RIVERSIDE COUNTY MODEL
- RIVCOM

Presented by:

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Agenda

- Motivation and Objectives
- Model Design and Input Preparation
- Model Specifications, Interface and Validation
- Modeling Tools

Motivation and Objectives

- History of the model in Riverside County
  - ✓ Developed in 2010
  - ✓ Based on 2008 SCAG RTP
  - ✓ Outdated infrastructure and land use
- Respond to stakeholders' priorities
  - ✓ Improve transparency
  - ✓ Improve runtime
  - ✓ Better reflect local conditions
  - ✓ Documentation and training

Motivation and Objectives

- Retain consistency with SCAG assumptions and projections
  - ✓ Updated as needed to reflect local conditions
  - ✓ Simplify as needed to reduce runtime and facilitate model maintenance
  - ✓ Upgrade as needed to capture unique Riverside County travel patterns
- Extensive involvement with local jurisdictions for accuracy of model inputs, including SED and networks.

Model Design

- RIVCOM has
  - ✓ A more focused model area than RIVTAM and SCAG Model
  - ✓ More detailed network and zone system
  - ✓ Jurisdiction-approved socio-economic input data
  - ✓ A base year of 2018 and a future year of 2045
  - ✓ Post-processors for legislative requirements
  - ✓ Improved run time compared to the current RIVTAM/SCAG models
  - ✓ Version-controlled code base accessible to model users
  - ✓ Up-to-date documentation

Model Design – Model Area

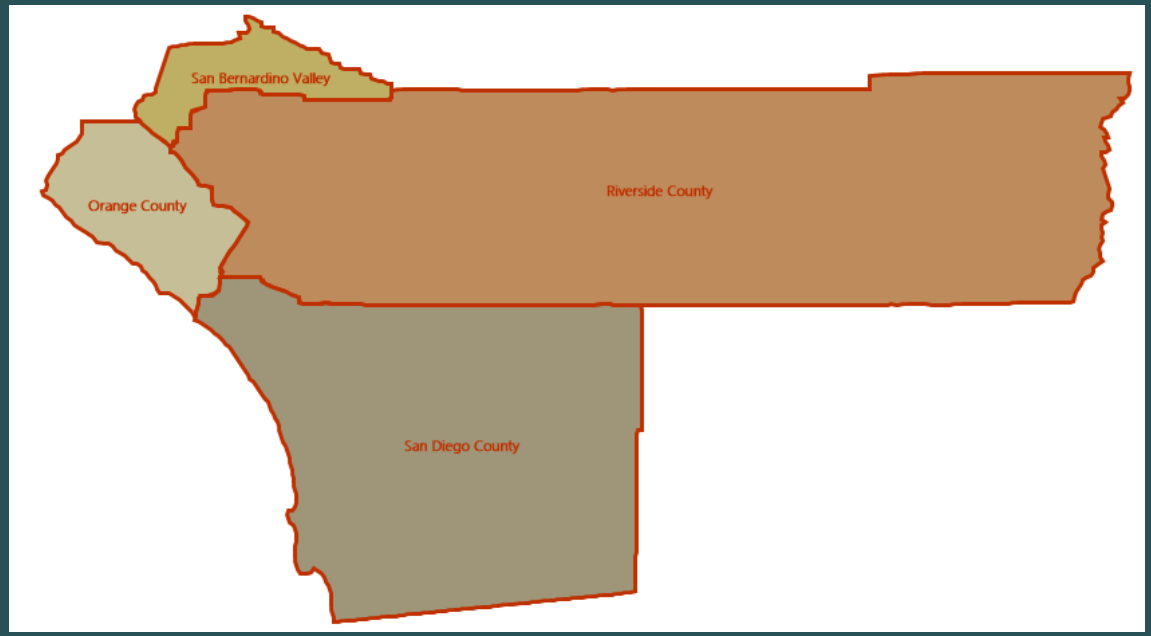
Riverside County

Orange County

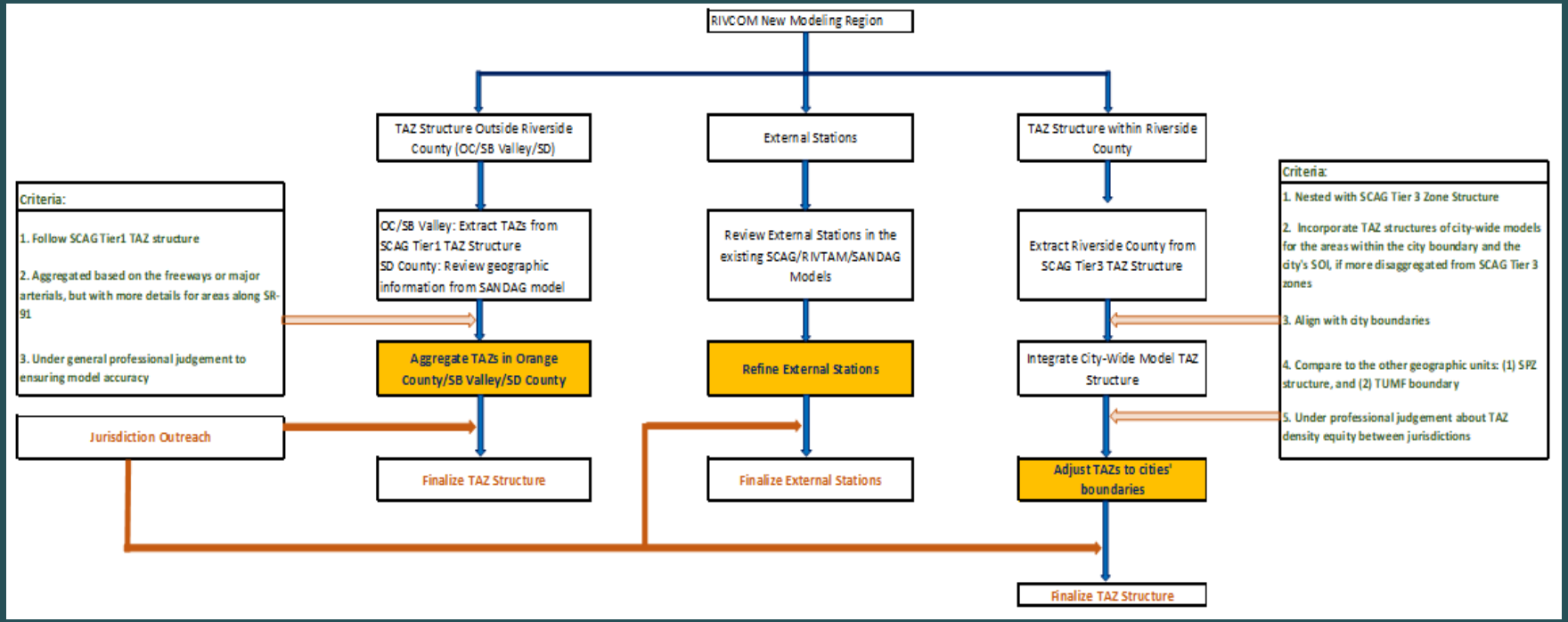
SB Valley

San Diego County

Balance desire to internalize inter-county trip prediction

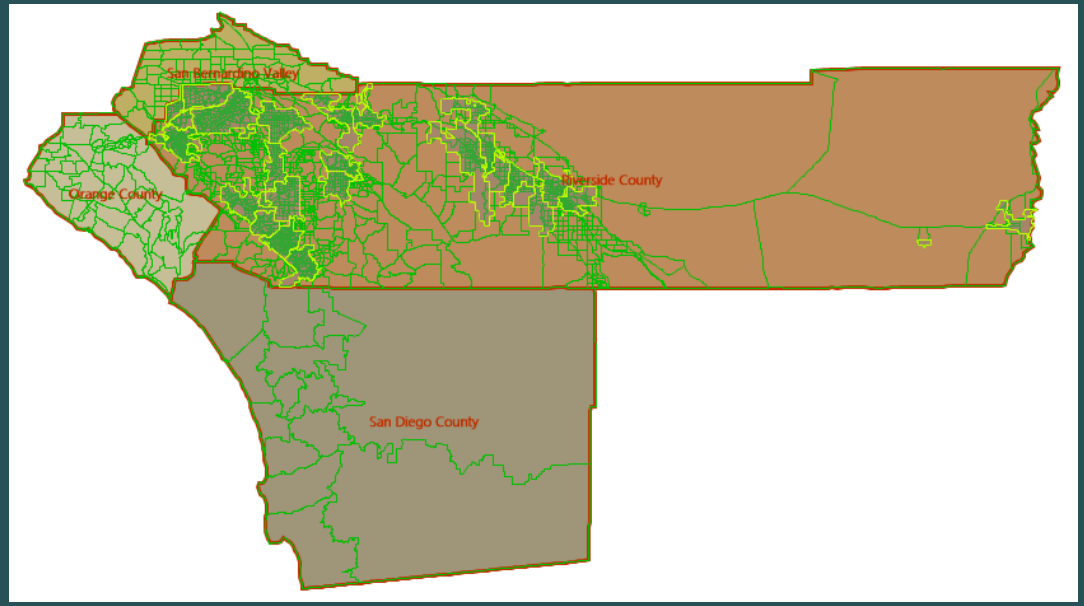


Model Design – TAZ Delineation



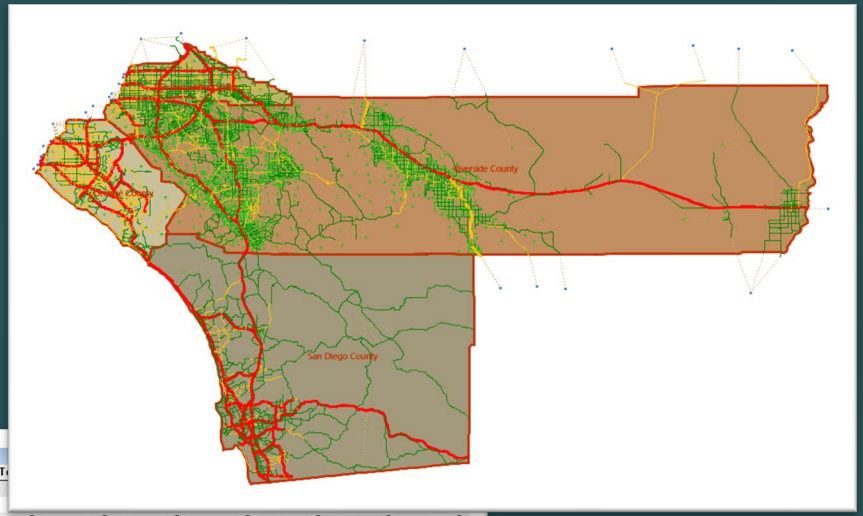
RIVCOM TAZ System

- 3,482 TAZs
- Nest within SCAG TAZs
- Riverside County
  - ✓ 3,299 TAZs
  - ✓ Preserve/increase zone detail more urbanized areas
  - ✓ Add detail in growing areas
  - ✓ Consistent with city boundaries
- Outside Riverside County
  - ✓ 99 in SB Valley, 70 in OC, and 14 TAZs in SD County
  - ✓ Recognize interaction across the county border



Input Data Preparation

- Consistent with SCAG 2020 RTP/SCS
- Significant involvement with local jurisdictions to refine input data



Dataview8 - ScenarioSE

ID	TAZ	Households							
1	1	1							
2	2	0							
3	3	0	0	0	0	0	0	0	0
4	4	0	0	0	0	0	0	0	0
5	5	2	4	4	0	11	1	2	0
6	6	19	39	39	0	2	0	0	0
7	7	27	57	57	0	3	0	0	0
8	8	0	0	0	0	0	0	0	0
9	9	29	60	60	0	96	9	15	0
10	10	0	0	0	0	0	0	0	0
11	11	3	6	6	0	5	0	0	0
12	12	0	0	0	0	0	0	0	0
13	13	890	2893	2888	5	532	0	95	147
14	14	832	2041	2041	0	601	0	9	6
15	15	612	2001	2000	1	72	0	56	1
16	16	18	55	55	0	0	0	0	0
17	17	90	314	314	0	40	0	31	1
18	18	158	528	528	0	493	0	4	0
19	19	0	0	0	0	0	0	0	0
20	20	0	0	0	0	0	0	0	0
21	21	0	0	0	0	0	0	0	0
22	22	715	2214	2214	0	49	0	9	0

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Model Specification, Interface and Validation

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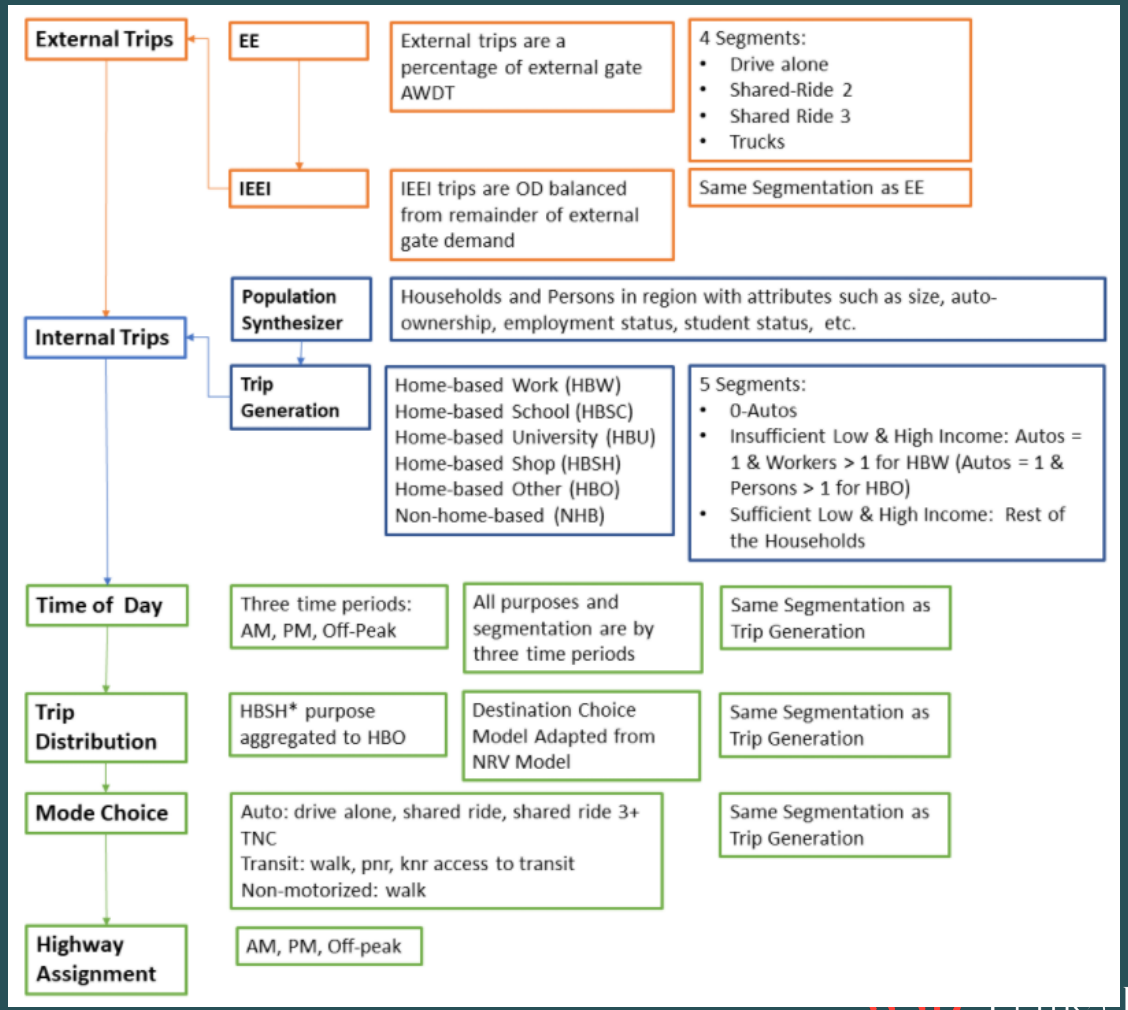
Model Specification

- Trip-based (four-step) model framework in TransCAD 8.0
- Stand-alone model – not derived from the SCAG model but …
  - ✓ Consistent with SCAG Tier 3 zones, networks, and regional SED control totals
  - ✓ Consistent with SCAG predicted external station volumes
  - ✓ Certain model components calibrated based on SCAG model outputs
- Three time-of-day periods
  - ✓ AM Peak 6:00 AM - 9:00 AM
  - ✓ PM Peak 3:00 PM - 7:00 PM
  - ✓ Off Peak 9:00 AM - 3:00 PM & 7:00 PM - 6:00 AM

Model Process



Population Synthesizer

- A Standalone PopSyn III implementation of the population synthesizer (JavaPop)
- To synthesize the resident population and group-quarter populations
- Two controls files - TAZ level controls and Regional controls
- 5-year ACS PUMS data for 2014-2018

Trip Generation

- Resident Trips
  - ✓ HBW/HBSH/ HBSC/HBU/HBO/NHB
  - ✓ A standard cross-classification approach for trip production
  - ✓ A simple rate model for trip attraction
- Truck Trips
  - ✓ Commercial Vehicles/Single Unit Trucks/Multi-Unit Trucks
  - ✓ Truck trip generation from a function of employment variables
- External Trips
  - ✓ Based on volumes at all the external stations/TAZs

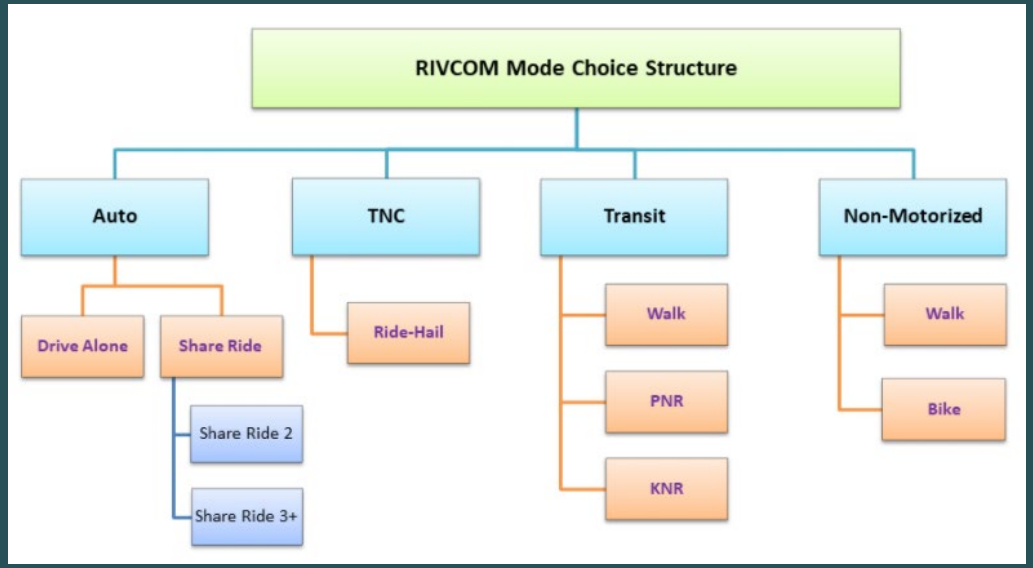
Trip Generation

- Five Market Segmentations for Resident HBW and HBO
  - ✓ Zero autos
  - ✓ Low income insufficient
  - ✓ Low income sufficient
  - ✓ High income insufficient
  - ✓ High income sufficient

Trip Distribution

- Resident Trips
  - ✓ Discrete destination choice models
  - ✓ The utility of a destination is a function of:
    - multi-modal accessibilities and preferences
    - the attractiveness of the destination zone
    - person and household attributes
    - other unknown, un-included attributes of the trip maker or the destination zone
- Truck Trips and External Trips
  - ✓ The gamma function friction factor-based gravity models

Mode Choice



- Home-based work
  - Zero autos
  - Low income insufficient
  - Low income sufficient
  - High income insufficient
  - High income sufficient
- Home-based other
  - Zero autos
  - Low income insufficient
  - Low income sufficient
  - High income insufficient
  - High income sufficient
- Non-home-based
- School
- University

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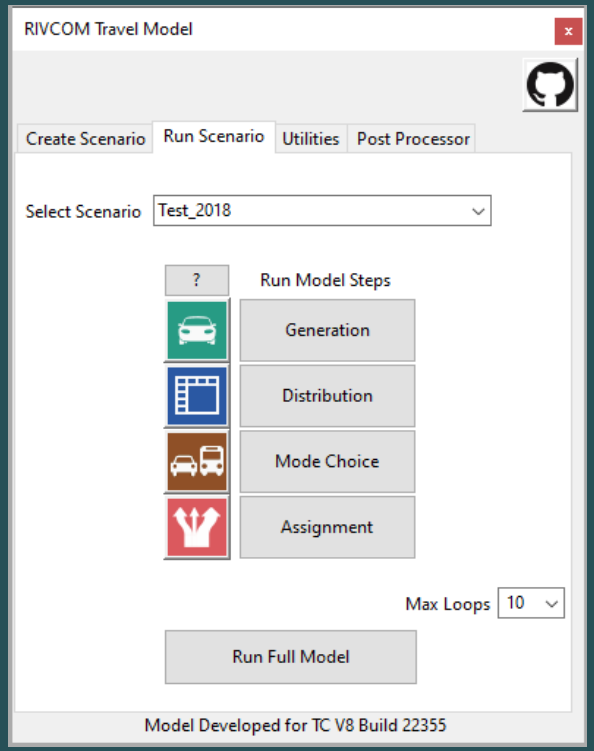
Trip Assignment

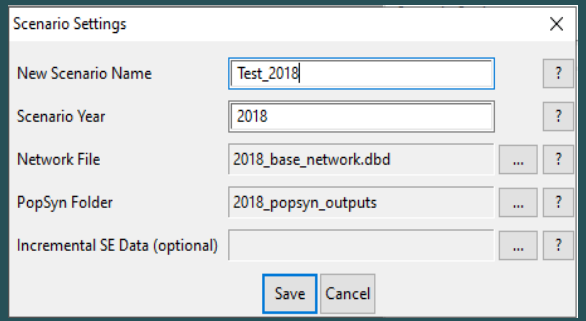
- San Diego County and Orange County links are preloaded
  - ✓ Based on OCTAM and SANDAG model outputs.
- Uses NCFW algorithm
- BPR Volume-Delay Function
- The number of iterations is determined by a user defined closure parameter (0.0001), or a maximum number of iterations (400).

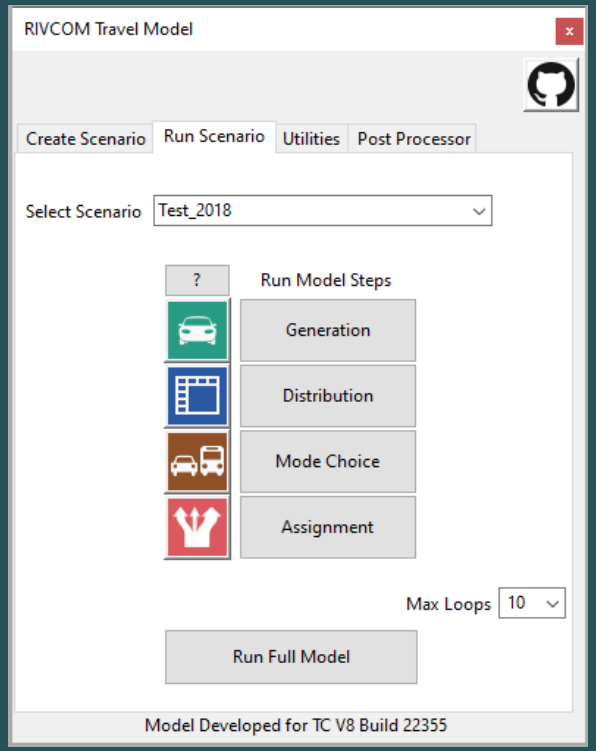
Model UI

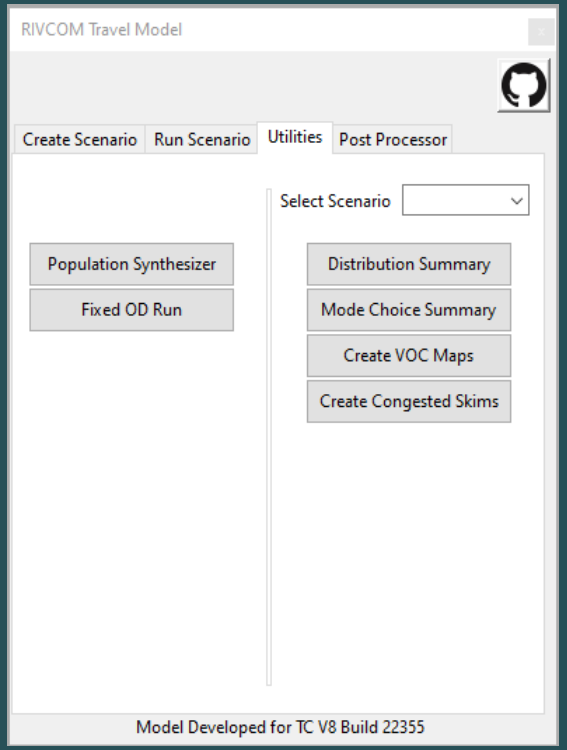
- Installation
  - ✓ Zip file with a double click installer
- Simple interface with four tabs
  - ✓ Create Scenario Tab
  - ✓ Run Model Tab
  - ✓ Utilities Tab
  - ✓ Post-process Tab



Model UI







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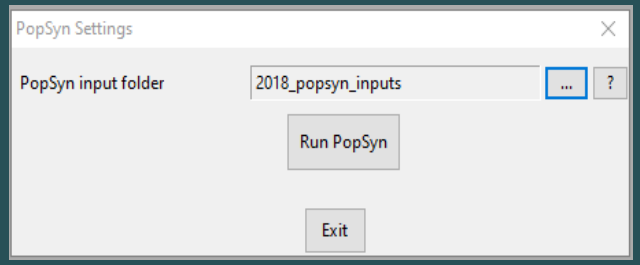
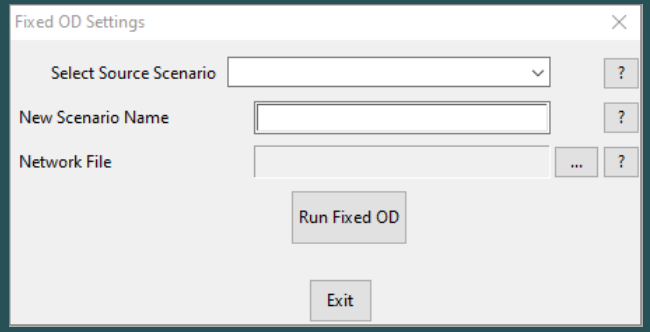
Model UI


PopSyn Settings
PopSyn input folder
2018_popsyn_inputs
...
?
Run PopSyn
Exit


Fixed OD Settings
Select Source Scenario
?
New Scenario Name
?
Network File
...
?
Run Fixed OD
Exit

Static Validation

Facility Type Highway Validation Statistics

Facility Name	Number of Links	Mean Count	Mean Volume	Percent RMSE
Freeways	122	73329	73299	15.95%
HOV	50	15994	15882	31.49%
Principal Arterial	154	21243	23554	33.77%
Minor Arterial	175	15615	15072	35.95%
Major Collector	121	9015	8747	50.75%
Minor Collector	4	6886	7202	38.42%

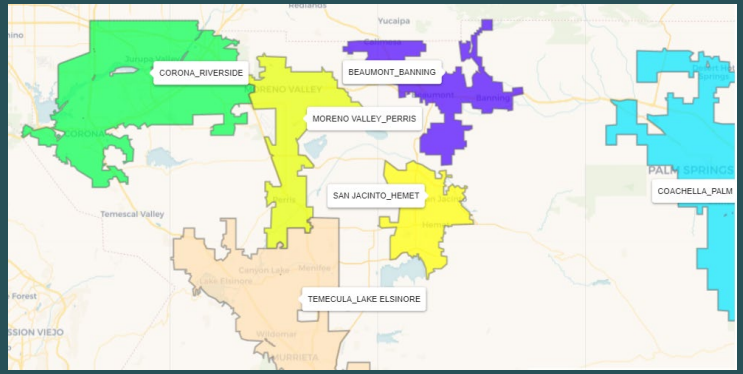
Volume Group Highway Validation Statistics

Count Volume Group	Number of Links	Mean Count	Mean Model Volume	Percent RMSE
<5000	65	3064	3615	108.34%
5000-24999	374	14195	14862	39.1%
25000-49999	80	32527	34143	27.08%
50000-99999	90	75309	73577	16.2%
>=100000	17	116484	114237	9.55%
Total	626	26946	27298	27.33%

Static Validation

City Type Highway Validation Statistics

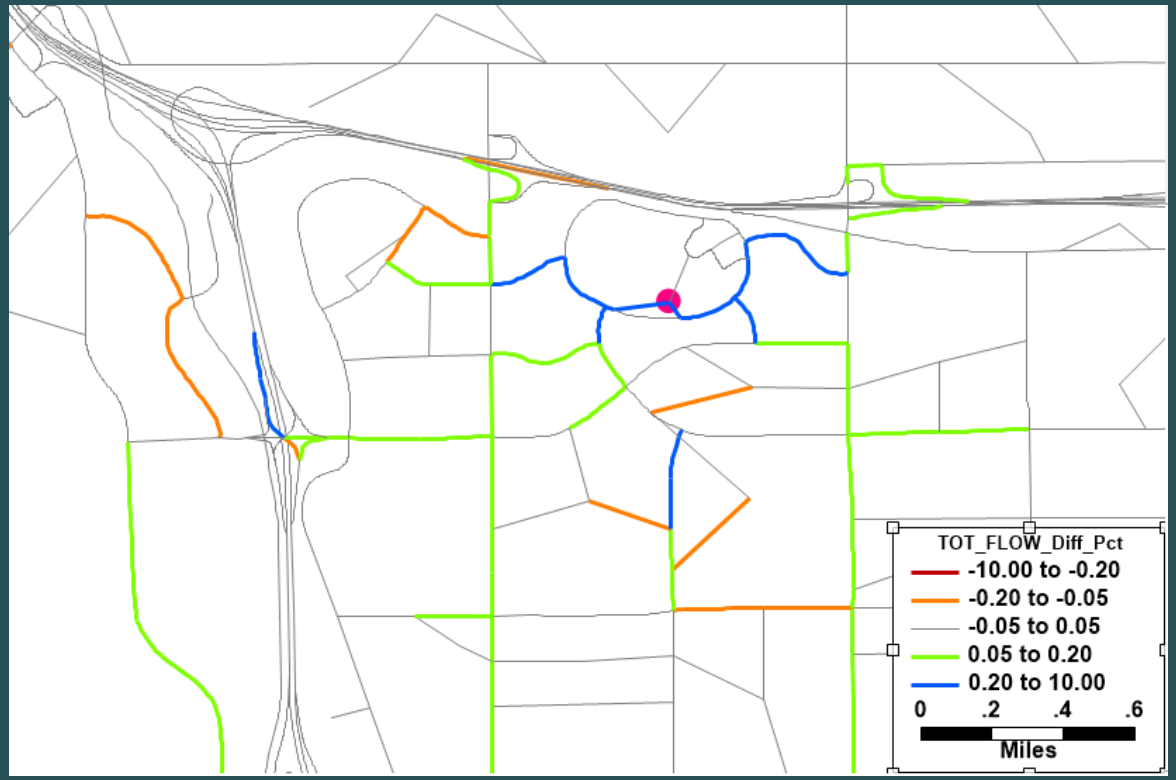
City Group	Number of Links	Mean Count	Mean Volume	Percent RMSE
BEAUMONT_BANNING	28	12795	10237	38.44%
COACHELLA_PALM SPRINGS	126	14133	15750	35.27%
CORONA_RIVERSIDE	162	26107	27008	26.49%
MORENO VALLEY_PERRIS	41	17817	17361	26.23%
San Bernardino County	131	46666	47306	23.61%
SAN JACINTO_HEMET	8	16817	16282	22.35%
TEMECULA_LAKE ELSINORE	82	24309	21429	24.72%
Unincorporated Riverside County	48	31839	34289	22.78%



Dynamic Validation

- A series of tests to evaluate how well the model responds to input changes
  - ✓ Add or remove households in a TAZ
  - ✓ Add or remove employments/jobs in a TAZ
  - ✓ Add or remove lanes in an arterial roadway segment
  - ✓ Toll a section of the highway
- Results showed good model sensitivity
  - ✓ Roadway volume changes
  - ✓ VMT changes

Dynamic Validation



Modeling Tools

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Modeling Tools

- For SB 743 analysis purpose
- VMT by purpose and by TAZ
- Boundary VMT

EMFAC

- VMT by speed bin
- Automate the process to:
  - ✓ update EMFAC template
  - ✓ run EMFAC, and
  - ✓ report emission outputs

- Estimates on active transportation strategies
- Multinomial logistic regression technique
- Outputs:
  - ✓ Mode share and trips by mode and by zone
  - ✓ VMT reduction by zone, etc.

Thank You

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