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U.S. Department of Transportation
Federal Highway Administration

TMIP

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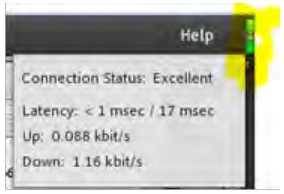
- **Close** all unnecessary programs running on their computer
- **Do not** use VPN or VDI. Connect directly to the room URL
- **Check** their connections status on the top right hand side of the screen



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More Administrative Items

- **The** session will be recorded. The recorded webinar is available after the session via GovDelivery and http://www.fhwa.dot.gov/planning/tmip/community/webinars/summaries/index.cfm.
- **All** participant phone lines are muted.
- **A** Q&A pod window is displayed on your screen and you can enter your questions there anytime. The presenters will answer them during the Q&A session.
- **Please** answer the polls to help us improve future webinars.
- **This** webinar will last approximately two hour.





SHRP2 SOLUTIONS

TOOLS FOR THE ROAD AHEAD

TravelWorks Implementation Update

C10/C04/C05/C16

November 2016

U.S. Department of Transportation
Federal Highway Administration

American Association of State Highway and Transportation Officials
AASHTO
The Voice of Transportation

Transportation Research Board
of the National Academies
TRB

Implementation Assistance

- Jointly funded by the State DOTs
- Competitive process managed by FHWA, AASHTO, TRB
- Support evaluation and implementation of SHRP2 products
    1. User Incentives
    2. Lead Adopter
    3. Technology Pilot

SHRP2 TravelWorks

- Rapid Policy Assessment Tool (C16)
- Improving our Understanding of How Highway Congestion and Price Affect Travel Demand (C04)
- Partnership to Develop an Integrated, Advanced Travel Demand Model and a Fine-Grained, Time-Sensitive Network (C10)

Current Use Cases

1. Vision, Goals, & Scenarios
2. Deficiencies & Strategies
3. Programming
4. Corridor Planning
5. Environmental Review

Adapted from SHRP2 PlanWorks

Sharing TravelWorks Results

- TravelWorks
  - https://planningtools.transportation.org/10/travelworks.html
- Travel Forecasting Resource
  - http://tfresource.org/Travel_Forecasting_Resource
- Innovations in Travel Modeling Conferences
- Planning Applications Conferences
- TRB Annual Meeting
- TMIP Webinar Series

TMIP Webinar Series

Rapid Policy Assessment Tool	• November 2, 2017
Demand Response to Congestion & Pricing	• Jan/Feb 2017
ABM+DTA	• Feb-Apr 2017

TravelWorks
Advanced Travel Analysis Tools

Introduction to the Rapid Policy Assessment Tool

Travel Model Improvement Program

November 2, 2016

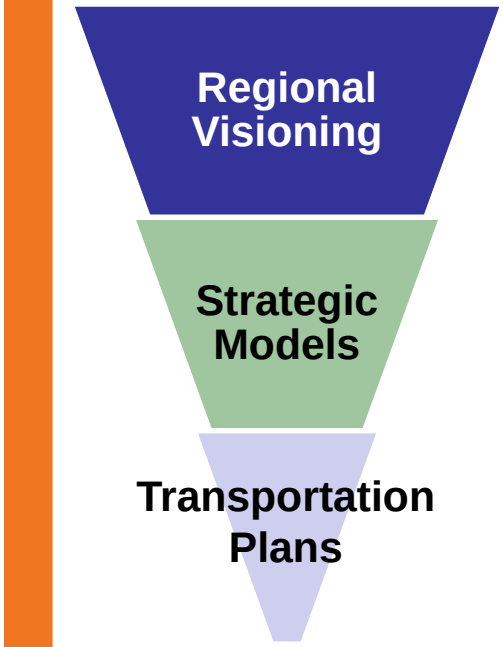
SHRP2 SOLUTIONS

Strategic Models

RapidPolicy
ASSESSMENT TOOL

- Consider many possible scenarios
- Combines higher level analysis of the transportation supply with individual characteristics of travelers and built environment
- Easy to apply and run quickly

- Bridge the Gap



Effects of Smart Growth on Travel Demand: Research Findings

RapidPolicy ASSESSMENT TOOL

Topic	Well-Established Relationships	Gaps in Research
Built environment impact on peak auto demand	Impact on daily travel	Impact by time of day
Mobility by mode and purpose	Impact on daily travel	Impact by trip purpose
Induced traffic and induced growth	Capacity expansion on an expanded facility	Route shifts, time-of-day shifts, mode shifts, induced trips, new destinations, growth shifts on the network; effects of operational improvements, land use plans
Relationship between smart growth and congestion	Localized effects	Macro-level or regional effects
Relationship between smart growth and freight	Freight is necessary for population centers	Impacts of loading docks, truck routing, full-cost pricing, freight facilities and crossings, interfirm cooperation, stakeholder communication

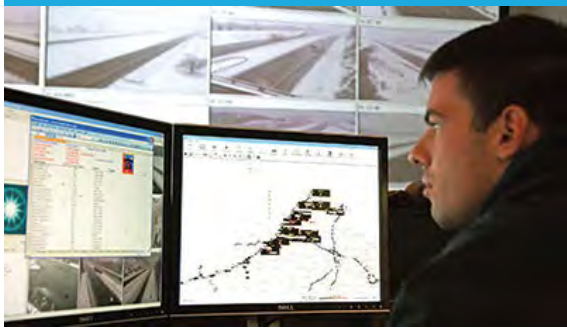
- Direct Experience by Practitioners and Academics capture through interviews
- Synthesis of Performance Metrics and Analysis Tools

RPAT Model Components

RapidPolicy
ASSESSMENT TOOL

1. Household Synthesis
2. Firm Synthesis
3. Urban Form
4. Accessibility
5. Vehicles
6. Auto Travel Demand
7. Truck and Bus Travel Demand
8. Congestion
9. Induced Demand
10. Policy Benefits

- Captures individual household and firm characteristics
- Captures interactions between policies
- Spatial results are by place type



Urban Form

RapidPolicy ASSESSMENT TOOL

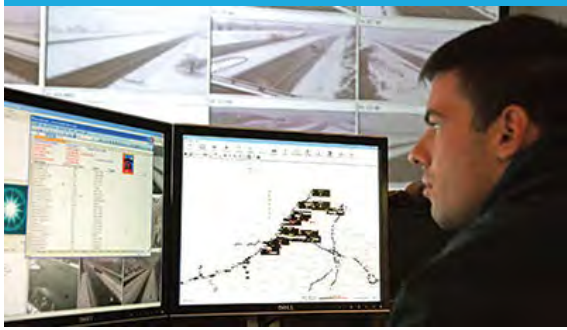
- Built Environment
  - Location of population and employment by place type

	Area Type			
Development Type	Urban Core	Close in Community	Suburban	Rural
Residential	✓	✓	✓	
Employment	✓	✓	✓	
Mixed-Use	✓	✓	✓	
Transit Oriented Development	✓	✓	✓	
Rural/ Greenfield				✓

- Demand Management Policies
  - Vanpool
  - Telecommuting
  - Ridesharing
  - Transit pass programs

Measures

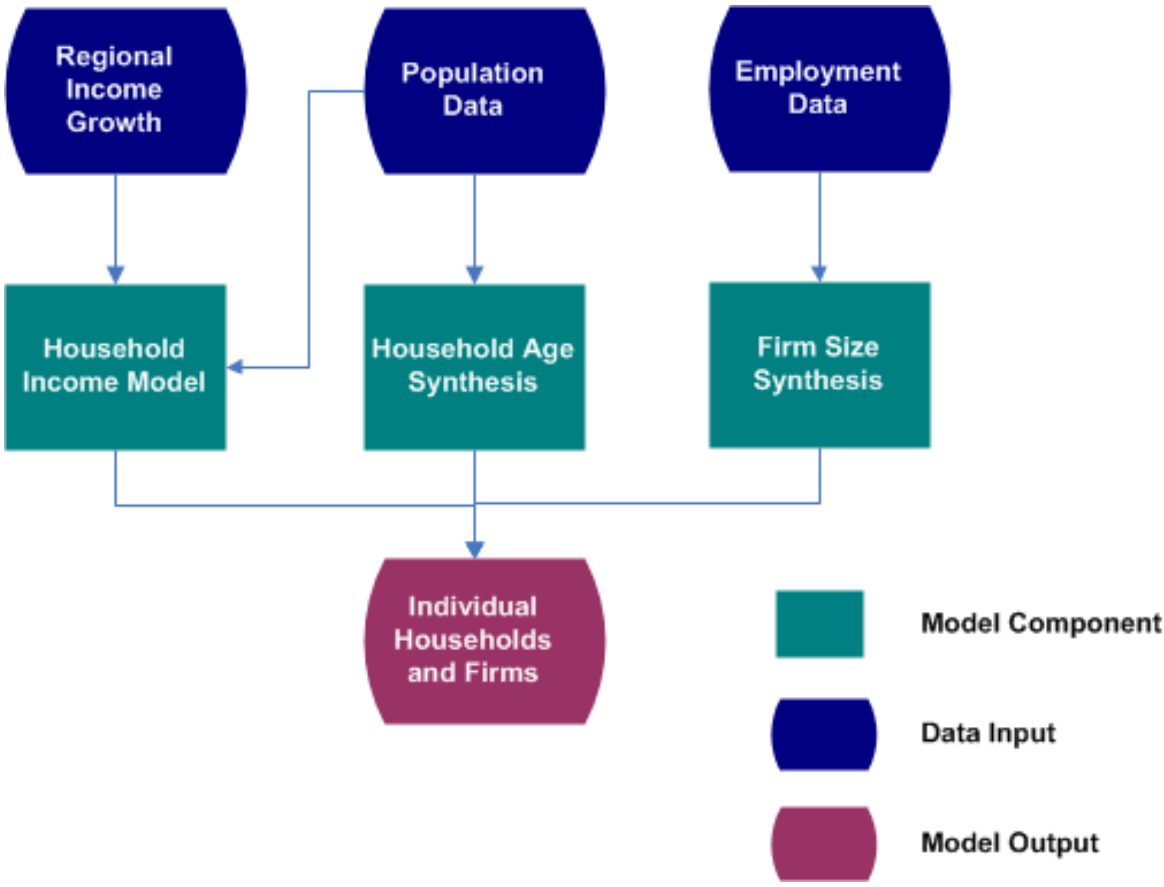
- Proportion of Population and Employment by Place Type
- Population and Employment Densities by Place Type



Household and Firm Synthesis

RapidPolicy ASSESSMENT TOOL

- Households
  - Persons by Age
    from Census data
  - HH Income
    from Bureau of Economic Analysis data
- Firms
  - Employees
  - Industry
    from County Business Pattern data
- Data can be updated from local sources



Accessibility

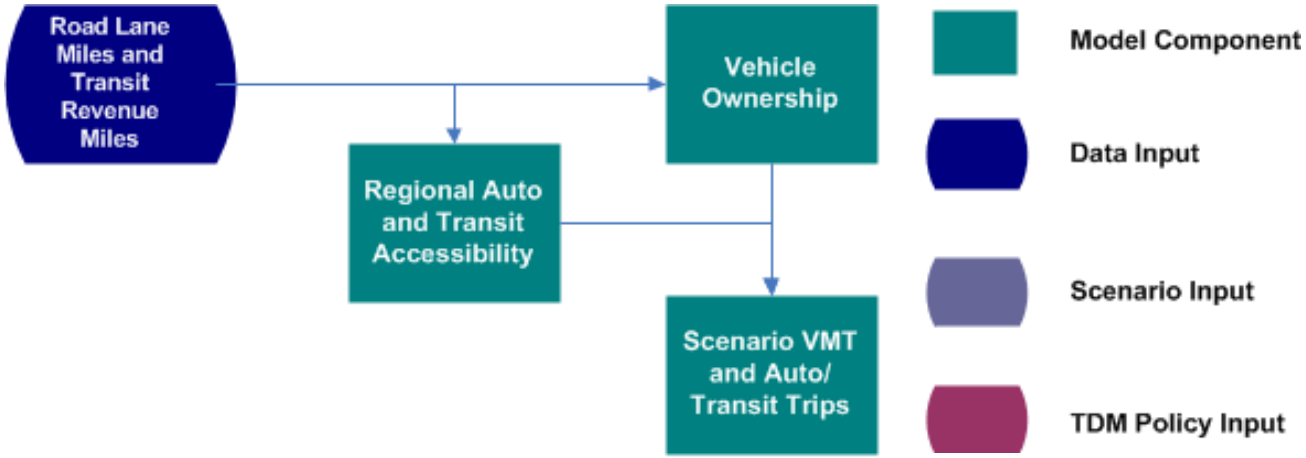
RapidPolicy
ASSESSMENT TOOL

Inputs

- Freeway Lane Miles
- Transit Revenue Miles (annual bus and rail revenue miles per capita)

Outputs

- Freeway Lane Miles per Person
- Transit Revenue Miles per Person



- Relates both transit and auto accessibility to travel behavior.
- Used in vehicle ownership models and vehicle miles traveled models.

Vehicle Models

RapidPolicy
ASSESSMENT TOOL

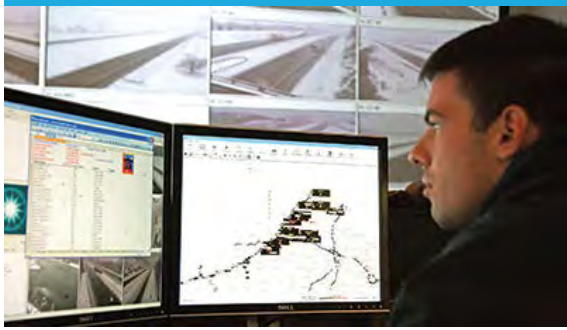
- **Predicts number of vehicle for each household**
  - Autos
  - Bikes
  - Light Trucks
- **Predicts vehicles by age/ fuel efficiency**
- **Based on**
  - Number of persons of driving age
  - Elderly persons
  - Household income
  - Population density
  - Urban mixed-use area
  - **Freeway and transit supply**

Travel Demand Models

RapidPolicy ASSESSMENT TOOL

- **Predicts Vehicle Miles Traveled for each Household**
  - Autos and Light Trucks
  - Heavy Trucks
  - Buses and Passenger Rail
- **Based on**
  - Household income
  - Population density
  - Driving age persons in household
  - Elderly persons in household
  - Mixed use development
  - Number of household vehicles
  - Freeway and transit supply

- Truck VMT is based on changes in regional household income
- Bus VMT is calculated from bus revenue miles



Performance Metrics

RapidPolicy ASSESSMENT TOOL

Direct Travel Impacts

- Daily VMT
- Daily Vehicle Trips
- Daily Transit Trips
- Peak Travel Speeds by Facility Type
- Vehicle Hours of Travel
- Vehicle Hours of Delay

Community Impacts

- Public Health Impacts and Costs
- Equity Impacts

Environment and Energy Impacts

- Fuel Consumption
- Greenhouse Gas Emissions
- Criteria Emissions

Financial and Economic Impacts

- Regional Highway Infrastructure Costs
- Regional Transit Infrastructure and Operating Costs
- Annual Traveler Cost

Land Market and Location Impacts

- Regional Accessibility

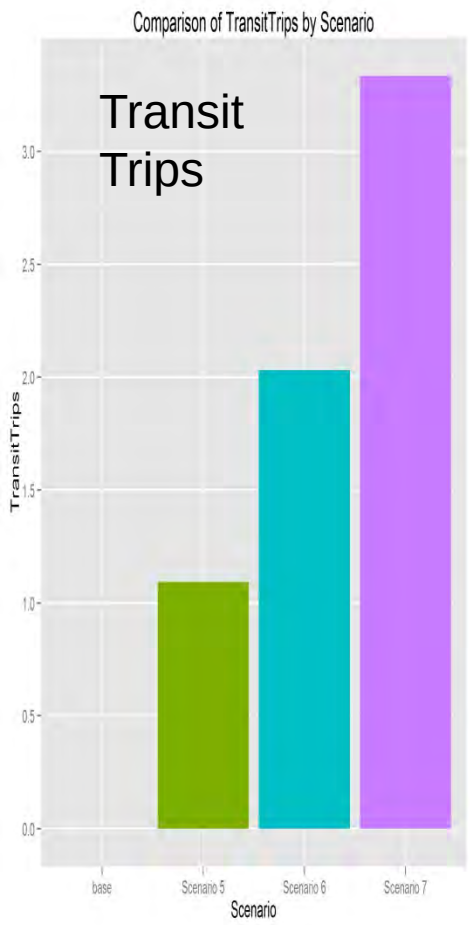
Developing Scenarios

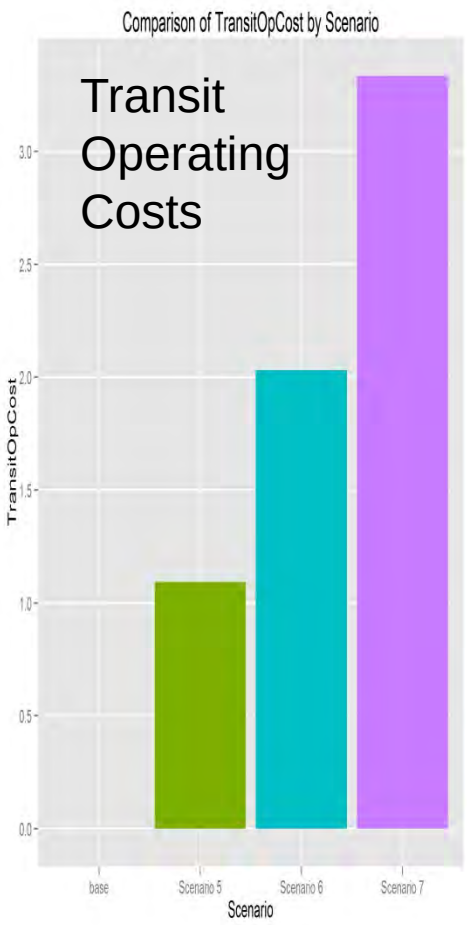
RapidPolicy ASSESSMENT TOOL

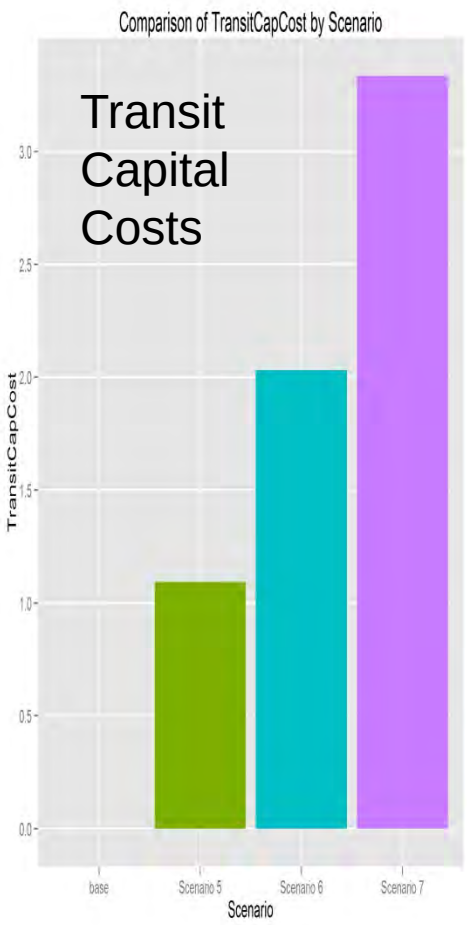
Scenario	Land Use	Transportation	Policy
#1	Baseline	Baseline	Baseline
#2	Baseline	+ 20% in Transit Supply	Baseline
#3	Baseline	+ 20% in Roadway Supply	Baseline
#4	Baseline	Baseline	+20% in Lane Miles with ITS
#5	Shift 10% of Population and Employment to Close in Community and 10% to Urban Core. Proportional reduction from Suburban Area	Baseline	Baseline
#6	Shift 20% of Population and Employment to Close in Community and 20% to Urban Core. Proportional reduction from Suburban Area	Baseline	Baseline
#7	Shift 30% of Population and Employment to Close in Community and 30% to Urban Core. Proportional reduction from Suburban Area	Baseline	Baseline
#8	Shift 30% of Population and Employment to Close in Community and 30% to Urban Core. Proportional reduction from Suburban Area	+20% in Transit Supply	+20% in Lane Miles with ITS

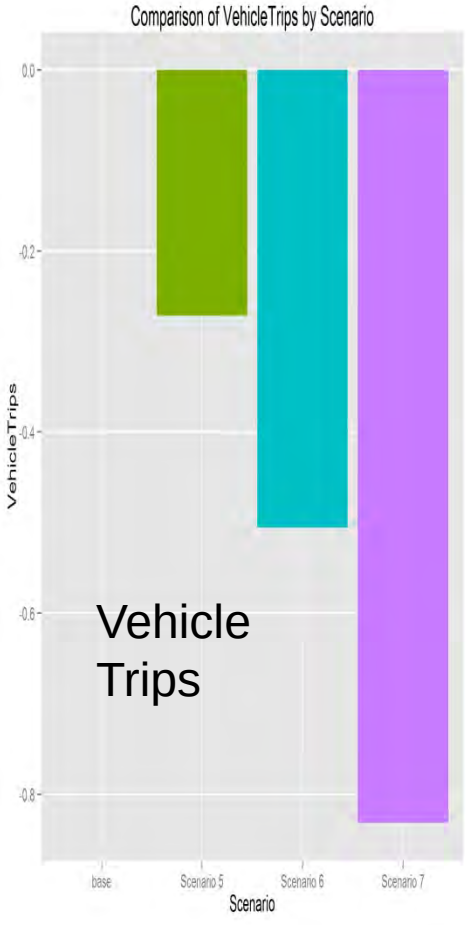
Evaluating Impacts

RapidPolicy ASSESSMENT TOOL









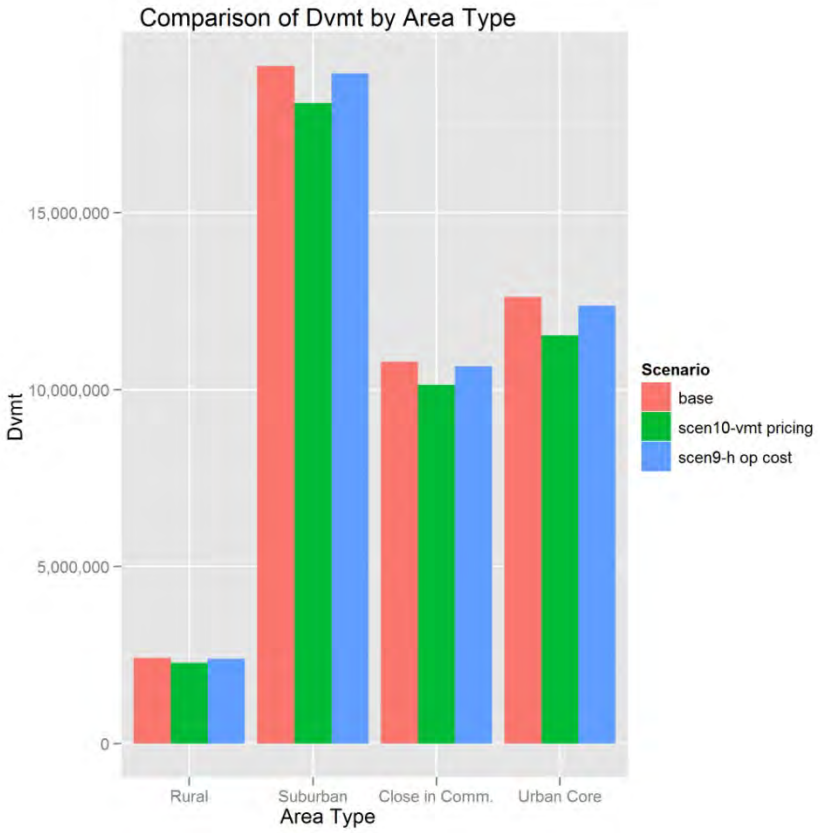
Allocating growth to more transit accessible locations increases transit use.

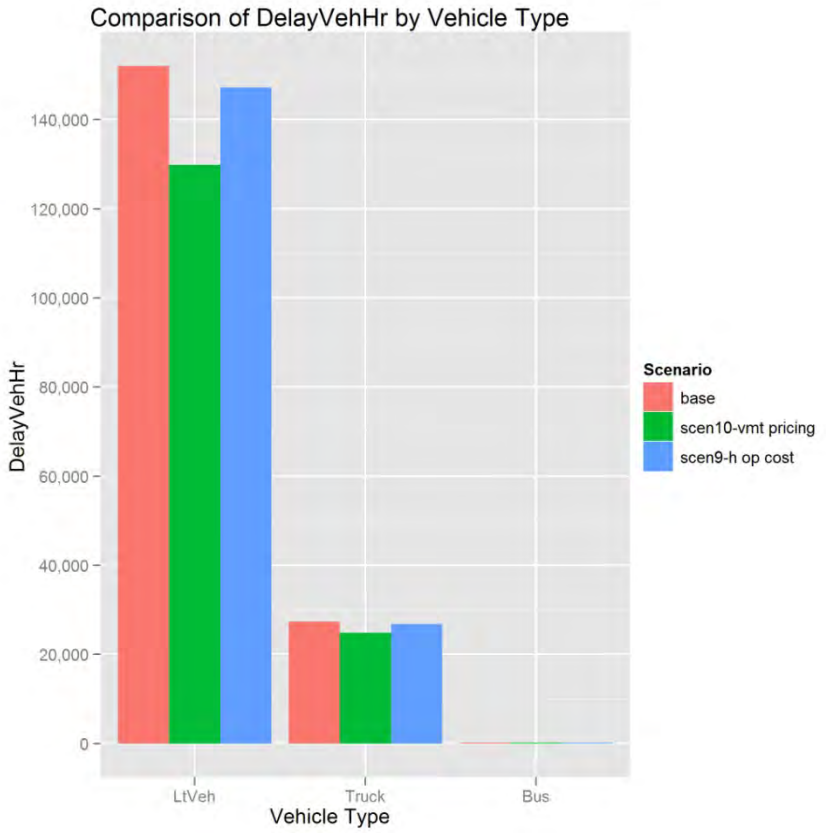
Allocating growth to more central and mixed use areas reduces vehicle trips.

Pricing Impacts

RapidPolicy ASSESSMENT TOOL

Scenario	Land Use	Transportation	Policy
#9	Baseline	Baseline	+ 25% auto operating cost growth
#10	Baseline	Baseline	10 c/mile VMT charge





VMT pricing at this rate (10c/mile) has a stronger effect than the more modest increase in operating costs (i.e. higher fuel price).

Resources

RapidPolicy ASSESSMENT TOOL

- RPAT Software
- RPAT Source Code
- RPAT User's Guide
- RPAT Place Type: Methodologies
- Report: *Effects of Smart Growth on Travel Demand*
- Discussion Forum
  - https://planningtools.transportation.org

RapidPolicy
ASSESSMENT TOOL

Adopting the Rapid Policy Assessment Tool (RPAT) for the Triangle Region *

Yanping Zhang & Felix Nwoko (DCHC MPO)
Colin Smith & Erich Rentz (RSG)

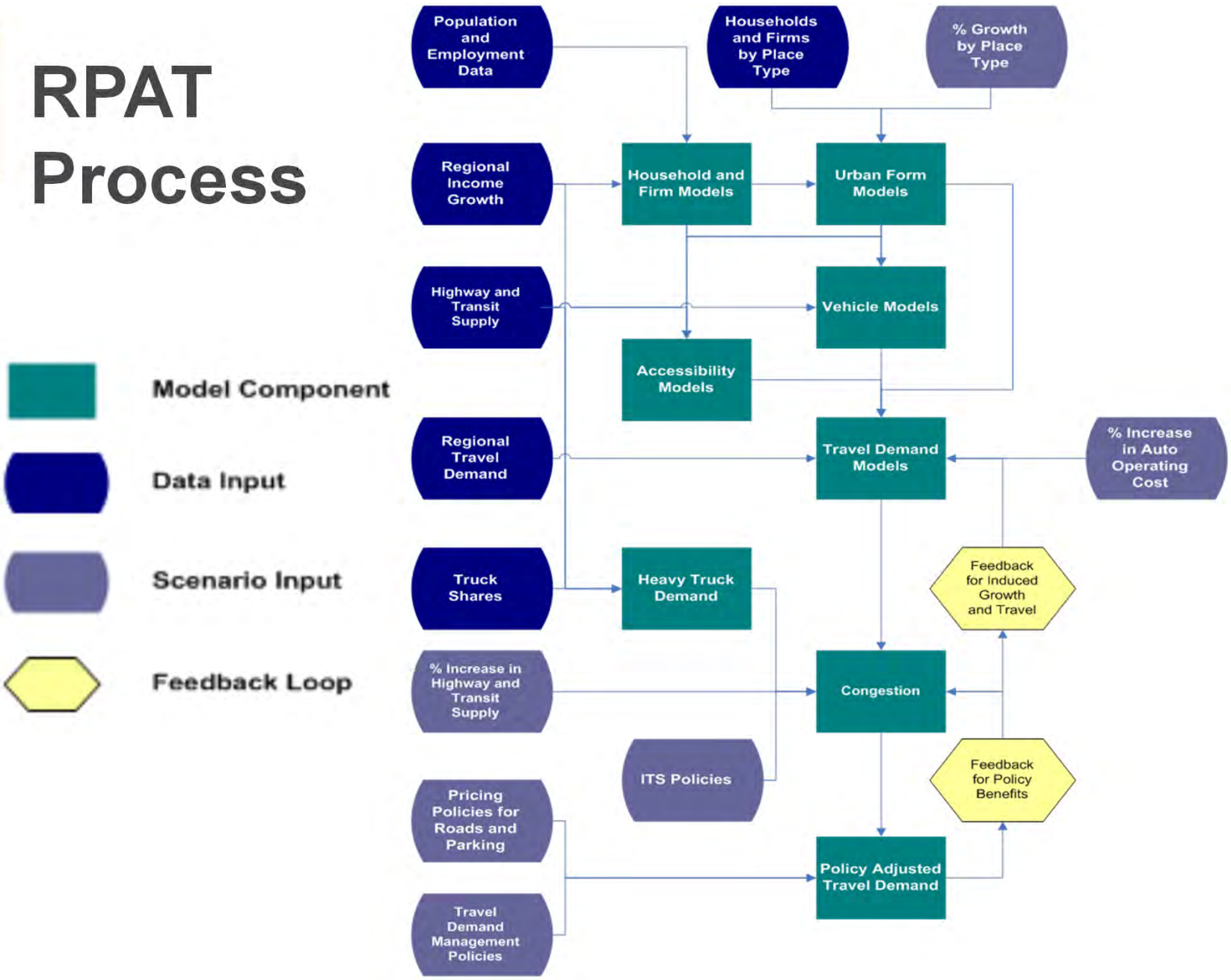
* SHRP2 C16 Project

What is the Rapid Policy Assessment Tool (RPAT)?

A free, open-sourced, and user-friendly strategic planning tool for,

- Evaluating growth effects on regional travel demand, energy-reduction, and carbon footprints
- Screening and comparing different growth scenarios
- Assessing what types of smart growth development are most suitable for given areas

RPAT Process



Triangle Region North Carolina

Western part:

Durham-Chapel Hill-Carrboro MPO (DCHC MPO)

Eastern Part:

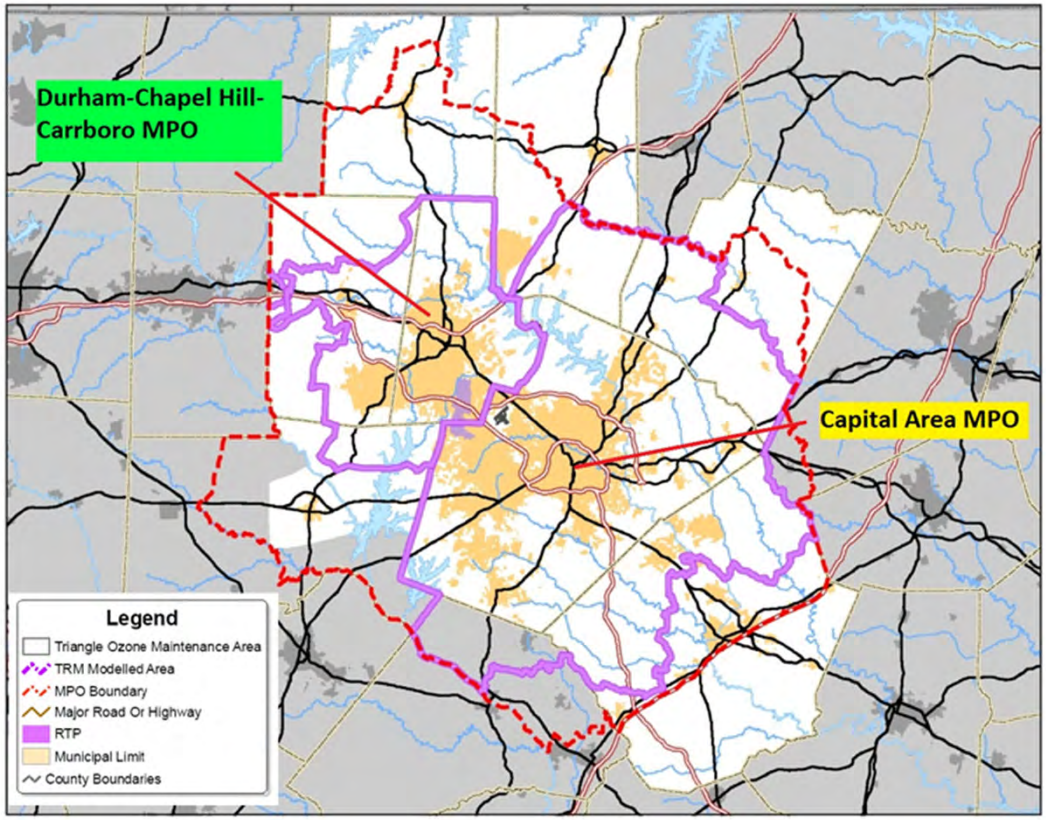
Capital Area MPO (CAMPO)

Regional Population:

2010: 1.61 Million Residents

2013: 1.72 Million Residents

2040: 2.95 Million Residents



Regional Travel Demand Model: Triangle Region Model (TRM)

RPAT Implementation (SHRP2 C16) Project for Triangle Region

DCHC MPO, CAMPO, RSG, NCDOT & ITRE/NCSU work together on,

- Preparing the RPAT input data and scenarios
- Validating the RPAT to replicate results of Triangle Region Model, for supporting the pre-screening of transportation and land use scenarios in the MTP process
- Addressing policy questions, such as the impact of smart growth on land use, travel demand, and transportation supply

Transportation & Land Use Policies

Predicts the Change in VMT for each Household due to Transportation Policies

Growth/Development

- High Density Transit-Oriented Development (TOD)
- More Growth in Urban & Suburban Areas

ITS strategies

- Percentage of freeways with ITS strategies
- Percentage of arterials with ITS strategies

Pricing Policies

- VMT charges (cents per mile)

	VMT Charge (Cents per Mile)									
	1	2	3	4	5	6	7	8	9	10
VMT Reduction	0.0%	0.2%	0.4%	0.6%	1.0%	1.3%	1.8%	2.3%	2.9%	3.6%

Tested Scenarios - Triangle Region

*Scenarios of the 2040 MTP Study

		Demand (& Landuse) Scenarios			
		Community Plan (CommP)	All-In-Transit (AIT)	Metro Transp Plan (MTP-D)	MTP-D w/ 20% Growth Shift to Dense Area
Supply (& Network) Scenarios	Existing Plus Committed (E+C)			*E+C	
	Transit Intensive (TRN)		*TRN		
	Highway Intensive (Hwy)	*Hwy			
	Metro Transp Plan (MTP-S)			*MTP	MTPx20DA
	MTP-S w/ 20% ITS Treatment			MTP wITS20	MTPx20DA wITS

Scenario Input

Inputs:

- Built environment
- Travel demand
- Transportation supply
- Policies

PLACE TYPES

	Area Type			
Development Type	Urban Core	Close in Community	Suburban	Rural
Residential	✓	✓	✓	
Employment	✓	✓	✓	
Mixed-Use	✓	✓	✓	
Transit Oriented Development	✓	✓	✓	
Rural/ Greenfield				✓

Data sources:

- TRM & CommunityViz Model
- Geocoded Regional Employment Data
- Census Data & others

Scenario Assumptions

Base – 2040 MTP Scenario

% Difference to Base		Scenario					
		E+C	**Hwy**	**TRN**	**xITS**	**yG20toDA**	**zG20toDA&ITS**
Input	Population	0.0%	0.2%	2.6%	0.0%	0.0%	0.0%
	Highway Lane Mile	-9.1%	9.4%	-1.6%	0.0%	0.0%	0.0%
	Transit Service Mile	-30.5%	6.7%	131.9%	0.0%	0.0%	0.0%
	20% ITS				Yes		Yes
	20% Growth to Dense Area					Yes	Yes

RPAT Validation

RPAT Was Validated against Results from the Triangle Region Model (TRM) for MTP, E+C, Hwy & TRN scenarios

2040 MTP (Base)	Vehicle Miles Traveled	Vehicle Hours Traveled	Total Transit Trips	Total Vehicle Trips
RPAT	66,367,265	1,623,893	223,402	8,894,594
TRM	63,920,021	1,707,586	227,878	8,919,982
Difference (%)	3.83%	-4.90%	-1.96%	-0.28%

Model Report

Home | Scenarios | Reporting | Users Guide

Please select from the report options below.

Note that you must select at least one option from each category.

Scenarios

- [x] Base
- [ ] Base_CAMPO
- [ ] Base_DCHC
- [x] E+C
- [x] Hwy
- [x] TRN
- [x] xITS20
- [x] yG20toDA
- [x] zG20&ITS

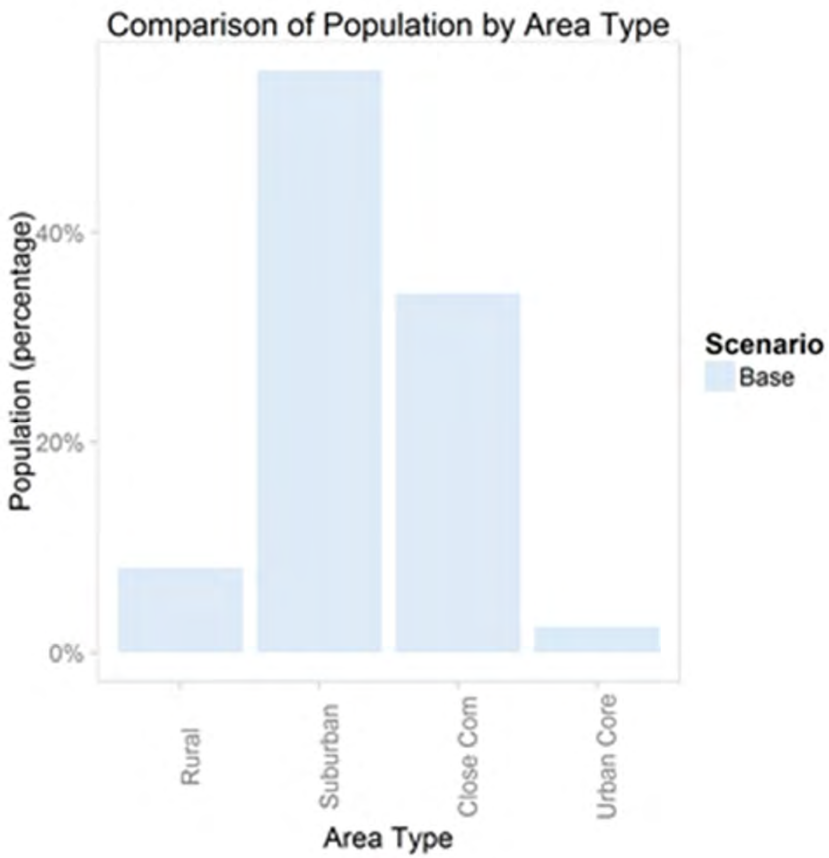
Measures

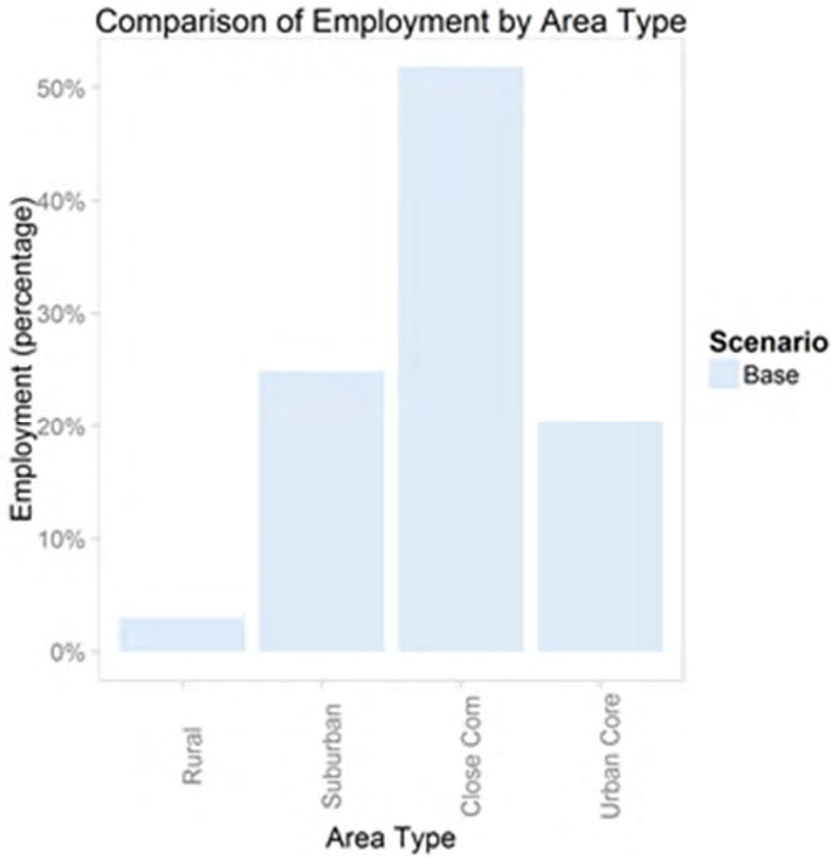
- [x] Number
- [x] Percentage
- [ ] Index(100)
- [ ] Index(0)

Performance Metrics

Performance Metrics	All	Place	Area	Development	Vehicle Type	Accident Severity	Income Group
Daily Vehicle Trips	☑	☐	☐	☐	■	■	■
Daily Transit Trips	☑	☐	☐	☐	■	■	■
Daily Vehicle Miles Traveled	☑	☐	☐	☐	■	■	■
Greenhouse Gas Emissions	☑	☐	☐	☐	■	■	■
Fuel Consumption	☐	☐	☐	☐	■	■	■
Annual Traveler Cost (Fuel and Charges)	☑	☐	☐	☐	■	■	■
Population	☑	☐	☐	☑	■	■	■
Employment	☑	☐	☐	☑	■	■	■
Income	☐	☐	☐	☐	■	■	■
Peak Travel Speeds by Vehicle Type	☑	■	■	■	☐	■	■
Vehicle Hours of Travel	☑	■	■	■	☐	■	■
Vehicle Hours of Delay	☐	■	■	■	☐	■	■
Accident Rates	☑	■	■	■	■	☐	■
Job Accessibility by Income Group	☑	■	■	■	■	■	☐
Regional Infrastructure Costs for Highway	☐	■	■	■	■	■	■
Regional Infrastructure Costs for Transit	☐	■	■	■	■	■	■
Annual Transit Operating Cost	☐	■	■	■	■	■	■
Regional Accessibility	☑	■	■	■	■	■	■
Walking Percentage Increase	☑	■	■	■	■	■	■

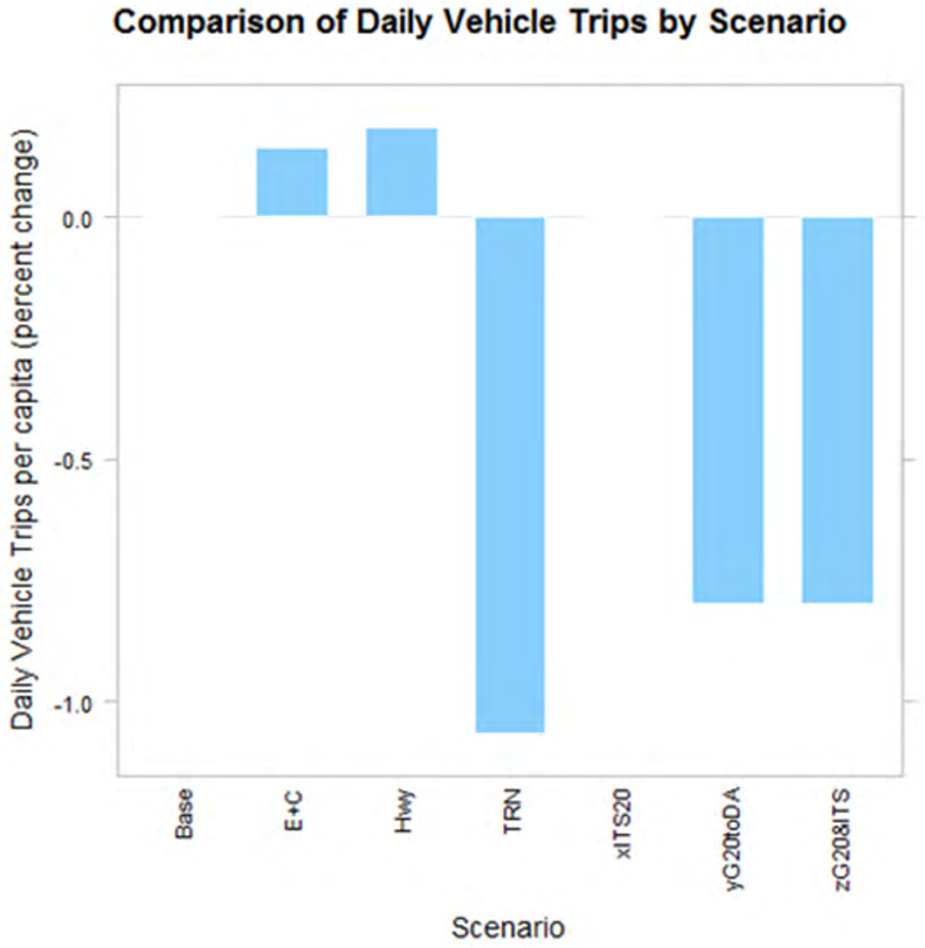
2040 MTP Pop. & Emp. By Area Type





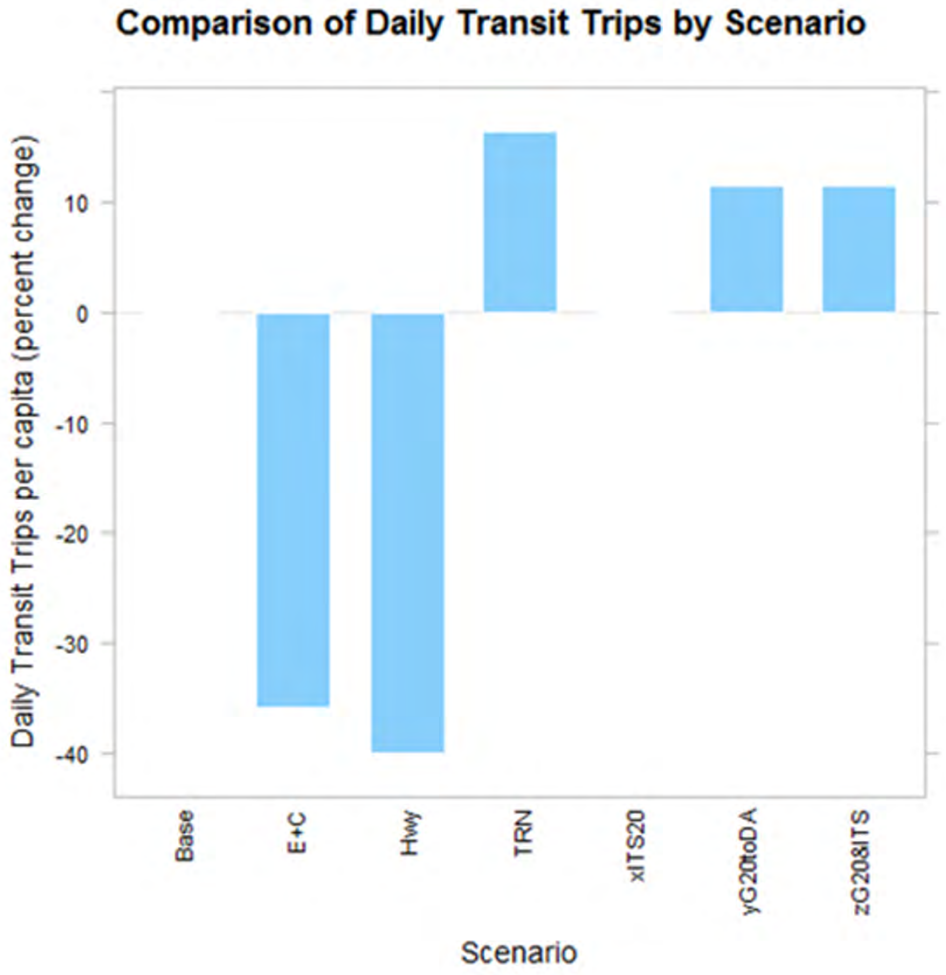
Vehicle Trips by Scenario

1. 2040 MTP - Baseline
2. E+C: 0.14% Trip Increase
3. Hwy: 0.19% Trip Increase
4. TRN: 1.07% Trip Reduction
5. ITS20: No change
6. MTPx20DA:
   0.8% Trip Reduction
7. MTPx20DAwITS:
   0.8% Trip Reduction



Transit Trips by Scenario

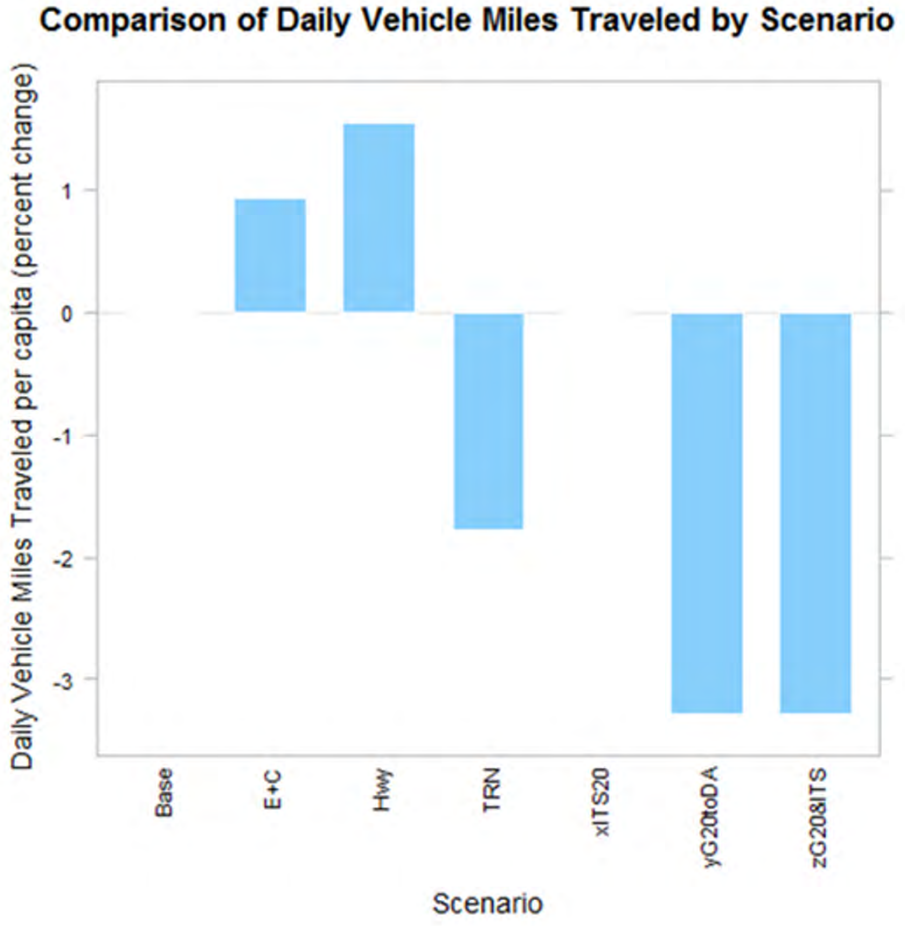
1. 2040 MTP - Baseline
2. E+C: 36% Trip Reduction
3. Hwy: 40% Trip Reduction
4. TRN: 16% Trip Increase
5. xITS20: No change
6. MTPx20DA:
   12% Trip Increase
7. MTPx20DAwITS:
   12% Trip Increase



* Under-estimation Issue and solution

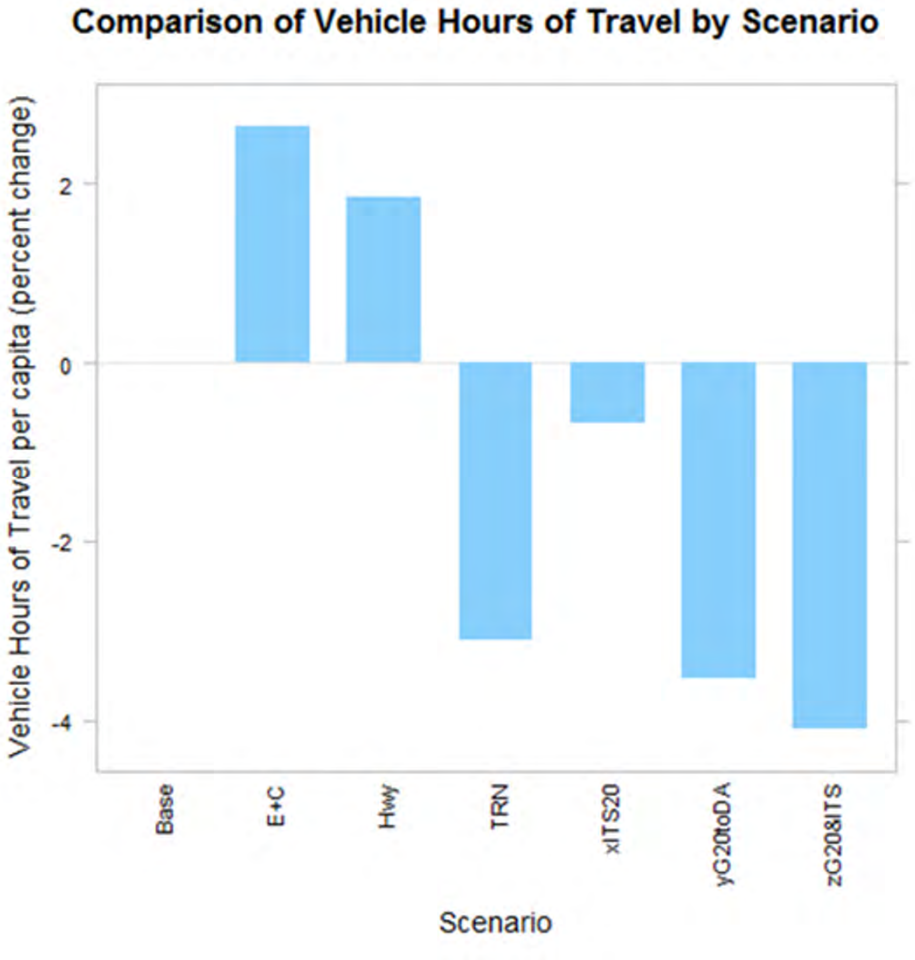
Vehicle Miles Traveled by Scenario

1. 2040 MTP - Baseline
2. E+C: 0.9% VMT Increase
3. Hwy: 1.6% VMT Increase
4. TRN: 1.8% VMT Reduction
5. xITS20: No change
6. MTPx20DA:
   3.3% VMT Reduction
7. MTPx20DAwITS:
   3.3% VMT Reduction



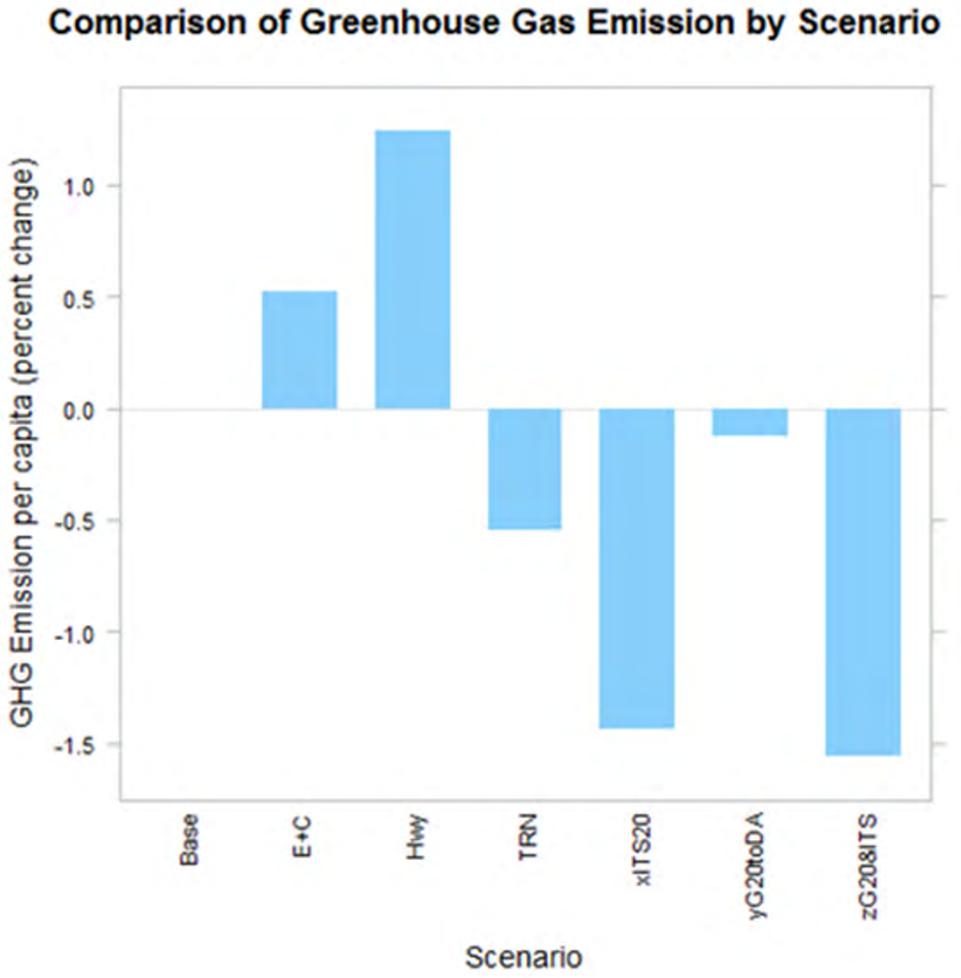
Vehicle Hours Traveled by Scenario

1. 2040 MTP - Baseline
2. E+C: 2.6% VHT Increase
3. Hwy: 1.8% VHT Increase
4. TRN: 3.1% VHT Reduction
5. xITS20:
   0.7% VHT Reduction
6. MTPx20DA:
   3.5% VHT Reduction
7. MTPx20DAwITS:
   4.1% VHT Reduction



Greenhouse Gas Emission by Scenario

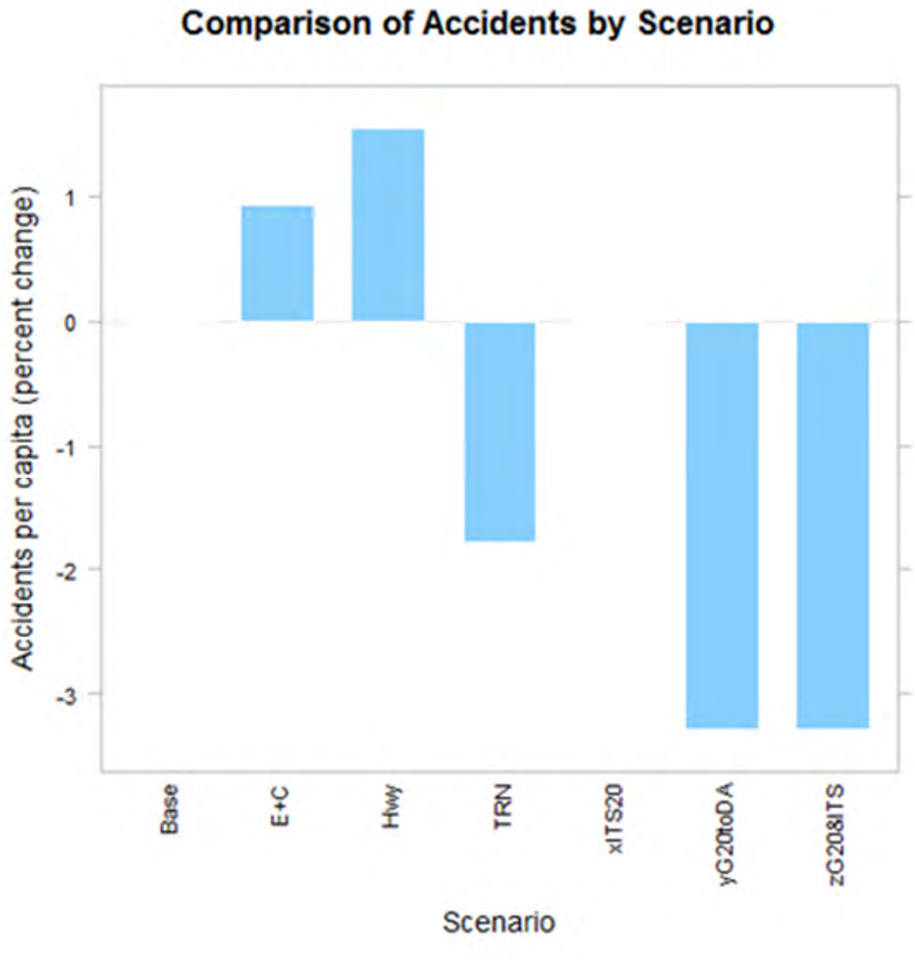
1. 2040 MTP - Baseline
2. E+C: 0.52% Increase
3. Hwy: 1.24% Increase
4. TRN: 0.55% Reduction
5. xITS20: 1.44% Reduction
6. MTPx20DA :
   0.13% Reduction
7. MTPx20DAwITS :
   1.56% Reduction



Scenarios 6+7 = 4.2% > 4.1% (of Scenario 7)

Traffic Accidents by Scenario

1. 2040 MTP - Baseline
2. E+C: 0.9% Increase
3. Hwy: 1.6% Increase
4. TRN: 1.8% Reduction
5. xITS20: No change
6. MTPx20DA :
   3.3% Reduction
7. MTPx20DAwITS :
   3.3% Reduction



Summary

- Quick response tool – 15 minutes for a scenario run
- Reasonable evaluation on multiple policy combination
- Multiple scenario comparison in one panel
- RPAT provides more performance measures than traditional TDM to address policy questions, such as land use pattern, transportation supply, and economic efficiency.
- Transit Trip Model refined by DCHC MPO

RPAT – Information & Downloading

https://planningtools.transportation.org/551/rapid-policy-analysis-tool.html

Thanks You!

Strategic Performance Based Planning:

MPO Scenario Planning using RPAT in Oregon

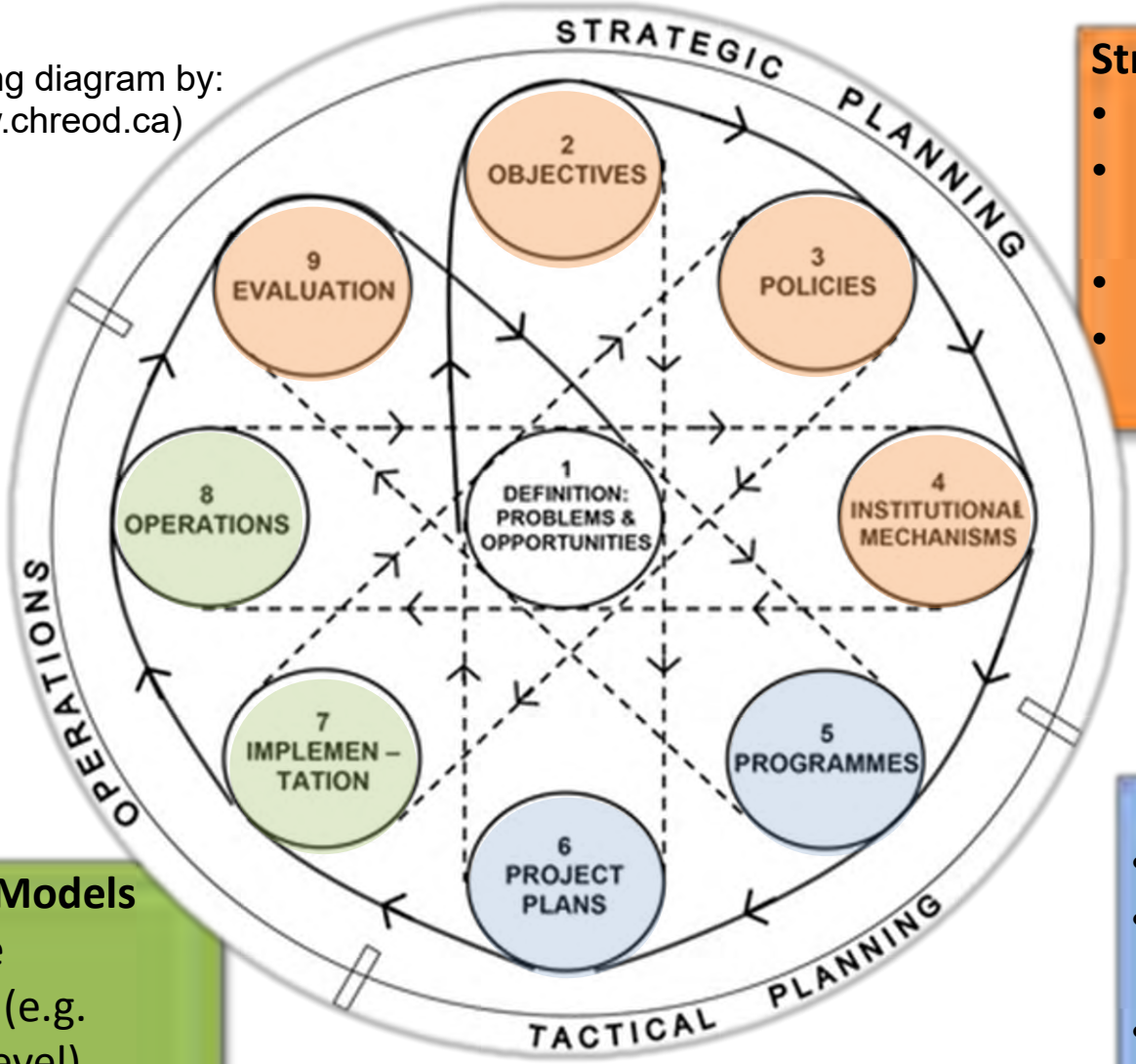
TMIP Webinar
11/2/2016

Oregon Department of Transportation

Brian Hurley
Transportation Planner

Strategic Planning Layer

Modified from planning diagram by:
Edward Leman (www.chreod.ca)



Strategic Planning Models

- Broad scope
- Limited detail (e.g. system level)
- Many scenarios
- e.g. GreenSTEP, RSPM, RPAT

Tactical Models

- Moderate scope
- Moderate detail (e.g. link level)
- Few scenarios
- e.g. urban travel demand model

Operational Models

- Limited scope
- Very detailed (e.g. intersection level)
- Few scenarios
- e.g. traffic simulation, transit operations

Scenario Planning

Demographics

- ✓ Aging Boomers
- ✓ Millennials Travel Choices

New Modes

- ✓ Car Share
- ✓ Transportation Service Providers
- ✓ Electric Vehicles
- ✓ Automated Driverless Vehicles
- ✓ Active Transportation

New Pricing

- ✓ Road User Fee
- ✓ Carbon Tax
- ✓ Pay-as-you drive insurance
- ✓ Electric Vehicle operating costs

Uncertainty

- ✓ Decreasing Fuel Tax Revenue
- ✓ Economy
- ✓ Road Use Fees

Source: ODOT

Regional Strategic Planning Model

Inputs

- Regional Context
- Community Design
- Marketing & Incentives
- Fleet & Technology
- Pricing

1. **Create MPO Households**
2. **Estimate Daily VMT**

3. **Add Vehicles & Estimate Greenhouse Gas Emissions**

Outputs

- Mobility
  - Vehicle miles traveled
- Land Use
  - Mixed Use
  - Housing Type
- Economy
  - Travel delay
- Equity
  - Household travel costs
- Environment
  - Air Quality
  - Greenhouse gas emissions

Model Inputs

	Regional Context	• Demographics • Income Growth • Fuel Price	
Local Actions	**Community Design**	• Future Housing (Single- & Multi-family) • Parking Fees • Transit service • Biking • Roads	
	Marketing & Incentives	• TDM (home & work-based, ridesharing) • Car Sharing • *Education on Driving Efficiency* • Intelligent Transportation Systems	
Collaborative Actions	**Fleet & Technology**	• Vehicle Fuel Economy (mpg) • Fuels • Commercial Fleets	
	Pricing	• *Pay as you drive insurance* • Gas taxes • *Road user fee*	

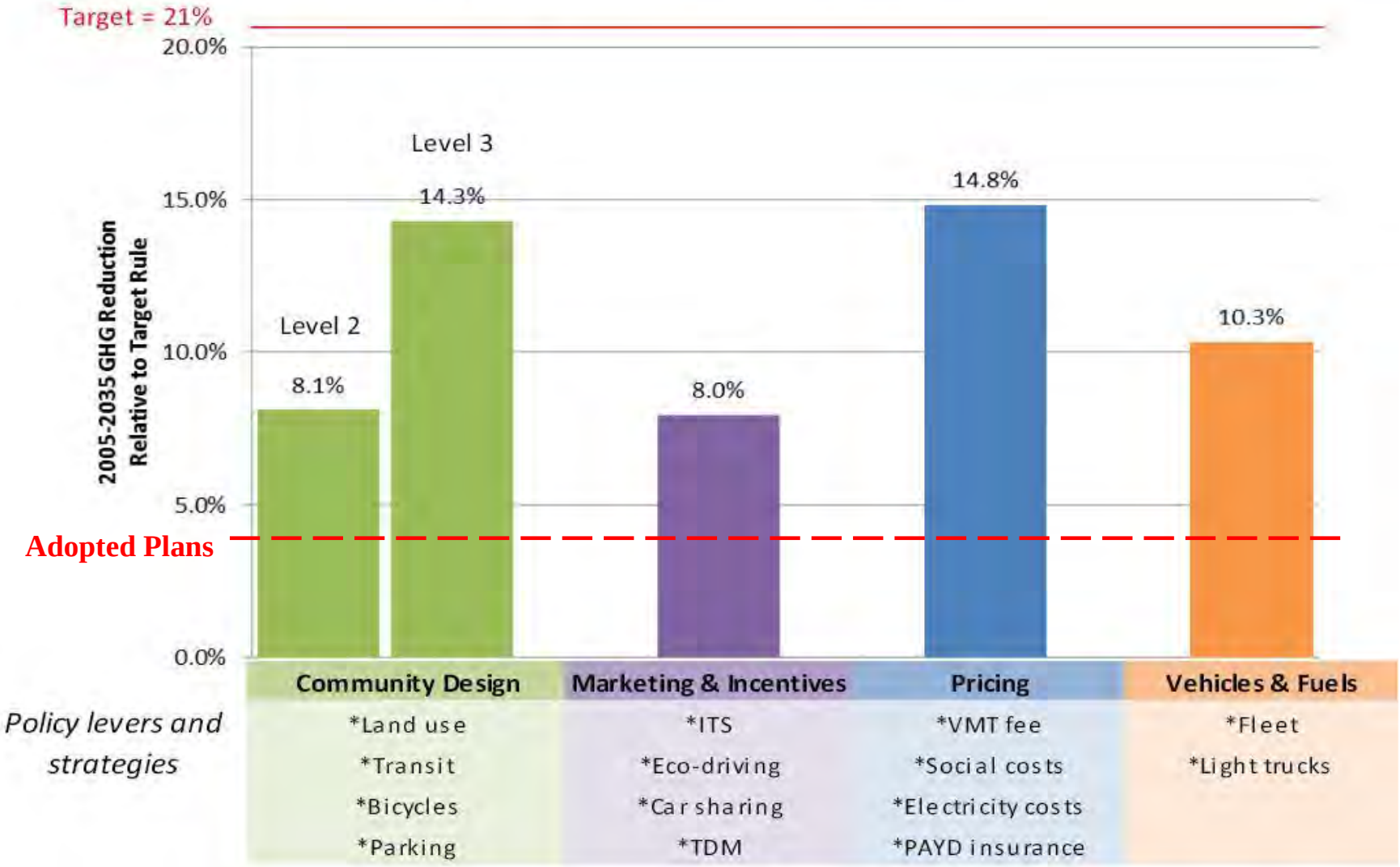
Model Outputs

Category	Output
Mobility	Daily vehicle miles traveled per capita
	Annual walk trips per capita
	Daily miles traveled by bicycle per capita
Economy	Annual all vehicle delay per capita (hours)
	Daily household parking costs
	Annual household vehicle operating costs (fuel, taxes, parking)
	Annual household vehicle ownership costs (depreciation, vehicle maintenance, tires, finance charges, insurance, registration)
Land Use	Residents living in mixed-use areas
	Housing type (Single-family : Multi-family)
Environment	Annual greenhouse gas emissions per capita from light vehicles including reductions from vehicle changes (metric tons)
	Reduction in greenhouse gas emissions per capita from implementation of adopted plans[1]
	Reduction in greenhouse gas emissions per capita from implementation of adopted plans and potential state-led actions
	Commercial Vehicle GHG/mile
	Clean Air Act[2] criteria pollutants (million kilograms per day)
Energy	Annual all vehicle fuel consumption per capita (gallons)
	Average all vehicle fuel efficiency (miles per gallon)
	Annual external social costs per household (unpaid)

Corvallis Area MPO

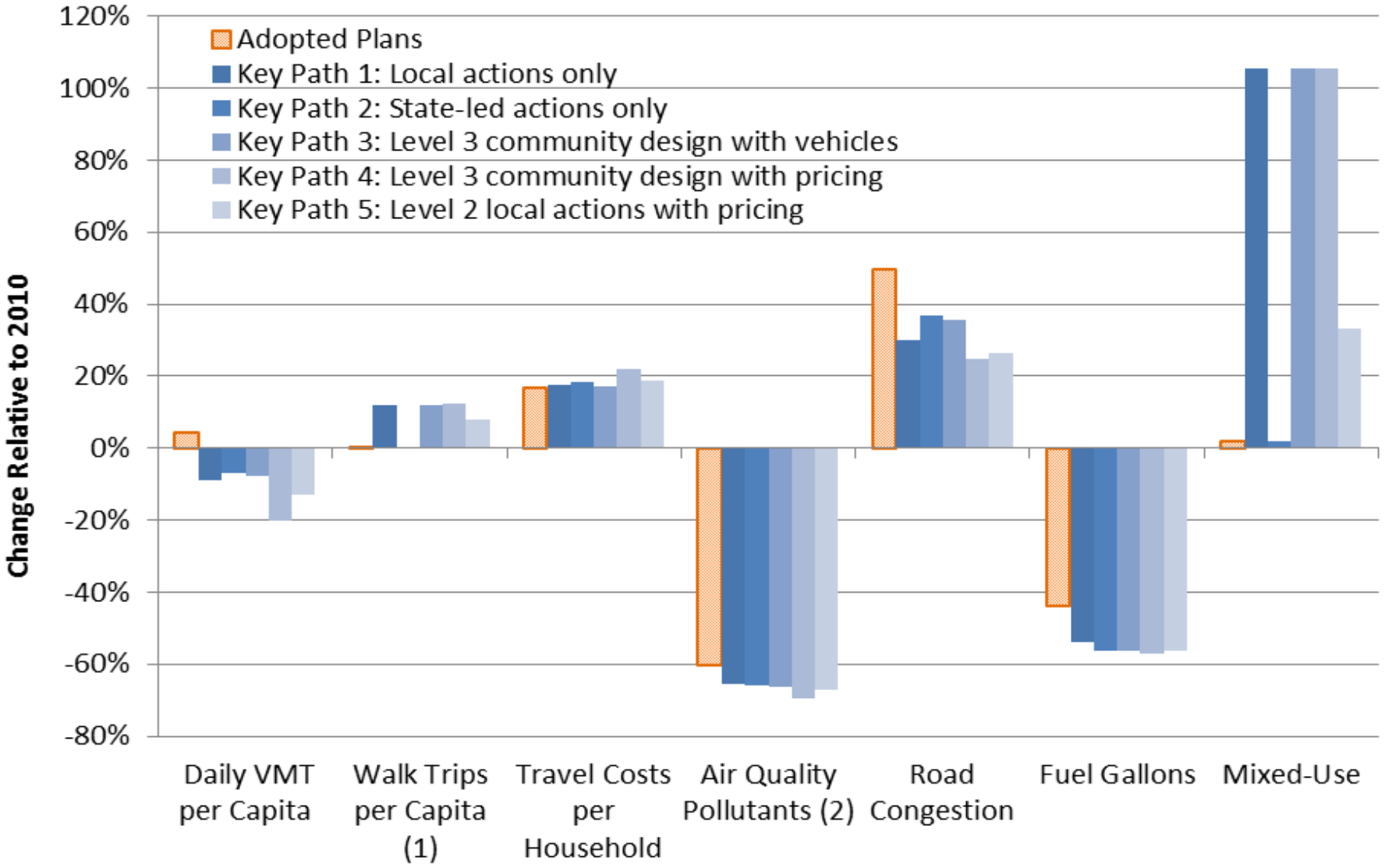
Strategic Assessment Scenario Planning

Individual Effects of Policies on GHG Reduction



Corvallis Area MPO

Strategic Assessment Scenario Planning



Strategic Assessment II - Policy Options

Corvallis Area MPO Policy Board, Fall 2015

Land Use Changes

- Decrease development in central area and direct development to outer areas
- Increase development in central area
- Most new development is concentrated near alternative mode facilities
- New developments in form of mixed use

Alternative Modes

- Expand transit service
- Expand bicycle & pedestrian facilities

Parking Fee Changes

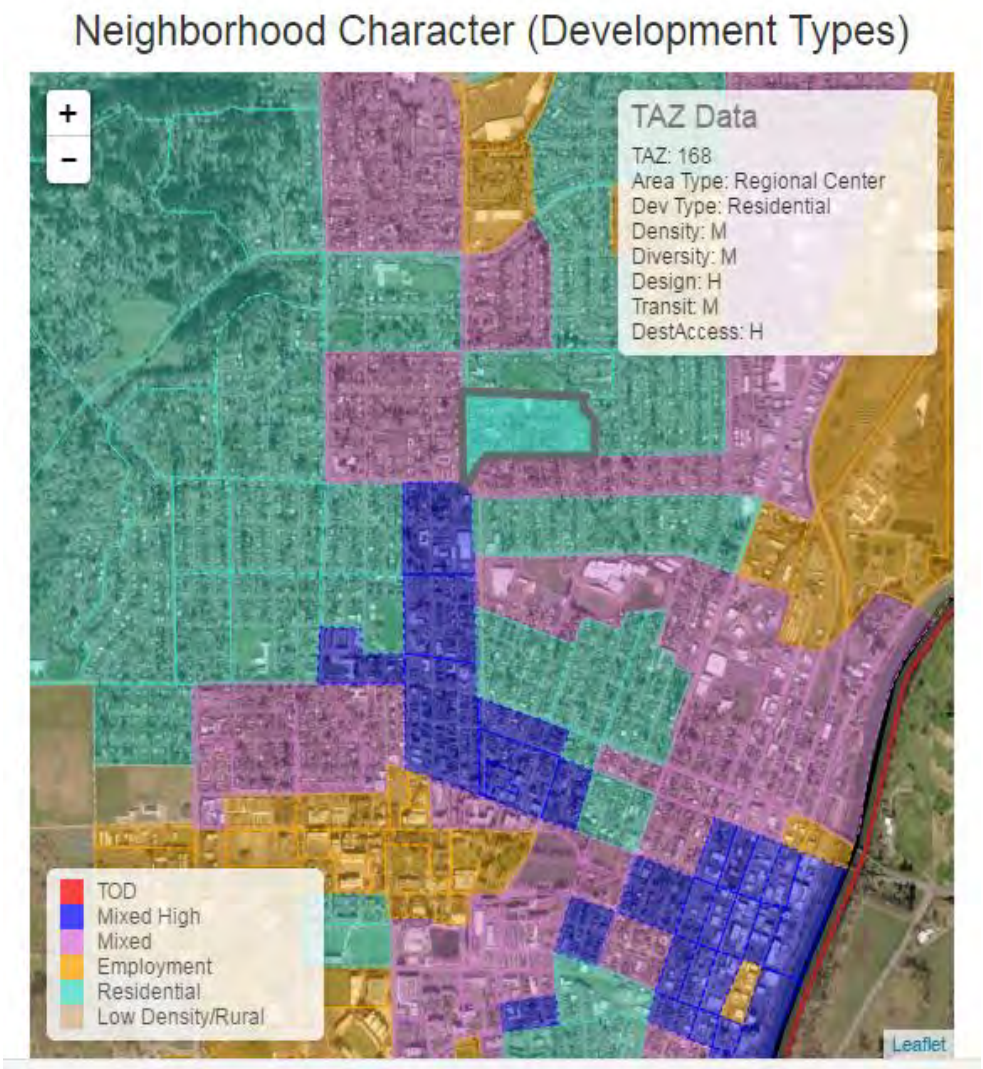
- Expand parking fee coverage areas
- Increase parking fees
- Cash-out parking programs

Transportation Options

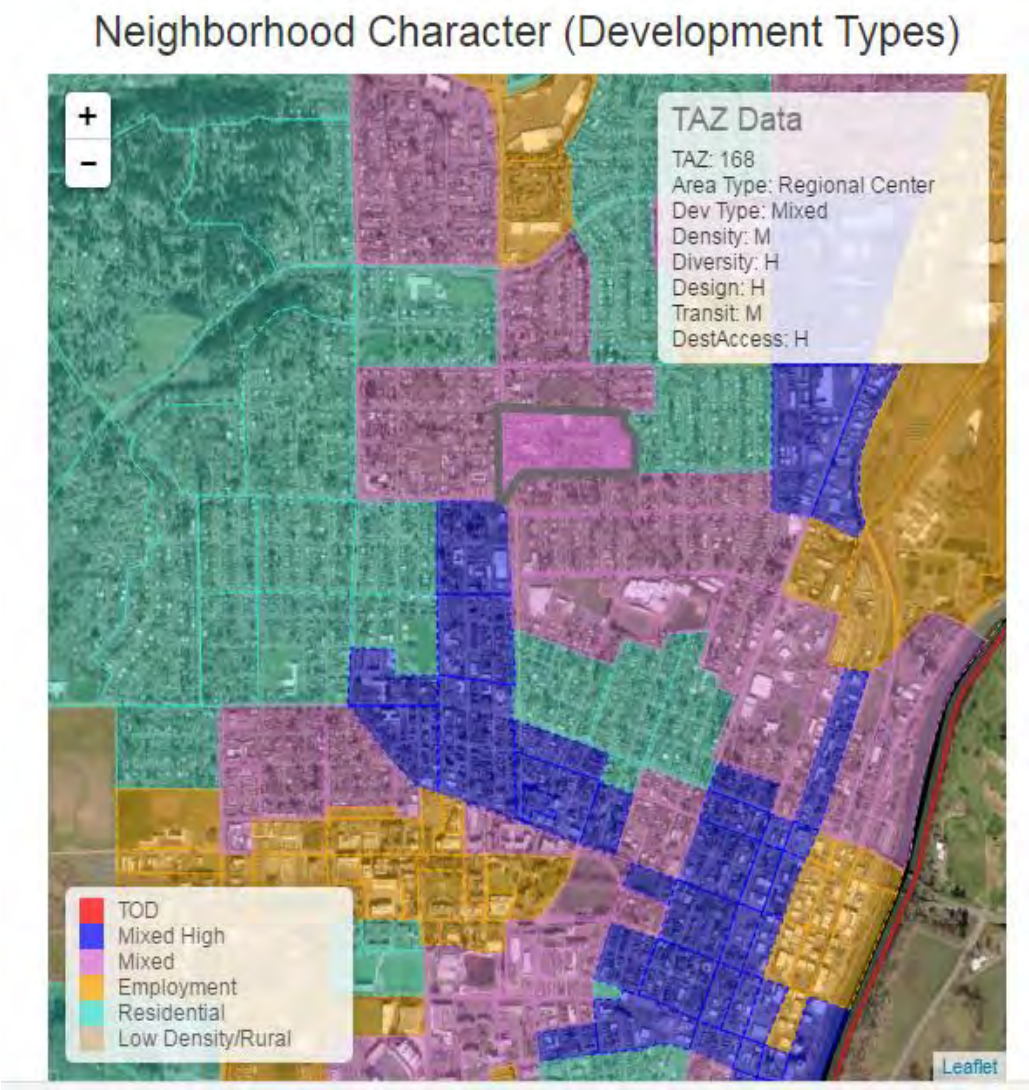
- Work based marketing programs
- Home based marketing programs
- Expand Car-sharing
- Telecommuting
- Transit Subsidies

Place Types Land Use Visualizer

2010



2040



Strategic Assessment II - Evaluation Criteria

Corvallis Area MPO TAC, Fall/Spring 2015/2016

GHG Emissions Reduction

- GHG emissions

Public Health

- Air quality (criteria air pollutants)
- Walk and bike trip miles
- Social costs (safety, pollution, energy security)
- Accident rates

Sustainability

- Percent of population living in mixed use areas
- Vehicle delay
- Vehicle miles traveled
- Trips diverted to bike

Equity

- Household transportation costs
- Driving costs as percentage of household income
- Transportation share of income for low income households
- Job Accessibility by income group

Strategic Assessment II - Evaluation Criteria

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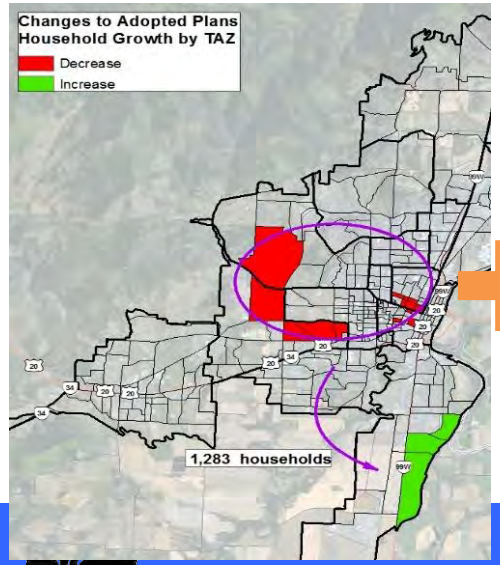
Strategic Assessment II - Assembling Scenarios

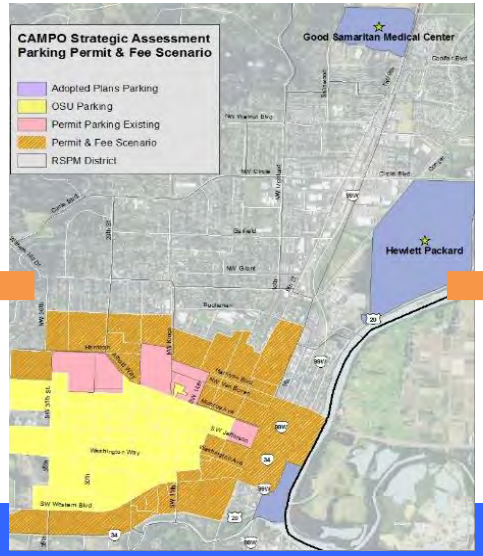
Corvallis Area MPO TAC, Fall/Spring 2015/2016

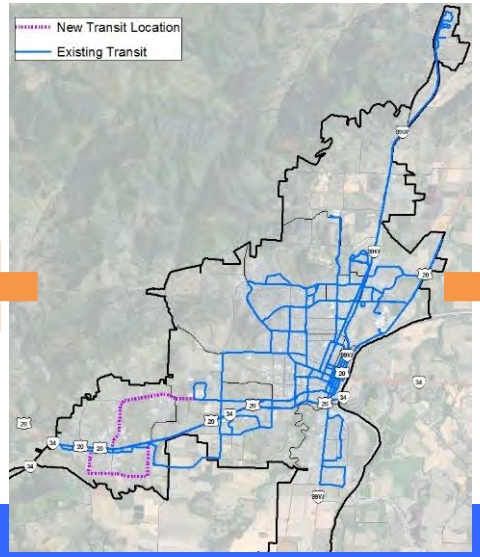
Example

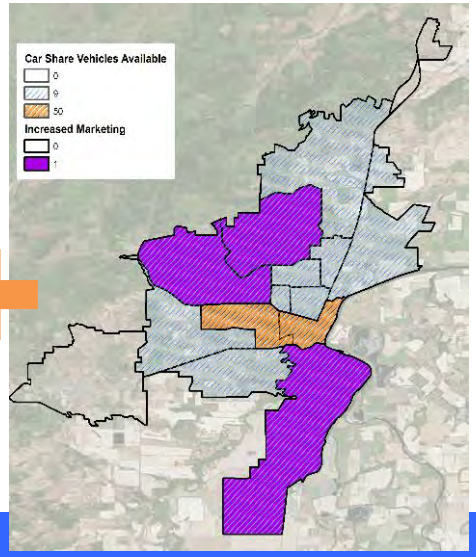
Policy Bundle E: Alternative Modes Focus

Land Use	Parking	Alternative Modes	Transportation Options
Most new development is concentrated near alternative mode facilities	– Expanded parking districts – Increased fees downtown – Cashout parking	– Increased transit frequency – Expand bicycle facilities	– Home/Work-based Marketing – Car Sharing







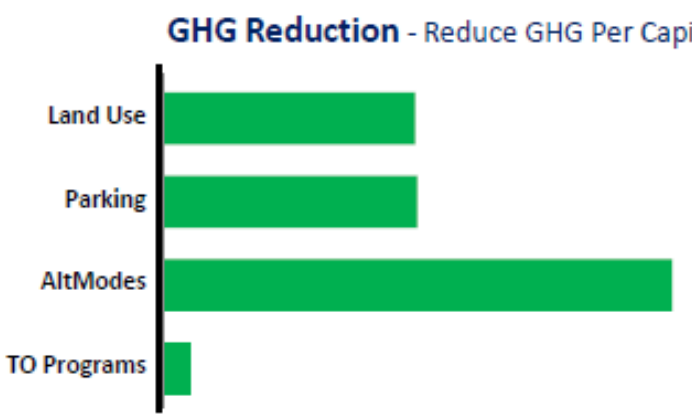


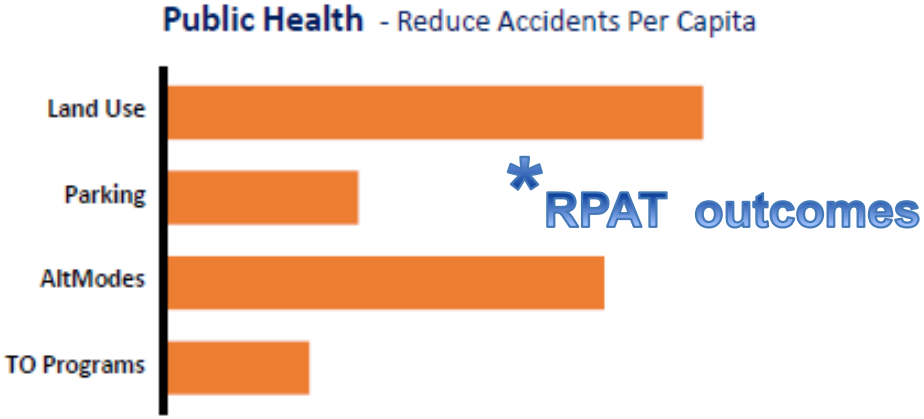
Oregon Department of Transportation

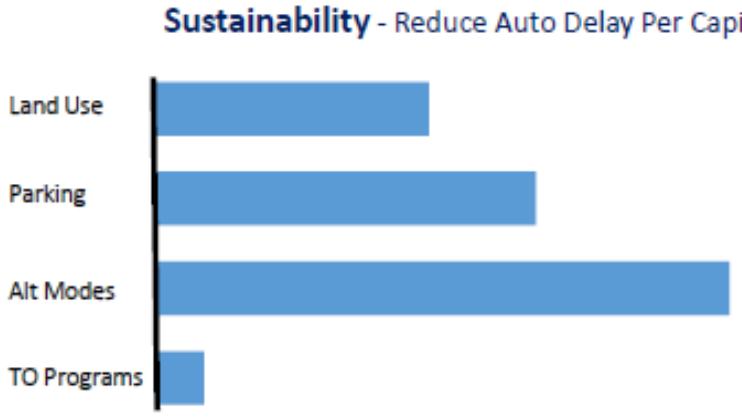
Strategic Assessment II – Policies in Isolation

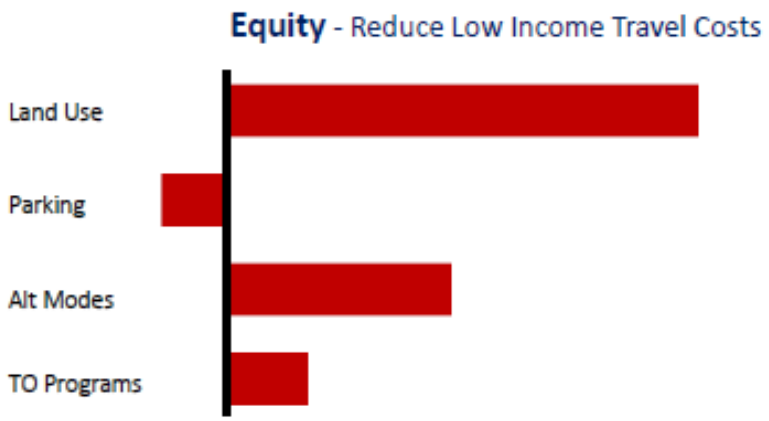
CAMPO, Spring 2016

Charts identify which policies (Land use, Parking, etc.) have the most impact in reaching the desired outcome (GHG, Health, etc.)









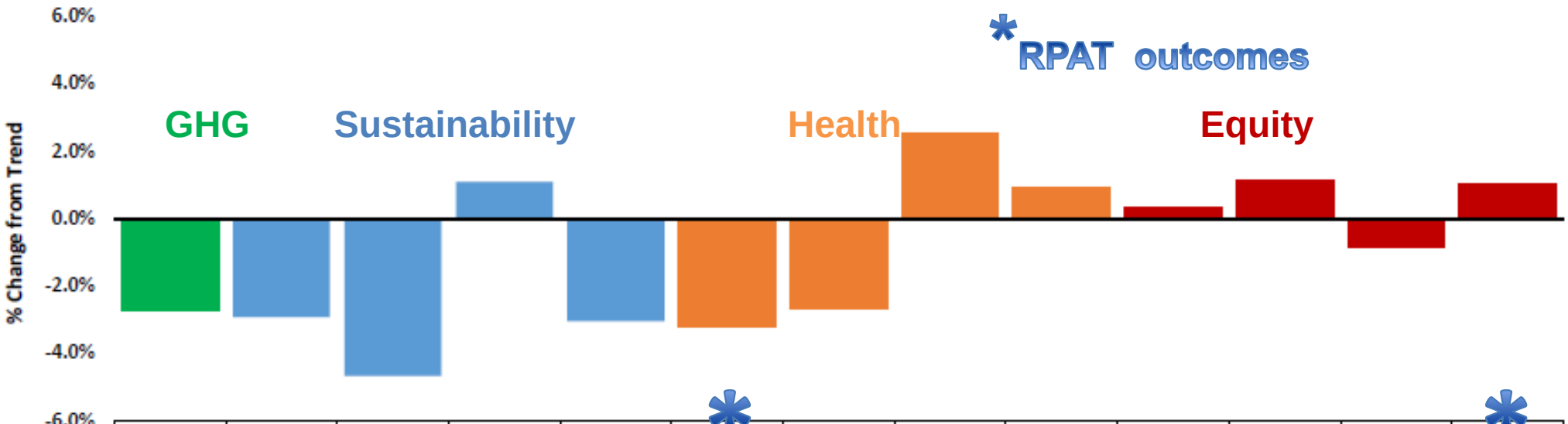
Note: A single representative outcome measure has been chosen to best represent each evaluation category

Strategic Assessment II - Findings

CAMPO, Spring 2016

- The region is better positioned to achieve its long term planning goals under the proposed policies.
- Each scenario moved the needle in the right direction for each indicator, with the exception of equity, with results up to 5% better than adopted plans.
- Combined policy scenarios provide greater benefits --the region cannot rely on one type of policy to achieve its planning goals.
- Performance of individual scenarios influence specific local plans/policy actions.

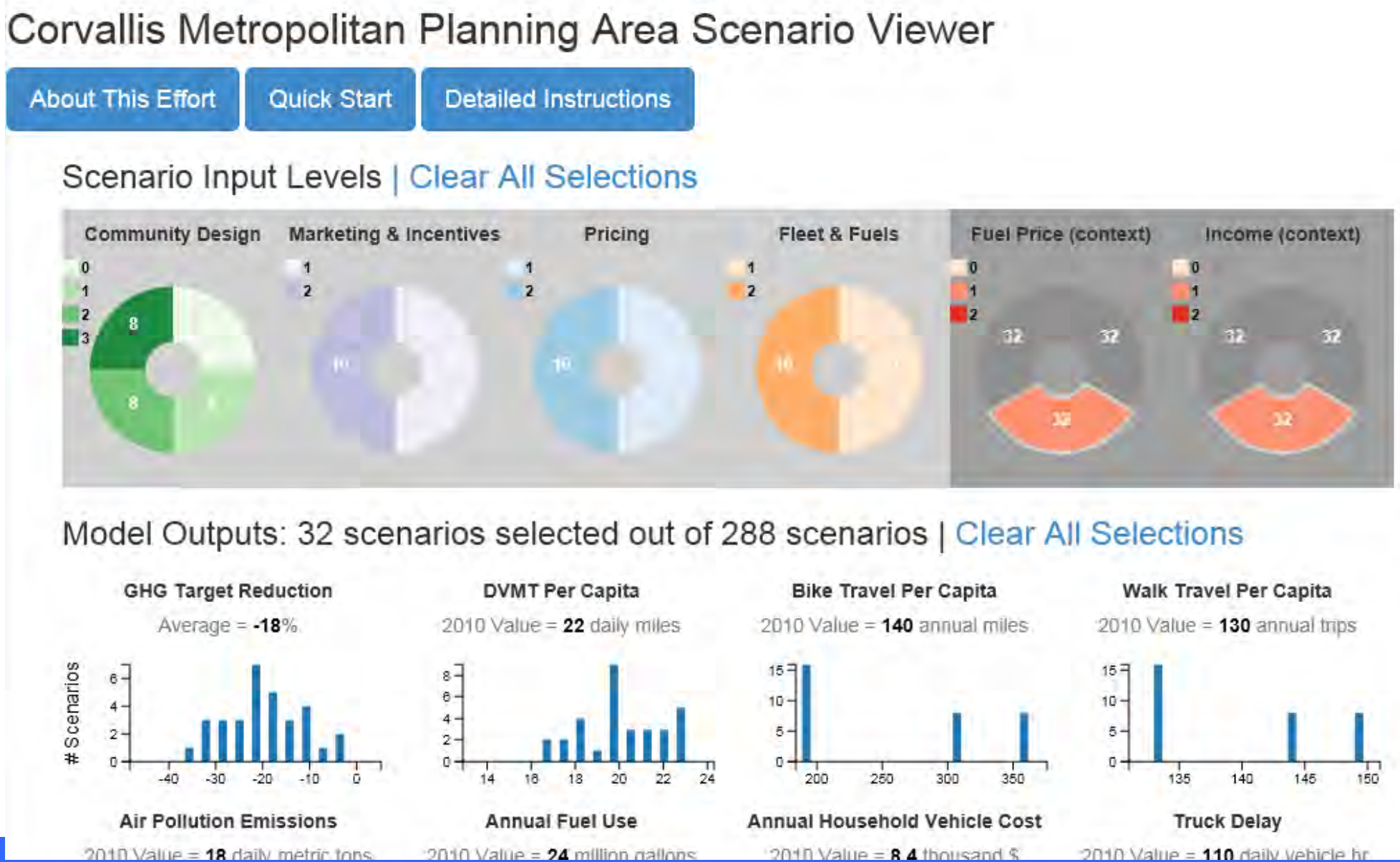
Average Impact of Scenario Bundles Relative to 2040 Trend Scenario



	Annual GHG Emissions	Daily VMT	Annual Auto Delay	% Pop in Mixed Use	Daily Air Quality Pollutants	Daily Accidents *	Annual Social Costs	Light Vehicle/ Bike Diversion	Annual Walk Trips	Travel Costs % of Household Income	Travel Costs % of Low Income Households	Auto Owned Per Household	Job Accessibility *
Average	-2.7%	-2.9%	-4.7%	1.1%	-3.1%	-3.2%	-2.7%	2.5%	0.9%	0.3%	1.1%	-0.9%	1.0%
Minimum	-2.1%	-2.3%	-3.5%	0.0%	-2.3%	-2.0%	-1.8%	0.0%	0.0%	0.9%	2.3%	-0.1%	0.0%
Maximum	-3.5%	-3.8%	-6.3%	2.2%	-3.9%	-5.0%	-3.8%	3.0%	2.1%	-0.4%	-0.5%	-1.2%	1.9%

** Average represents the average impact across the five scenarios, minimum is the scenario with the lowest impact, and maximum is the scenario with the greatest impact.*

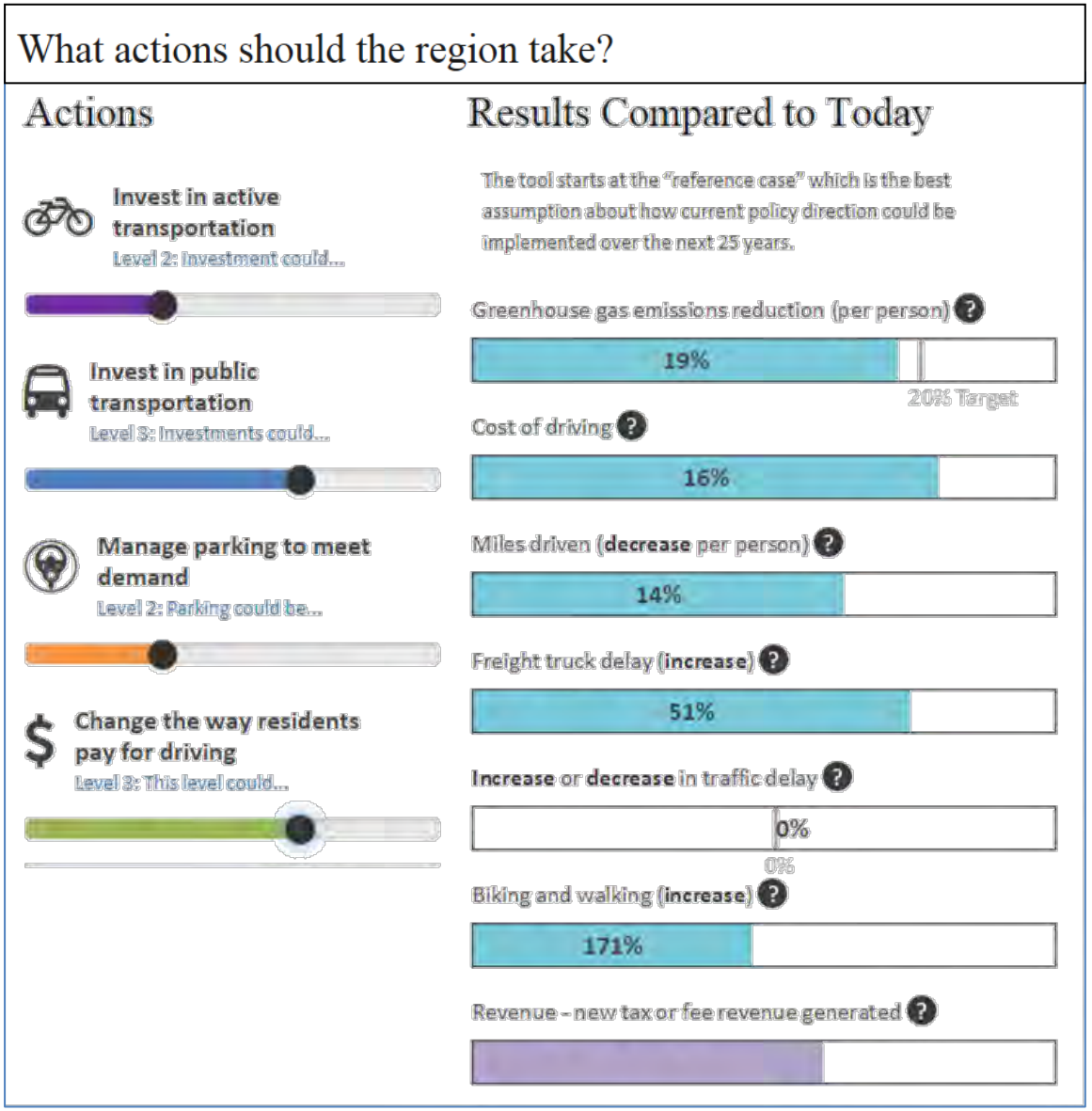
Web-based Viewers- Sensitivity Testing



Viewer - Community Involvement

Central Lane Scenario Planning

- Stakeholder workshops
- Future Builder online tool
- Telephone survey
- Targeted equity outreach



Value to Planning Process

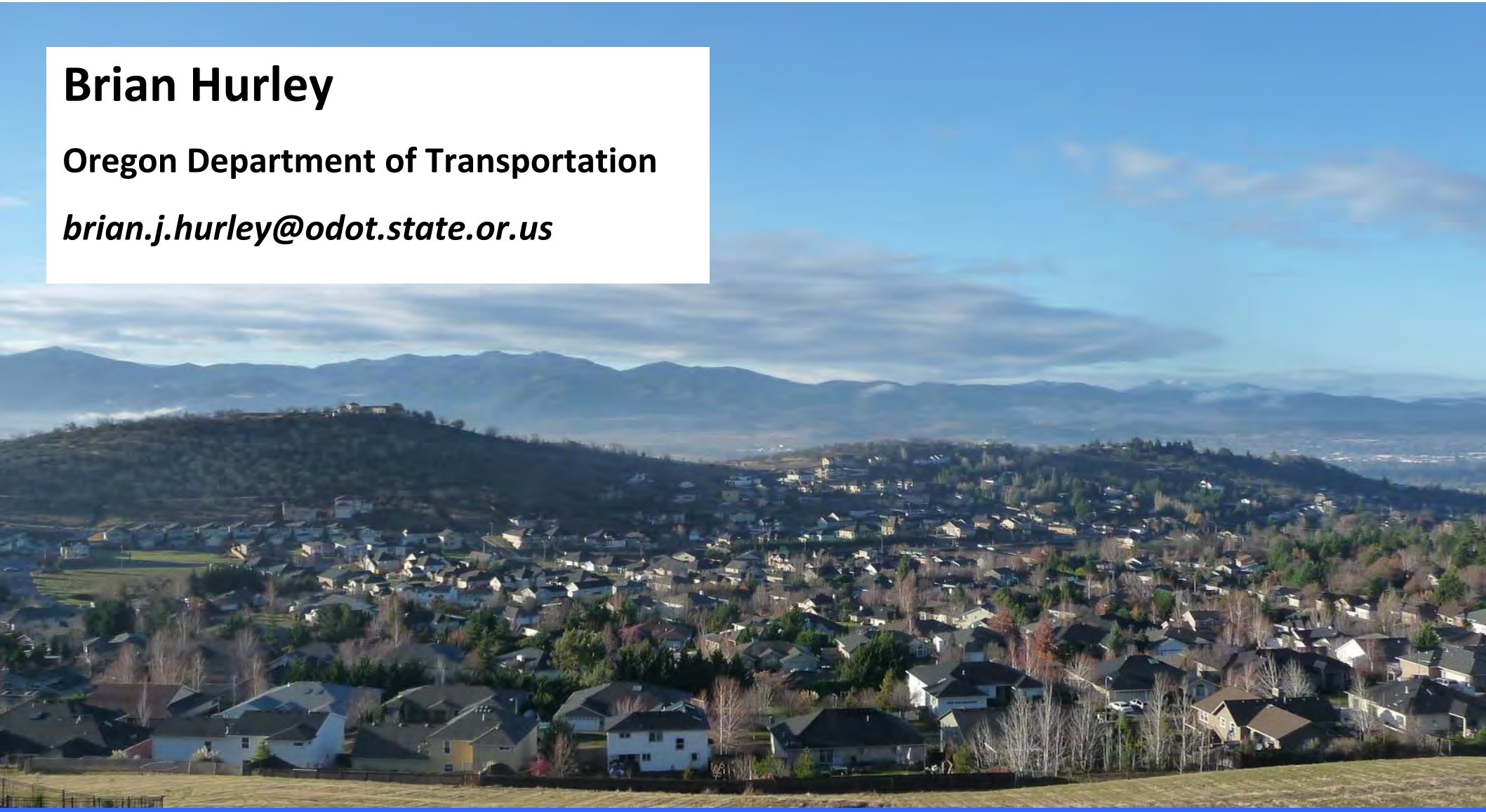
- **Supports implementation**
- **Informs development of plan updates**
- **Bolsters collaborative efforts**
- **Provides information to stakeholders**

Thank You

Brian Hurley

Oregon Department of Transportation

brian.j.hurley@odot.state.or.us



Oregon Department of Transportation

VisionEval Open Source Project

Tara Weidner, Oregon DOT

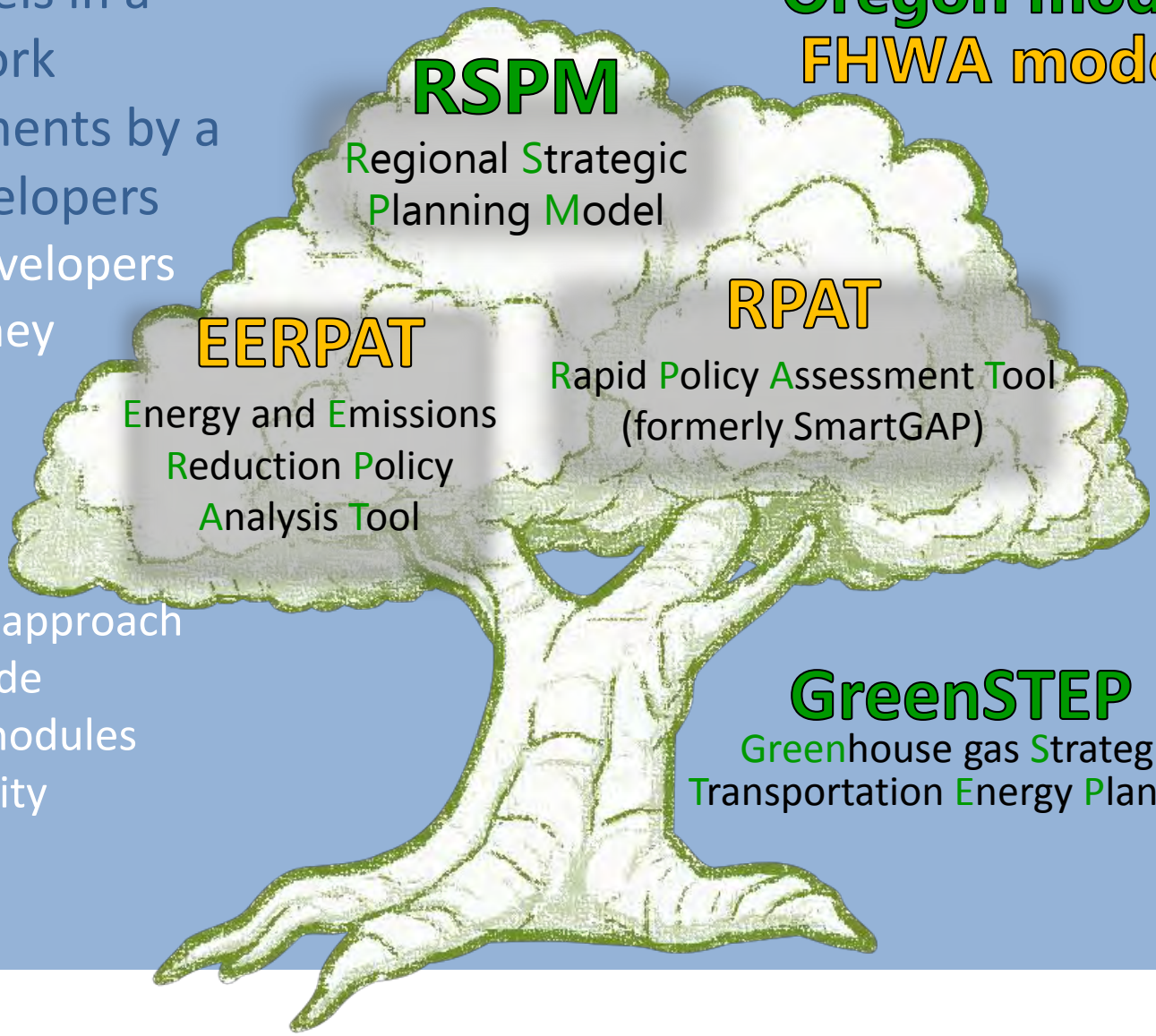
November 2, 2016

Oregon Department of Transportation

VisionEval Open Source Project

WHAT? Four models in a Common Framework allowing improvements by a community of developers

- Expand users & developers
- Save time and money



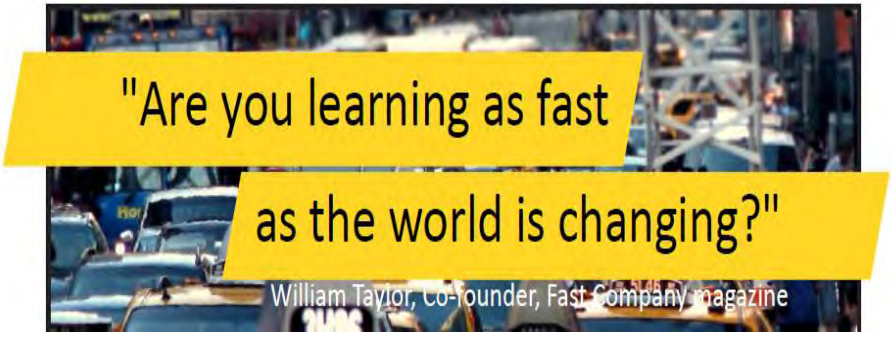
HOW?

- Common modeling approach
- Modular, shared code
- Loose coupling of modules
- Geographic Scalability
- Data accessibility
- Open Source

VisionEval Family of Tools
Scenario Planning Applications to date…

DOTs (EERPAT, GreenSTEP, RPAT)

- Oregon – statewide GHG Plan, Impact of Mode & Topic plan investment
- Maryland – statewide GHG Plan (EERPAT); policy testing (RPAT)
- Washington – statewide GHG Plan
- Vermont – statewide GHG reduction goals
- Colorado – Smart Energy Initiative



MPOs (RPAT and RSPM)

- Atlanta-GA (ARC)
- Philadelphia-PA (DVRPC)
- Raleigh-Durham-NC (DCHC)
- Portland, Eugene-Springfield, Corvallis & Rogue Valley-OR (Metro, CLMPO, CAMPO, RVMPO)
- Olympia-WA (Thurston RPC)

Harness into something bigger…

VisionEval Mission

INFORM DECISIONS to reach **DESIRED COMMUNITY OUTCOMES**
under uncertainty and limited resources

Strategic Planning – **Research/Teaching**

Performance-Based Planning — Test new ideas, mentor

Harness into something bigger…

VisionEval Mission

INFORM DECISIONS to reach **DESIRED COMMUNITY OUTCOMES**
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Tool:

Create a collaborative Open Source Tool that houses an award-winning family of strategic models, in a plug-and-play fashion

Open Source – **Modular** – **Open Data**

Global reach — Multi-disciplinary — Transparent/allows Re-estimation

Harness into something bigger…

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Community:

Maintained and governed by a **COMMUNITY** to fund host & upgrades, share applications

Agency Sponsors – **Active Users** – **Developers**

Policy Q/Funding — Case Studies — Upgrades/Research

Harness into something bigger…

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Continuity:

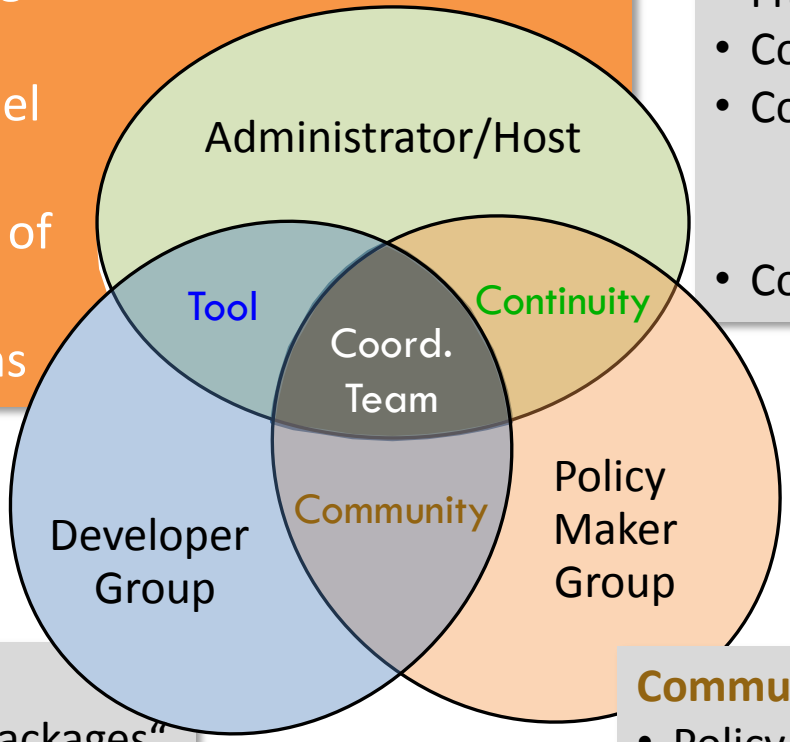
The value of the tool would engender long term support, upgrades and outreach.

Credibility – **Emerging Policies/Outcomes** – **Current Data**

Making VisionEval an Open Source Project

Services:

- Manage tool maintenance/updates
- Maintain documentation for various users
- Review module packages for inclusion in the repository
- Sponsor module/model development
- Maintain a repository of example models & case study applications



Continuity:

- Maintain & Update Framework
- Community Forum
- Continued Funding
  - Basic Services
  - Upgrades
- Communication/Outreach

Tool:

- Repository of "module packages"
- Working versions of assembled "models"

Community:

- Policy Maker (consumer/funder)
- Analysts (applier)
- Developer/Researcher
- Educators

Value of VisionEval Tool & Partnership

Value of tool:

- Improves reasoning about complex systems
- Impacts of many possible courses of action
- Tests risk/resilience
- Visualization tools
- Research sandbox

Partnership benefits:

- Credible, documented, maintained/updated tool
- Code guidelines/standards
- Cost-effective upgrades
- Community of active users; case studies
- Community of active developers; Consultant flexibility

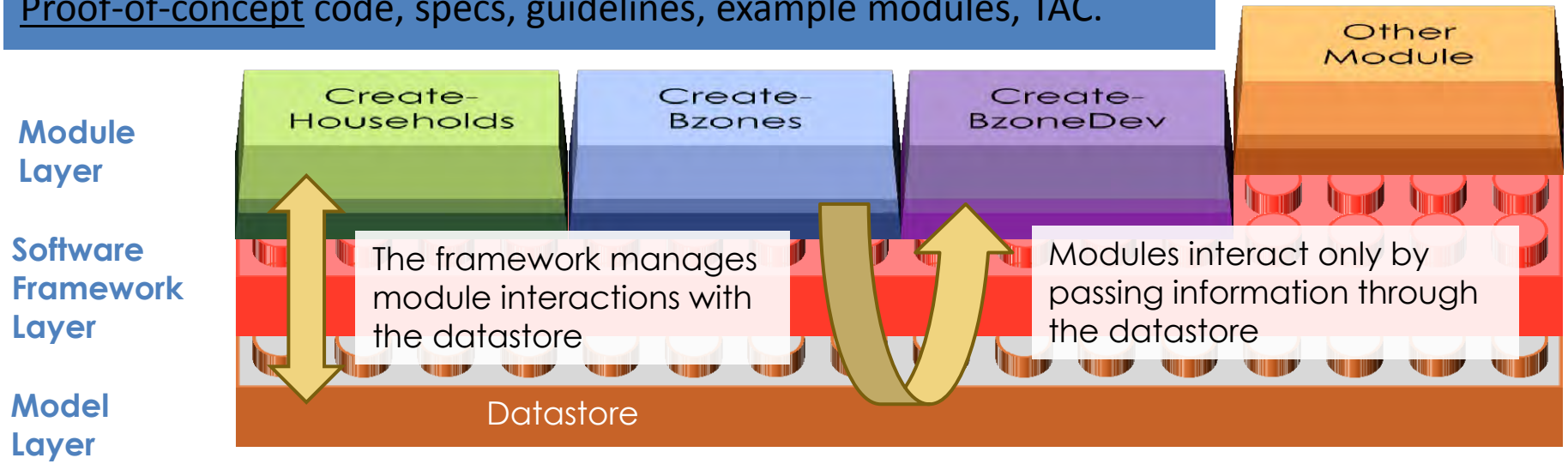
Community:

- Policy Makers (consumer)
- Analysts (applier)
- Developers/Researchers (developer)
- Educators

VisionEval Partnership -- Phases 1-2-3

Phase 1 (complete Jan 2016) - ODOT/FHWA

Proof-of-concept code, specs, guidelines, example modules, TAC.



- **Modules** perform individual tasks (e.g., create households)
- **Packages** are combinations of modules that do bigger tasks (e.g. HH synthesis including location, income, age, etc.)
- **Models** consist of a set sequence of packages (e.g. RSPM, RPAT), which can be customized for a local community

- **Data store** and **Framework services** support a running model
- **Consistent geography** (explicit or synthesized) in all components allows modules/packages to be shared across model.

VisionEval Partnership -- Phases 1-2-3

Phase 2 (start August 2016) - AASHTO/FHWA

Transfer 2-3 models to VisionEval common framework.

Phase 2 Support (start Nov 2016) - ODOT

Establish Contributor Review Team Process, etc.

Phase 3 (anticipated 2017/18 start) – Pooled fund project

Multi-year partnership, directs annual work plan

Host, maintain, upgrade tools, and support a collaborative forum

August 2016
Peer Exchange with Key Partner Agencies

Anticipated Sample Products…

Host/Outreach **($30K/year)** website, training, information clearinghouse, and knowledge sharing activities.

Technical Maintenance **($20K/year)** maintain code repository, workable core-code, testing, periodic code releases/updates.

Tool Upgrades **($100-200K/year)** Implement upgrades as funding allows per Partner prioritization.

Q&A

For More Info…

https://gregorbj.github.io/VisionEval/

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Jeremy Raw, FHWA: jeremy.raw@dot.gov

Eric Pihl, FHWA (RPAT): Eric.Pihl@dot.gov

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Oregon Department of Transportation

Thank you

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If you have any questions or comments about today's presentation or TMIP, or if you are interested in sharing your experience, please contact me at:

sarah.sun@dot.gov or
feedback@tmip.org.

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