





INTRODUCTION TO SACSIM

Why do we use travel models?

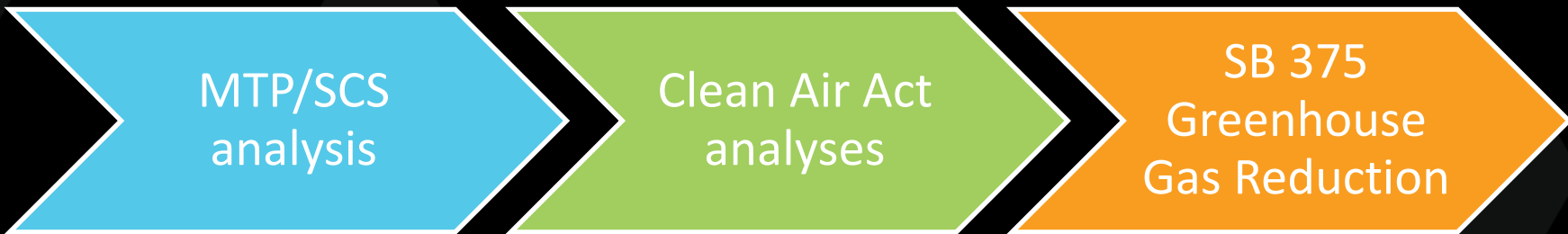
Development/evaluation of projects & plans

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

Filling in gaps in “real” data

- Not enough empirical data
- Models have to fill the gap

Why do we use travel models?



MTP/SCS
analysis

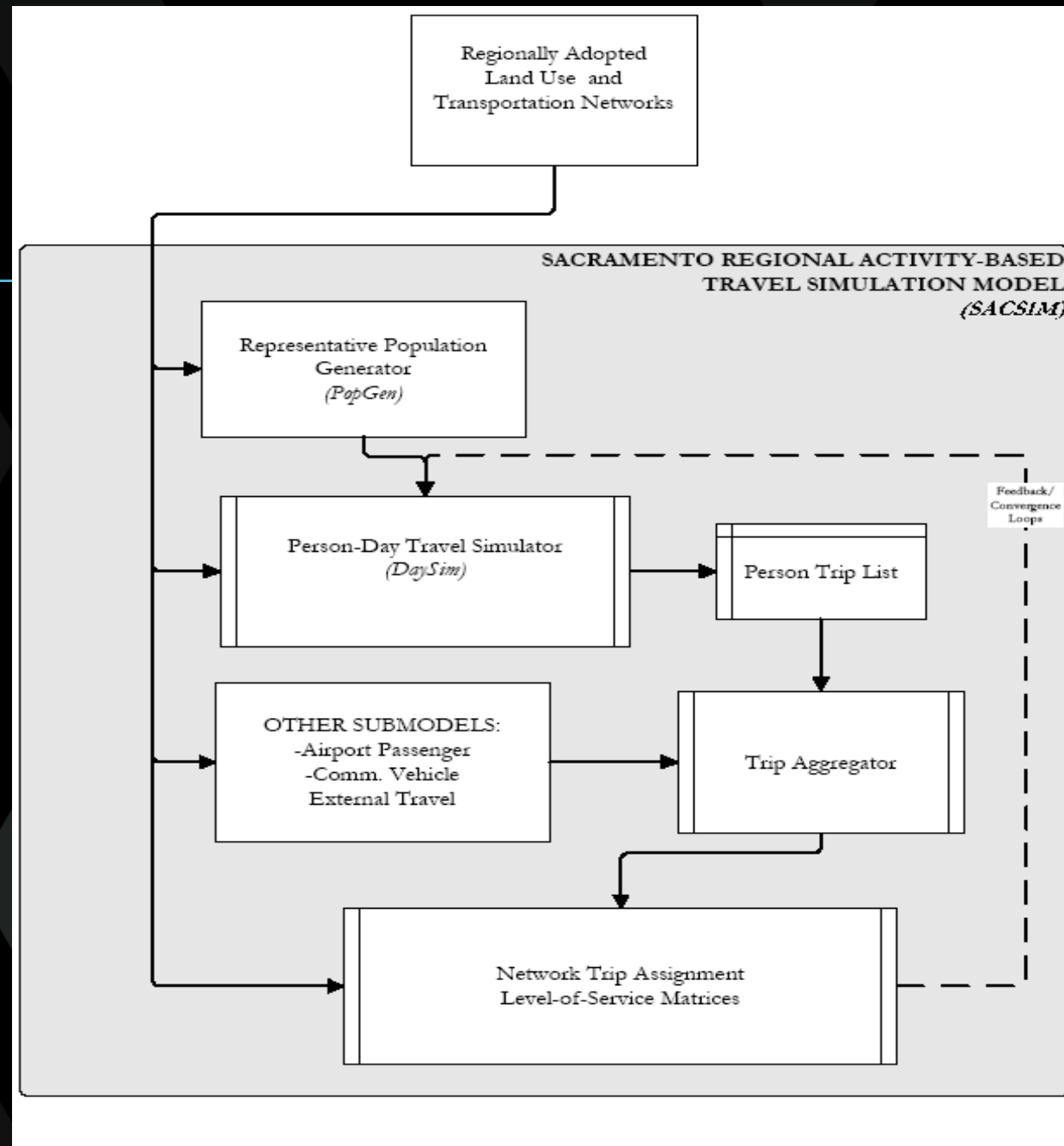
Clean Air Act
analyses

SB 375
Greenhouse
Gas Reduction

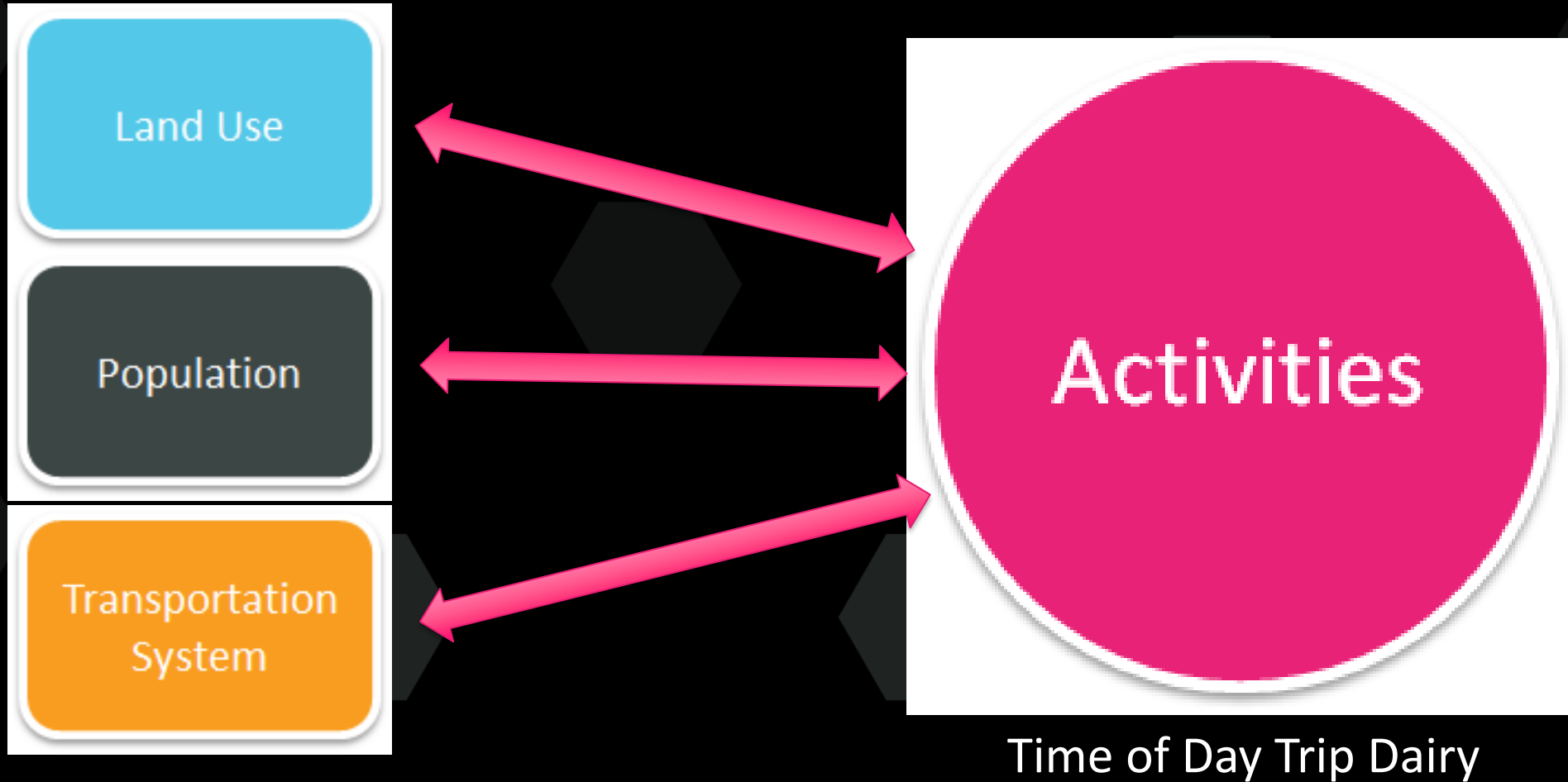
**Why do
we use
travel
models?**



SACSIM Model System



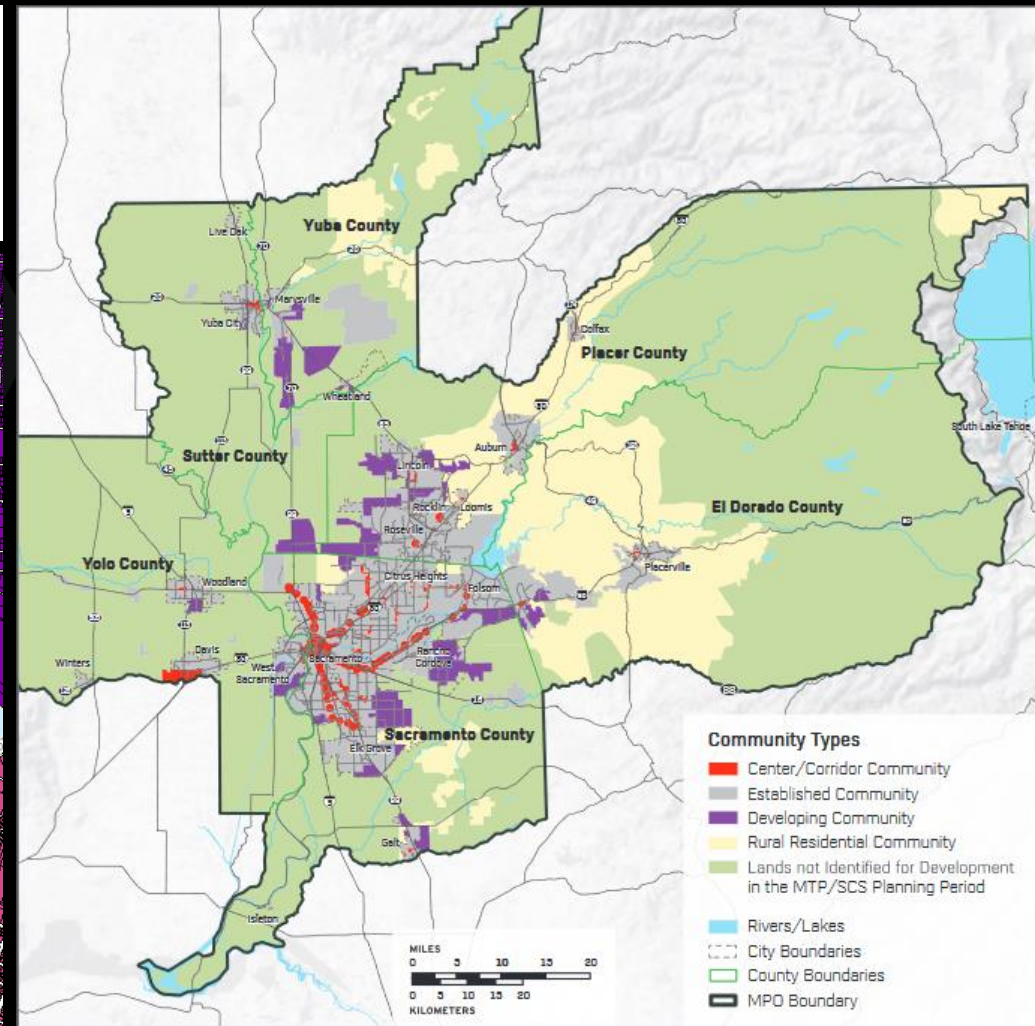
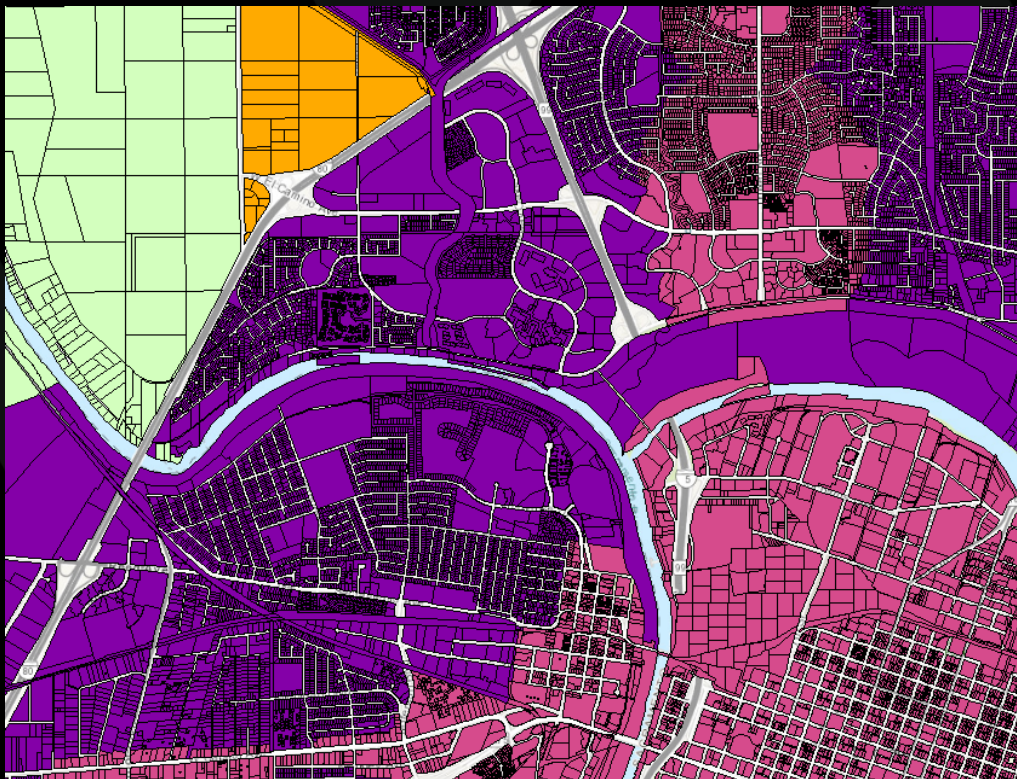
How does SACSIM work?



Land Use Inputs



Land Use

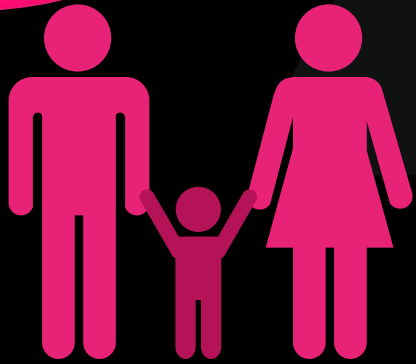


Population/Demographic Inputs

Population

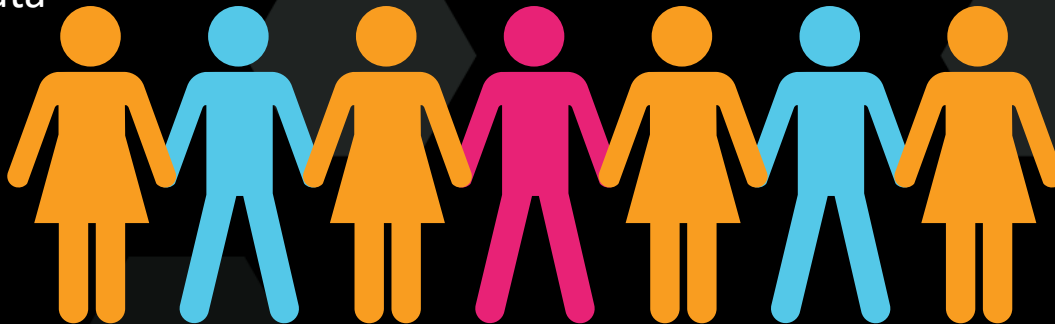
Sample Data

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



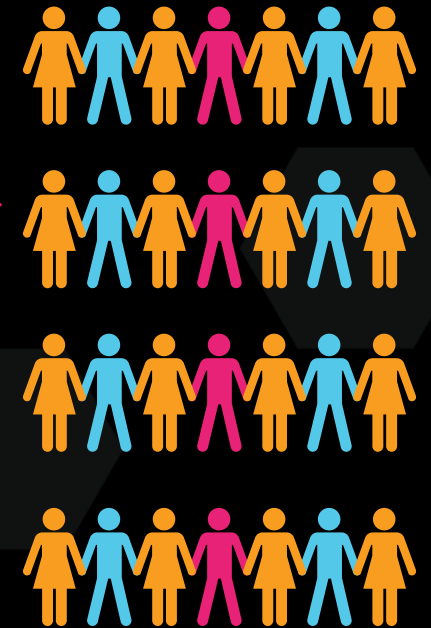
5 year ACS (American Community Survey) Marginal data

Control Data



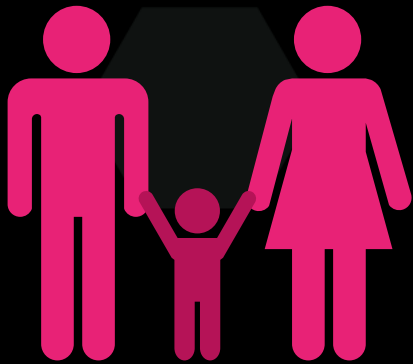
Population
Synthesizer Tool

SACSIM
Synthetic
Population

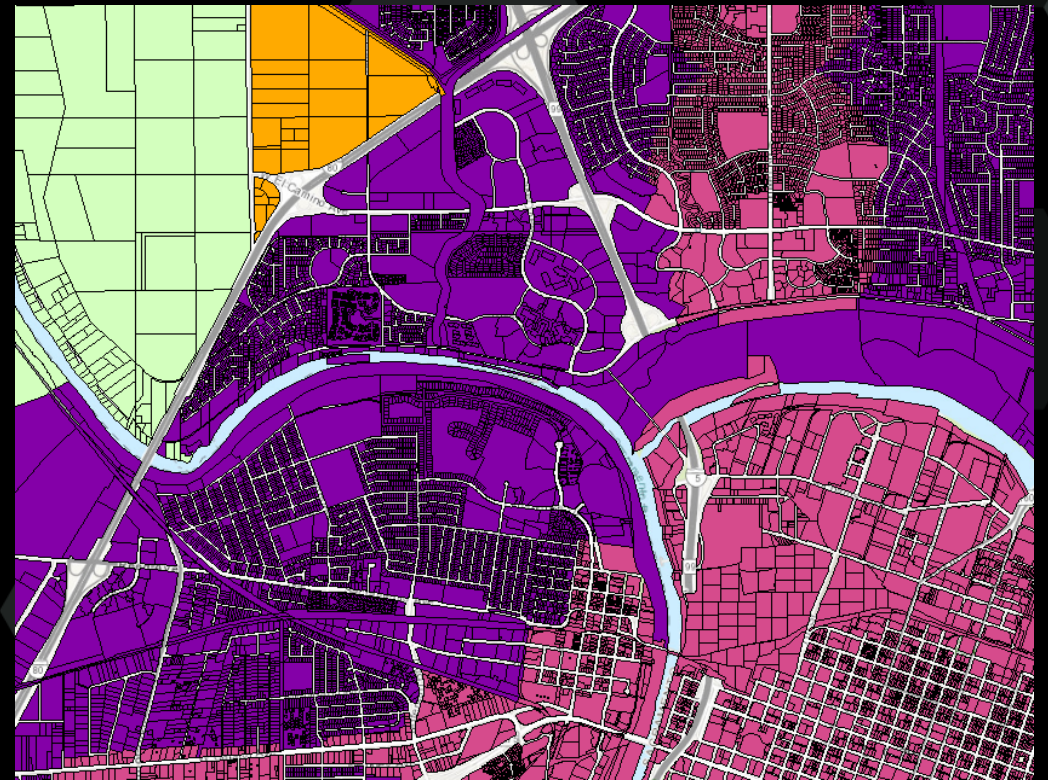


Assign Population and Households to Parcels

Population



Land Use





Transportation
System

Transportation Input



Transportation Inputs – Road Network

Transportation
System





Transportation Inputs – Transit Network

Transportation
System



Transportation Inputs – Bike and Walk Network



Transportation
System

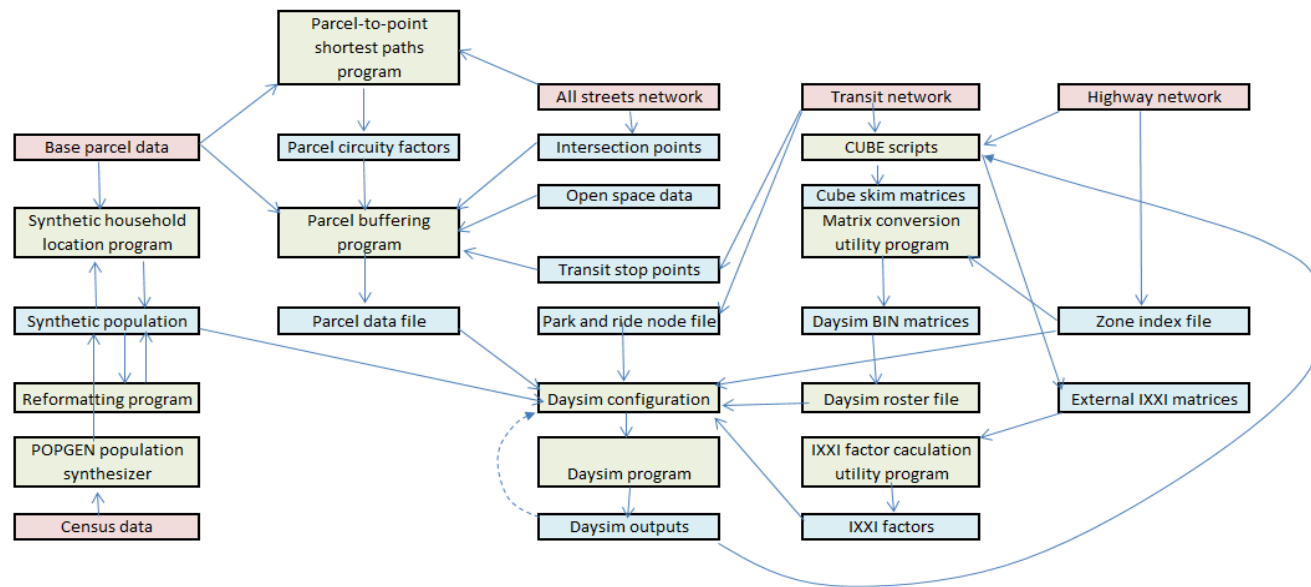
SACSIM Land Use / Population Relationships

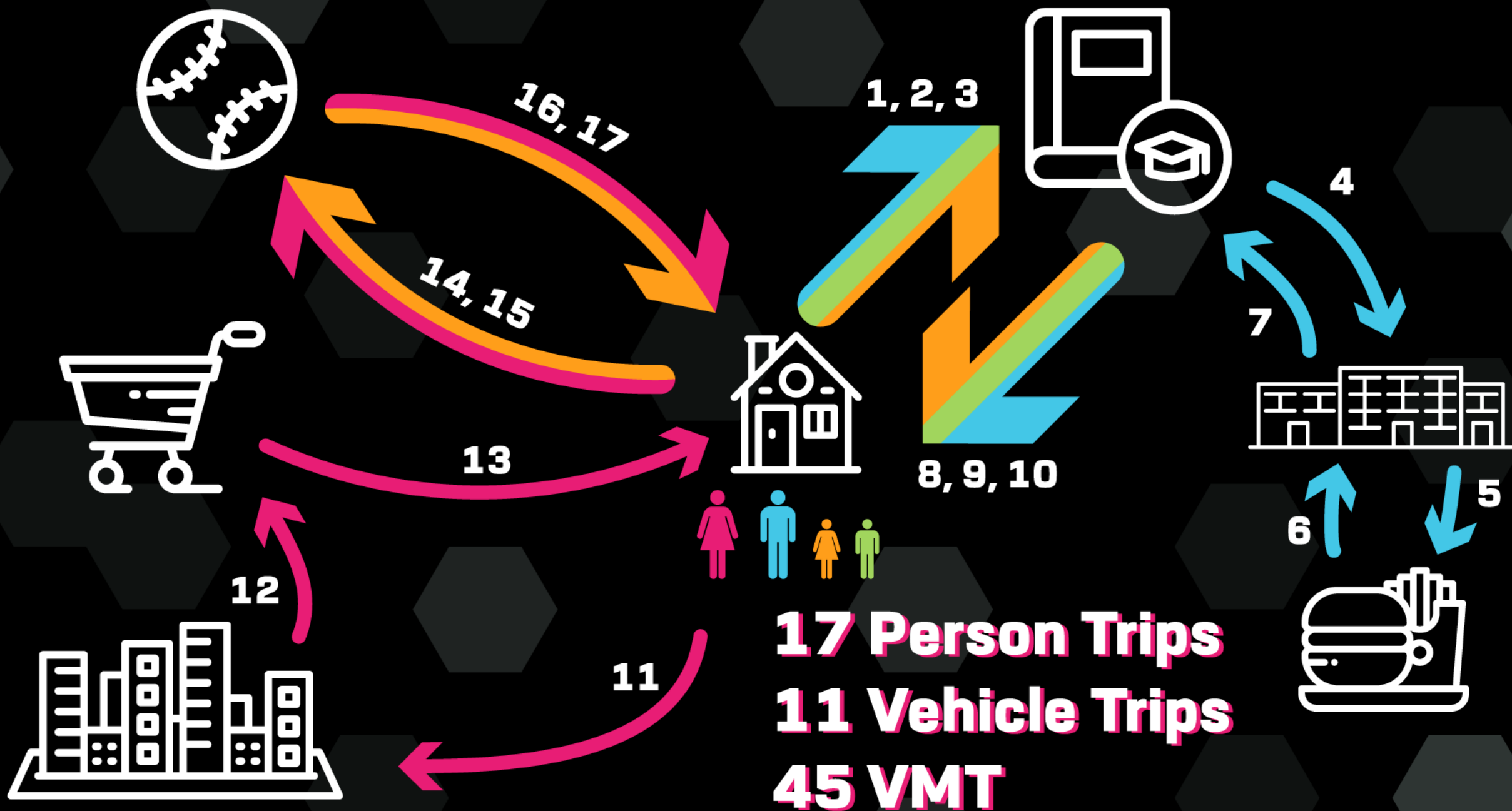
Land Use

Population

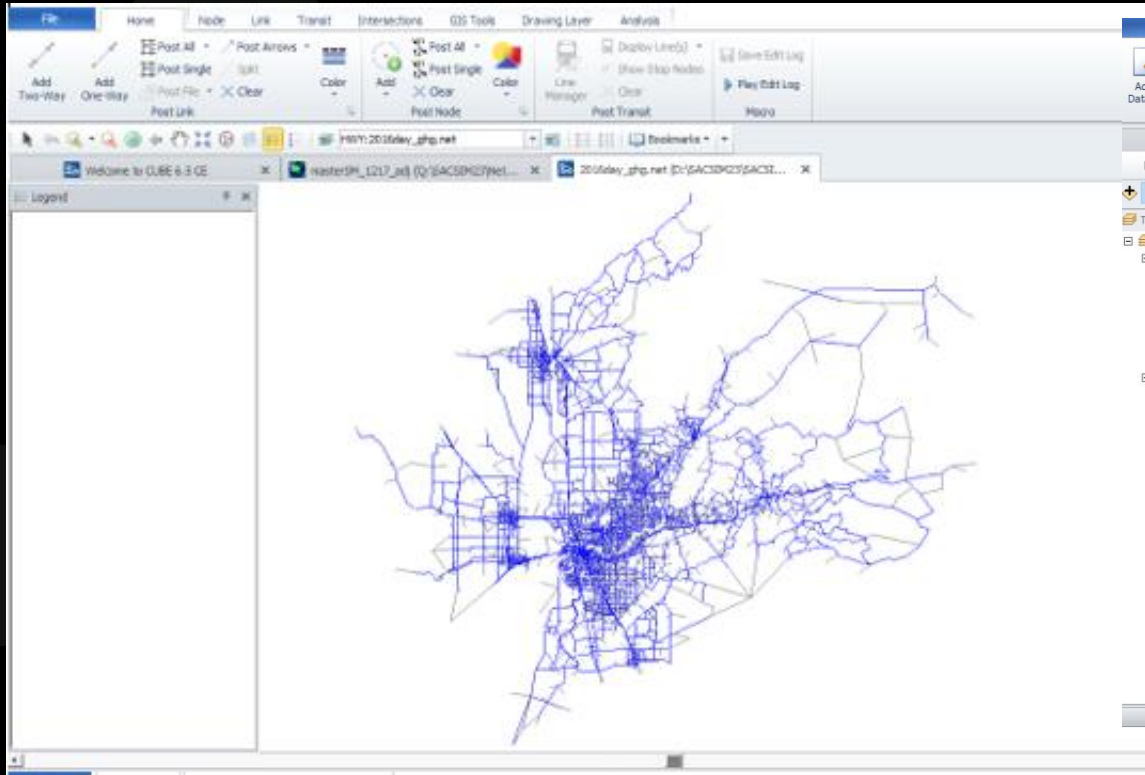
Transportation
System

Activities

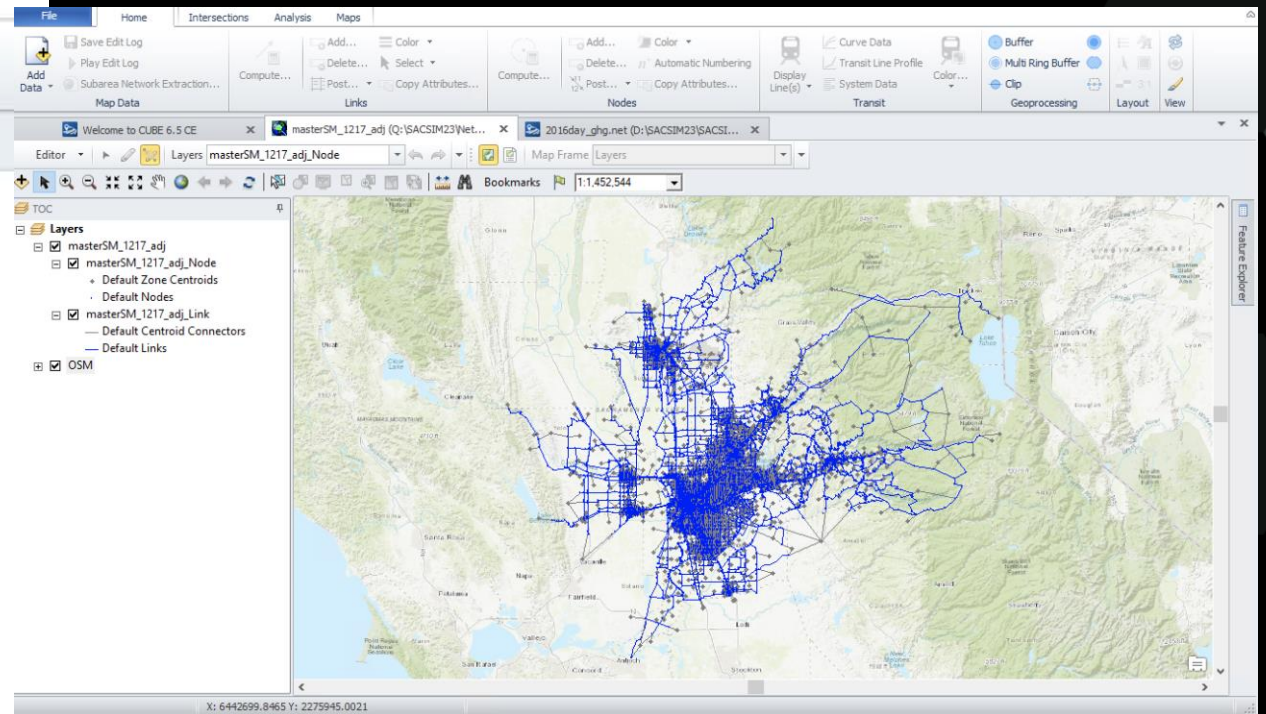




Network Interface



- Previous CUBE Network Interface



- New CUBE GIS Interface

Before... **Evaluating the Future**

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 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)

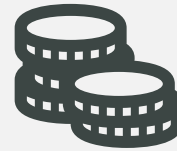
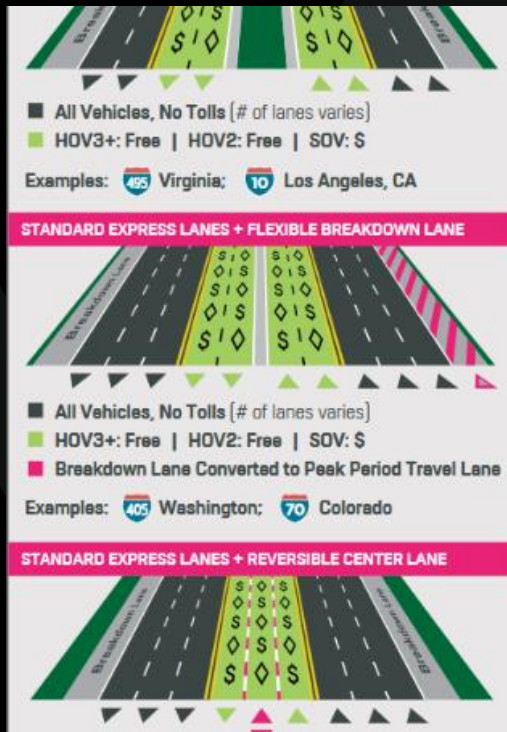
**How do we
know
SACSIM is a
reasonable
model?**

Review
and
Repeat

- Internal Review
- Local Agency users
- Transparency
Access to
Model files, and
documentation

SACSIM Advanced Features

Managed Lanes



Potential funding source as gas tax revenues decline



HOT (High-occupancy toll) lanes

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

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

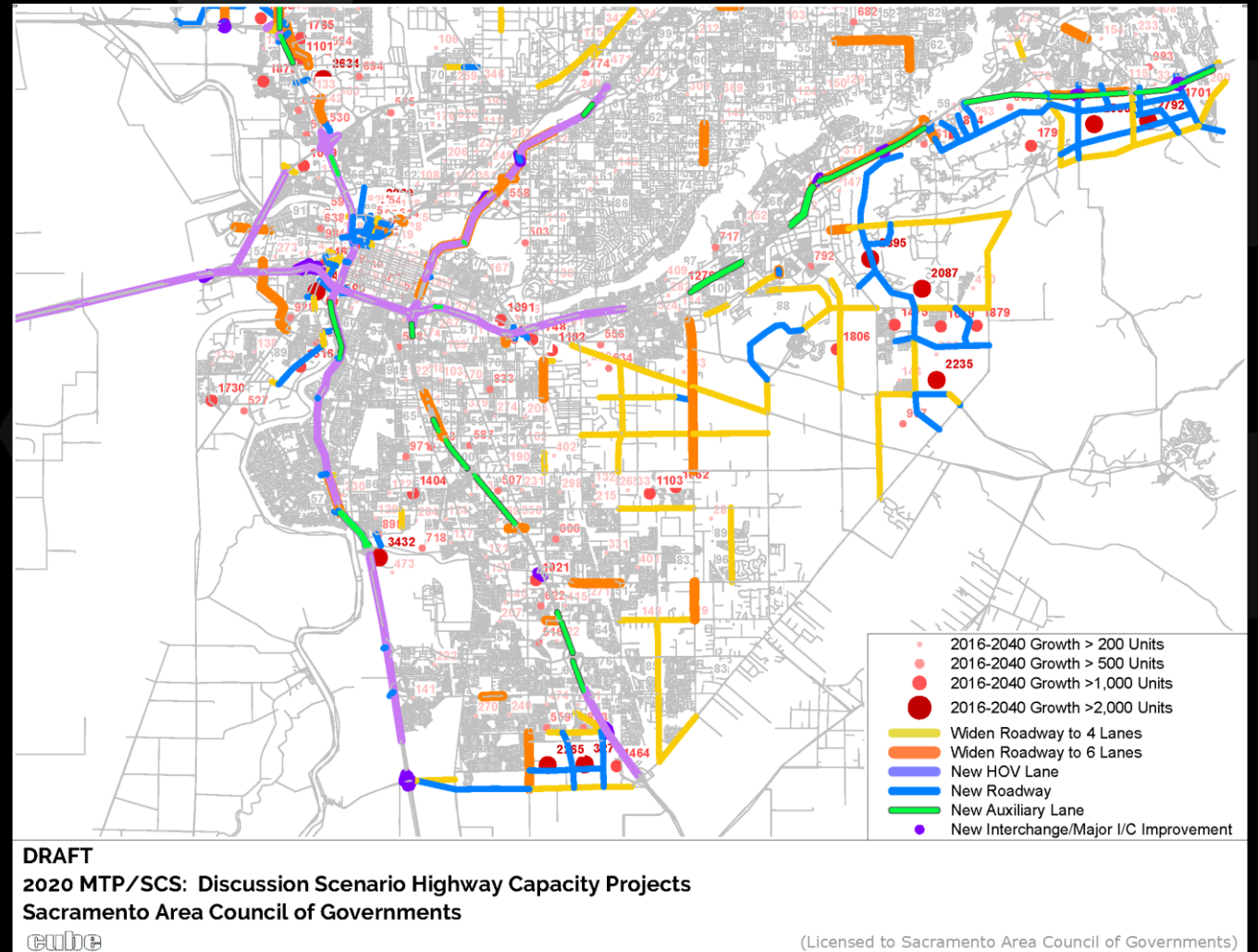
Telework and AV/TNC Estimations

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.

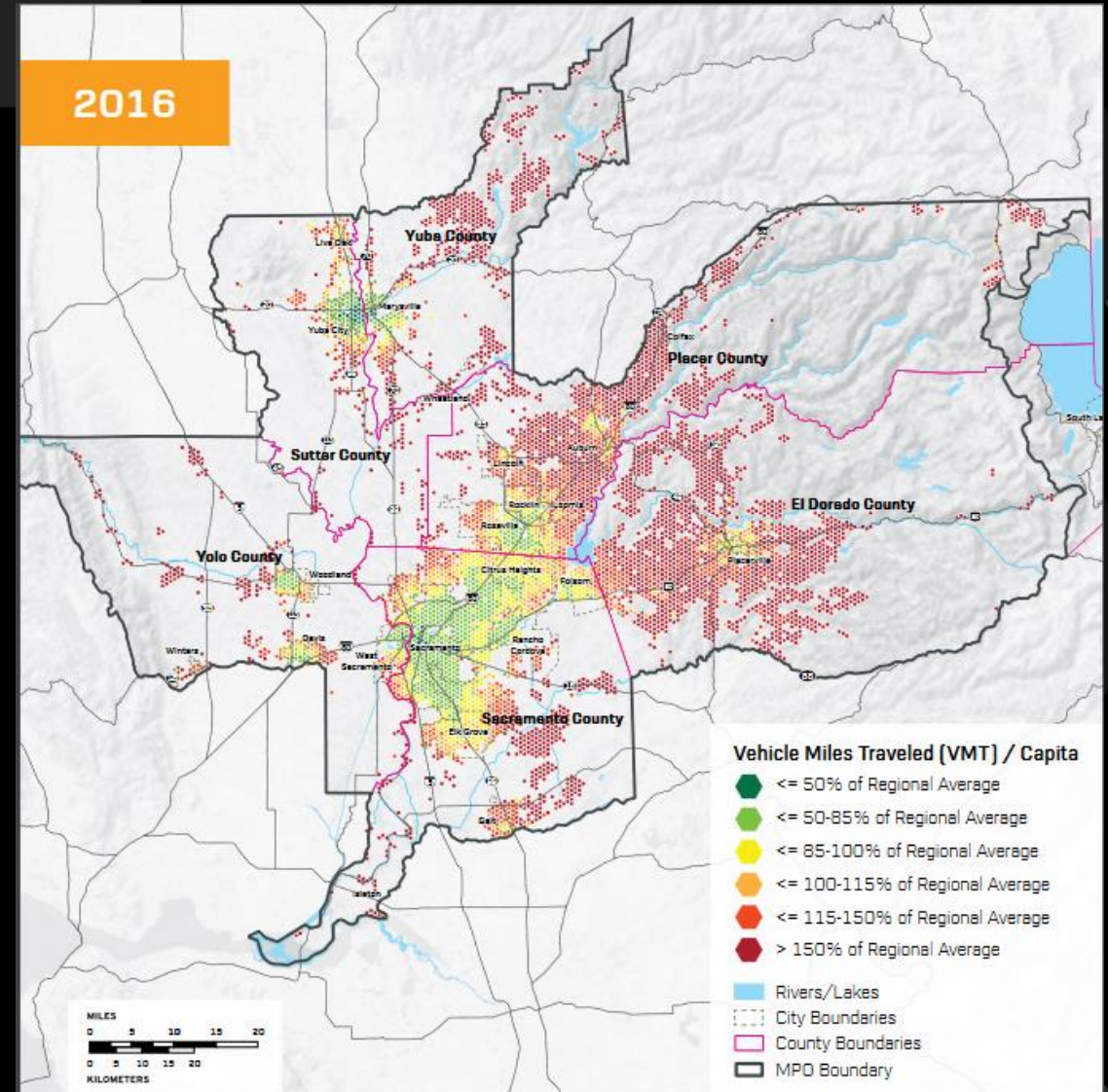
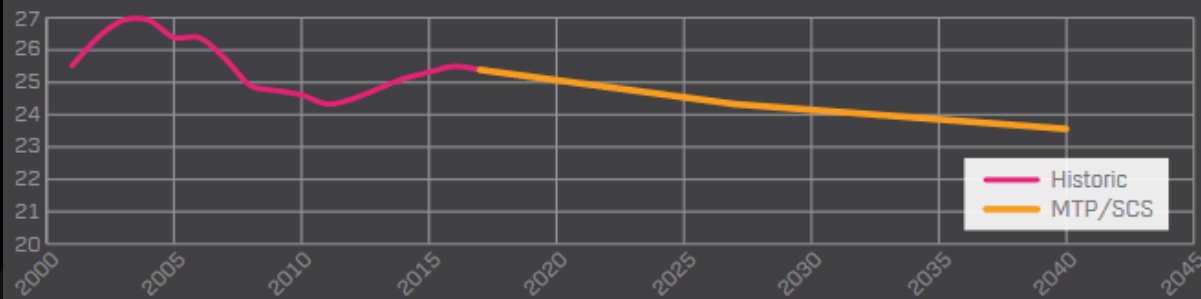
Applications



Application

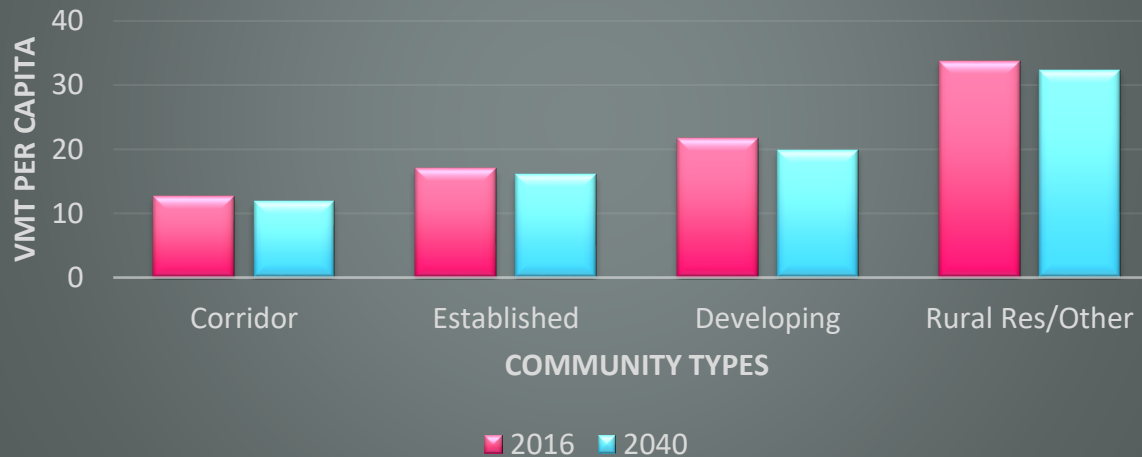
Vehicle Miles Traveled per Capita Forecasts

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

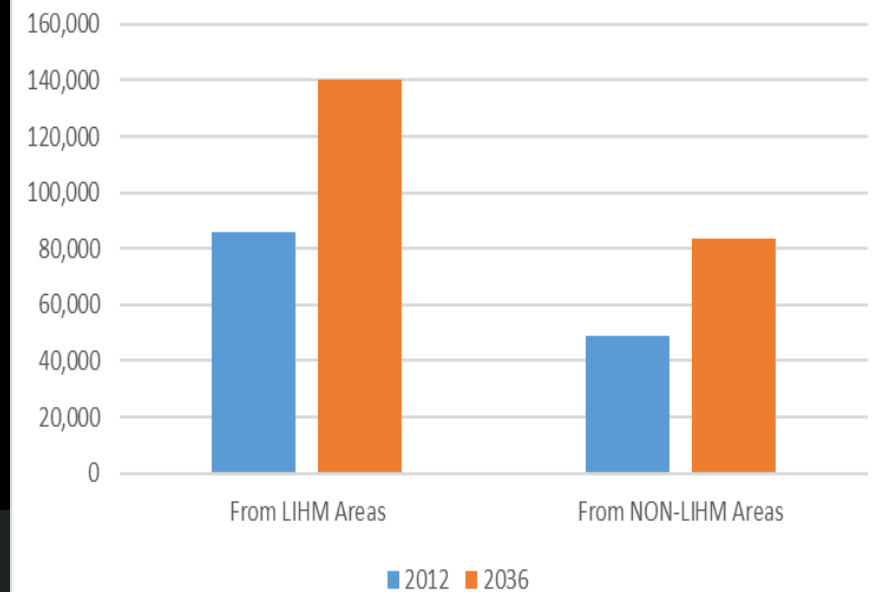


Application

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



Transit Access to Jobs



Application

Estimate Vehicle Emissions

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

- NOx
- Reactive Organic Gases (ROG)
- Particulate Matters (PM10, PM2.5)

To meet the requirement of SB375 GHG reduction target

- 19% reduction in 2035 from 2005 baseline

Resources

- Check Out SACOG Modeling Website for Data Requests and Additional Resources:
<https://www.sacog.org/modeling>
 - SACSIM19 Model Documentation and User Guide
 - <https://www.sacog.org/travel-model-documentation>
 - Past Conference Presentation
 - <https://www.sacog.org/travel-model-users-conference>

Thank You

For more information on SACSIM contact

kshipley@sacog.org or visit

<https://www.sacog.org/modeling>

