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Smart Growth Area Planning Tool (SmartGAP)

Prepared for
New Partners for Smart Growth Conference

Prepared by
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Acknowledgements

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Transportation Research Board

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- Technical Expert Task Group (TETG) Members

Project Team

- RSG
- Fehr & Peers
- Robert Cervero
- Kara Kockelman
- Richard Kuzmyak

Agencies Implementing Pilot Tests

- Maryland Department of Transportation
- Atlanta Regional Commission
- Thurston Regional Planning Commission

Open Source Software Platform (GreenSTEP)

- Oregon Department of Transportation

Overview

Purpose

- Provide tools, methods, and resources to evaluate smart growth policies on travel demand

Objectives

- Understand critical decision points in the transportation planning process and how smart growth approaches affect demand for capacity
- Research the dynamics and inter-relationships of smart growth strategies with the performance of a transportation investment
- Identify range of features and capabilities that new tools need to represent
- Facilitate improved communication, interaction and partnerships between decision-makers and planners in transportation and land use arenas

Smart Growth Area Planning Tool (SmartGAP)

Software Tool Design

Developed for regional decision-makers of transportation and land use policies

Evaluates regional scenarios

- Built environment
- Travel demand
- Transportation supply
- Policies

Considers households and firms individually

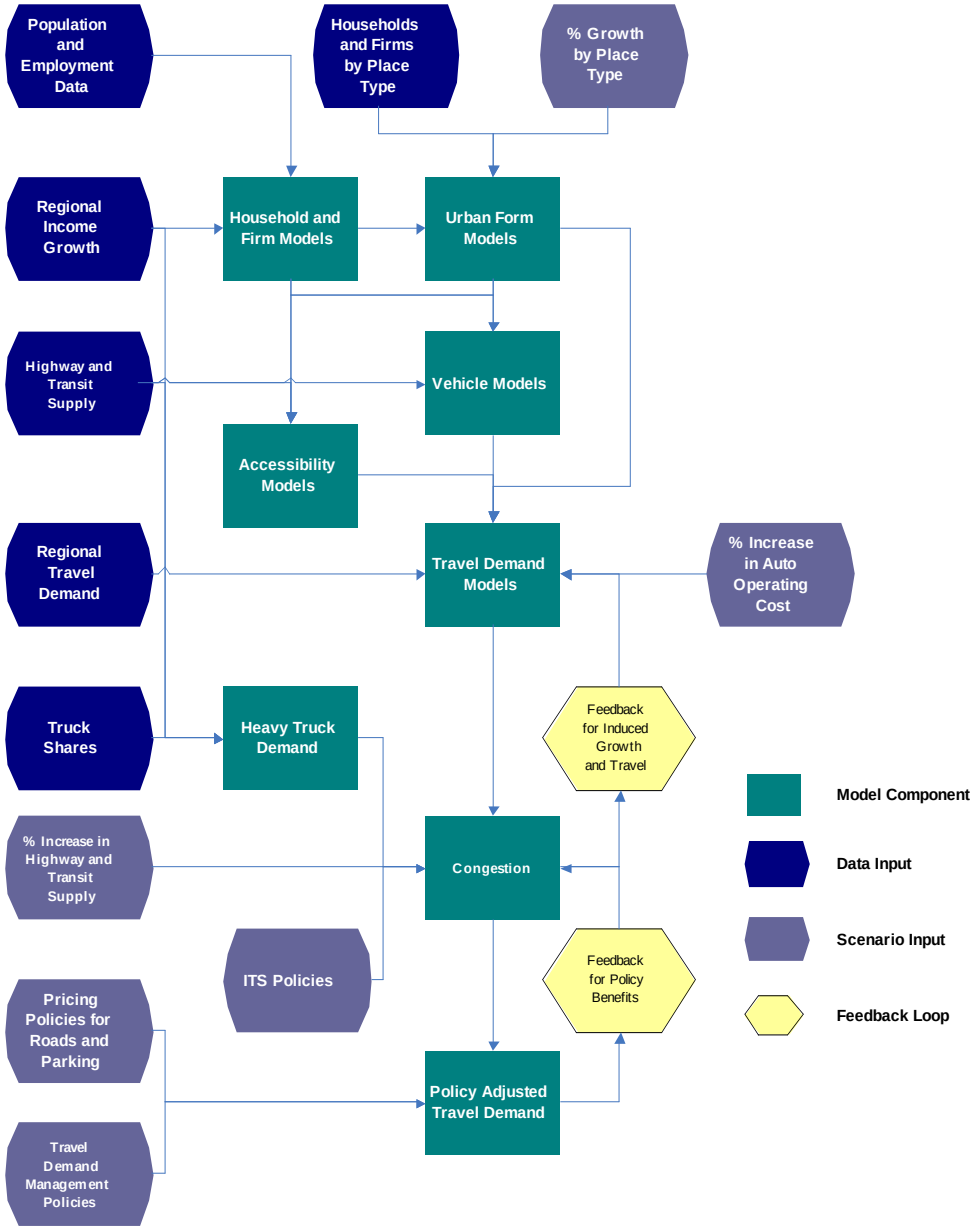
Easy to use and freely distributed

PLACE TYPES

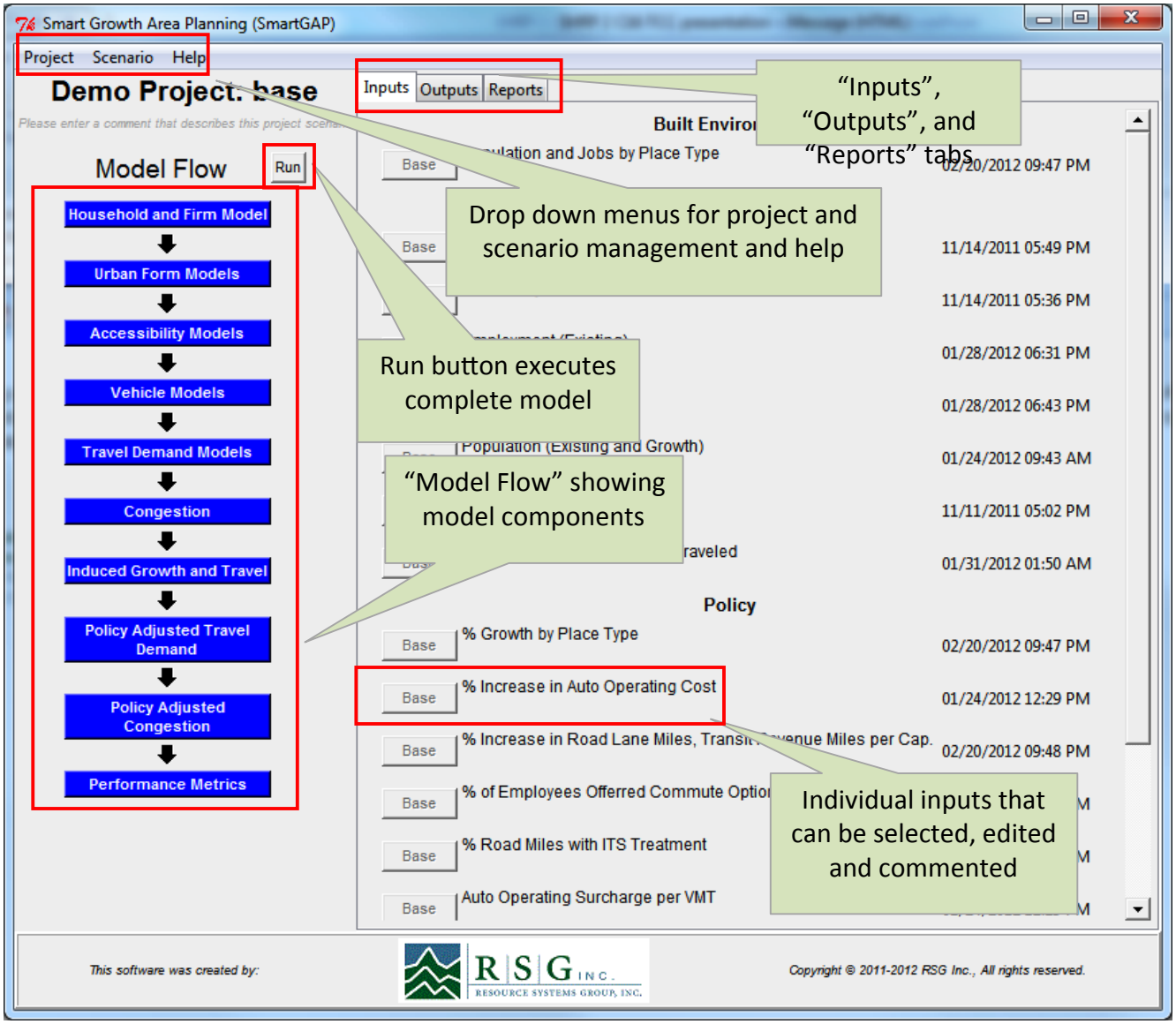
	Area Type			
Development Type	Urban Core	Close in Community	Suburban	Rural
Residential	✓	✓	✓	
Employment	✓	✓	✓	
Mixed-Use	✓	✓	✓	
Transit Oriented Development	✓	✓	✓	
Rural/ Greenfield				✓

SmartGAP Process

Evaluates transportation impacts of smart growth strategies



Interface


Smart Growth Area Planning (SmartGAP)
Project
Scenario
Help
Demo Project. base
Please enter a comment that describes this project scena
Model Flow
Run
Household and Firm Model
Urban Form Models
Accessibility Models
Vehicle Models
Travel Demand Models
Congestion
Induced Growth and Travel
Policy Adjusted Travel Demand
Policy Adjusted Congestion
Performance Metrics
Inputs
Outputs
Reports
Built Enviro
Base
ulation and Jobs by Place Type
02/20/2012 09:47 PM
11/14/2011 05:49 PM
11/14/2011 05:36 PM
01/28/2012 06:31 PM
01/28/2012 06:43 PM
Population (Existing and Growth)
01/24/2012 09:43 AM
11/11/2011 05:02 PM
raveled
01/31/2012 01:50 AM
Policy
% Growth by Place Type
02/20/2012 09:47 PM
% Increase in Auto Operating Cost
01/24/2012 12:29 PM
% Increase in Road Lane Miles, Transit
venue Miles per Cap.
02/20/2012 09:48 PM
% of Employees Offerred Commute Optio
% Road Miles with ITS Treatment
Auto Operating Surcharge per VMT
This software was created by:
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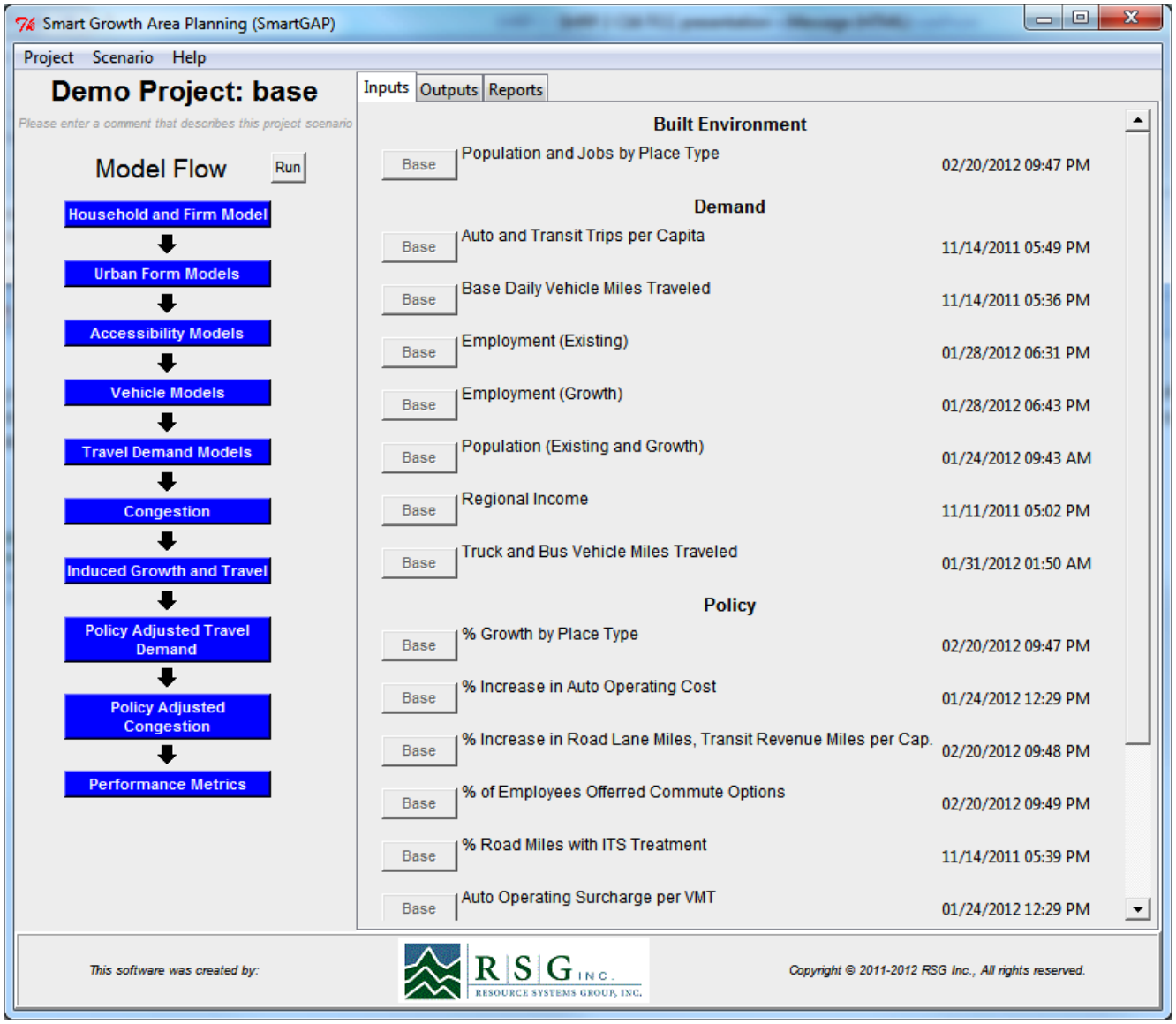
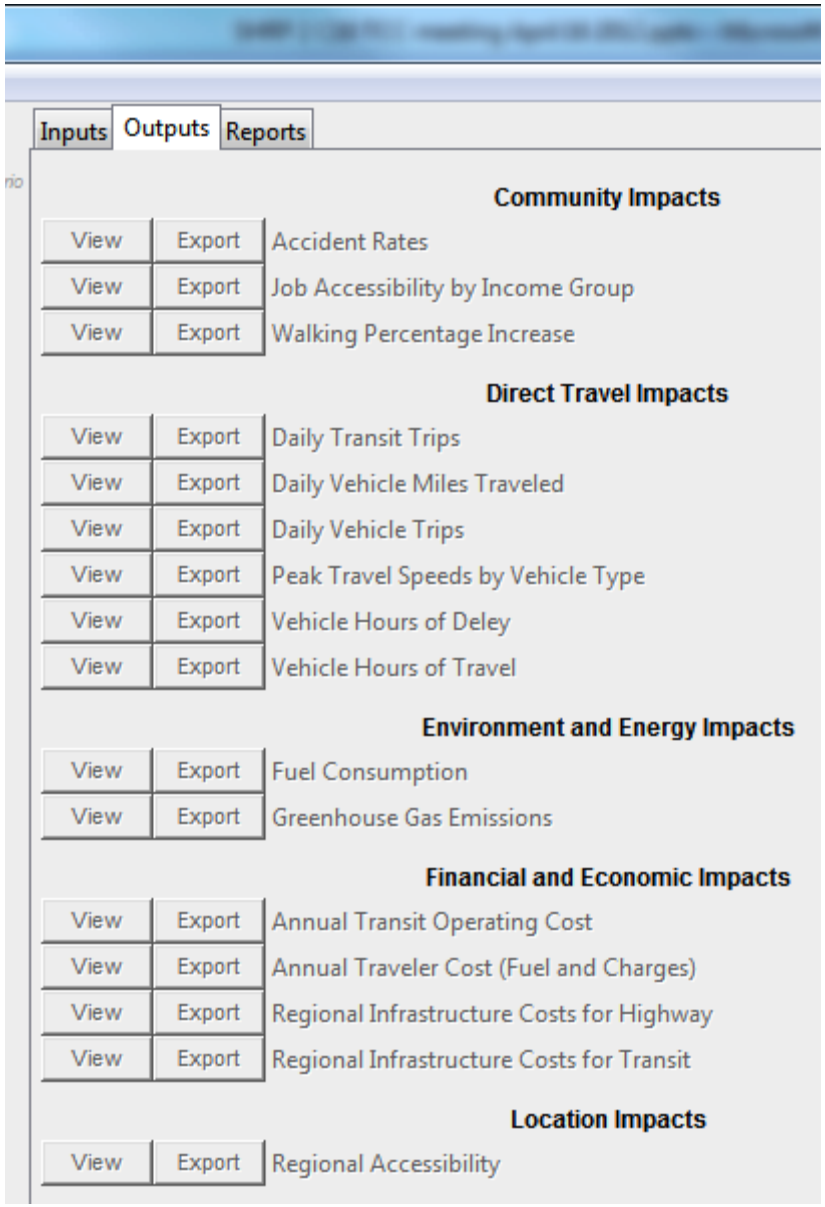
"Inputs", "Outputs", and "Reports" tabs
Drop down menus for project and scenario management and help
Run button executes complete model
"Model Flow" showing model components
Individual inputs that can be selected, edited and commented

Input Data for Base and Scenario Runs

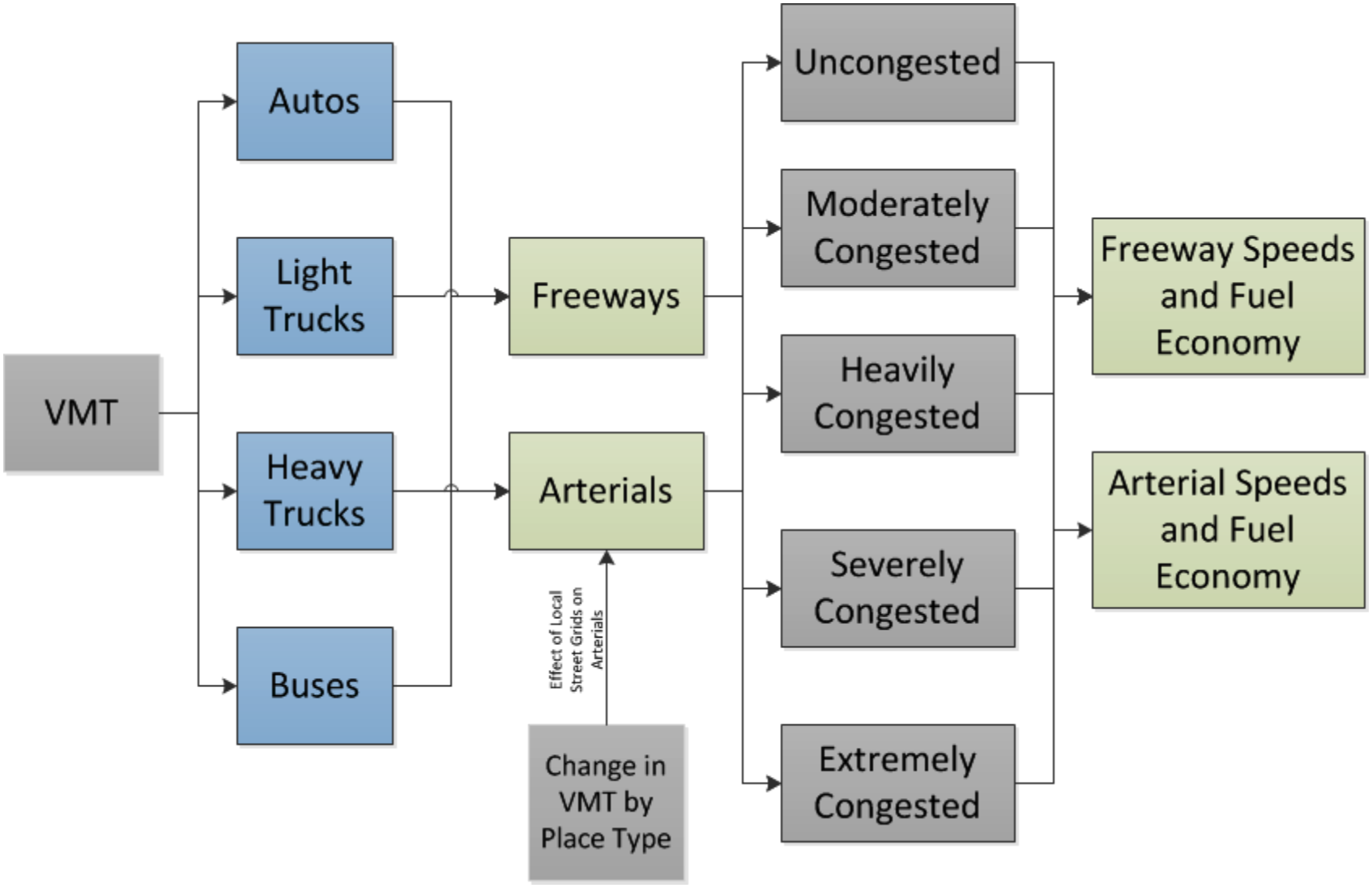


Performance Metrics (Model Outputs)



Congestion Impacts

Accounts for recurring and nonrecurring congestion on local streets, arterials and freeways

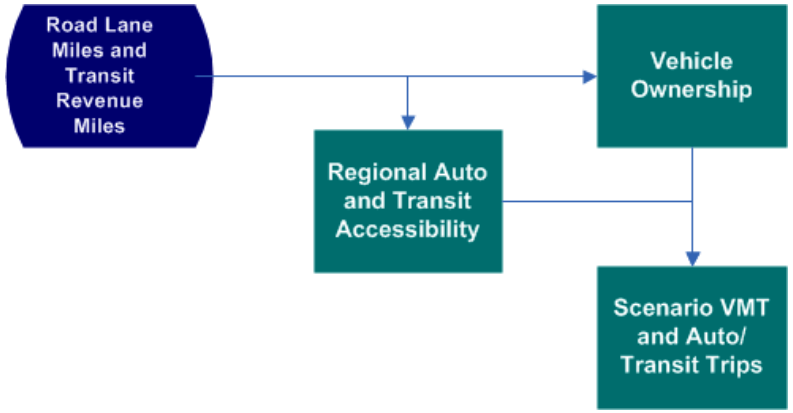


Induced Demand and Urban Form Effects on Travel

Predicts the change in VMT for each household due to changes in urban form and the short and long term induced demand effects of increases in transportation supply.

Primary Source:
Meta Analysis

Category	Urban Form Description	Elasticity for Change in VMT
Density	Household/Population Density	-0.04
Diversity	Land Use Mix (entropy)	-0.09
Design	Intersection/Street Density	-0.12
Distance to Transit	Distance to Nearest Transit Stop	-0.05



Primary Source:
GreenSTEP

Transportation Policies

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

Primary Source: GreenSTEP

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%

- Parking pricing based on
  a) Percent of workplace and non-workplace parking that is priced
  b) Parking rates per space

ITS strategies

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

Travel Demand Management Strategies

Predicts the Change in Work Trip VMT for each Household due to TDM

Primary Source: CAPCOA

Vanpool Program	Percent VMT Reduction
Low Level of Participation	0.30%
Medium Level of Participation	6.85%
High Level of Participation	13.40%

Telecommuting	VMT Reduction based on Percent Employees Participating				
	1%	3%	5%	10%	25%
9/80 Schedule	0.07%	0.21%	0.35%	0.70%	1.75%
4/40 Schedule	0.15%	0.45%	0.70%	1.50%	3.75%
Telecommuting 1.5 days a week	0.22%	0.66%	1.10%	2.20%	5.50%

More on Travel Demand Management Strategies

Predicts the Change in Work Trip VMT for each Household due to TDM based on Development Settings

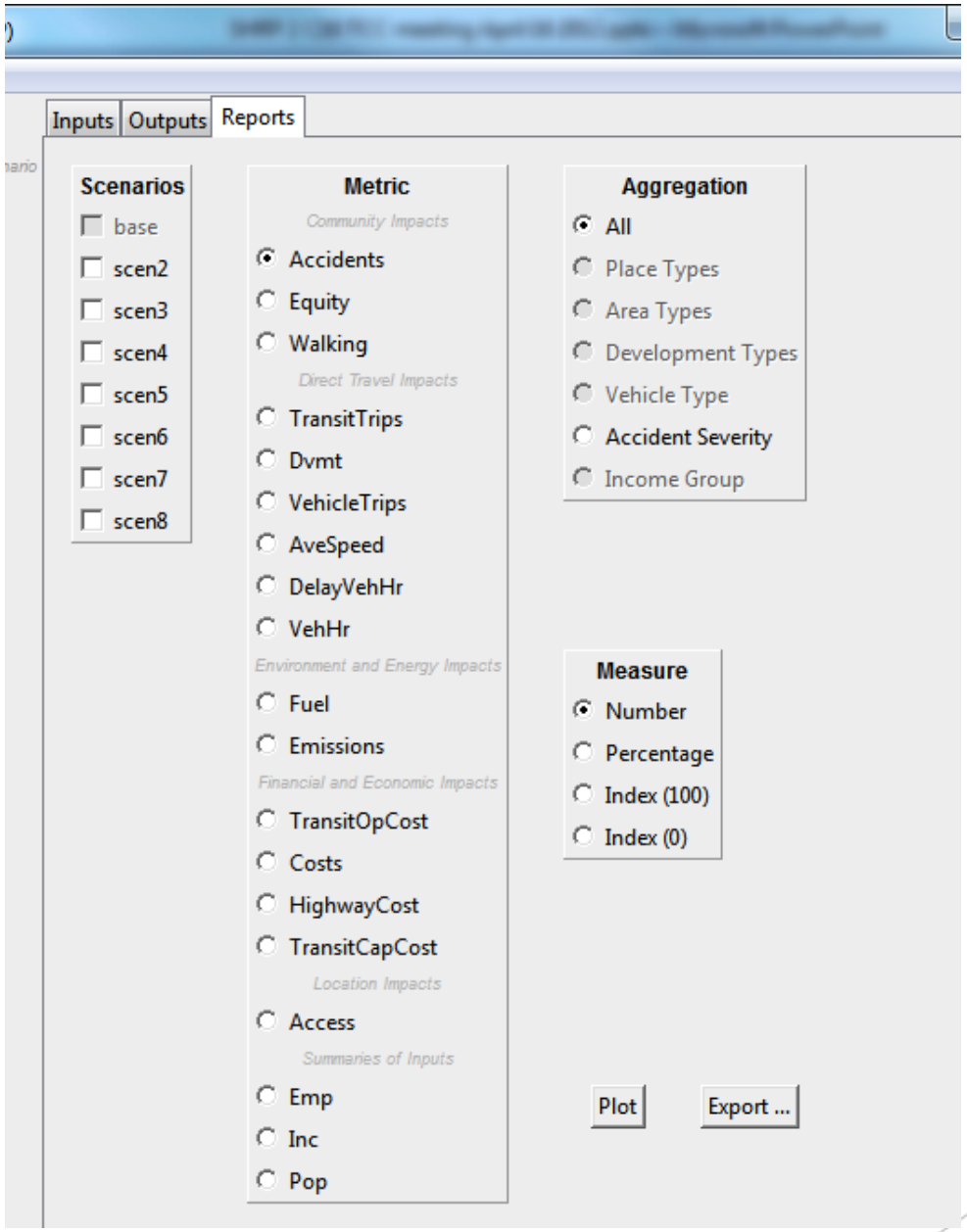
Primary Source:
CAPCOA

Ridesharing Program	Rural	Suburban	Close In Community	Urban Core
VMT Reduction for Work Trips	0%	5%	10%	15%

	VMT Reduction for Work Trips			
Transit Pass Subsidy Level	Rural	Suburban	Close In Community	Urban Core
$ 0.75	0%	2.0%	3.4%	6.2%
$ 1.49	0%	3.3%	7.3%	12.9%
$ 2.98	0%	7.9%	16.4%	20.0%
$ 5.96	0%	20.0%	20.0%	20.0%

Model Reports

- Community Impacts
- Direct Travel Impacts
- Environment and Energy Impacts
- Financial and Economic Impacts
- Location Impacts
- Input Summaries



Distribution and Use of SmartGAP

SmartGAP is delivered as a .zip file

- Install by simple unzipping to a location on your computer's hard drive, e.g. c:\SmartGAP
- Consists of text file scripts, csv file input files, and .Rdata binary files holding containing models

R is an open source statistical software platform

- SmartGAP runs in R so R must be installed on the computer
- SmartGAP uses several add in packages to R which it will download automatically the first time it is run
- R is available at: http://cran.r-project.org/

Summary and Breakout Groups

SmartGAP Summary

Use

- SmartGAP can evaluate smart growth policies on travel demand

Features

- Represents critical decision points in the transportation planning process and how smart growth approaches affect demand for capacity
- Includes the dynamics and inter-relationships of smart growth strategies with the performance of a transportation investment
- Facilitates improved communication, interaction and partnerships between decision-makers and planners in transportation and land use arenas

Breakout Groups to Discuss Pilot Tests

- **Large Region (Guy Rousseau)**
  - Atlanta Regional Commission (ARC) pilot test
  - Large MPO setting
- **Small Region (Colin Smith)**
  - Thurston Regional Planning Commission (TRPC) pilot test
  - Smaller/medium MPO setting
- **County Application (Maren Outwater)**
  - Maryland DOT (MDOT) pilot tests for 2 counties
  - DOT setting
  - Test larger urban/suburban county and smaller rural county

Contact

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