

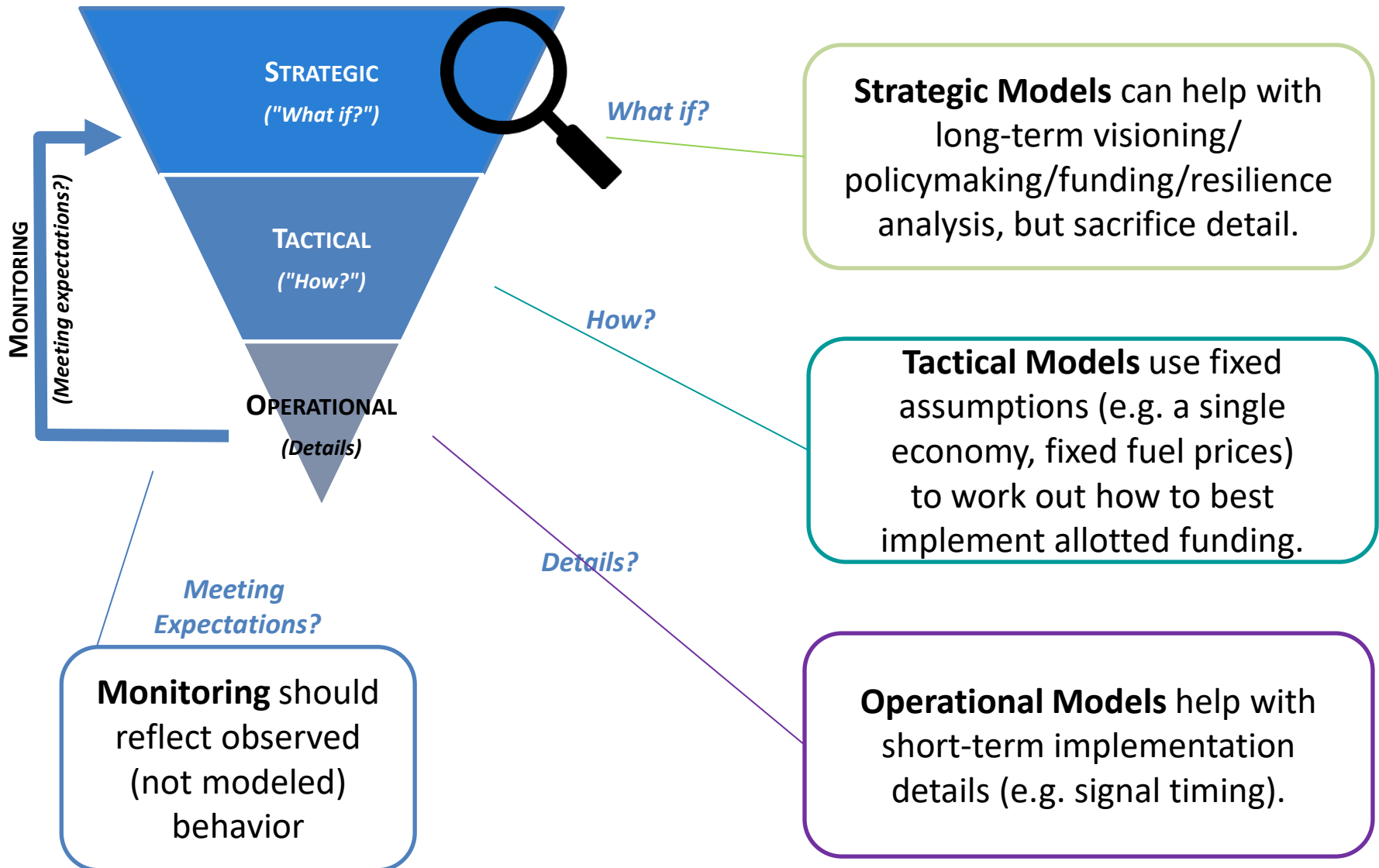
Transportation Planning Uncertainty: Oregon DOT Experience

Tara Weidner, ODOT Climate Office

January 9, 2025

5003 Future Uncertain: Research and Tools for
Transportation Planning
2025 Transportation Research Board (Washington, DC)

Where does Uncertainty fit in our Analysis Toolkit



Uncertainty

Resilience to outside forces



- **Policy Uncertainty**

Market Uncertainties

Program Effectiveness

e.g., vehicle/fuel regulations, demand management programs

- **Global Forces**

Population, Economy/income, Fuel price, etc.

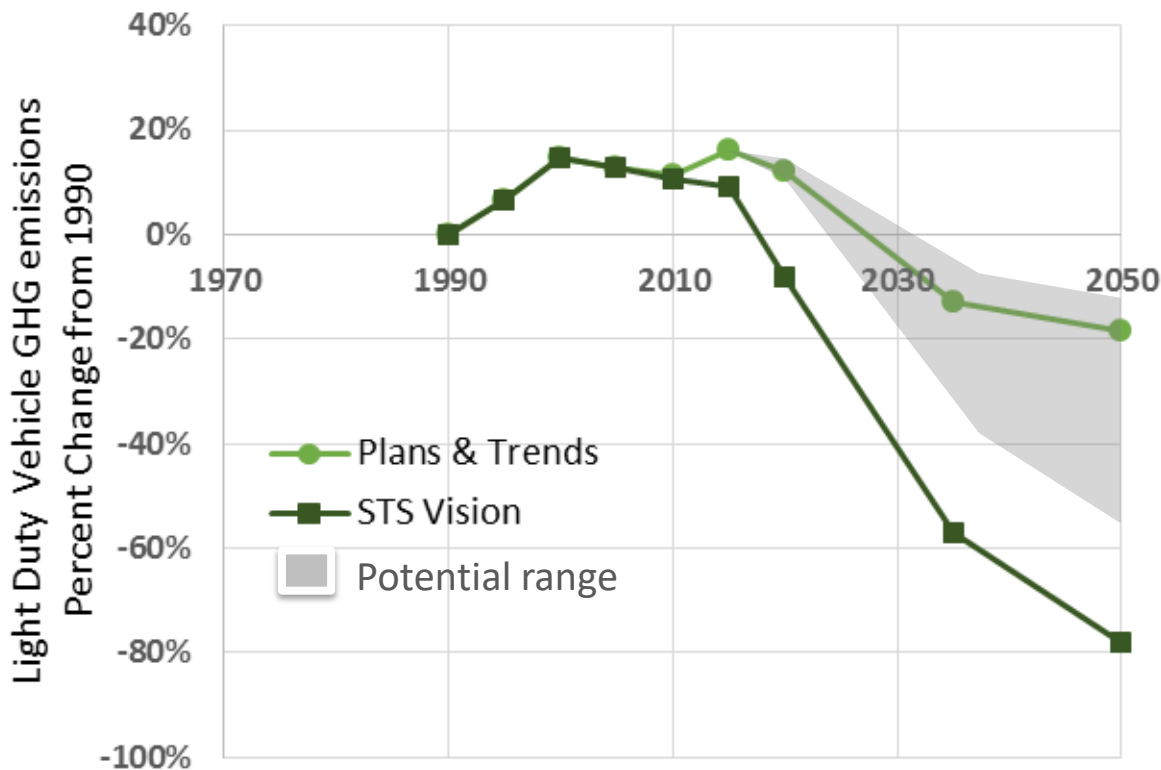
Talking about Uncertainty

Sharing uncertainty ranges when running many scenarios



Projected GHG Emissions

Light Duty Vehicle CO₂e Percent Change from 1990



Good News

Federal CAFÉ standards
OR Clean Fuels Program
Transit Funding (HB2017)

Most Local Plans on track
through 2020

Headwinds

Population
Economy/Income
Fuel Price



VisionEval EMAT Application

Enables lots of Scenarios including uncertainties

Oregon Transportation Plan Update

What policy mix meets Oregon's long-term goals?

1. Tested a wide **range of futures** within Oregon's influence:

- Transit investments
- Walking and Biking infrastructure
- Demand management policies
- Roadway capacity
- Land use density and mix of uses
- Roadway taxes (fuel and VMT)

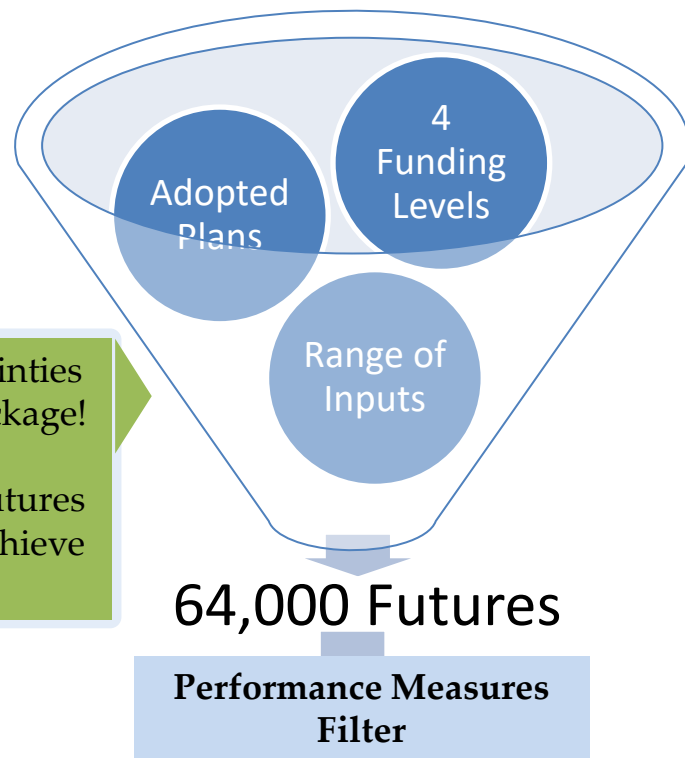
Input ranges informed by ODOT policy documents/plans & associated costs

Over 4,000 Different uncertainties analyzed per investment package!

From those many possible futures assess which ones help us achieve our goals

2. Uncertainties tested around 16 scenarios/emphasis areas

♦Economy ♦Telework ♦C/AVs ♦ Electrification



Which futures reach our Goals?

ODOT ABM EMAT Application

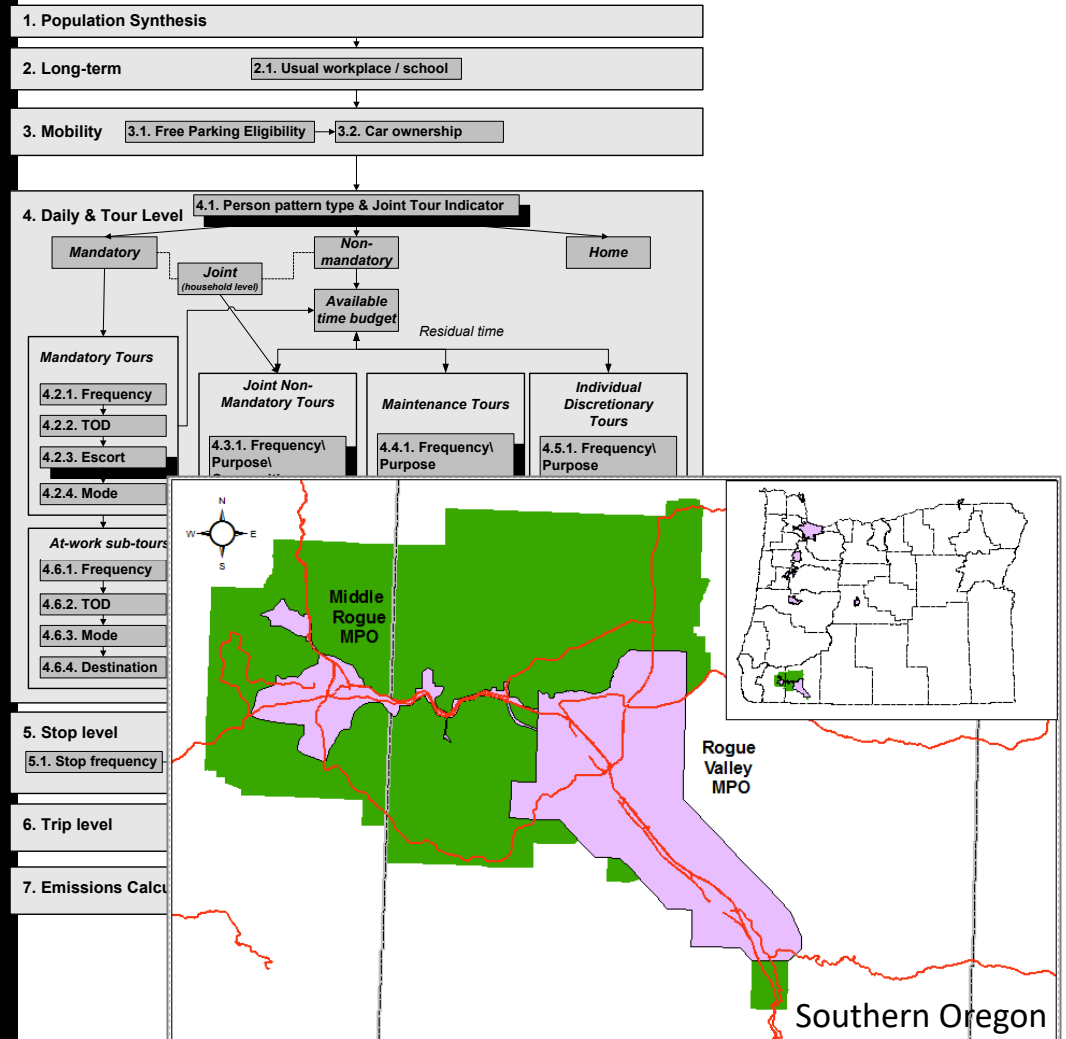
- Policies

- Emerging tech
- Uncertainty

- ABM covering 2 small MPOs (500K pop)



Exploratory Analysis informed multi-agency Emerging Tech group...



ODOT ABM EMAT Application

Robust Decision Making (RDM) Problem design & scoping

Valuable language for facilitating discussions of problem space

G

IS FOR GOALS

Goals

What are you
trying to achieve



XLRM: A general framework
for conducting exploratory
analysis [Lempert et al \(2003\)](#).



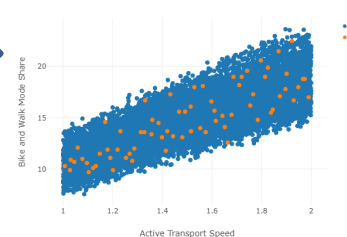
X: Uncertainties

What could impact
your goals that you
have no control over



L: Policy Levers

How can you
influence your goals



M: Metrics

How will you know
you are successful;
continued monitoring

R: Relationships

What are the
relationships between
inputs and outputs
(model representation)

ODOT ABM EMAT Application

Scoped **L**evers, **U**ncertainties, **M**etrics & **R**elationships to meet Goals

Goals

- Determining **resilient** actions that work under all tested futures as opposed to only work under some futures
- **Evaluating the ABM** for questions around Emerging Tech, and Equity metrics

Policy **L**evers

- . Transit LOS
- . Parking Rates
- . Active Transport Speed
- . Urban Speed Changes

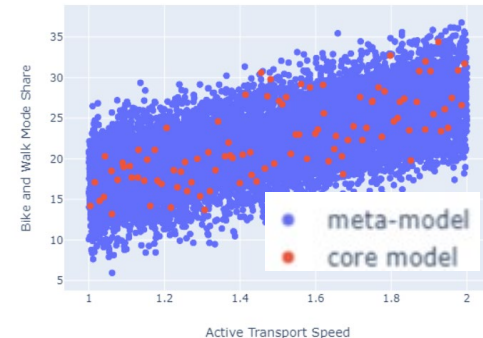
Uncertainties

- . Freeway Capacity
- . **Auto Operating Cost**
- . Economic conditions
- . Household Density
- . Age Distribution
- . Telecommuting

Metrics

- . **Accessibility:**
PM peak jobs by SOV
- . **Congestion/Reliability**
 - Mode split
 - PMT / VMT
 - VHT, V/C
- . **Auto ownership**
- . **Quality of Life:**
Non-Mandatory Tours
- . ~~Fiscal sustainability~~
- . ~~Safety~~

ABM model
limitations {



Relationships

Key EMAT strength:
Meta-model based
on limited ABM runs
(Latin Hypercube)

ODOT ABM EMAT Application

EMAT Workbench tools to unearth rich value from many scenarios

Example: Impacts of Housing Density on Active Mode share and Auto Ownership



Contacts



www.oregon.gov/odot/climate/Pages/default.asp



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