Welcome
Key Presenters

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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?

MTP/SCS analysis
- Project screening and phasing
- Project Benefit-Cost Analysis*
- Economic development impacts

Clean Air Act analyses
- Does the region’s MTP/SCS and MTIP meet its emissions budgets?

SB 375 Greenhouse Gas Reduction
- Does the region’s MTP/SCS meet its GHG reduction target?
SACSIM Model System
How does SACSIM work?
SACSIM Land Use / Population Relationships

Land Use
- Base parcel data
- Synthetic household location program
- Parcel-to-point shortest paths program

Population
- Synthetic population
- Parcel buffering program
- Parcel data file

Transportation System
- POPGEN population synthesizer
- Census data
- Daysim configuration
- Daysim program
- Daysim outputs

Transit network
- Transit network
- CUBE scripts
- Matrix conversion utility program

Highway network
- Highway network
- Cube skim matrices
- Zone index file

Daysim BIN matrices
- Daysim roster file
- External IXXI matrices
- IXXI factor calculation utility program
Land Use Inputs
Population/Demographic Inputs

5 year ACS (American Community Survey) Marginal data

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

Network Processing

DaySim

Aggregate Models

Assignment

Demand-Assignment Loop

Optimization Loop

Toll Optimization

Managed Lanes Network Processing

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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
Testing Autonomous and Connected Vehicles (AVs)

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

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

Vehicle Miles Traveled per Capita Forecasts
Weekday Household Vehicle Miles Traveled per Capita by Community Type in SACOG Region"
Why Do We Estimate Vehicle Emissions?
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

Application
Thank You

For more information on SACSIM contact sacsim@sacog.org or visit https://www.sacog.org/modeling