 95% of battery electric vehicles (BEV) in households, commercial, and transit



Road capacity

- 50% growth in freeway and artery miles from 2050 base model



Fuel costs

- Fuel cost: \$8.00 per gallon (retail cost before tax)
- Power cost: \$0.30 per kilowatt-hour (retail cost before tax)



Transit service

- 100% growth in all transit revenue miles from 2050 base model



Fuel/VMT tax

- Fuel tax: \$1.80 per gas gallon equivalent of fuel
- Vehicle Miles Traveled (VMT) tax: \$1.80 per gas gallon equivalent of fuel

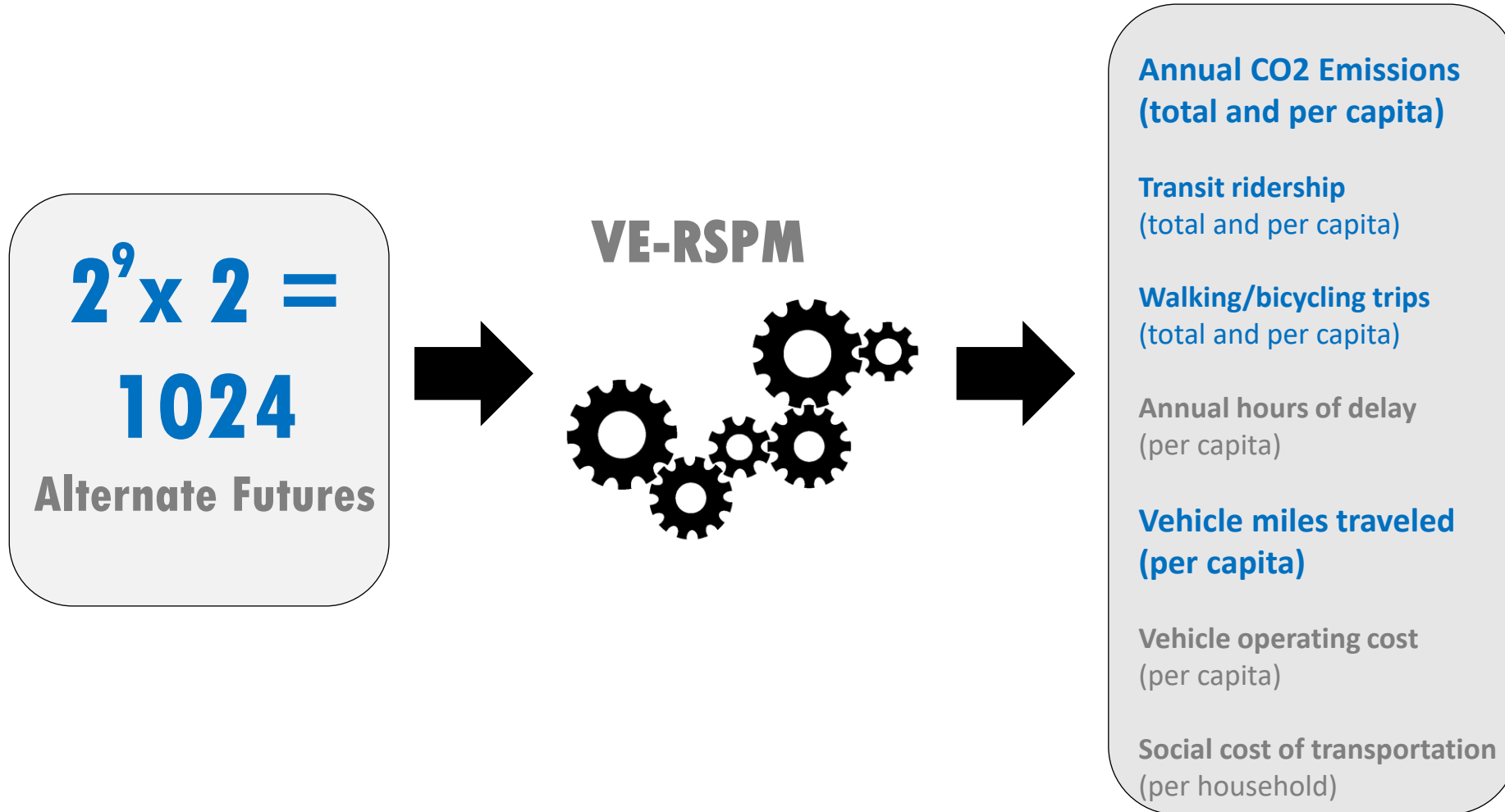


Congestion charges

- \$1.00 per vehicle traveled mile on freeways during periods of severe and extreme congestion

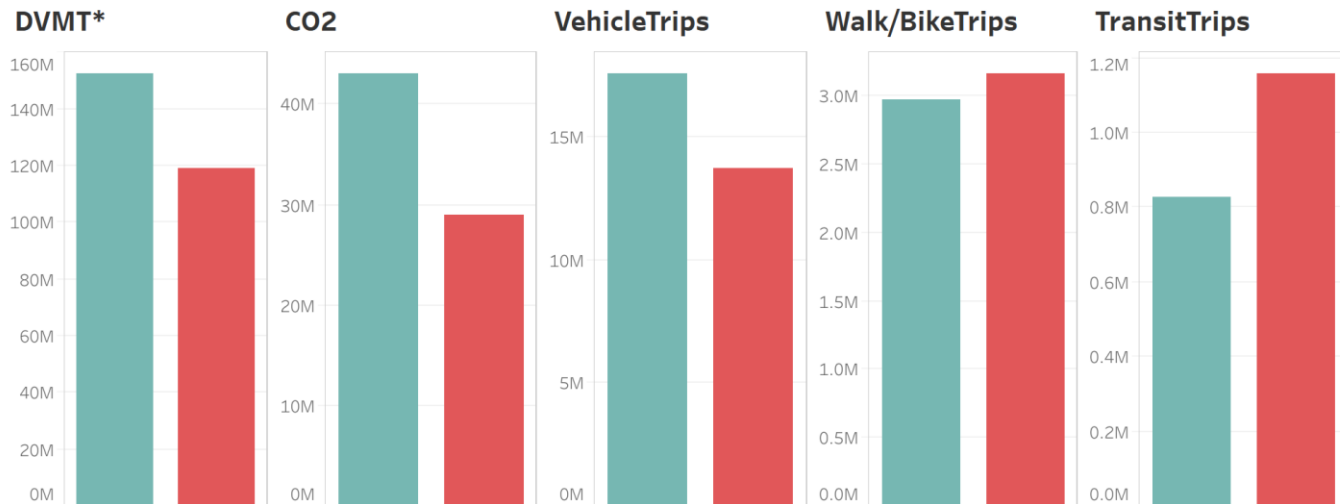
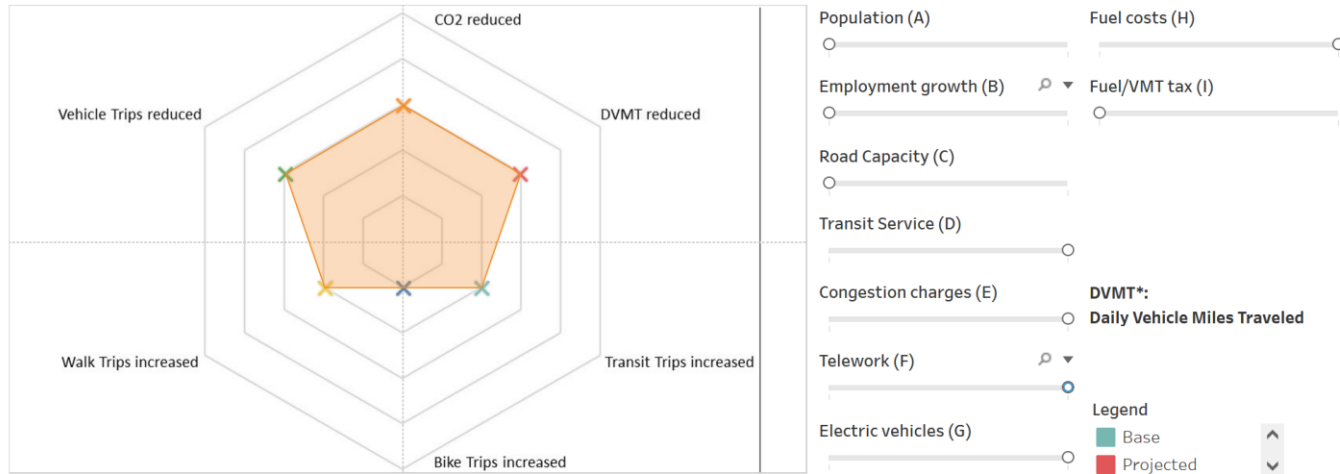
$2^9 = 512$ future scenarios

VisionEval Running Process and Outputs



VisionEval Analysis with the Results at the Regional Level

VisionEval scenario results



Comprehensive evaluation through the development of **over 1,000 scenario** combinations now allows us to examine the relationship between land use, travel technology, and transportation policies and to see these future impacts through climate variable measures like **CO2 emissions**. Initial results show that **no one policy change will substantially impact our greenhouse gas emissions.**



VisionEval Visualization with Tableau Dashboard

Link 1:

https://public.tableau.com/app/profile/jay.kwon8030/viz/Presentation_16793385675040/Final1

Link 2:

https://public.tableau.com/app/profile/jay.kwon8030/viz/VE_Phase2_01/VisionEvalScenarioResults?publish=yes

Link 3:

https://public.tableau.com/app/profile/jay.kwon8030/viz/VE_Phase2_02/ExtremeScenarioResults



Collaboration of VisionEval and TMIP-EMAT



Variables that affect DVMT, CO2, and Trips. A total of nine variables.

A minimum of 10 samples for each variable. Uniform, Triangle, PERT, and other distributions. We selected Uniform and Triangle distributions.

180 scenarios with samples from TMIP-EMAT (90 from each distribution).

Meta-Model Regression, Cross Validation, and Visualization

