

2020 SACOG
Travel Model User Conference

Welcome

Transportation Modeling and Analysis Team (TMAT)



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Key Presenters



Clint Holtzen



Jennifer Hargrove



Maricela Salazar

The background features a large white circle with a thin grey border, centered on a dark grey background. In the bottom-left corner, there are several overlapping triangles in grey, yellow, orange, and blue. The text is centered within the white circle.

Evaluating the Future with SACSIM

Why do we use travel models?

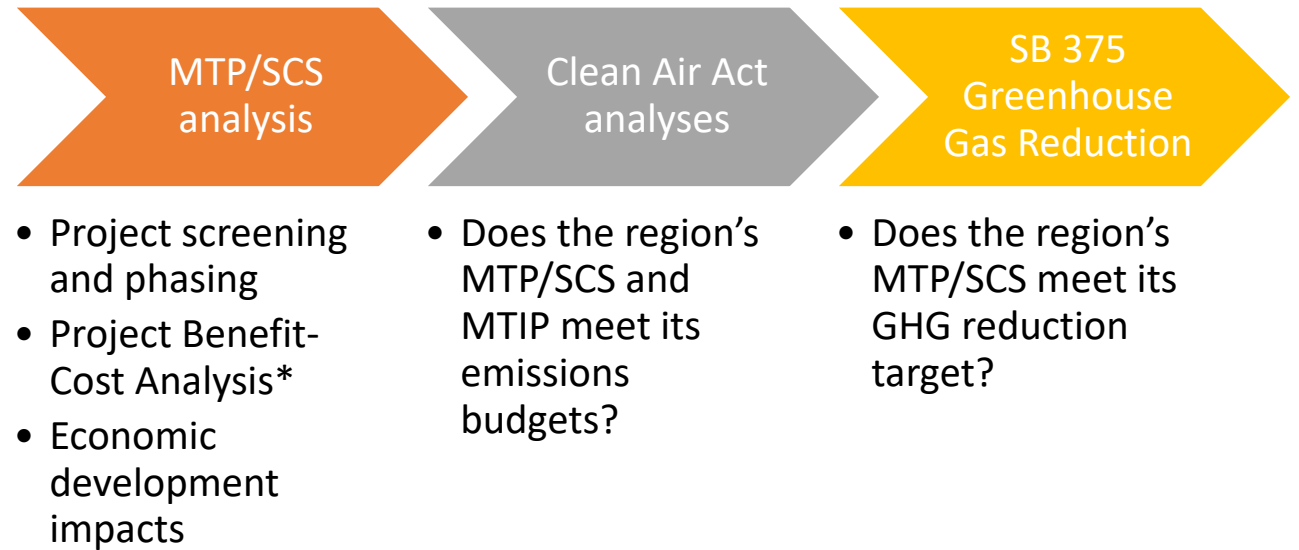
Development/evaluation of projects & plans

- Transportation improvements
- Land development projects
- System-wide packages of transportation improvements
- Area-wide changes in land use

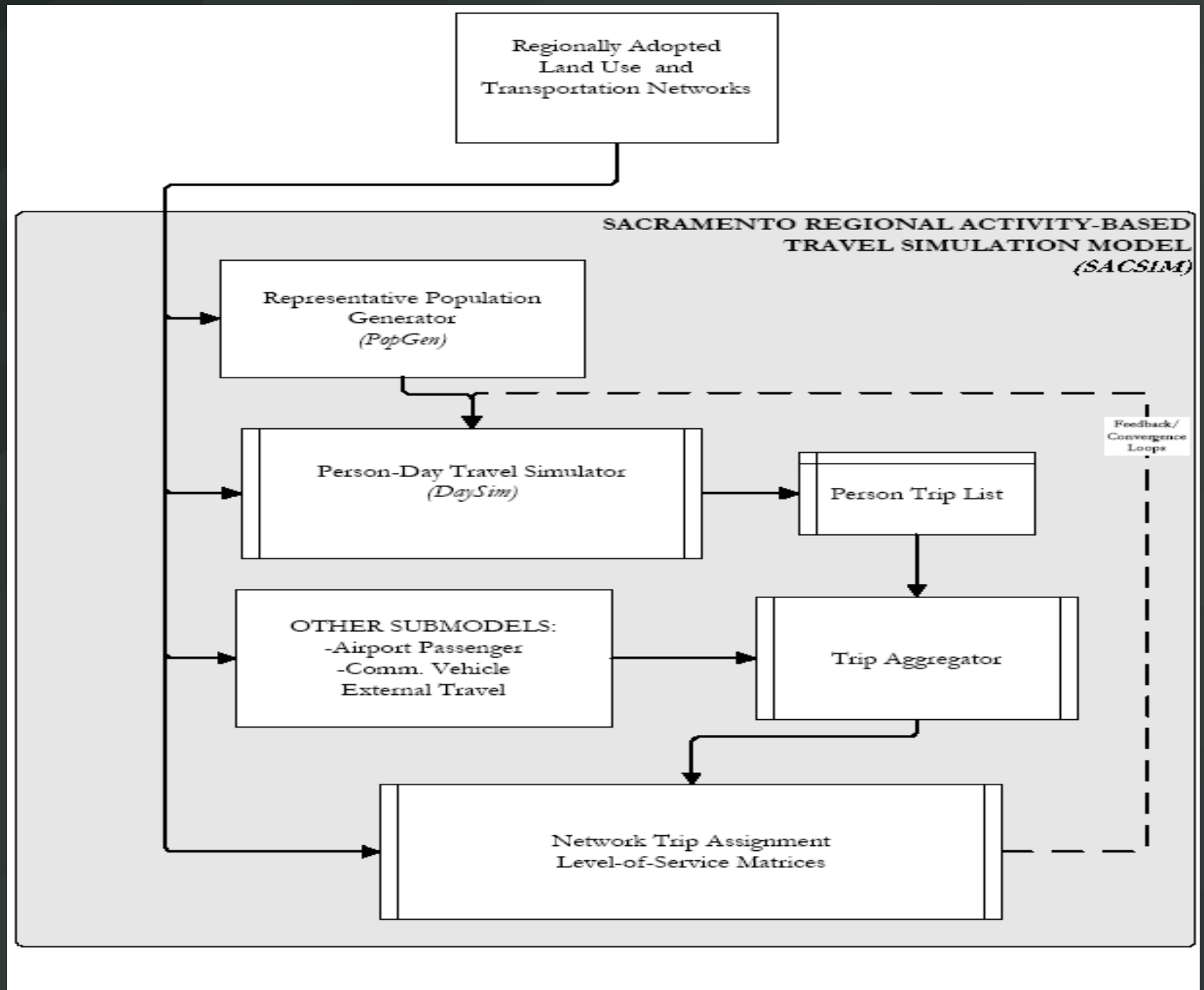
Filling in gaps in “real” data

- No agency counts or surveys enough to empirically know what is going on for a system or a large area.
- Models have been pressed into service to fill in this knowledge gap.

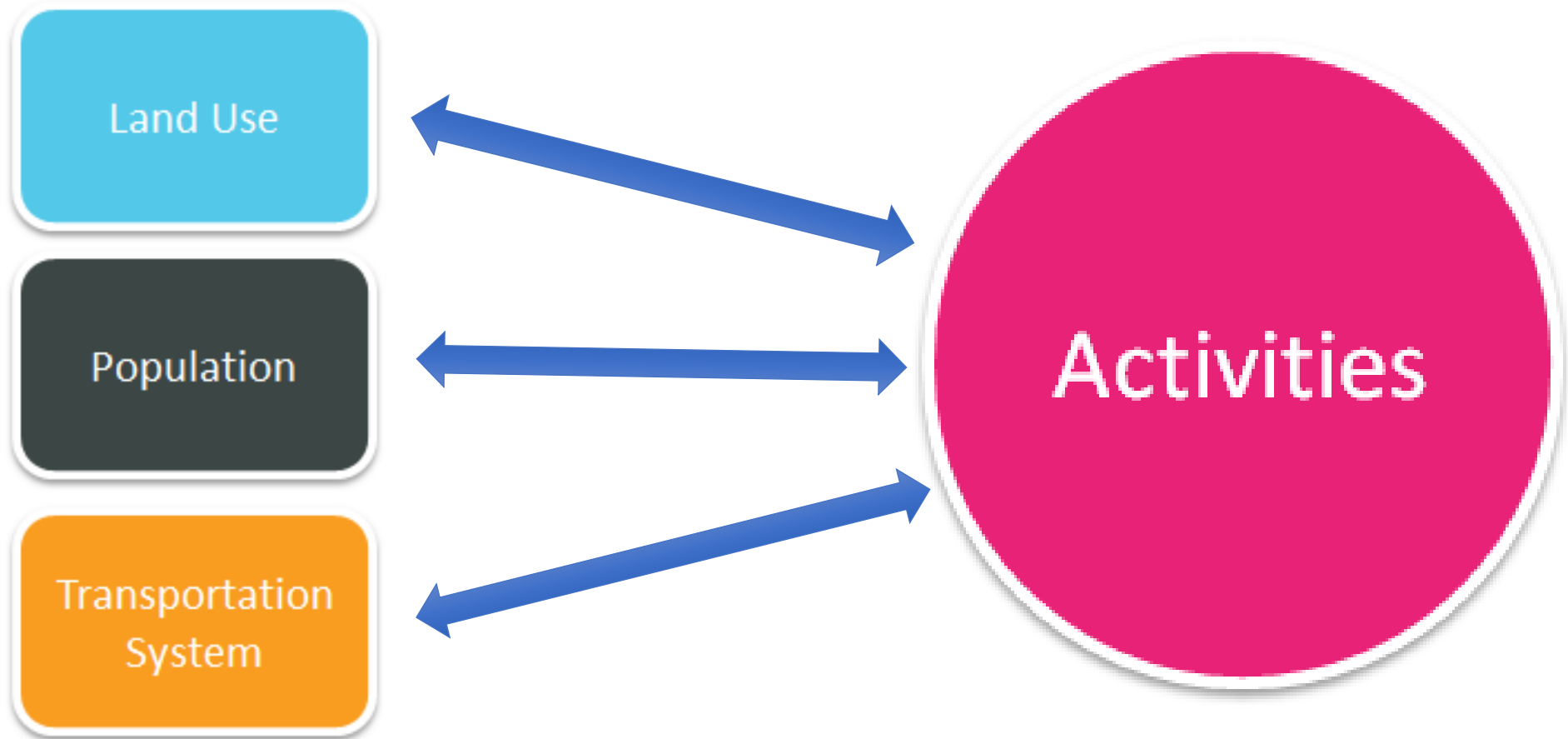
Why do we use travel models?



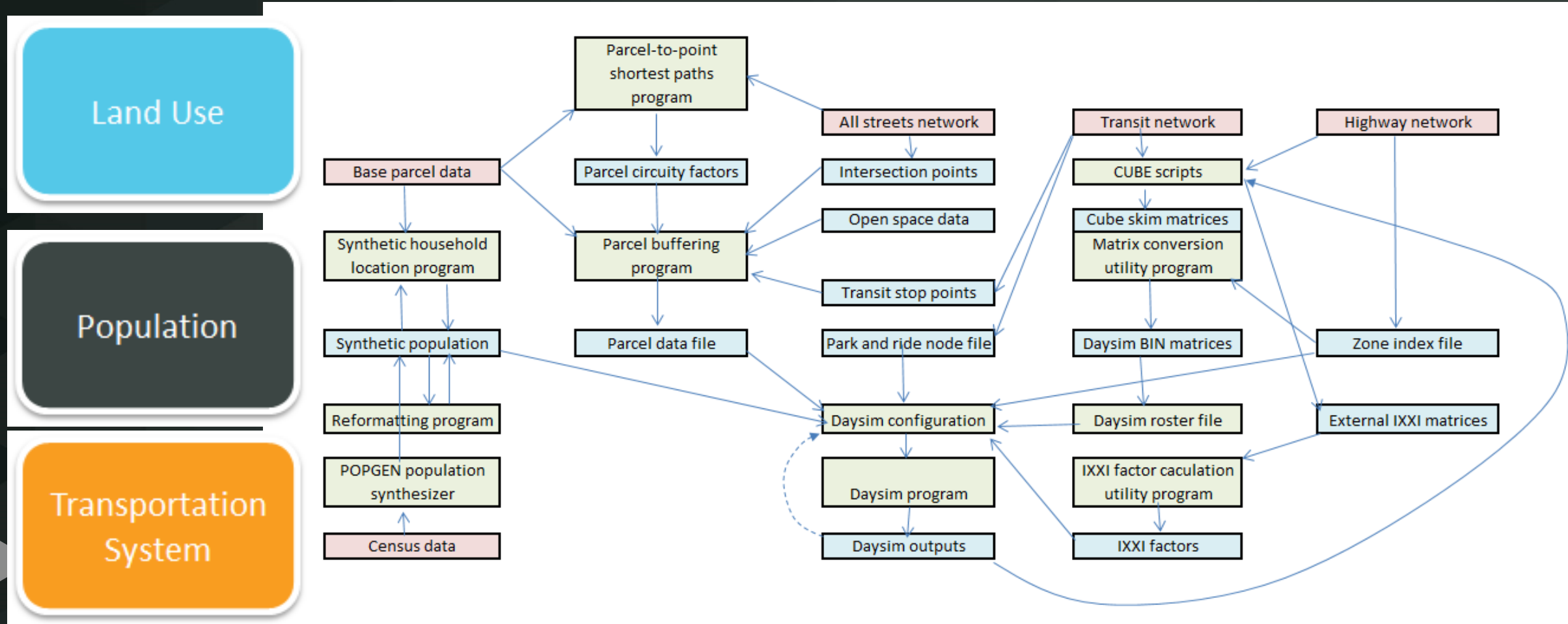
SACSIM Model System



How does SACSIM work?



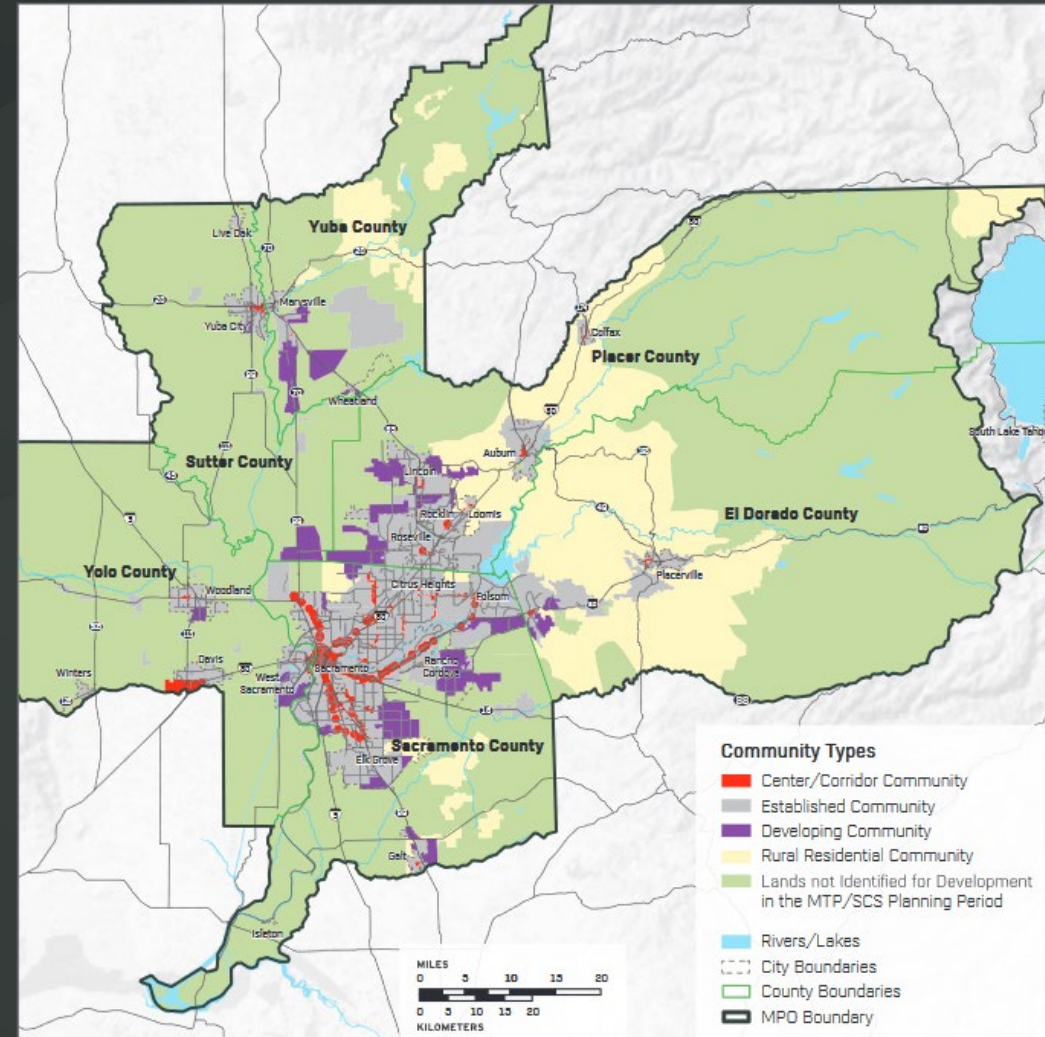
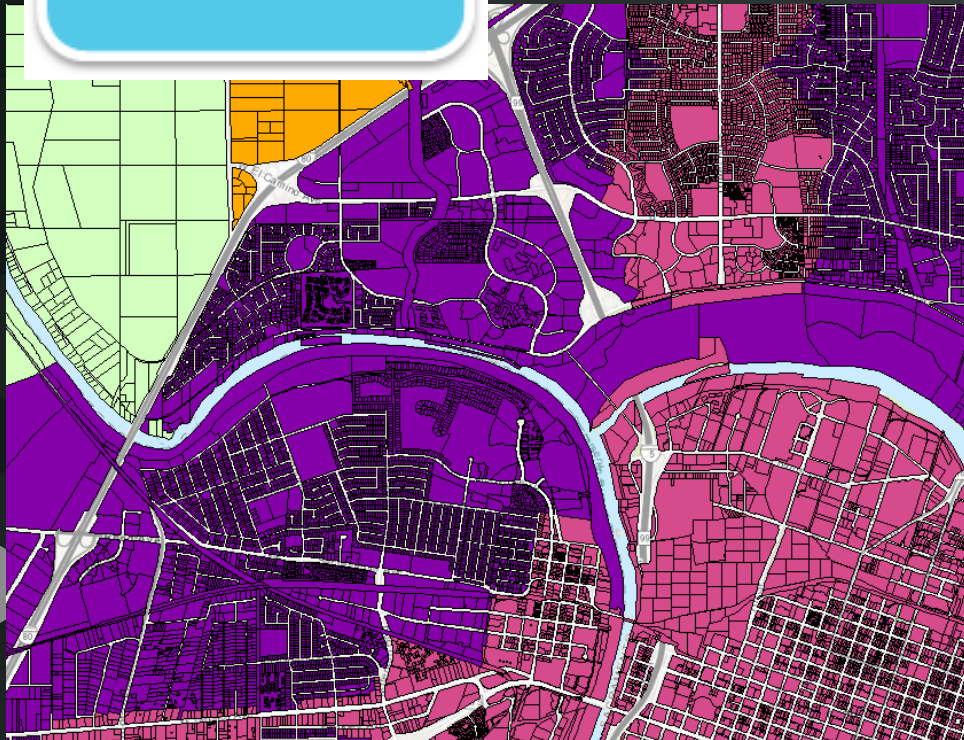
SACSIM Land Use / Population Relationships



Land Use Inputs

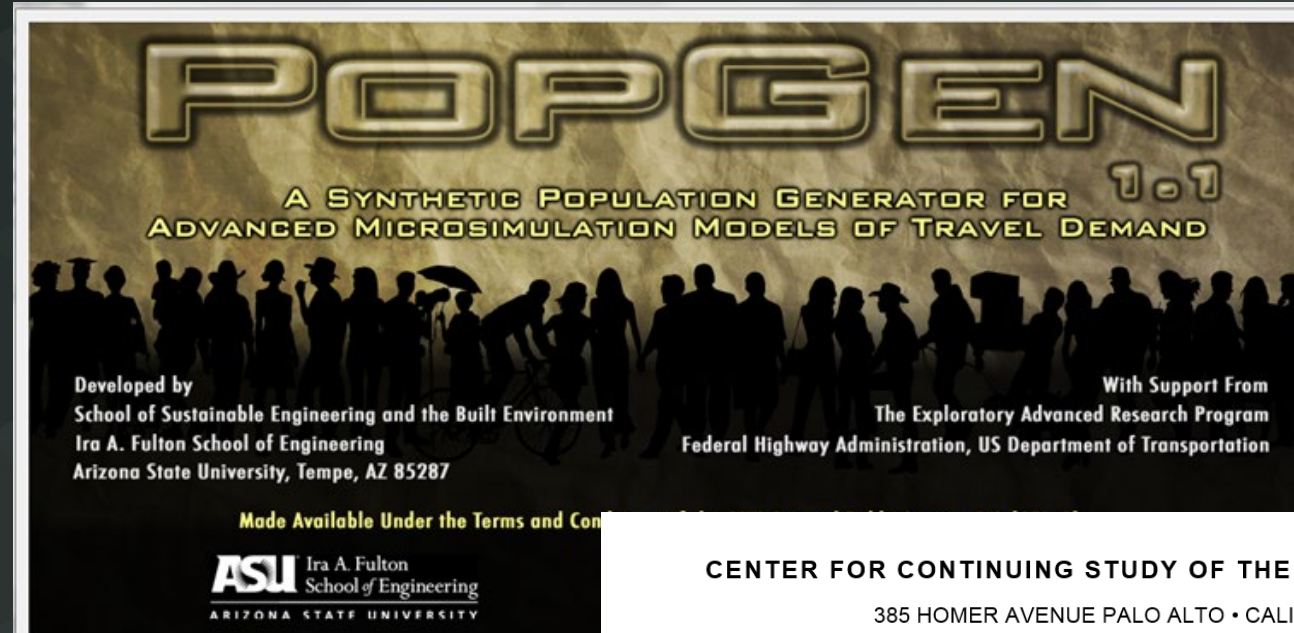


Land Use



Population/Demographic Inputs

Population



5 year ACS (American Community Survey) Marginal data

5-year PUMS (Public Use Microdata Sample) sample population data

CENTER FOR CONTINUING STUDY OF THE CALIFORNIA ECONOMY

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December 2017

SACOG Growth Forecast 2016-2050

Final Report



Transportation Input

- Roadway Characteristics
- Transit Network
- Bike and Walk Networks





Transportation Inputs – Road Network

- Key Characteristics
 - Roadway Type (Capacity Class)
 - Speed
 - Lanes
 - Toll attributes (new for SACSIM19)



Transportation Inputs – Transit Network

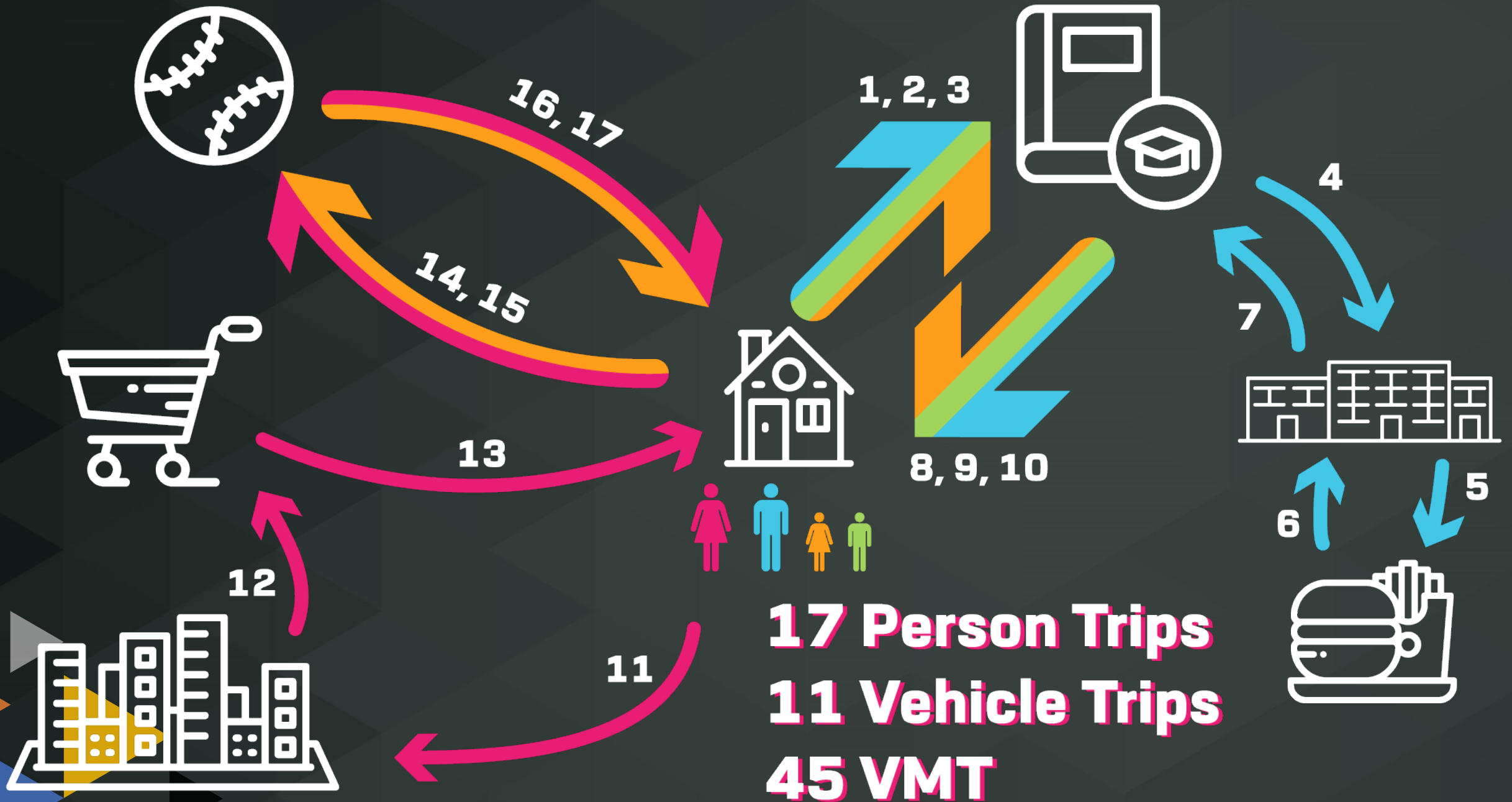
- Key Attributes
 - Service Type (new in SACSIM19)
 - Headway (5 time periods)
 - Travel time



Transportation Inputs – Bike and Walk Network

- Bike Network
 - On-street facilities
 - Off-street paths
- Walk Network





Before...
Evaluating the Future

How do we
know SACSIM
is a reasonable
model?

Development
& Calibration

Review

Validation

Sensitivity
Testing

How do we know SACSIM is a reasonable model?

Development

- Based on Regional Household Travel Survey Data, 2018
- 5th Generation of SACSIM "SACSIM19"

Calibration: Adjust model parameters in an effort to make the model replicate observed data for a base year to produce more reasonable results.

- Iterative process

Validation: comparing SACSIM outputs to observed conditions

- traffic volumes & transit ridership to counts for base year
- reasonableness checks on length of trips, trip rates, etc. from household travel surveys

Sensitivity Testing: ensuring SACSIM is reasonably sensitive to key factors

- Demographics (income, age)
- Land Use (density, mix of use)
- Transportation (accessibility, proximity to transit, street pattern)

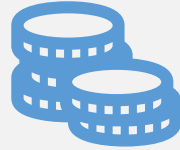
Review

Internal Review

Local Agency users

Transparency Access to Model files, and documentation

Tolling



Potential funding source as gas tax revenues decline



HOT (High-occupancy toll) lanes

Limit specific lanes within corridors to either HOVs or solo drivers willing to pay a toll

Toll optimization algorithm sets toll based on travel time savings and desire to keep tolled facility uncongested

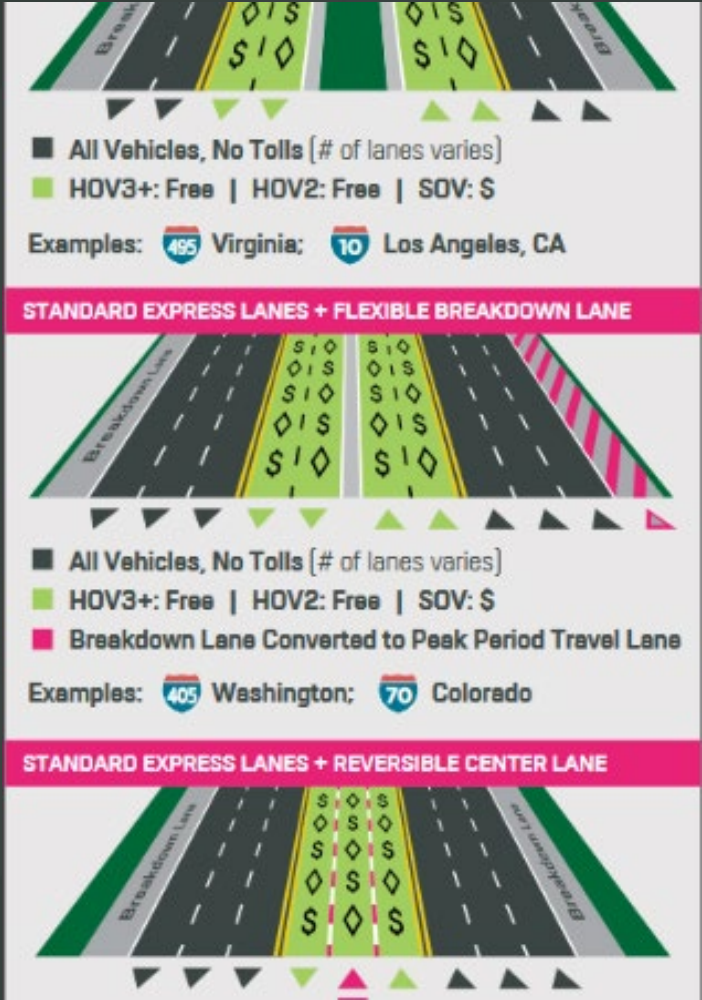
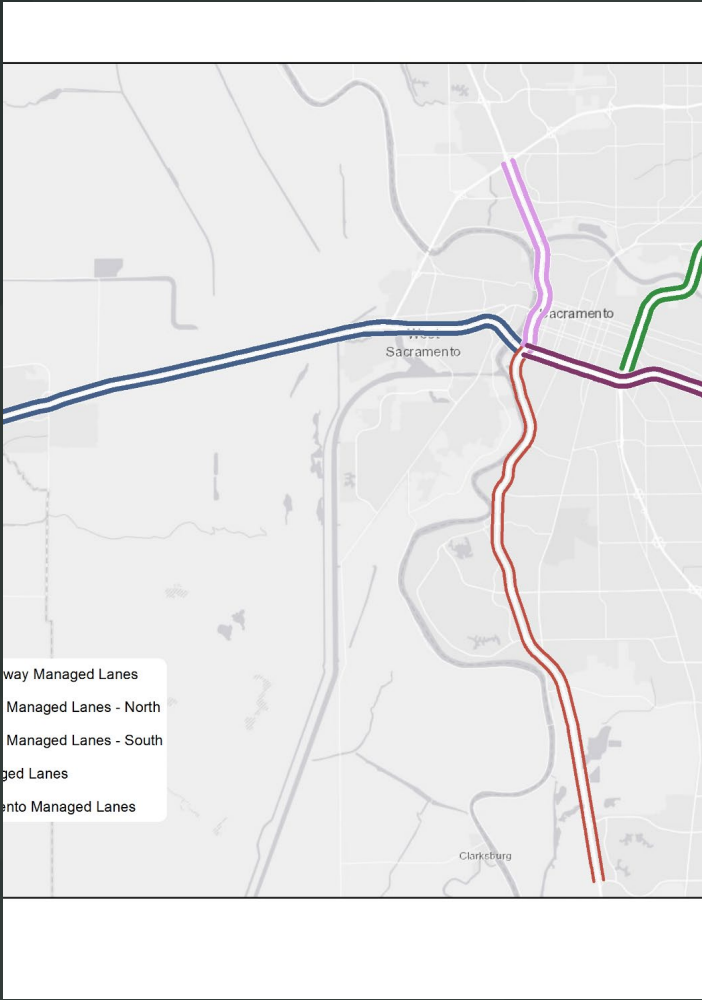
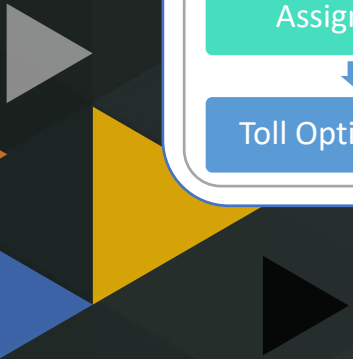


All-lane tolled facilities

Toll applies to all lanes in a facility

Toll is flat and manually set for each facility

Managed Lanes



Pay-as-you-go Fee



Charges fee per vehicle mile traveled

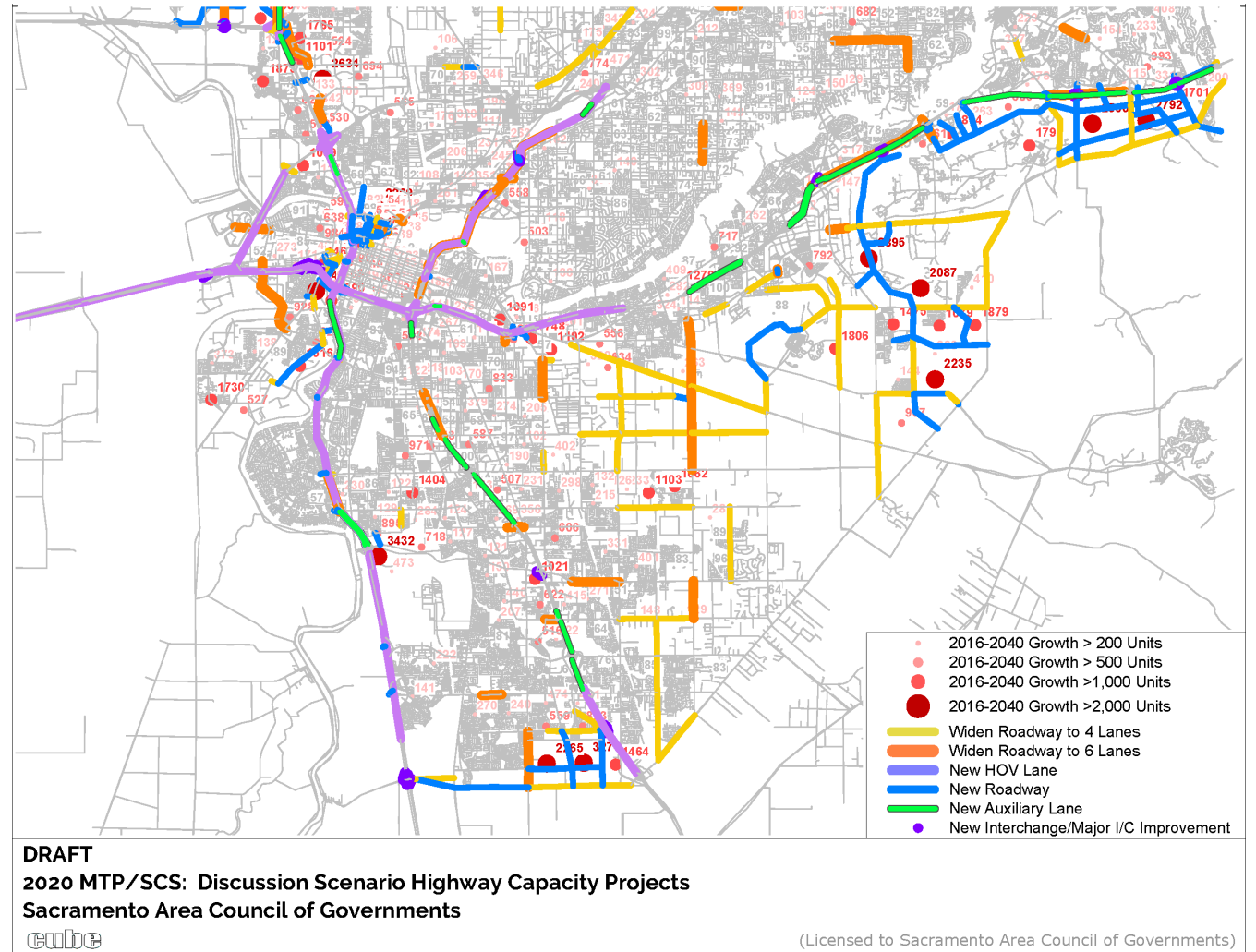


Potential need:

Replacement funding source as gas tax revenues decline

Temper potential VMT increases from AV adoption

Applications



Testing Autonomous and Connected Vehicles (AVs)

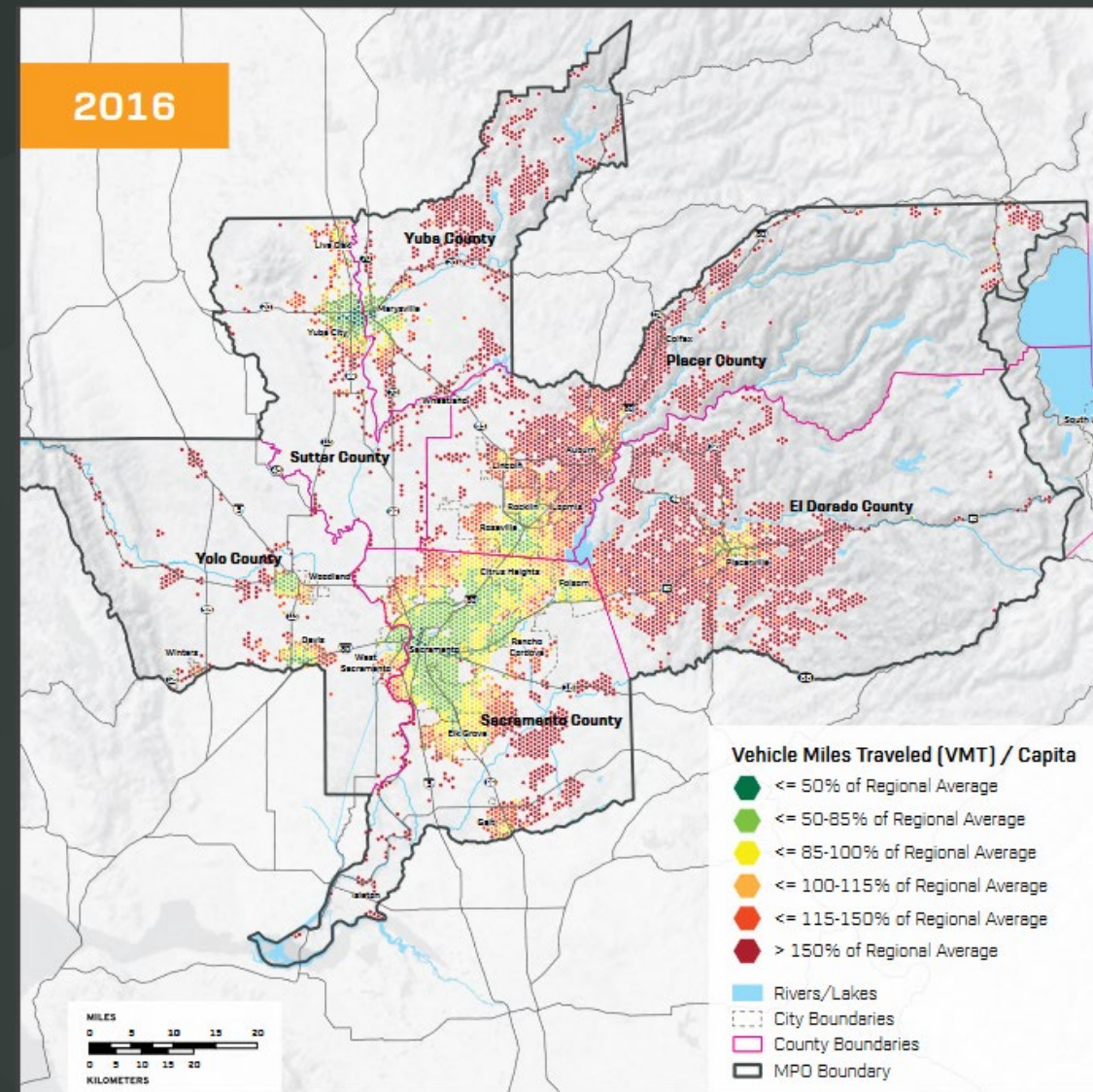
- Due to absence of data on AVs, model allows users to set parameters to test potential outcomes.

Parameter	Assumptions
Adoption rate	Unknown. Range of rates tested.
Highway capacity	Expected increase in lane capacity.
Effect of household age and income	Younger, wealthier HHs more likely to acquire AVs
Vehicle ownership	Fewer vehicles per HH due to easier sharing among HH members
Travel time cost	Lower cost due to ability to engage in other activities while traveling.

Application

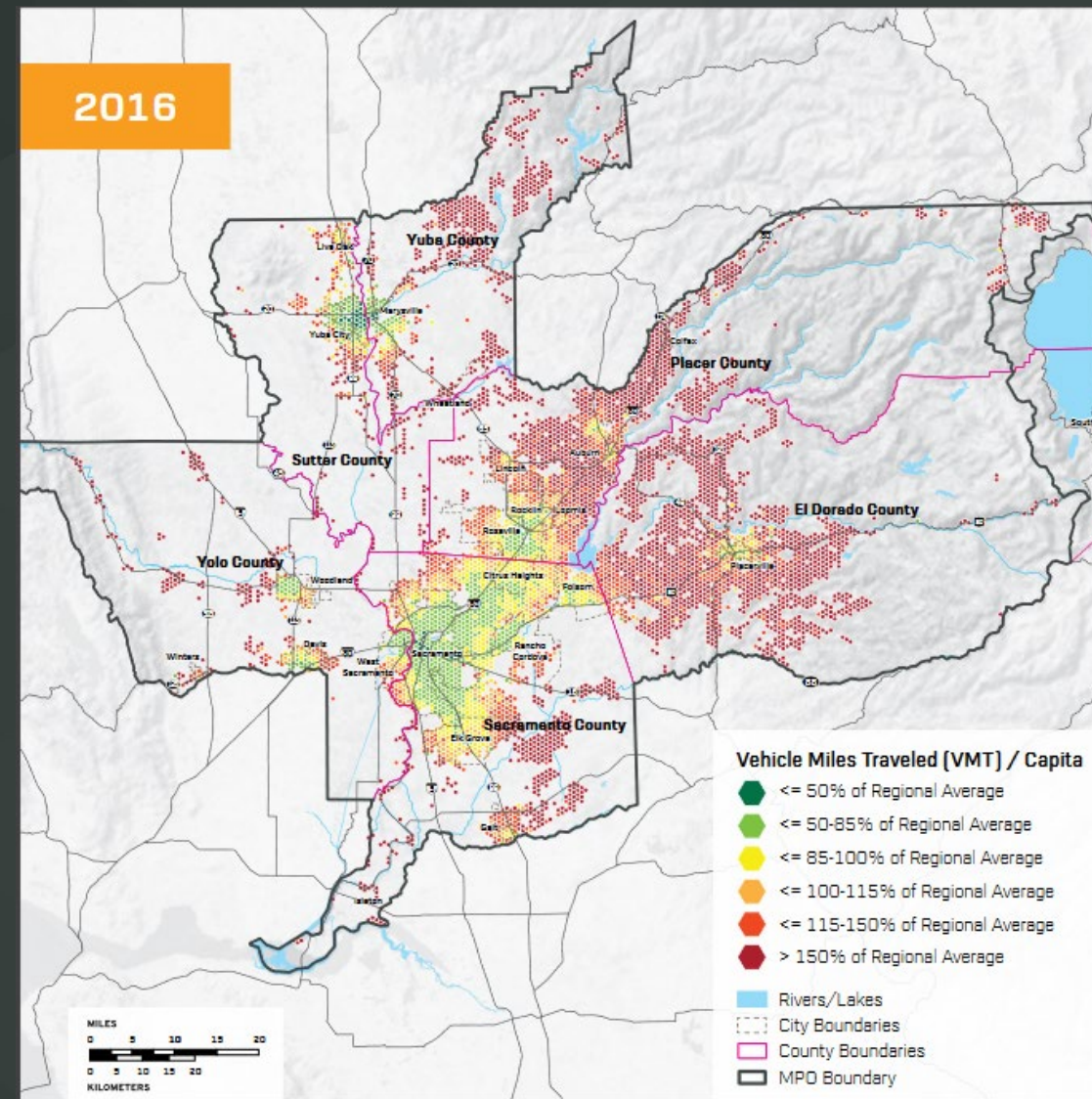
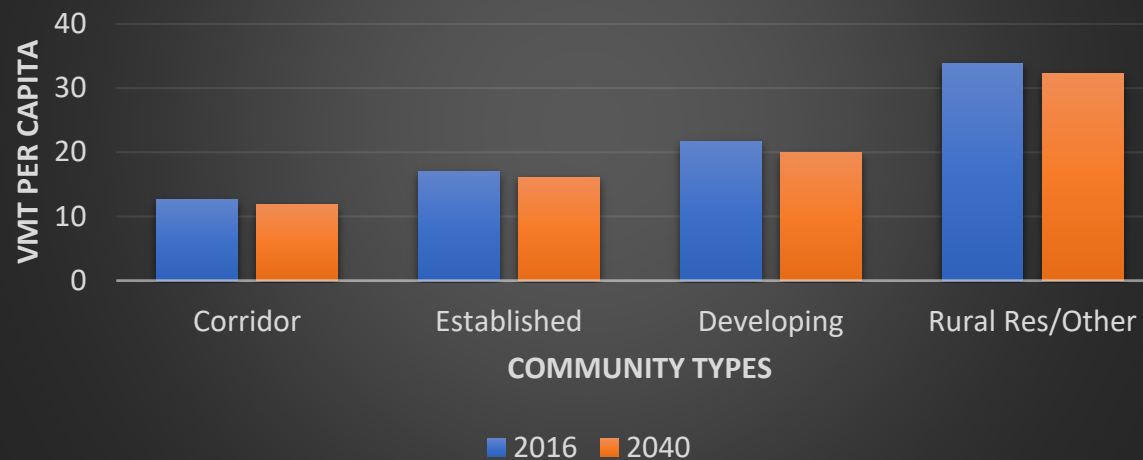
Vehicle Miles Traveled per Capita Forecasts

FIGURE 3.9 Vehicle Miles Traveled per Capita in the SACOG Region over Time

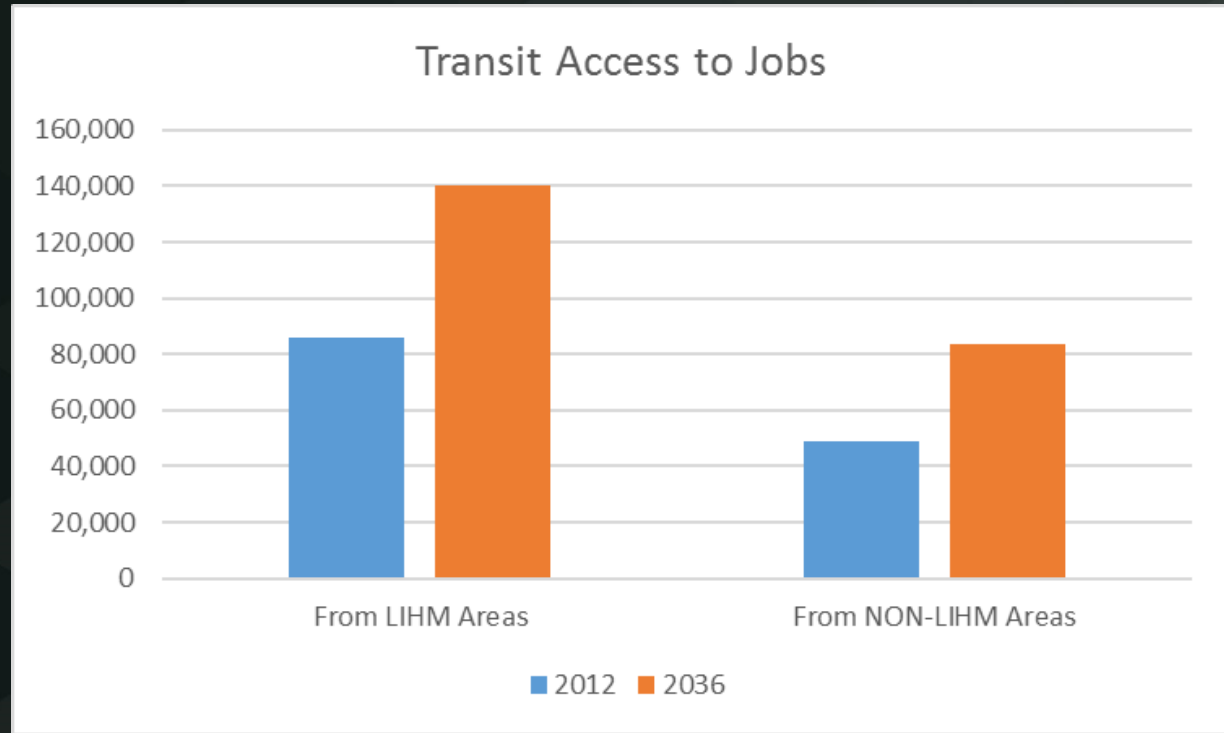


Application

Weekday Household Vehicle Miles Traveled per Capita by Community Type in SACOG Region

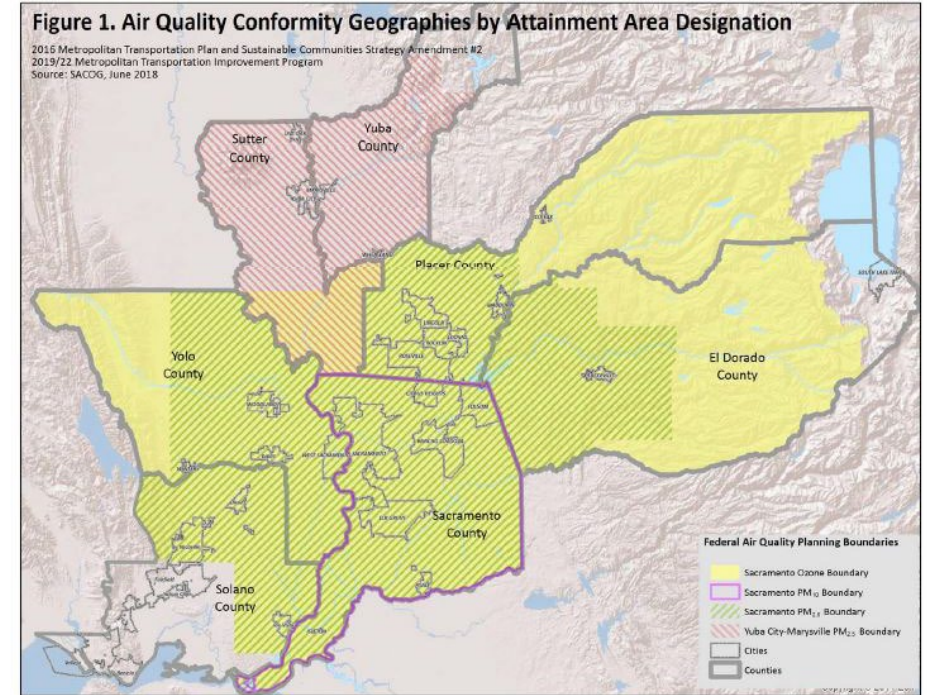


Application



Application

Why Do We Estimate Vehicle Emissions?



	2016		2016 - 2040		2040	
Community Type	Dwelling Units	Employees	Dwelling Units	Employees	Dwelling Units	Employees
Center and Corridor Communities	113,880	370,890	86,661	82,850	200,541	453,739
Established Communities	712,012	645,326	81,365	146,053	793,377	791,379
Developing Communities	20,793	12,339	89,313	39,754	110,106	52,093
Rural Residential Communities	74,438	32,196	2,789	1,405	77,227	33,601
Lands Not Identified for Development in the MTP/SCS Planning Period	n/a	n/a	n/a	n/a	n/a	n/a
Region Total	921,123	1,060,751	260,128	270,062	1,181,251	1,330,813

Source: SACOG Proposed MTP/SCS Land Use Forecast for 2040, June 2019.

Application

Estimate Vehicle Emissions?

To meet the
requirements
of federal
and state law
on air quality

- NO_x
- Reactive Organic Gases (ROG)
- Particulate Matters (PM₁₀, PM_{2.5})

To meet the
requirement
of SB375
GHG
reduction
target

- 19% reduction in 2035 from 2005 baseline

Thank You

For more information on SACSIM contact

sacsim@sacog.org or visit
<https://www.sacog.org/modeling>