1 Introduction

SACOG, as the designated Metropolitan Planning Organization (MPO) for the Sacramento region, has the primary responsibility for the development and maintenance of its travel demand forecasting methods and models. These models are used by agencies like SACOG for regional-scale policy analyses of land use and transportation plans, as well as for analyses of the effects of exogenous variables, like fuel prices and demographic change (e.g. aging of the population). The travel demand model currently used by SACOG is the Sacramento Activity-Based Travel Simulation Model, or "SACSIM".

1.1 SACSIM Version

Versions of SACSIM are identified by the year the model code and data files are first utilized for a publicly released analysis. This report provides a detailed description of SACSIM19, which was developed and used for evaluation of the 2020 Metropolitan Transportation Plan/Sustainable Community Strategy (MTP/SCS). Table 1-1 lists the substantial changes and improvements made to SACSIM models since SACSIM15 was released.

Table 1-1 SACSIM15 to SACSIM19 Comparison

Feature	Used for…	SACSIM15	SACSIM19	Change in Modeling
New generation DAYSIM with updated choice models and software structure	Simulation of individual's daily travel activities	Software constraints on number of skims allowed.	Re-estimated choice models; Fully object-originated programming; Shadow pricing to maintain supply/demand of work and school locations	Easy to use & add network skims by modes, VOT classes, time periods; better estimation / forecasting of travel patterns etc.
Proximity buffering (# of households, jobs, K12 enrollments, etc. within travel distance of each parcel)	Modeling attractiveness of parcels as destinations	-Simple radial buffers (¼ & ½ mile) -Unweighted (i.e. activities at far edge of buffer count same as near edges	-Buffers based on network distance -Buffers decay weighted—closer activities count more	-Captures linearity of many activities clustered along major arterials -Captures accessibility "shadows" created by freeways, rivers, etc.
Valuation of time (VOT)	-Assessing trade-offs between cost of travel and time of travel -Useful for any model—but necessary to correctly model pricing	-Three levels of VOT, based on household (HH) income range -All members of high income HH have high VOT -All members of low income HH have low VOT	-Distributed VOT -VOT varies for all persons -Higher VOT more likely for high income HH… -…but VOT mixes across HH income -Some high income have low VOT, some low income have high VOT	-Necessary for implementation of pricing -Necessary for fairly capturing equity impacts of pricing -Causes some trade-offs on shorter, slower routes and longer, faster routes
Transit and Traffic Assignment Time Periods	-Identify peak hour travel -Congestion levels, accessibility, boarding/alighting during peak hours of travel.	4 daily transit periods 4 daily traffic periods (AM,MD,PM,NT)	5 daily transit periods 9 daily traffic periods	-Better control over hourly diurnal flows.

Feature	Used for…	SACSIM15	SACSIM19	Change in Modeling
Vehicle Equivalence on Traffic Assignment (weighting trucks more heavily in estimates of congestion)	-Identifying congested segments and bottlenecks -Reflecting higher congestion impact of bigger trucks	No weighting of bigger trucks	-passenger vehicles =1 -smaller commercial vehicles = 1.5 -3+ axle commercial vehicles = 2.0	-Better practice—called out in last peer review -Overall higher congestion levels
Transit sub-modes (rail, commuter bus, standard fixed route bus)	-Reflecting preferences for different types of transit in mode choice	-Transit mode choice only accounts for mode of access (drive vs. walk) -All transit treated generically	-Continue to account for mode of access -Sub-modes allowed as part of mode choice (rail, commuter bus, fixed route bus)	Better balance of transit trips & boardings amongst the sub-modes
Facility-based Pricing	Modeling toll roads, high-occupancy/toll roads, express lanes	n/a	Full suite of options for modeling toll facilities with dynamic tolling and occupancy class exceptions. User settings for minima/maxima tolls, tolling periods, etc.	New functionality, allows for modeling the impact of tolling on travel behavior and on revenue
Pay-As-You-Go Pricing (PAYGO)	Modeling of mileage-based user fees	Limited to single-point auto-operating cost, inclusive of PAYGO. Fixed by time period, geography. Does not affect path-building.	PAYGO added as roadway network variable, captured in path-building and skims. Can vary by time period or geography.	Captures effects of PAYGO more realistically, and affects path-building and skims for auto modes.

Source: SACOG 2020.