

# SCAG Activity-Based Model

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# SCAG ABM Improvement and Validation 2024 RTP/SCS

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## Project overview

- ❑ SCAG ABM – background, flow chart, data
- ❑ SCAG ABM – research and regional local agency support
- ❑ Peer review recommendation
- ❑ Improvement and Validation– 2024 RTP/SCS – Project goal, task and timeline

## Project details and status

- ❑ Details and status of the Tasks and Sub-tasks:
  - **Task 2:** Model improvement
  - **Task 3:**
    - Base Year Calibration and Validation
    - Peer Review Meeting
  - **Task 4:** Modeling Support for 2024 RTP/SCS



# Background

- ❑ SCAG Regional Travel Demand Model – SCAG Activity–Based Travel Demand Model (ABM)– **2020 RTP/SCS**
- ❑ Travel emerges from the desire to participate in activities. Activities are predicted first, and then travel is generated to link these activities in time and space.
- ❑ Addresses the requirements of metropolitan planning process and relevant State and Federal requirements
- ❑ Model Peer Review Meeting – May 31, 2019
- ❑ Operation and analysis to SCAG's **2024 RTP/SCS**

SED

Land Use

Network

Policy

Airport/sea trips

Inter-regional trips

Heavy-Duty truck



SCAG ABM



Assignment



Emission



SCAG™

INNOVATING FOR A BETTER TOMORROW

## Model estimation

- Household Travel Survey (2011 CHTS)
- On-Board Survey (2011-2012)

## Other Data

- CA DMV (2019)
- California Vehicle survey (2019)

## Model Calibration & Validation

- Household Travel Survey (2011 CHTS)
- National Household Travel Survey (NHTS 2017)
- **Commuting pattern**
  - American Community survey (ACS 2019)
  - Longitudinal Employer-Household Dynamics (LEHD 2018)
- **Traffic data**
  - SCAG 2017 Traffic count
  - Performance Measurement System (PeMS)
  - Highway Performance Monitoring System (HPMS)
  - CALTRANS Traffic census
  - Streetlight
  - Replica

# SCAG ABM- Research and Analysis Tool

Research

UCLA

- Planning-level Analysis Tools for Connected and Automated Traffic and New Mobility Systems

UC DAVIS

- Ridesharing study in Los Angeles County

USC

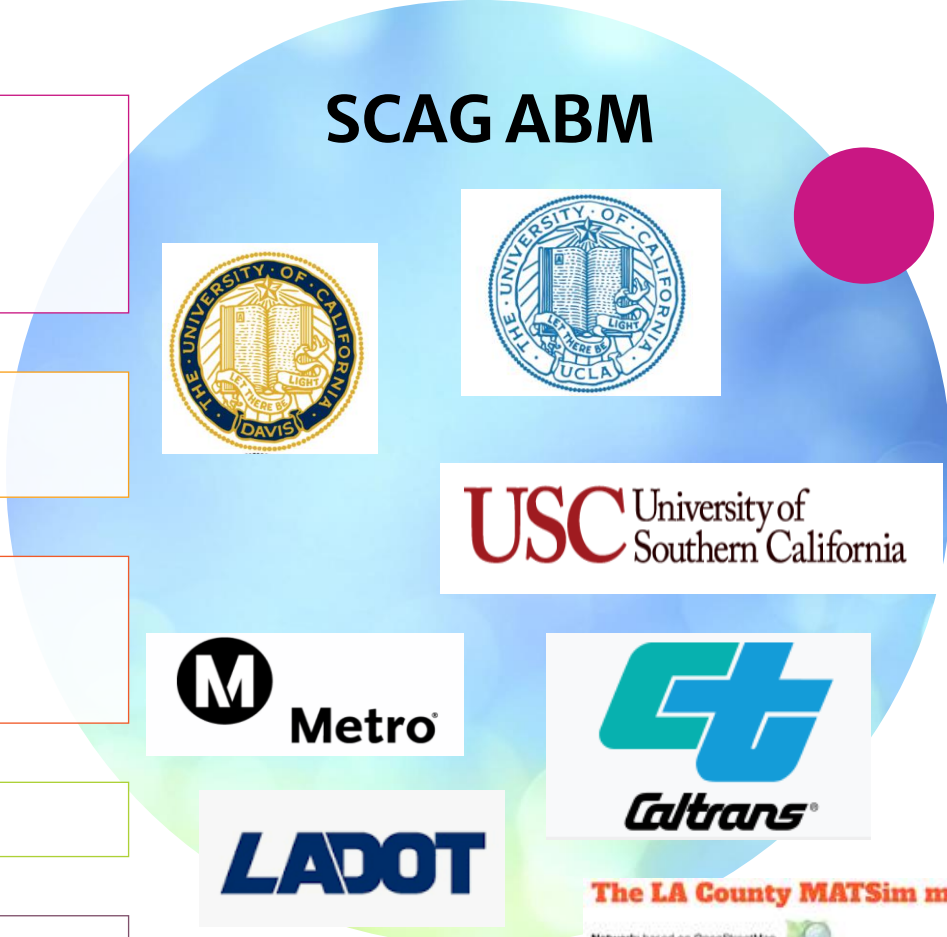
- Dynamic assessment of human exposure levels to PM2.5 using big geo-location data”.

CALTRANS

LA METRO

Other agencies

Sub-Region/Local



The LA County MATSim model



SCAG ABM “meets current state of the practice compared to peer MPOs (i.e., large metro areas in U.S.), given the complexity of region, and has some special features that go beyond standard practice.”

- ❖ Model framework and software/ hardware ( Amazon cloud)
- ❖ Intra-zonal trips and distance
- ❖ Transit demand – leverage and use the existing transit rider survey data (i.e., LA Metro).
- ❖ Highway assignment
- ❖ Model sensitivity
- ❖ New household travel survey & Big Data

# SCAG ABM Improvement and Validation- 2024 RTP/SCS

## SCAG & WSP

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### Task 2: MODEL IMPROVEMENT ( – 8/30/2022)

- 2.1 Sub-Models Refinement
- 2.2 New Sub-Models Development
  - 2.2.1 Trip Departure Time Choice
  - 2.2.2 In-home/Out-of-home Choice for Non-mandatory Activities
- 2.3 Transportation Strategy Analysis Add-on

### Task 3: MODEL VALIDATION AND PEER REVIEW (4/1/2022 – 6/30/2023)

- **Task 3.1: Base Year Calibration and Validation**
- **Task 3.2: Peer Review Meeting**

### Task 4: MODELING SUPPORT FOR 2024 RTP/SCS (4/1/2023 – 6/30/2024)

- 4.2: Model Sensitivity Improvement
- 4.3: Model Software Optimization and Support



## 2.1 Sub-Models Refinement

- Estimate ABM sub-models based on local data – California household travel survey (2012)
- Sub-models selected based on peer review feedback
- Estimation file prepared using R and estimation done using R/Alogit

## 2.2 New Sub-Models Development

- Trip Departure Time Choice
  - Activity duration allocation within a tour based on observed data
  - Results in more realistic trip departure times
- In-home/Out-of-home choice for non-mandatory activities
  - Motivated by increasing non-mandatory activities being done remotely
  - Policy driven as opposed to Behaviorally Driven

### 2.3 Transportation Strategy Analysis Add-on

- Associated with SCAG's travel demand management (TDM) policies
- Implementation after planning staff identifies the policies
  - E.g. include Safe Routes to School (SRTS) and Average Vehicle Ridership (AVR) in job centers

# Task 3 Base Year Calibration and Validation



## 3.1 Base Year Calibration and Validation

### ➤ Model Calibration

- ABM sub-models to updated calibration targets
- Survey expansion weights updated to 2019
- Other updated data sources
  - LEHD, DMV data etc..

### ➤ Model Validation

- Roadway segment flows to traffic counts
- VMT, Speed
- Transit boardings by major routes

# Task 3 Model Validation and Peer Review



## 3.1 Base Year Calibration and Validation

- Model Documentation
  - Model Specification Report
  - Model Validation report
  - Model Sensitivity Report
  - Model User Guide

## 3.2 Peer Review Meeting

- Feedback from academics, practitioners and peer agency staff
- Document suggestions and recommendations
- Short-term improvements will be addressed during the remainder of the project duration

# Task 4 Modeling Support for 2024 RTP/SCS



- Address short-term priorities identified during the peer review meeting
- Additional sensitivity tests and model revisions
- Model run time performance improvements

**THANK YOU**