Next Generation Open Source Sketch Model & Data Ecosystem

Garlynn Woodsong
September 26, 2012
Urban Footprint in the SCAG region

- UrbanFootprint Overview
- Potential to Assist Regional & Local Planning
- Future Improvements
Urban Footprint in the SCAG region

✓ UrbanFootprint Overview
✓ Potential to Assist Regional & Local Planning
✓ Future Improvements
True Open Source Platform

Model Includes:

- Automated base data loading
- 35+ Place type library
- 90+ Building type library
- Scenario translation engine
- Thin-Client GUI
- Web-based scenario painter
- 8d sketch travel engine
- Full co-benefits analysis
- Modular, expandable

- Fully loaded with all major California MPO base data

- [www.calthorpe.com](http://www.calthorpe.com) for model info
Open Source Software ‘Stack’

Display/Reporting
- Highcharts
- Open Layers

Data Delivery & Queuing
- Celery/Redis Queue
- Geoserver

Database, Analysis, UI
- Postgresql/PostGIS
- Python/Django/Apache

Operating Environment
- Ubuntu 11.10
- Linux
Faster and More Efficient

Place Type Translation for 8-County San Joaquin Valley

12 days

ArcGIS

UrbanFootprint
Open Source

8 minutes

Run Time
‘Thin Client’ User Interface

Web-Based Interface
Tablet and Mobile-Ready
Urban Footprint Model Components

Data Development and Organization

Base Data

Future Plan / Scenario Data

Existing Plan Translation

Scenario Painting / Editing

Scenario Development

Analysis

Public Health

Local Fiscal Impacts

Transportation

Land Consumption

Building Energy Use

Household Costs

Greenhouse Gas Emissions

Building Water Use
Base Data Development

**Parcels with Land Uses**
- **LOAD PARCELS** with TAZ counts based on Land Use Assumption
- **Parcels** with uses and counts controlled to TAZ totals
  - **UNION**
  - **150 meter Grid**
  - Seamless coverage with Parcel and Land Cover data
    - **INTERSECT and convert results to CENTROIDS**
  - **Census**
    - Population, housing, and jobs characteristics
    - **SPATIAL JOIN**
    - Combined unit counts, census characteristics, land cover, and uses
  - **Transit Stations and Street Intersections**
    - **SPATIAL JOIN**
    - 150 meter Grid
  - **Land Cover**
    - Urban, Constrained and Greenfield Lands

**TAZ Population, Housing, and Jobs Counts**

**Table Calculations**
- Apply census data
- Impute building square feet
- Calculate the count of all variables by land type

**BASE YEAR LOADED GRID**
Base Data Development

Parcel Data

Demographics and Control Totals (TAZ)  Distributed to Land Uses  Assigned to Parcels
Base Data Development

Census and Related Data

Census Demographics

Block and Block Group Data Applied to Parcels and Grids
Base Data Development

Transportation Features

Intersection Density

Transit Database

Transportation Features Database

Proximity and Connectivity Analysis
### Base Data Variables

#### UrbanFootprint

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID_Grid</td>
<td>Grid ID</td>
</tr>
<tr>
<td>County</td>
<td>County Name</td>
</tr>
<tr>
<td>PlaceType_ID</td>
<td>Place type code</td>
</tr>
<tr>
<td>PlaceType</td>
<td>Place type name</td>
</tr>
</tbody>
</table>

#### Acres Variables by Use and Landtype

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acres_Grid</td>
<td>Grid cell acres (approx 5.5997)</td>
</tr>
<tr>
<td>Acres_Grid_U</td>
<td>Urbanized grid acres</td>
</tr>
<tr>
<td>Acres_Grid_FF</td>
<td>Constrained grid feet (Note: These acres can be farmland below, but it is anticipated that we will use other land below)</td>
</tr>
<tr>
<td>Acres_Grid_FP</td>
<td>Greenfield feet acres on farmland of state import</td>
</tr>
<tr>
<td>Acres_Grid_FU</td>
<td>Greenfield feet acres on farmland of state import</td>
</tr>
<tr>
<td>Acres_Grid_GC</td>
<td>Greenfield feet acres on farmland of state import</td>
</tr>
<tr>
<td>Acres_Grid_GC</td>
<td>Constrained parcel acres (defined by FMFP dataset)</td>
</tr>
<tr>
<td>Acres_Parcel</td>
<td>Parcel acres</td>
</tr>
<tr>
<td>Acres_Parcel_R</td>
<td>Parcel acres with dwelling units exclusively</td>
</tr>
<tr>
<td>Acres_Parcel_Res</td>
<td>Parcel acres with dwelling units exclusively</td>
</tr>
</tbody>
</table>

#### The following four variables need only the Acres, Parcel, res category (not Acres, Parcel, Mixed, or Parcel, mixed, used, or Parcel, mixed, or Parcel, mixed, used)

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acres_Parcel_R</td>
<td>Parcel acres with detached single family dwelling units</td>
</tr>
<tr>
<td>Acres_Parcel_Res</td>
<td>Parcel acres with small detached single family dwelling units</td>
</tr>
<tr>
<td>Acres_Parcel_Mixed</td>
<td>Parcel acres with large detached single family dwelling units</td>
</tr>
<tr>
<td>Acres_Parcel_Mixed_Res</td>
<td>Parcel acres with multi-family dwelling units</td>
</tr>
</tbody>
</table>

#### The following four variables need only the Acres, Parcel, mixed category (not Acres, Parcel, Mixed, or Parcel, mixed, used, or Parcel, mixed, or Parcel, mixed, used)

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acres_Parcel_Emp</td>
<td>Parcel acres with jobs exclusively</td>
</tr>
<tr>
<td>Acres_Parcel_Emp_R</td>
<td>Parcel acres with retail jobs (might include other types)</td>
</tr>
<tr>
<td>Acres_Parcel_Emp_Mixed</td>
<td>Parcel acres with industrial jobs (might include other types)</td>
</tr>
<tr>
<td>Acres_Parcel_Emp_Mixed_Res</td>
<td>Parcel acres with retail and single family dwelling units</td>
</tr>
</tbody>
</table>

#### Density Variables

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>gross_Dwens</td>
<td>Dwelling units per grid cell</td>
</tr>
<tr>
<td>gross_Hdws</td>
<td>Households per grid cell</td>
</tr>
<tr>
<td>gross_pop_GdAc</td>
<td>Population grid cell</td>
</tr>
<tr>
<td>gross_Emp_GdAc</td>
<td>Jobs per grid cell</td>
</tr>
<tr>
<td>gross_BldGdAc</td>
<td>Buildings per grid cell</td>
</tr>
<tr>
<td>gross_Ctys</td>
<td>Counties per grid cell</td>
</tr>
</tbody>
</table>

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**Building & SourceFootprint Variables**

- **Emp, Industry No, Ag**: Employee, industry, no, agriculture, export, extract, are excluded.

- **building & sourceFootprint variables**: Sum of detached single family housing building square feet.

#### Transit Proximity Variables

- **Transit Proximity Variables**
  - **Transit Proximity Variables**: Number of transit stops of all types in the grid cell.
From Base to Future....
## Place Types

### Mixed Use Centers and Corridors
1. Urban Mixed Use
2. Urban Residential
3. Urban Commercial
4. City Mixed Use
5. City Residential
6. City Commercial
7. Town Mixed Use
8. Town Residential
9. Town Commercial
10. Village Mixed Use
11. Village Residential
12. Village Commercial
13. Neighborhood Residential
14. Neighborhood Low

### Employment Areas
15. Office Focus
16. Mixed Office and R&D
17. Office / Industrial
18. Industrial Focus
19. Low-Density Employment Park

### Suburban Areas
20. High Intensity Activity Center
21. Mid Intensity Activity Center
22. Low Intensity Retail Centered Neighborhood
23. Retail: Strip Mall / Big Box
24. Industrial / Office / Residential Mixed High
25. Industrial / Office / Residential Mixed Low

### Suburban Residential
26. Suburban Multifamily
27. Suburban Mixed Residential
28. Residential Subdivision
29. Large Lot Residential Area

### Rural Areas
30. Rural Residential
31. Rural Ranchettes
32. Rural Employment

### Institutional Areas
33. Campus / University
34. Institutional
35. Parks and Open Space

### Scenario Building Blocks
Place and Building Type Studies

Place Type Studies

Building Type Studies

Place Type

- Site Size
- Block Size
- Densities
- Floor Area Ratio
- Land Use
- Population
- Housing
- Employment
- Streets
<table>
<thead>
<tr>
<th>Place Types with 150 or more Intersections per Square Mile</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Meta-Place Types</strong></td>
</tr>
<tr>
<td>Urban (Super Regional Center)</td>
</tr>
<tr>
<td>Place Types</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td>9</td>
</tr>
<tr>
<td>13</td>
</tr>
<tr>
<td><strong>Place Types Summary</strong></td>
</tr>
<tr>
<td>Gross Employment Density (Jobs/Acre)</td>
</tr>
<tr>
<td>Gross DU Density</td>
</tr>
<tr>
<td>Employment Density (Jobs/Empl. Acre)</td>
</tr>
<tr>
<td>Res. Use Density (DU/Res. Acre)</td>
</tr>
<tr>
<td><strong>Land Use Breakdown (%)</strong></td>
</tr>
<tr>
<td>Mixed Use</td>
</tr>
<tr>
<td>Residential</td>
</tr>
<tr>
<td>Employment</td>
</tr>
<tr>
<td>Streets</td>
</tr>
<tr>
<td>Parks</td>
</tr>
<tr>
<td>Civic</td>
</tr>
<tr>
<td><strong>Land Use Summary</strong></td>
</tr>
<tr>
<td>Gross Residential Density (DU/Acre)</td>
</tr>
<tr>
<td>Net Residential Density (DU/Acre)</td>
</tr>
<tr>
<td>Gross Jobs Density (Employees/Acre)</td>
</tr>
<tr>
<td>NetJobs Density (Employees/Acre)</td>
</tr>
<tr>
<td>Gross Total Density (Population+Jobs/Acre)</td>
</tr>
<tr>
<td>Gross FAR</td>
</tr>
<tr>
<td>Net FAR</td>
</tr>
<tr>
<td>Average Building Height</td>
</tr>
<tr>
<td><strong>Housing Breakdown</strong></td>
</tr>
<tr>
<td>Single Family</td>
</tr>
<tr>
<td>Single Family Use Density (DU/Acre)</td>
</tr>
<tr>
<td>Townhouse</td>
</tr>
</tbody>
</table>

**CALTHORPE ASSOCIATES**
**URBAN DESIGNERS, PLANNERS, ARCHITECTS**
# Place Types Details

<table>
<thead>
<tr>
<th>Place Types</th>
<th>Meta-Place Types</th>
<th>Mixed Use Centers &amp; Corridors</th>
<th>Village (Small Mixed-Use Center)</th>
<th>Neighborhood</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Place Types</th>
<th>Employment Areas</th>
<th>Hi/ Mid Density</th>
<th>Low Intensity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Office Focus</td>
<td>Mixed Office</td>
<td>Office/Industri al</td>
</tr>
<tr>
<td></td>
<td></td>
<td>and R&amp;D</td>
<td></td>
</tr>
</tbody>
</table>

Calibrated to Study Areas? Calibrated to Study Areas?

Mixed Use Check:

<table>
<thead>
<tr>
<th>BUILDING % CHECK</th>
<th>100.0%</th>
<th>100.0%</th>
<th>100.0%</th>
<th>100.0%</th>
<th>100.0%</th>
<th>100.0%</th>
<th>100.0%</th>
<th>100.0%</th>
<th>100.0%</th>
<th>100.0%</th>
<th>100.0%</th>
<th>100.0%</th>
<th>100.0%</th>
<th>100.0%</th>
<th>100.0%</th>
<th>100.0%</th>
<th>100.0%</th>
<th>100.0%</th>
<th>100.0%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mixed Use</td>
<td>57.0%</td>
<td>15.0%</td>
<td>12.0%</td>
<td>44.0%</td>
<td>14.0%</td>
<td>5.0%</td>
<td>33.0%</td>
<td>12.5%</td>
<td>20.0%</td>
<td>20.0%</td>
<td>0.0%</td>
<td>10.0%</td>
<td>2.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Residential</td>
<td>25.0%</td>
<td>80.0%</td>
<td>0.2%</td>
<td>35.0%</td>
<td>81.0%</td>
<td>0.0%</td>
<td>35.0%</td>
<td>81.0%</td>
<td>0.0%</td>
<td>60.0%</td>
<td>200.0%</td>
<td>0.0%</td>
<td>98.0%</td>
<td>100.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Commercial/Industrial</td>
<td>20.0%</td>
<td>5.0%</td>
<td>88.0%</td>
<td>71.0%</td>
<td>5.0%</td>
<td>95.0%</td>
<td>27.0%</td>
<td>0.0%</td>
<td>80.0%</td>
<td>20.0%</td>
<td>0.0%</td>
<td>90.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>
## Building Types

### Building Summary (Per Acre)

<table>
<thead>
<tr>
<th>Building Type</th>
<th>Assumed Acres</th>
<th>Height (Floors)</th>
<th>Residential %</th>
<th>Retail %</th>
<th>Office %</th>
<th>Industrial %</th>
<th>Total %</th>
<th>FAR</th>
<th>Total BUA (gross SF)</th>
<th>Total BUA (net, lease SF)</th>
<th>DJ / Acre</th>
<th>Employees / Acre</th>
<th>Parking (Stalls/Acre)</th>
<th>Structured Parking (SF/Acre)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mid-Rise Mixed</td>
<td>20%</td>
<td>1</td>
<td>16</td>
<td>94%</td>
<td>6%</td>
<td>0%</td>
<td>0%</td>
<td>100%</td>
<td>9.1</td>
<td>3,946,654</td>
<td>3,405,656</td>
<td>248</td>
<td>103</td>
<td>258</td>
</tr>
<tr>
<td>Mid-Rise Mixed (The Edge, Portland)</td>
<td>40%</td>
<td>1</td>
<td>11</td>
<td>57%</td>
<td>12%</td>
<td>1%</td>
<td>1%</td>
<td>100%</td>
<td>7.1</td>
<td>3,097,779</td>
<td>2,282,036</td>
<td>189</td>
<td>116</td>
<td>129</td>
</tr>
<tr>
<td>Mid-Rise Mixed (The Gregory Lofts, Portland)</td>
<td>40%</td>
<td>1</td>
<td>12</td>
<td>84%</td>
<td>6%</td>
<td>10%</td>
<td>10%</td>
<td>100%</td>
<td>7.4</td>
<td>3,214,757</td>
<td>2,735,272</td>
<td>185</td>
<td>124</td>
<td>178</td>
</tr>
<tr>
<td>Low-Rise Mixed Use</td>
<td>100%</td>
<td>1</td>
<td>12</td>
<td>75%</td>
<td>5%</td>
<td>1%</td>
<td>16%</td>
<td>0%</td>
<td>100%</td>
<td>7.6</td>
<td>3,300,831</td>
<td>2,812,206</td>
<td>167</td>
<td>188</td>
</tr>
</tbody>
</table>

### Building Types

- Mid-Rise Mixed
- Low-Rise Mixed
- Low-Rise Mixed Use
- Low-Rise Mixed Use (Cap Metro City Center MV)
- Low-Rise Mixed (Stone Way Apts, Seattle)
- Low-Rise Mixed (200 Second Street, Oakland)
- Low-Rise Mixed (Carlini First Hill Apts, Seattle)
- Low-Rise Mixed (Kinsley Flats, Cincinnati, OH)
- Low-Rise Mixed (Shadutts Lofts, Berkeley)
- Low-Rise Mixed
- Parking Structure/Mixed Use
- Parking Structure/Mixed Use (2)
- Parking Structure/Mixed Use (3)
- Parking Structure/Mixed Use (4)
- Parking Structure/Mixed Use (5)
- Main Street Commercial (MU)
# Climate/Location Sensitivity

## Location-Dependent Variables

### Water Use Variables

<table>
<thead>
<tr>
<th>Indoor</th>
<th>Outdoor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Per-capita single family gallons per day</td>
<td>Evapotranspiration Zone: 1</td>
</tr>
<tr>
<td>80 gal</td>
<td>Active ETo factor: 32.9</td>
</tr>
<tr>
<td>Per-capita multifamily gallons per day</td>
<td>ET factor: 1.0</td>
</tr>
<tr>
<td>70 gal</td>
<td>Gallons per AFI: 325,851 gal/af</td>
</tr>
</tbody>
</table>

### Energy Use Variables

#### Title 24 Climate Zone
- Residential Energy Use by Unit Type: ACTIVE FACTORS
- Residential Energy Use by Zone and Unit Type: LOOKUP TABLE
- Residential Gas Use by Zone and Unit Type: LOOKUP TABLE

Calthorpe Associates
Urban Designers, Planners, Architects
Existing Plan Translation

- Existing Plans of Varying Scale or Input Type
  - City
  - County
  - Region

- Analyze Key Characteristics
  - Density / Mix / Connectivity

- Translate
  - Place Types

- UrbanFootprint Scenario
  - Scenarios
Scenario Painter
Edit Scenarios + Build New Ones
Oahu Deployment
Oahu Deployment
UrbanFootprint Analysis Engines
Land Consumption

Previously Undeveloped (Greenfield) Land

Previously Urbanized Land

Growth accommodated on Infill / Redevelopment Land

Growth accommodated on Greenfield Land

Agricultural Land Consumed (acres)

Environmentally Sensitive Land Consumed (acres)

Other Lands Consumed by Type (acres)
Building Energy Use

- Housing Units by building type
- Jobs by building type

- Residential
  - Per-Unit Electricity and Gas Use
  - Climate Zone

- Commercial
  - Per-Unit Electricity and Gas Use
  - Climate Zone

- Policy-Based Efficiency / Conservation Factors
  - Applied to new buildings, existing buildings, and replacement buildings

- Total Energy Use
- Total Energy Cost and GHG Emissions
Building Water Use

Housing Units
- Residential irrigated square feet
- People per household, by type
- Commercial square feet, by type

Jobs
- by building type

Evapotranspiration Zone

Outdoor
- Gallons per capita

Indoor
- Gallons per employee

Policy-Based Efficiency / Conservation Factors
- Applied to new buildings, existing buildings, and replacement buildings

Total Water Use

Total Water Cost
Local Fiscal Impacts

Next Steps
- Assumptions Research
- IMPACS Model Integration
Transportation

150 meter Grid

Place Types
Regional Travel Inputs
Base Year and Forecast Data

Intrinsic Factors
- Density
- Diversity
- Design
- Development Scale

Extrinsic Factors
- Distance to Transit
- Destinations
- Demand
- Management

Demographic Factors
- Demographics

MXD Model
Mode Choice
Trip Internalization

VMT by Vehicle Type

Fleet Characteristics
Trips by Mode
Congestion

Per-Mile Costs

Fuel Use
Electricity Use

Fuel Price
Fuel and Electricity Emission Rates

Per-Mile Emission Rates

Auto Ownership and Maintenance Costs

Criteria Pollutant Emissions

Fuel Costs

GHG Emissions

‘8-D’ Sketch Travel Model
“8D” Factors that Affect Trips and VMT

1. Density dwellings, jobs per acre
2. Diversity mix of housing, jobs, retail
3. Design connectivity, walkability
4. Destinations regional accessibility
5. Distance to Transit rail proximity
6. Development Scale pop, jobs
7. Demographics household size, income
8. Demand Management pricing...
Demand Management Effects

- Parking pricing
- Transit service level
- Transit fare
- Employer commute programs
- Auto operating cost increase
Steps to produce travel estimates

1. Fratar factoring variable-distance buffer for each scenario
2. Analyze geographic context ¼ & 1 mile buffers
3. Trip generation from ITE daily trip rate parameters
4. Trip purpose splits NCHRP Factors, averaged among area types
5. Total raw trips by purpose HBW, HBO, NHB; Productions, Attractions
6. Auto ownership for residents
7. Model variables and log odds calculations application of the ‘D’s
8. Model application - all trips produces grand total VMT
9. Regional post-processes congestion, VHT, pricing
## Base-Year Vehicle Miles Traveled (VMT) Validation Chart

<table>
<thead>
<tr>
<th>Region</th>
<th>Base Year Validation Daily VMT</th>
<th>UrbanFootprint Modeled Base Year Daily VMT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sacramento Area</td>
<td>50,040,540</td>
<td>53,632,530</td>
</tr>
<tr>
<td>(6 Counties, SACOG)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>San Francisco Bay Area</td>
<td>143,681,890</td>
<td>143,784,640</td>
</tr>
<tr>
<td>(9 counties, ABAG/MTC)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Southern California</td>
<td>378,105,370</td>
<td>378,117,580</td>
</tr>
<tr>
<td>(6 Counties, SCAG)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>San Diego (SANDAG)</td>
<td>80,584,670</td>
<td>82,432,940</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>San Joaquin Valley</td>
<td>114,532,890</td>
<td>111,197,210</td>
</tr>
<tr>
<td>(8 Counties)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source:
Fehr & Peers, SACOG - SACMET model, 2009 MTP
Fehr & Peers, MTC - MTC model, 2009 RTP
Fehr & Peers, SCAG - SCAG model, 2008 RTP
Fehr & Peers, SANDAG - SANDAG model, 20011 RTP/SOG
Fehr & Peers, UC Davis - CSTDM 2009 Model
SCAG
2008
Transit Mode Split
UrbanFootprint
Public Health

Next Steps

- ITHIM Integration and Testing
New Scenario & Analytical Tools

Urban Footprint in the SCAG region

- UrbanFootprint Overview
- Potential to Assist Regional & Local Planning
- Future Improvements
Regional & Local Coordination
Regional & Local Coordination

- **Customize UrbanFootprint for the SCAG region**
  - Meet the specific needs of local users
    - Subregions
    - Cities
  - Work with subregions & locals to refine design improvements

- **Streamline the RTP/SCS process**
  - Better inform local & regional planning
  - Allow for meaningful local review of base year data

- **Ease of use: Web-based interface**
  - Low friction of entry for new users
  - Potential for broader adoption
Regional & Local Coordination

- Work together to update base year data
- City review of existing base data load at parcel-level resolution
- Edit land use codes on parcels
- Re-run base load to see updated results
Regional & Local Coordination

- Localize UrbanFootprint building & place types
  - Calibrate the current library of building & place types
  - Add new buildings based on local examples
  - Change calibrations of building types
  - Study local areas to calibrate place types subregionally
Regional & Local Coordination

- Locals create scenarios with subregional COGS and SCAG
  - Translate or paint local plans
  - Quickly analyze relationships to sub-regional & regional plans
  - Run UrbanFootprint impact modules to assess plan performance
  - Easily create additional scenarios to test against baseline plan
Urban Footprint in the SCAG region

- UrbanFootprint Overview
- Potential to Assist Regional & Local Planning
- Future Improvements
Next Steps for UrbanFootprint

- Upgrade engines
  - Advanced travel model
    - Network-based
    - User-editable transportation features
  - Next-generation public health engine
    - ITHIM integration
  - Enhanced redevelopment analysis
  - Integrate functionality to use additional urban form data inputs
    - FAR
    - Built Up Area (BUA)

- Performance optimization
  - Computer clustering

- Upgrade to 3D
  - Allow for three-dimensional scenario display & analysis
Agency Partnerships

- **SCAG, SACOG, MPOs**
  - Customize functionality to allow for closer coordination with locals
  - Evolve scenario painting and development capability for RTP/SCS/local planning processes
- **CDPH**
  - Enhance public health engine by integrating with ITHIM
- **Caltrans**
  - Integrate Sketch7 transportation model functionality
- **OPR/SGC**
  - Develop state home and support system for UrbanFootprint
- **CEC/DWR**
  - Advance energy and water capabilities
- **ARB**
  - Refine vehicle, fuels, and fleet assumptions and methodology
For More Information
garlynn@calthorpe.com