Tools for Reducing GHGs from the Transportation Sector

Cutting Carbs Workshop – Central Point Oregon

Transportation Planning Analysis Unit

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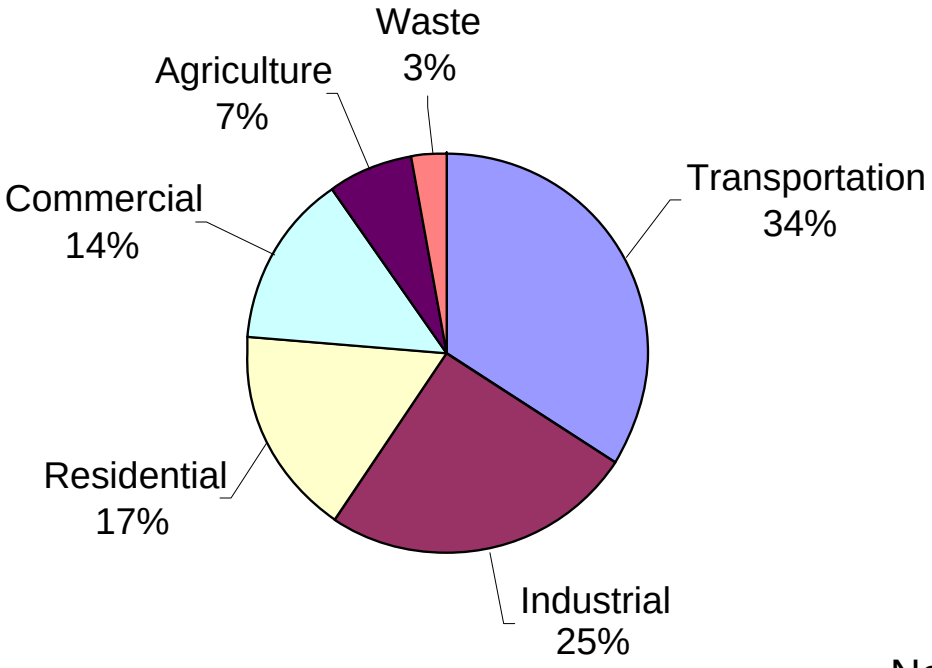
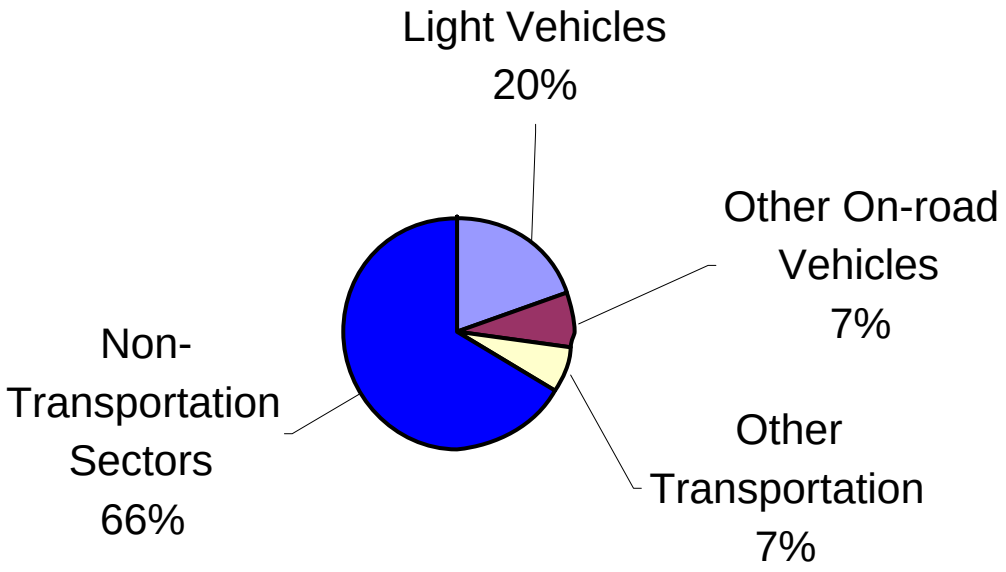
Outline

1. Greenhouse gas emissions from the transportation sector
2. Illustrative example of the magnitude of the problem
3. Opportunities for transportation sector GHG reductions
4. Modeling greenhouse gas mitigation actions

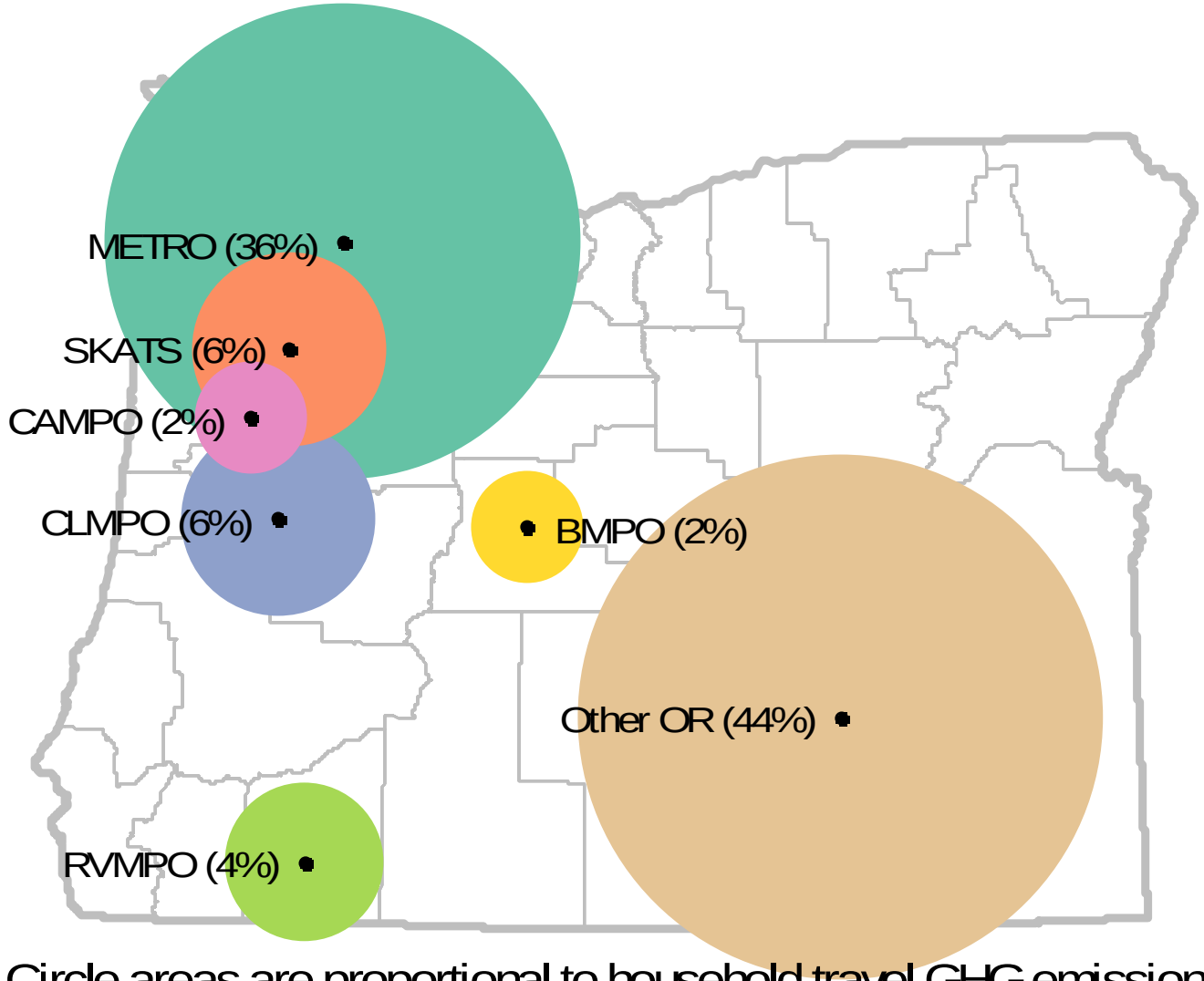
Greenhouse gas emissions from the transportation sector

GHG Emissions By Sector





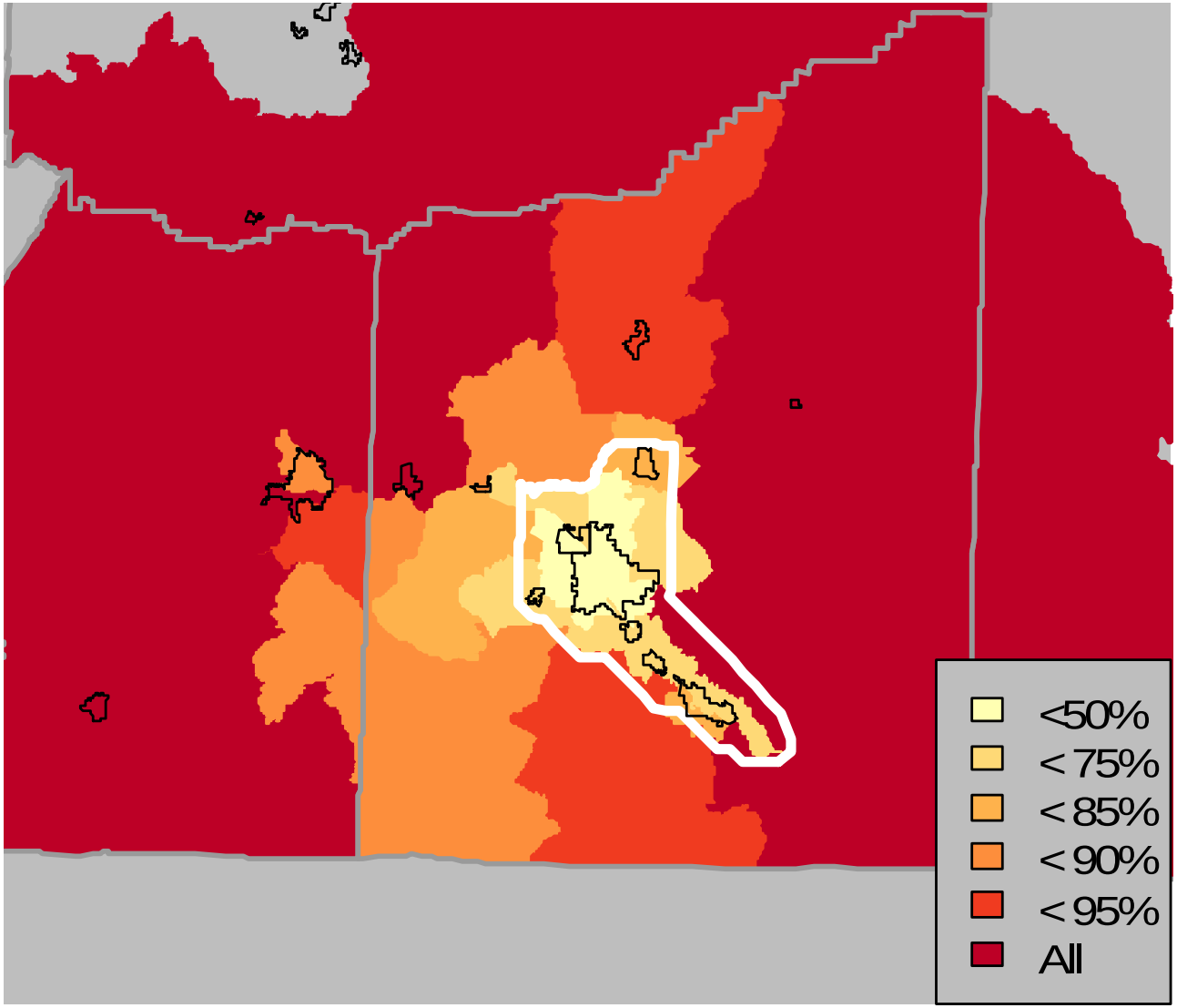
Oregon Household Light Vehicle GHG Emissions



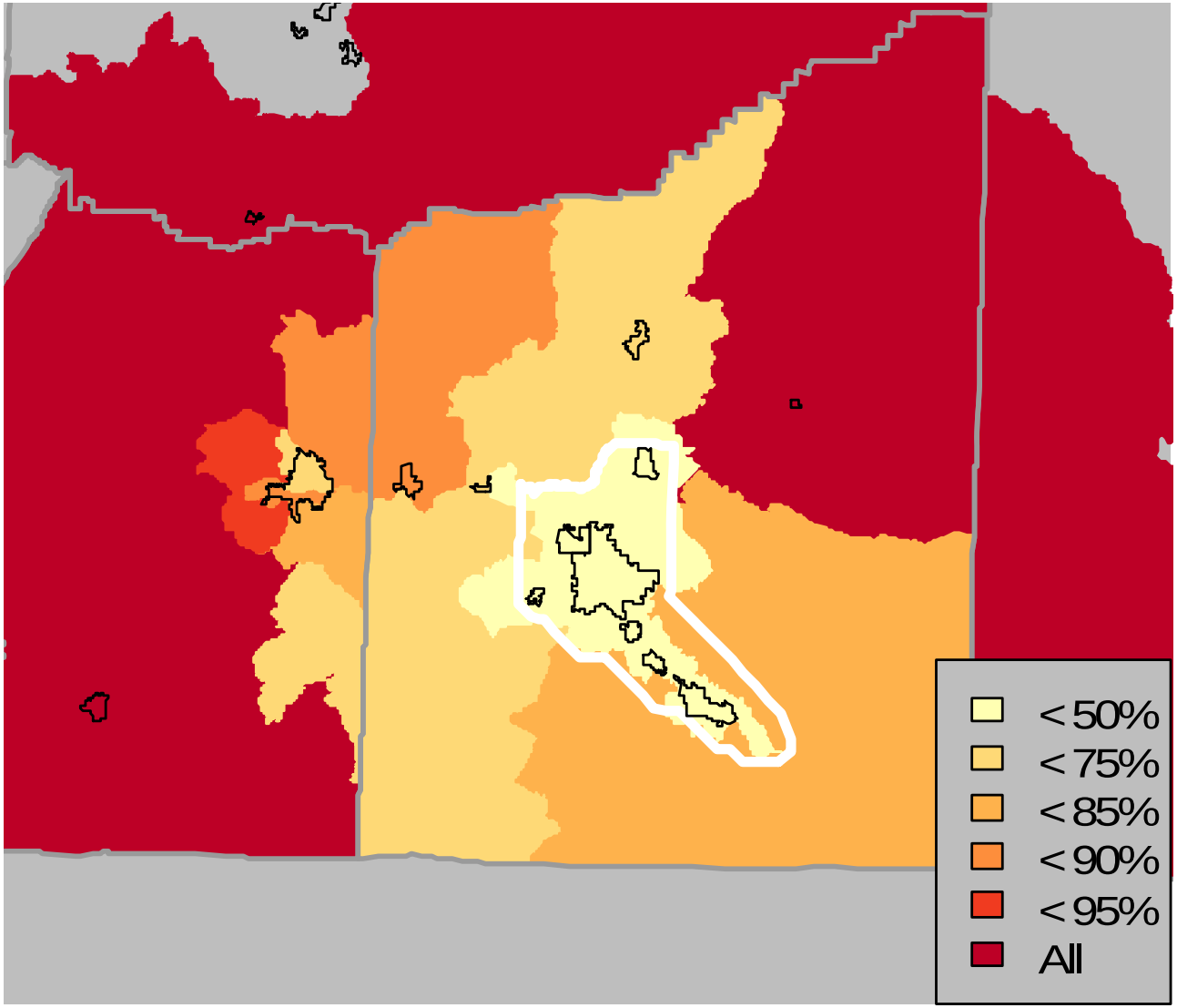
Circle areas are proportional to household travel GHG emissions

Effect of travel distance: A commuting example

Proportions of Workers to RVMPO Jobs

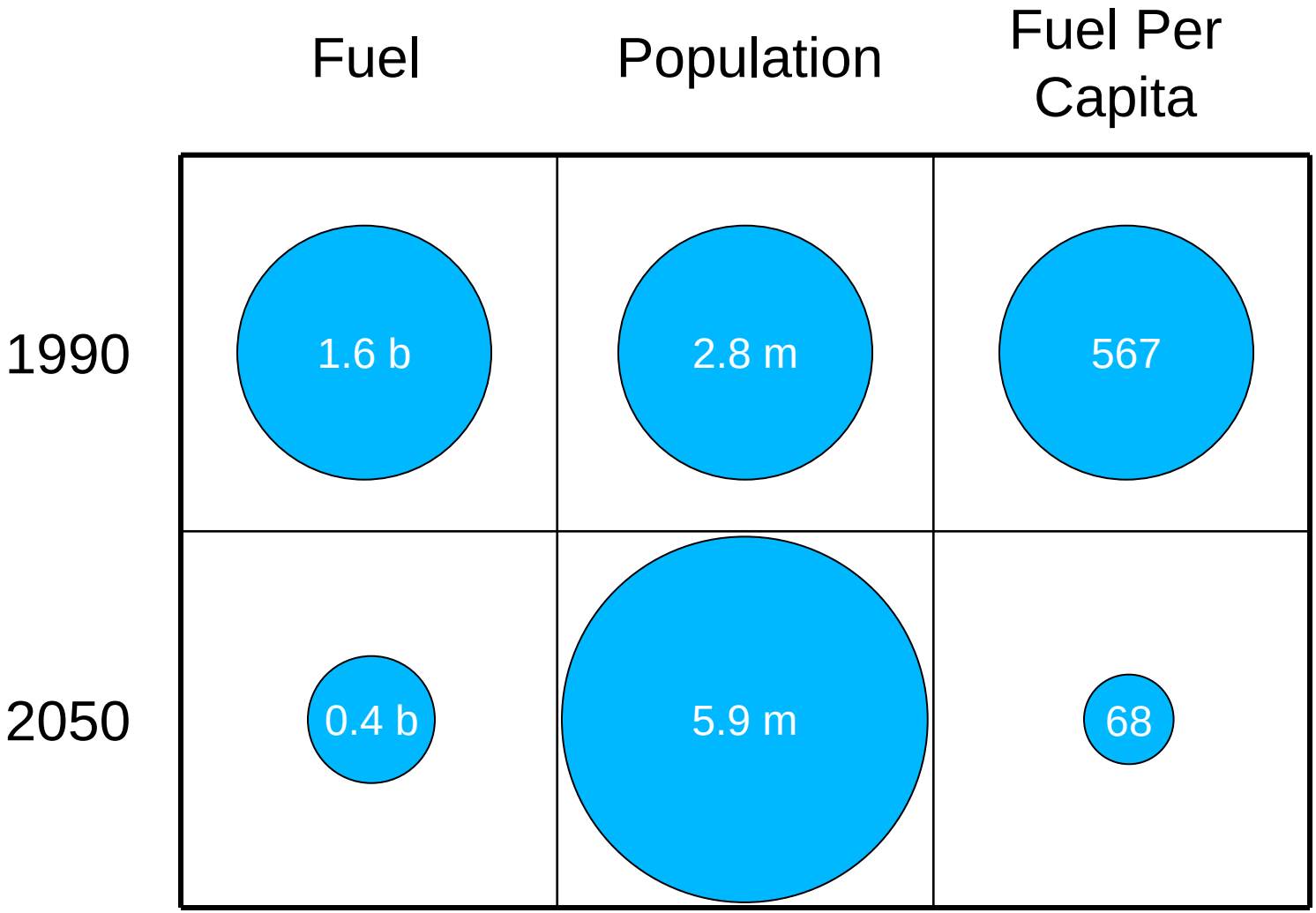


Proportions of Emissions to RVMPO Jobs



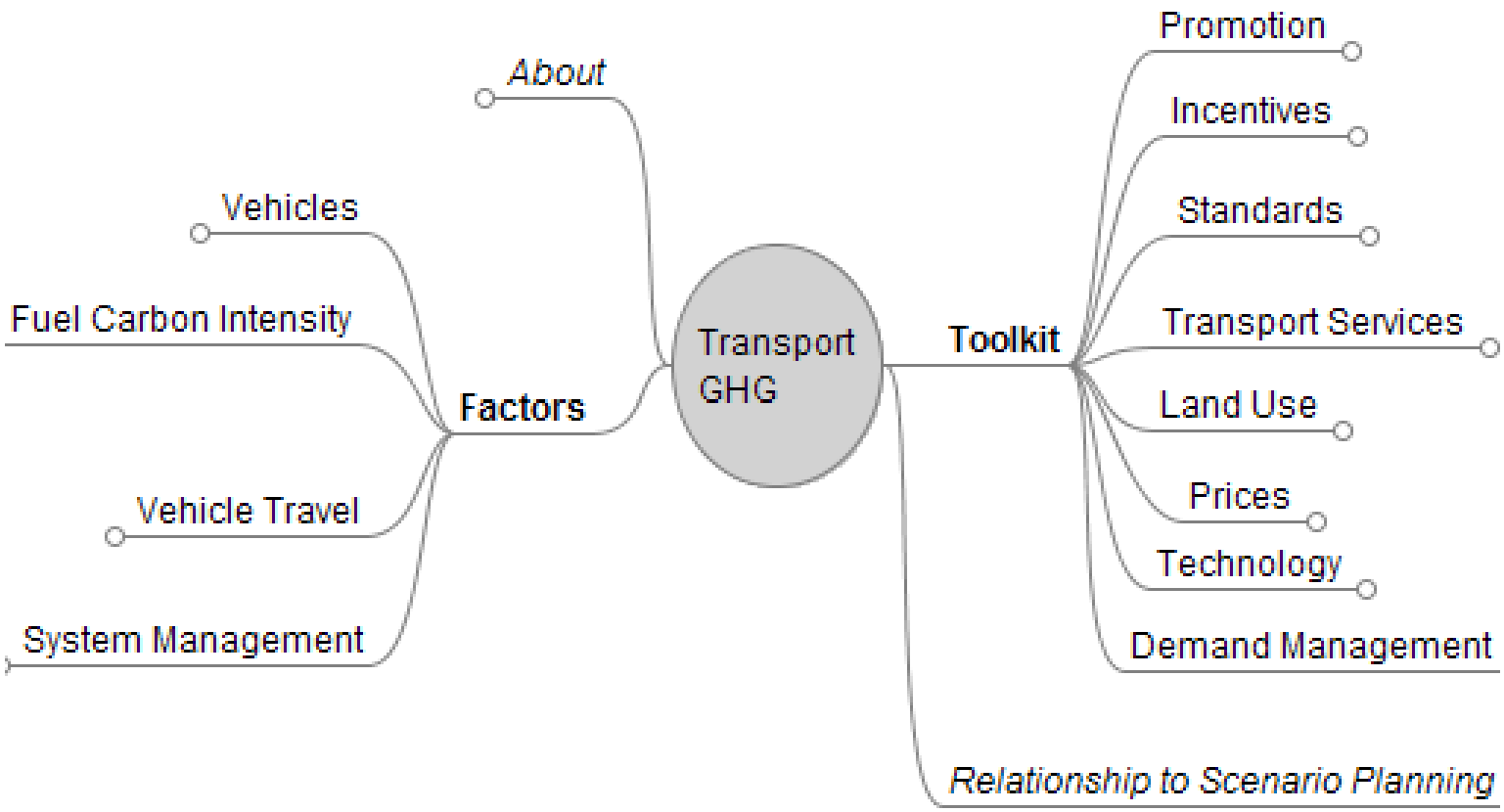
Illustrative example of the magnitude of the problem

75% reduction in GHG emissions in fuel consumption terms



Opportunities for transportation sector GHG reductions

Transportation GHG Factors and Toolkit



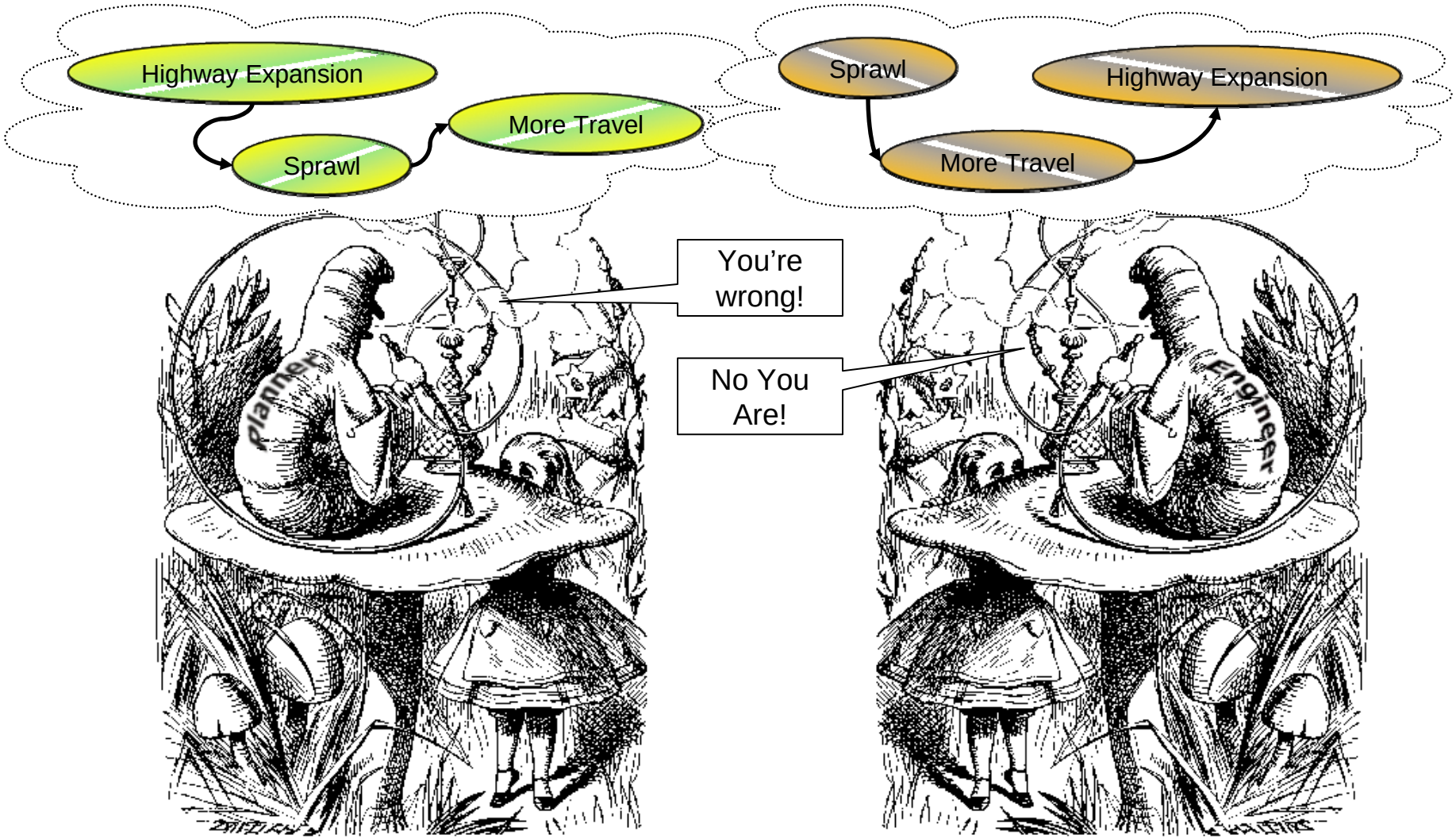
http://www.oregon.gov/ODOT/TD/TP/HB2186.shtml

Modeling GHG Mitigation Actions

We Are All Modelers

Any time that logic is used to predict the consequences of decisions, a model is used to structure the reasoning process. Most often that is a mental model.

Conflicts Arise from Differences in Mental Models



Formal Models are Needed for Analyzing Complex Systems

- To account for many complex interactions
- To maintain logical consistency
- To provide a more complete accounting
- To allow more policies to be tested
- To help resolve conflicts

Formal models are developed using procedures to check their validity.

Greenhouse Gas State Transportation Emissions Planning Model

GreenSTEP is a statewide transportation GHG planning model with sensitivity to a large number of land use, transportation, vehicle, price, fuels and other inputs.

It was created to help develop a statewide strategy on how to meet targets for reducing greenhouse gas (GHG) emissions from the transportation sector

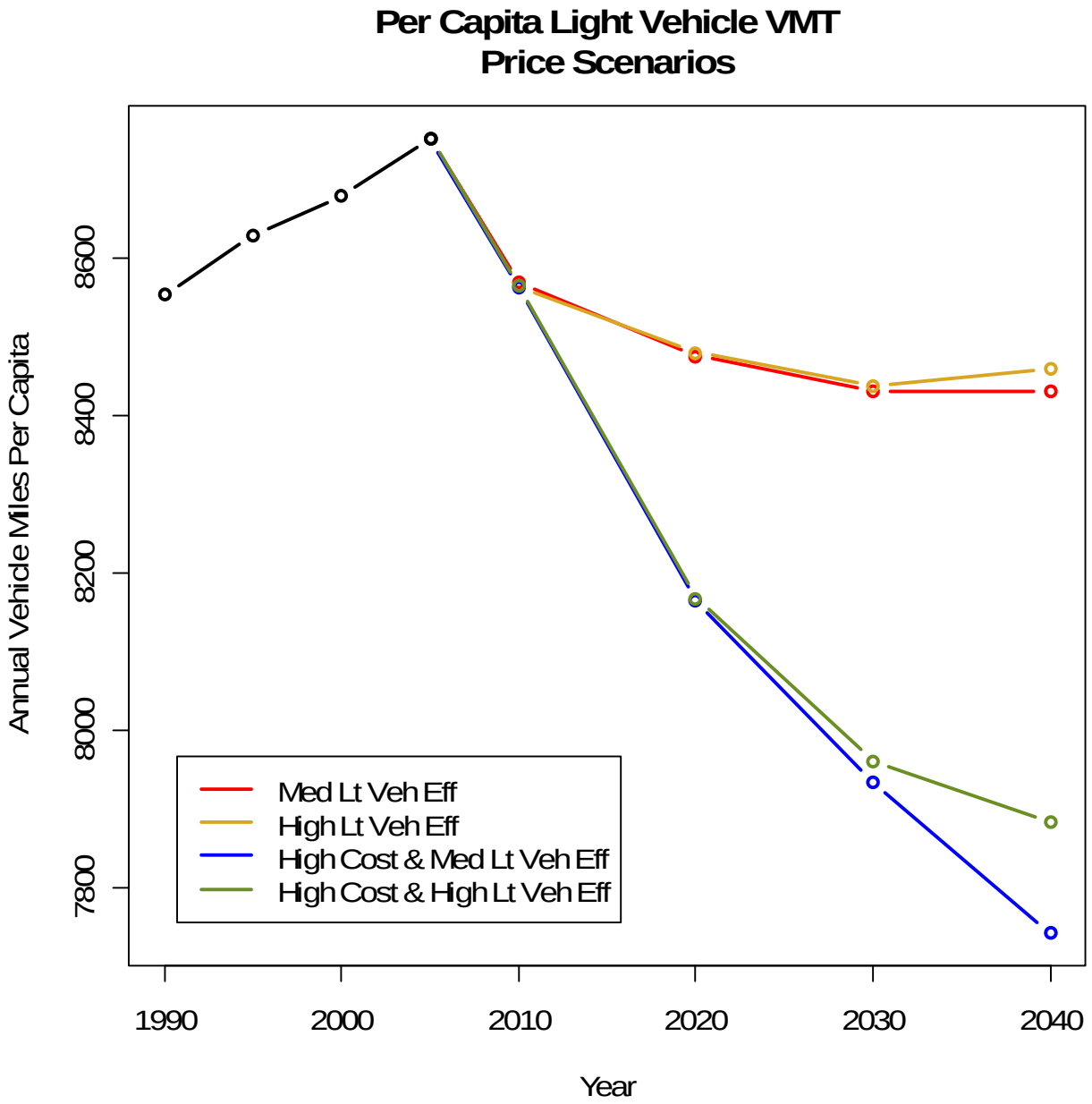
Description

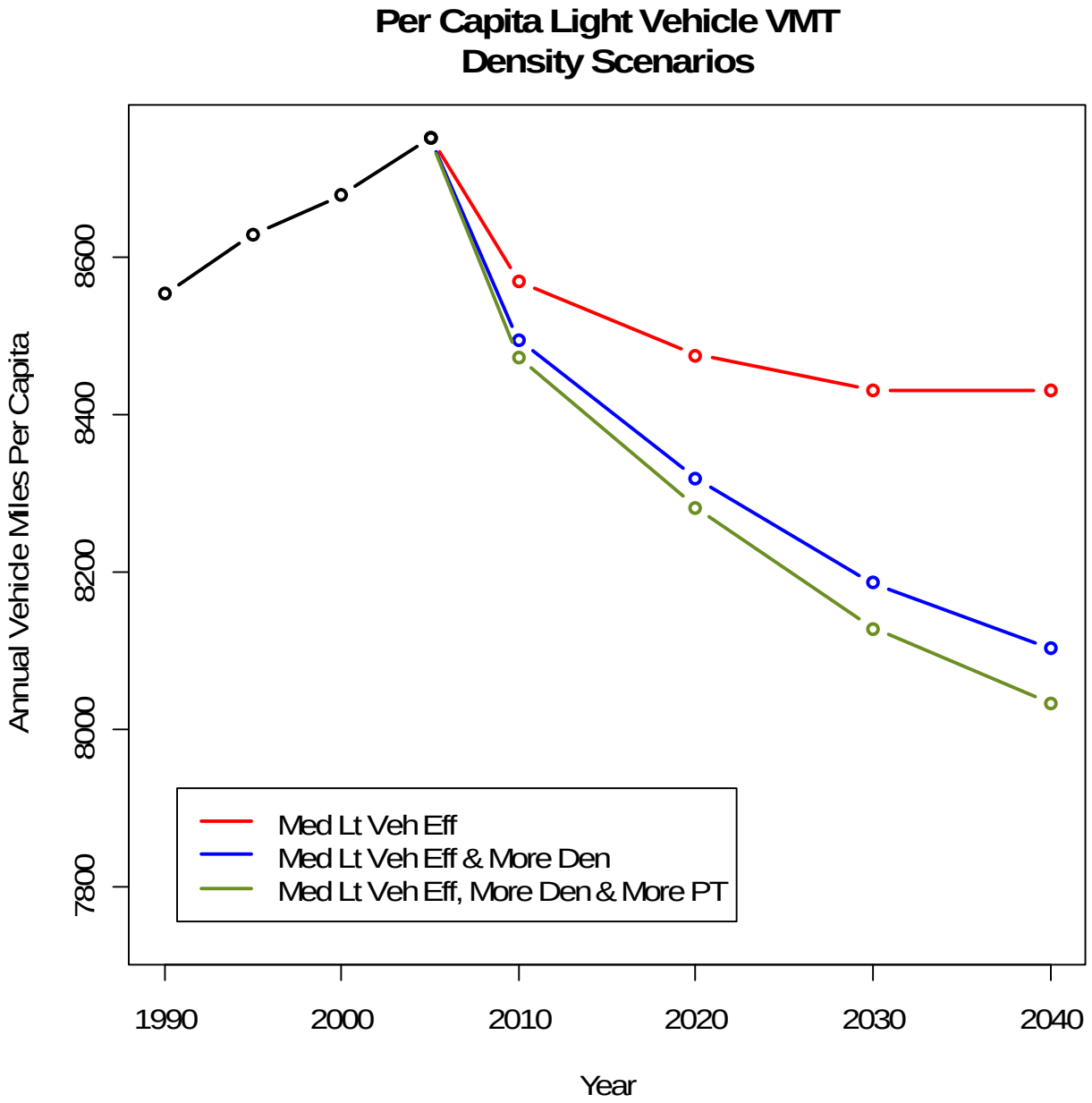
GreenSTEP has been peer reviewed by a panel of state and national experts

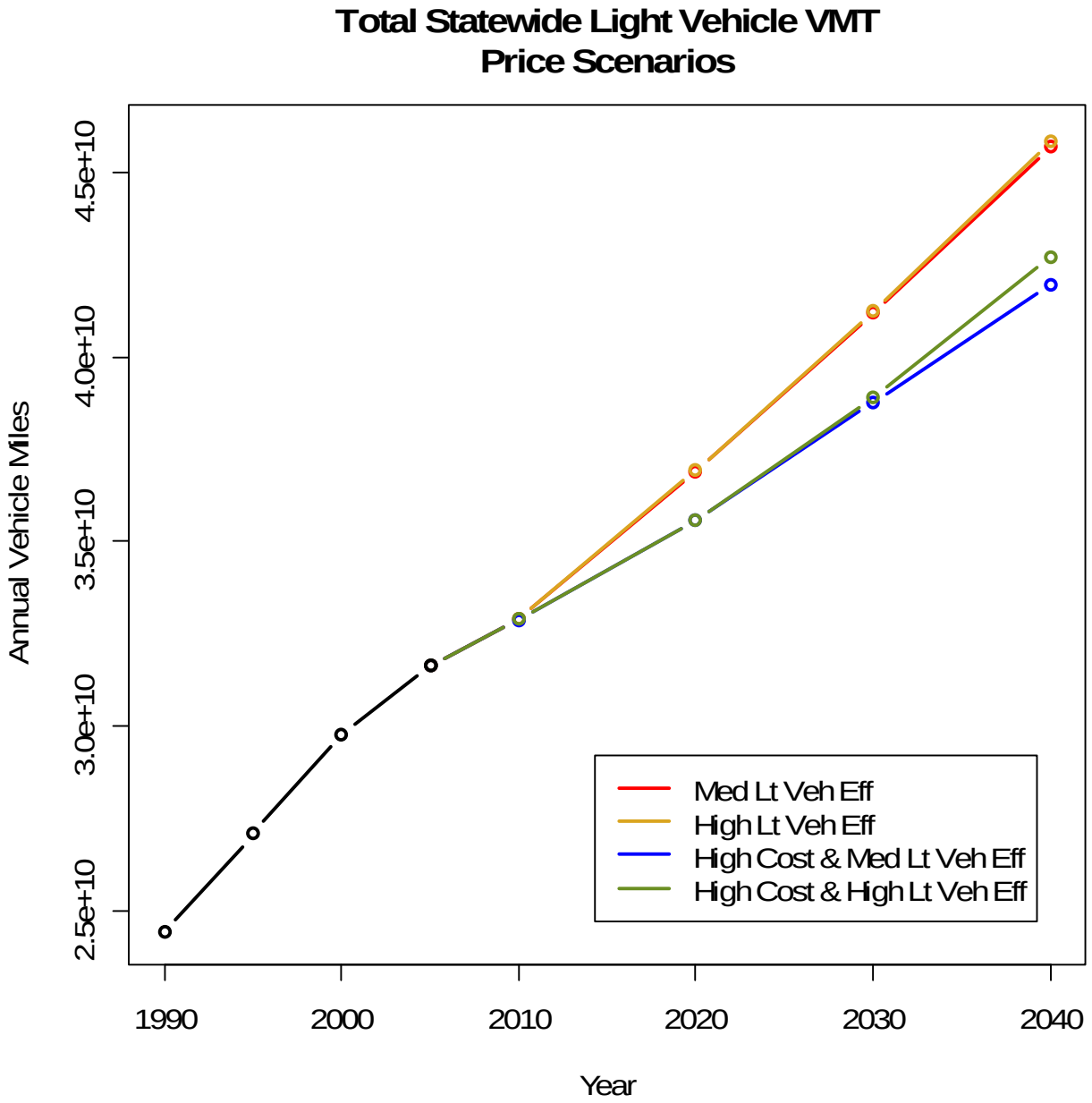
Some GreenSTEP model components can be added to urban models and the statewide integrated model to evaluate GHG emissions

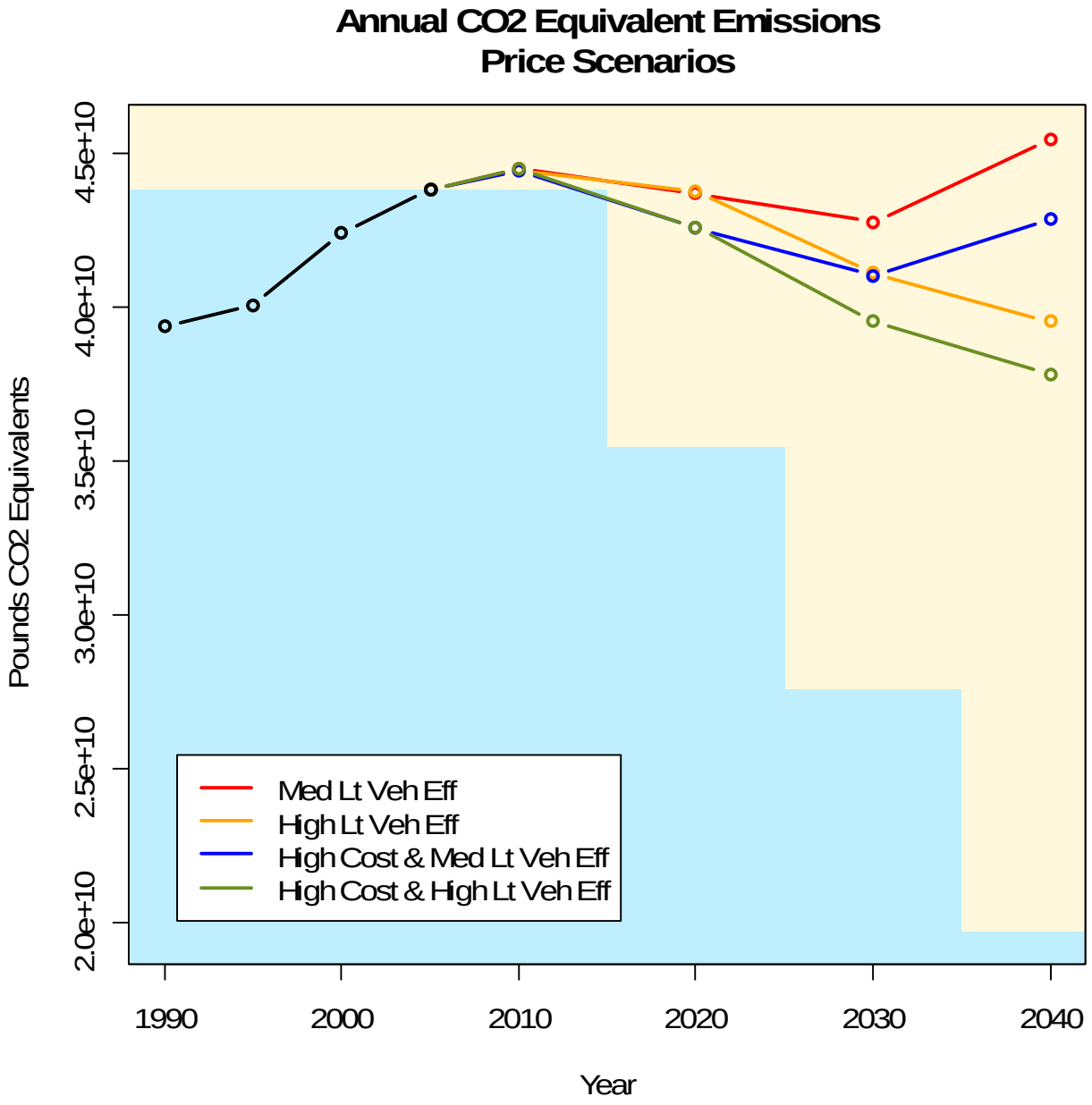
Model sensitivity

- Demographic changes
- Relative amounts of development occurring in urban and rural areas
- Metropolitan and other urban area densities
- Urban form
- Amounts of metropolitan area public transit service
- Highway capacity
- Vehicle fuel efficiency
- Vehicle ages
- Electric vehicles
- Fuel prices
- VMT pricing
- Demand management
- Effects of congestion on fuel economy
- Carbon content of fuels – including well to wheels impacts
- CO2 production from electrical power use for transportation


Per Capita Light Vehicle VMT
Price Scenarios
Annual Vehicle Miles Per Capita
7800
8000
8200
8400
8600
1990
2000
2010
2020
2030
2040
Year
Med Lt Veh Eff
High Lt Veh Eff
High Cost & Med Lt Veh Eff
High Cost & High Lt Veh Eff


Per Capita Light Vehicle VMT
Density Scenarios
Annual Vehicle Miles Per Capita
7800
8000
8200
8400
8600
1990
2000
2010
2020
2030
2040
Year
Med Lt Veh Eff
Med Lt Veh Eff & More Den
Med Lt Veh Eff, More Den & More PT


Total Statewide Light Vehicle VMT
Price Scenarios
Annual Vehicle Miles
2.5e+10
3.0e+10
3.5e+10
4.0e+10
4.5e+10
1990
2000
2010
2020
2030
2040
Year
Med Lt Veh Eff
High Lt Veh Eff
High Cost & Med Lt Veh Eff
High Cost & High Lt Veh Eff


Annual CO2 Equivalent Emissions
Price Scenarios
Pounds CO2 Equivalents
2.0e+10
2.5e+10
3.0e+10
3.5e+10
4.0e+10
4.5e+10
1990
2000
2010
2020
2030
2040
Year
Med Lt Veh Eff
High Lt Veh Eff
High Cost & Med Lt Veh Eff
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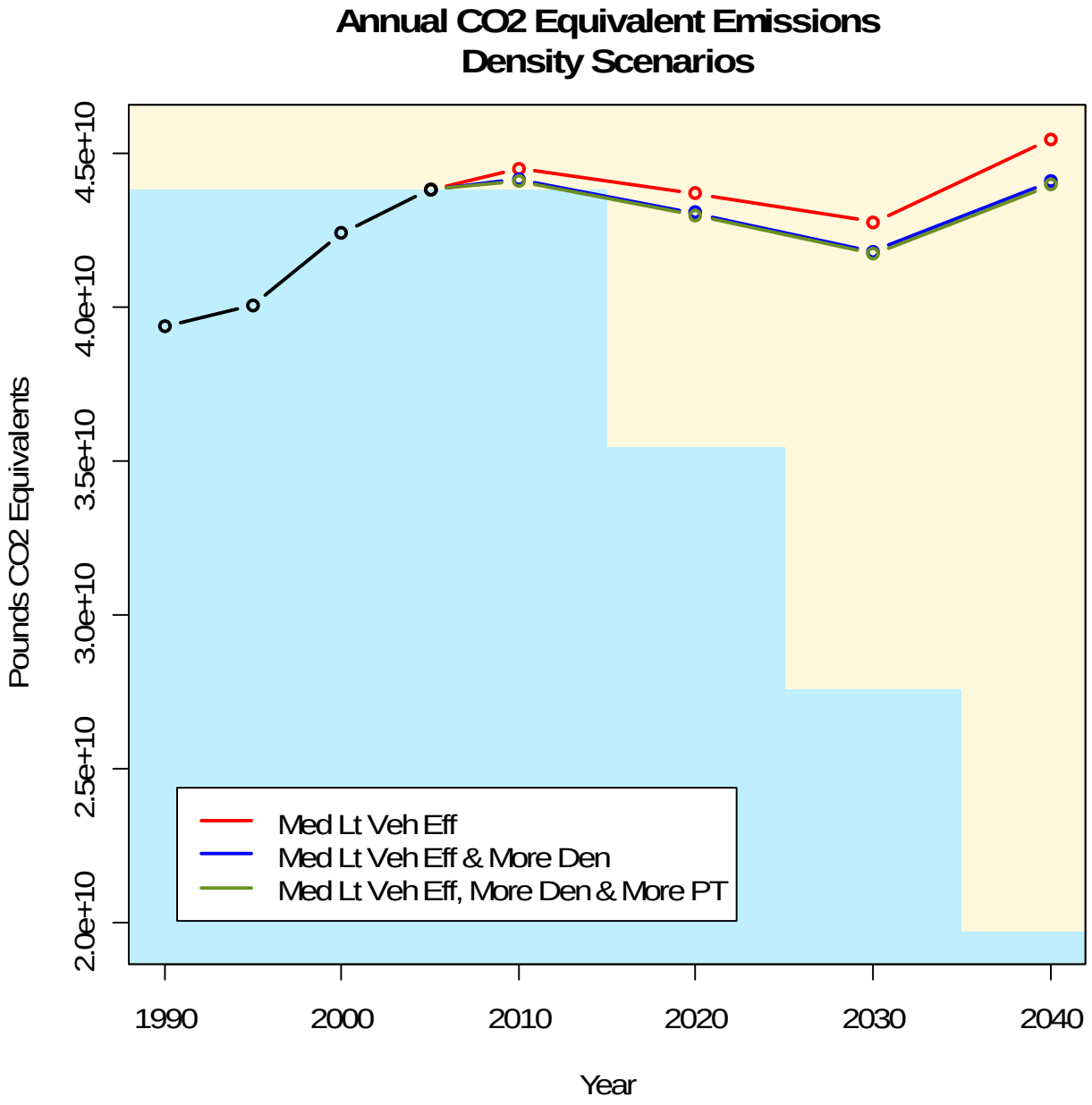
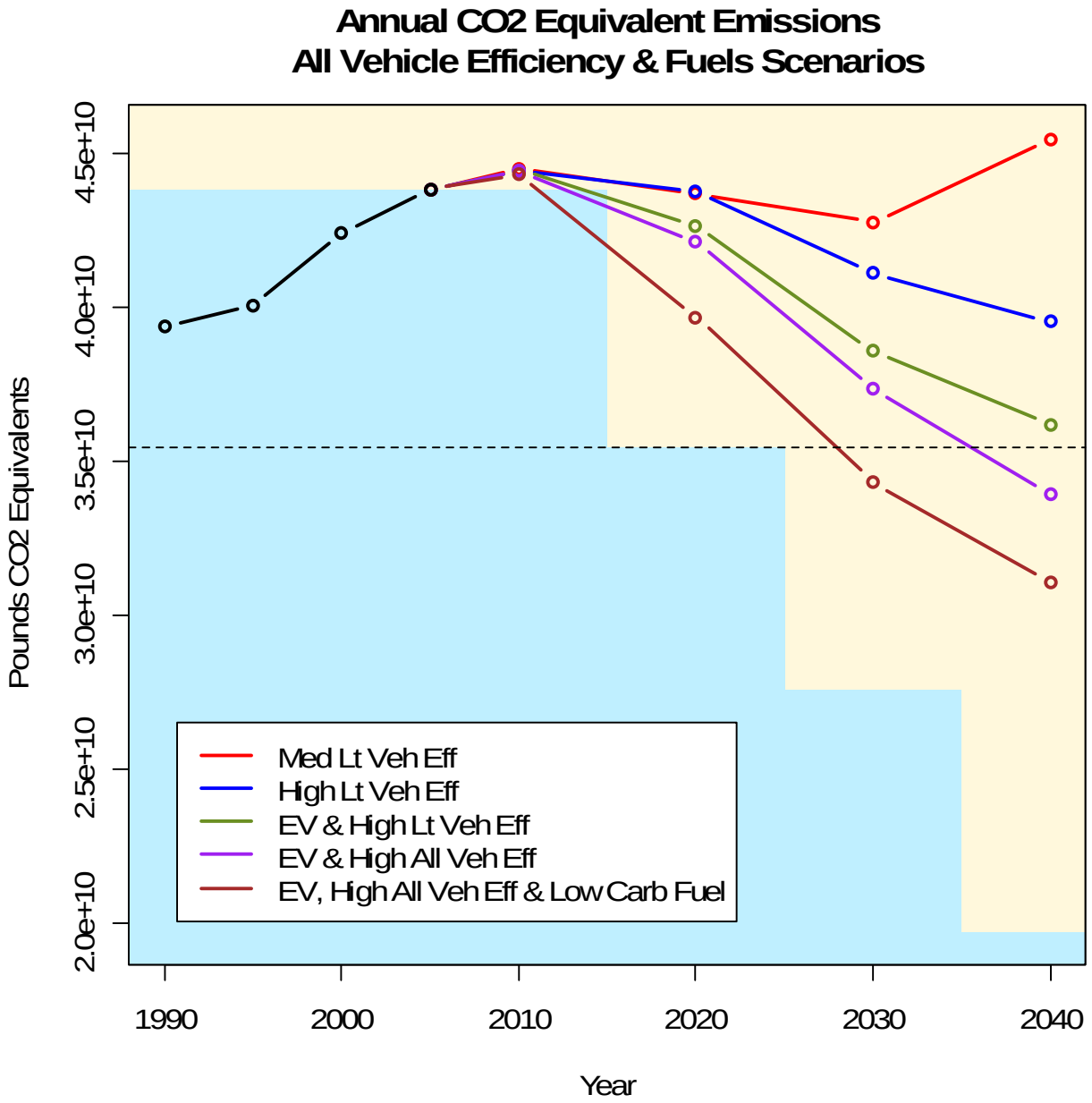

Annual CO2 Equivalent Emissions
Density Scenarios
Pounds CO2 Equivalents
2.0e+10
2.5e+10
3.0e+10
3.5e+10
4.0e+10
4.5e+10
1990
2000
2010
2020
2030
2040
Year
Med Lt Veh Eff
Med Lt Veh Eff & More Den
Med Lt Veh Eff, More Den & More PT


Annual CO2 Equivalent Emissions
All Vehicle Efficiency & Fuels Scenarios
Pounds CO2 Equivalents
2.0e+10
2.5e+10
3.0e+10
3.5e+10
4.0e+10
4.5e+10
1990
2000
2010
2020
2030
2040
Year
Med Lt Veh Eff
High Lt Veh Eff
EV & High Lt Veh Eff
EV & High All Veh Eff
EV, High All Veh Eff & Low Carb Fuel