

# A Golden Opportunity...



*...California  
and Scenario  
Tool Evolution*



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New Partners for Smart Growth 08 Feb 2013

Climate Change

Health Care Costs

Failing Schools

Energy Security

Housing Costs

Budget Shortfalls

California is In Trouble

Asthma Rates

Water Shortages

Energy Prices

Political Gridlock

Failing Infrastructure

Obesity

Land Use is the Answer  
at least part of

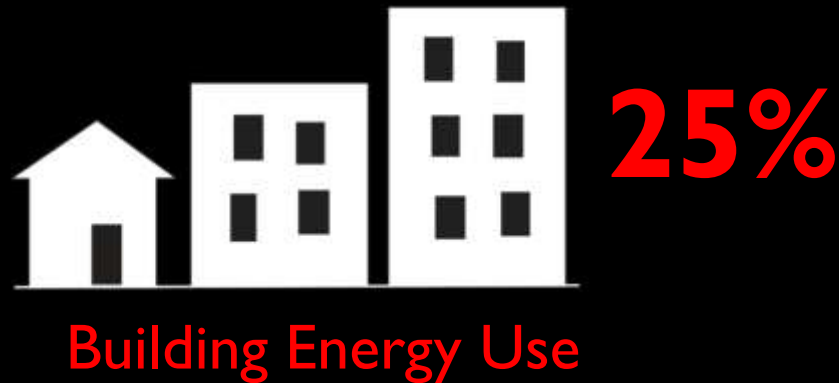
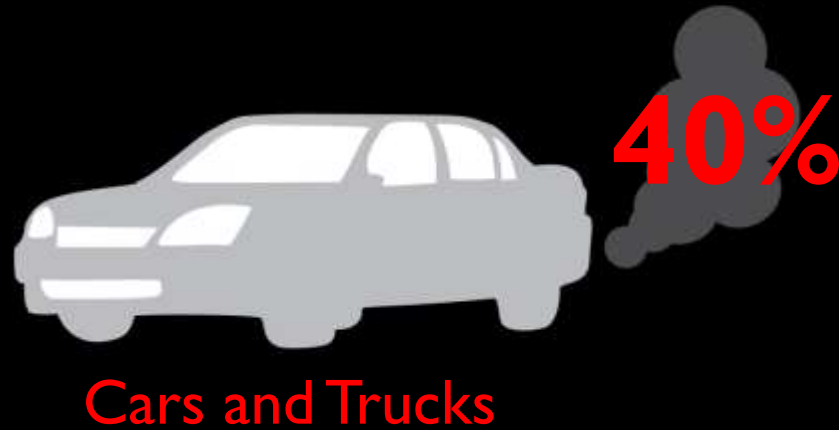
# Assembly Bill 32

## Greenhouse Gas Emissions

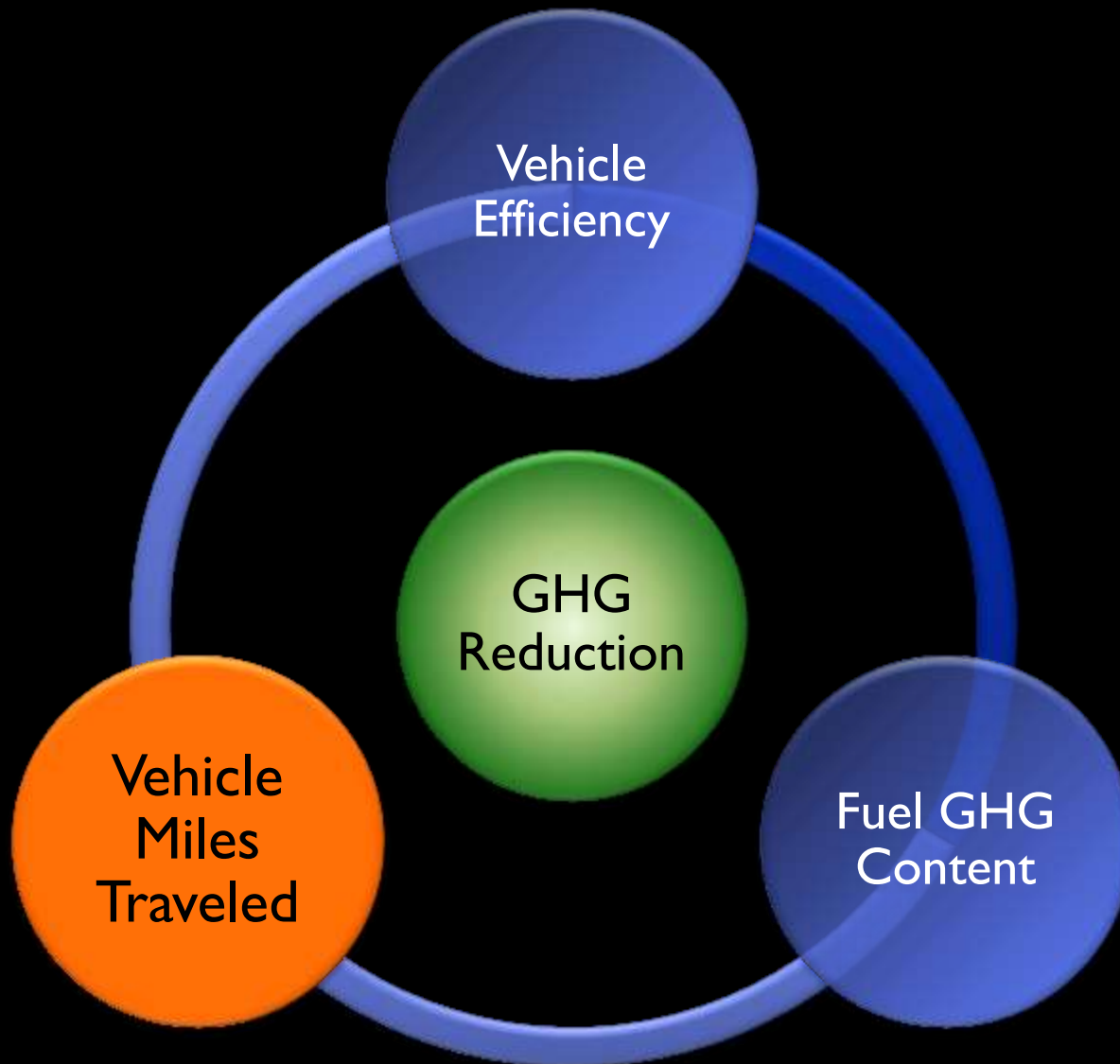


# California GHG Emissions

By Sector, 2006



# 3-Leg Stool: Transport Greenhouse Gases



Source: Growing Cooler, 2007



# Senate Bill 375

## Regulates VMT – GHG Connection

**Targets:** Establishes Regional GHG (VMT) Targets

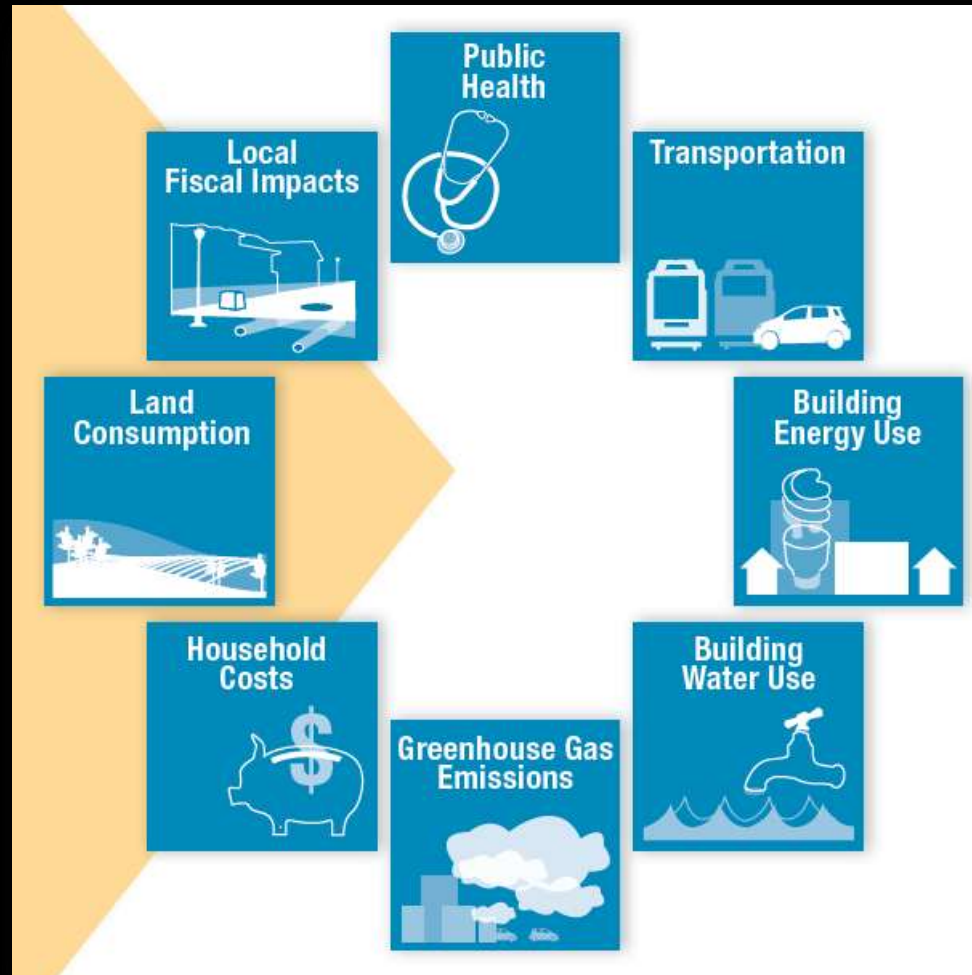
**SCS:** Requires a Regional Land Use Plan (SCS)

**Housing Element:** Cities Must Meet Regional Housing Need

**CEQA:** Streamlining in Targeted/High Performance Zones

# California Strategic Growth Council

## SB 732 - Larger Sustainability Nexus

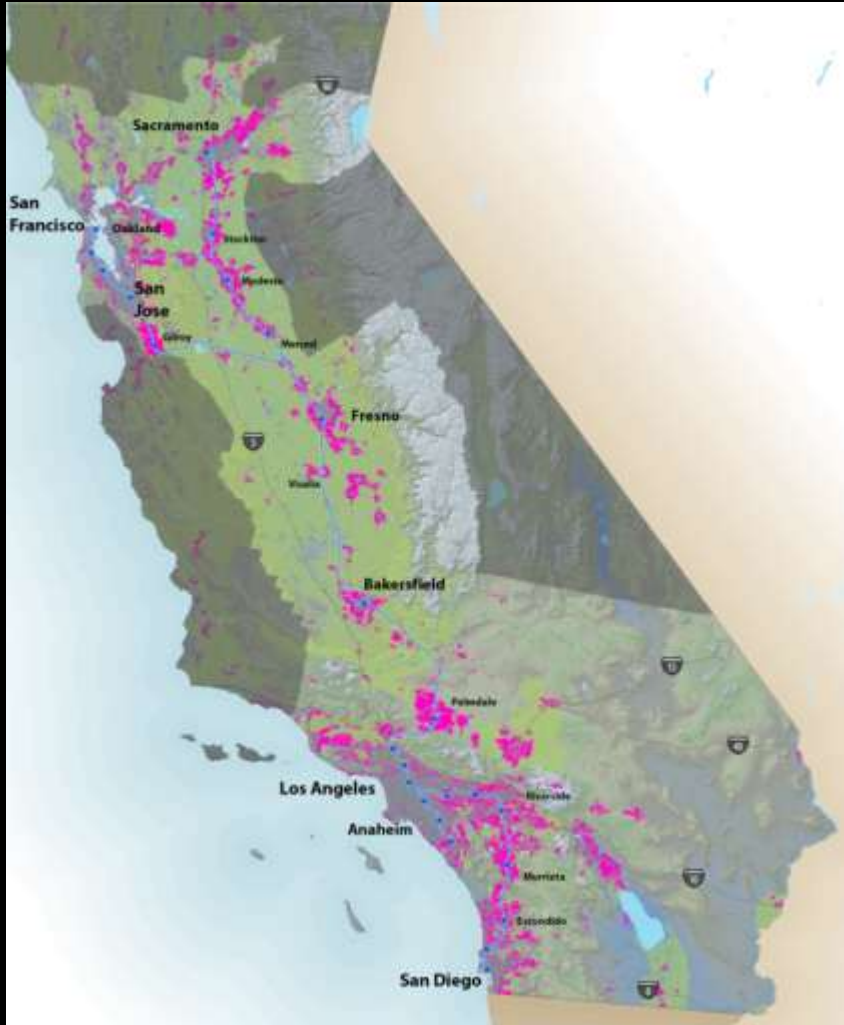




# Vision California



# California in 2050



Trend



Compact Future

# What did we get ourselves into?

Existing Tools Are Not Going to Get it Done

**Timing:** Target Setting Moving Fast

**Data:** Too many places, too much variation

**Scale:** Large operations too big for current toolsets



# Next Generation Sketch Models

Scenario Definition: Land Use Options & Policy Package Selection

### 1. DEFINE LAND USE OPTIONS

A. LAND USE OPTION DEFINITION

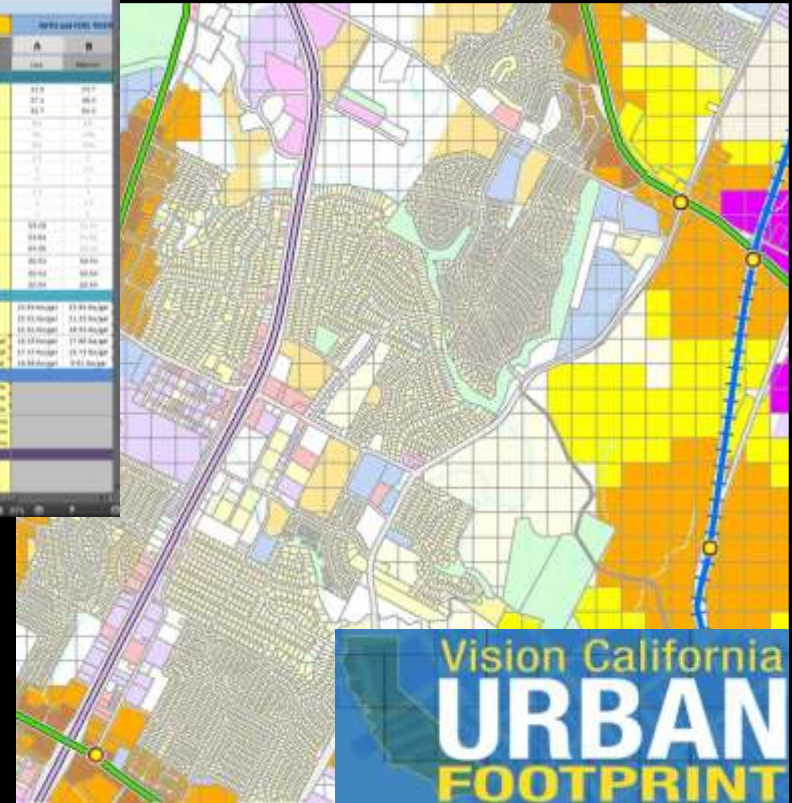
Option	Category	Area (sq ft)	Value	Cost	Benefit	Net	Weight	Priority
1.1	...	...	...	...	...	...	...	...
1.2	...	...	...	...	...	...	...	...
1.3	...	...	...	...	...	...	...	...
1.4	...	...	...	...	...	...	...	...

B. LAND-DEVELOPMENT CATEGORY ECONOMIC WEIGHTING

Category	Weight	Value	Cost	Benefit	Net
...	...	...	...	...	...
...	...	...	...	...	...

### 2. SELECT POLICY PACKAGES

Policy Package	Area (sq ft)	Value	Cost	Benefit	Net
...	...	...	...	...	...
...	...	...	...	...	...



## RapidFire

- ✓ Programmatic Model
- ✓ Quick Testing of Options
- ✓ Handshake to Other Models
- ✓ Multi-Scale and Policy-Sensitive
- ✓ Peer Reviewed

## UrbanFootprint

- ✓ Data & Scenarios Platform
- ✓ Multi-Scale, Multi-Geography
- ✓ Web-Based, Open Source

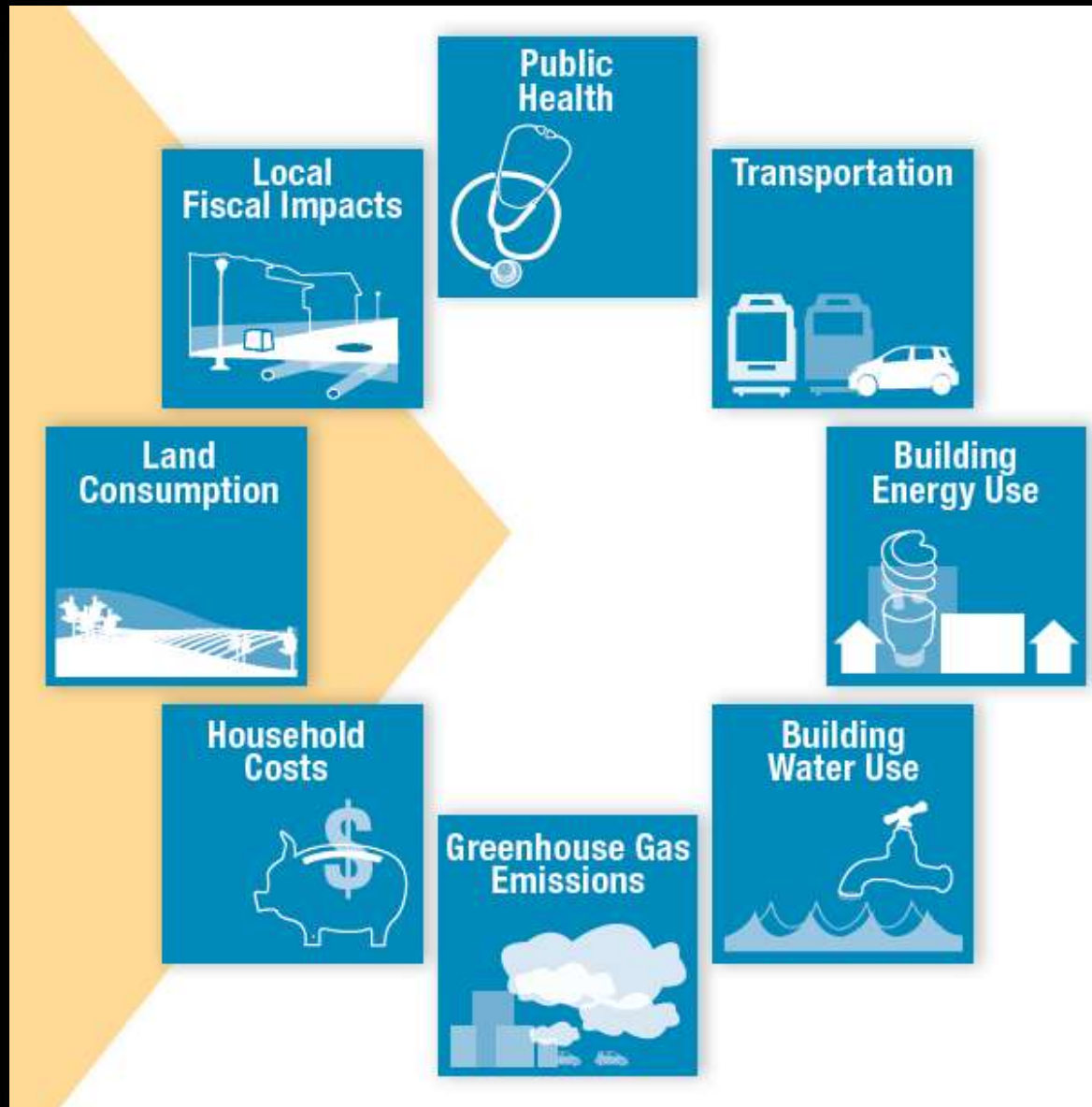
# Sketch Futures...

The screenshot displays a web-based urban planning application. The main map shows an aerial view of Makakilo City with various colored placetypes overlaid. The placetypes are color-coded according to the legend on the right. The legend lists 35 placetypes, each with a unique color and a corresponding PTID. The map also features several black circles highlighting specific areas of interest. The interface includes a toolbar at the top with options like 'Apply Placetype', 'Erase', and 'Revert to Original PT'. The browser window shows the URL 'footprint.calthorpe.com' and various browser tabs.

PTID	Placetype Name	Color
1	Urban Mixed Use	Dark Red
2	Urban Residential	Red
3	Urban Commercial	Orange
4	City Mixed Use	Light Orange
5	City Residential	Yellow-Orange
6	City Commercial	Yellow
7	Town Mixed Use	Light Yellow
8	Town Residential	Light Green
9	Town Commercial	Light Green
10	Village Mixed Use	Light Green
11	Village Residential	Light Green
12	Village Commercial	Light Green
13	Neighborhood Residential	Light Green
14	Neighborhood Low	Light Green
15	Office Focus	Light Green
16	Mixed Office and RBD	Light Green
17	Office/Industrial	Light Green
18	Industrial Focus	Light Green
19	Low-Density Employment Park	Light Green
20	High Intensity Activity Center	Light Green
21	Mid Intensity Activity Center	Light Green
22	Low Intensity Retail-Centers	Light Green
23	Retail: Strip Mall/ Big Box	Light Green
24	Industrial/Office/Res Mixed I	Light Green
25	Industrial/Office/Res Mixed I	Light Green
26	Suburban Multifamily	Light Green
27	Suburban Mixed Residential	Light Green
28	Residential Subdivision	Light Green
29	Large Lot Residential Area	Light Green
30	Rural Residential	Light Green
31	Rural Ranchettes	Light Green
32	Rural Employment	Light Green
33	Campus/ University	Light Green
34	Institutional	Light Green
35	Parks & Open Space	Light Green



# ...Test Impacts





# RapidFire Model

## Programmatic Modeling

### Scenario Definition: Land Use Options & Policy Package Selection

#### 1 DEFINE LAND USE OPTIONS

##### a. LAND USE OPTION DEFINITIONS

restore default scenario definitions.

		Urban		Compact		Standard		% refill growth
		Scenario %	Refill %	Scenario %	Refill %	Scenario %	Refill %	
		<b>1. RAU</b>	2005-2020	5%	100%	25%	25%	
	2020-2035	5%	100%	25%	25%	70%	0%	9%
	2035-2050	5%	100%	25%	25%	70%	0%	9%
<b>2. Mixed Growth</b>	2005-2020	10%	100%	40%	20%	50%	0%	18%
	2020-2035	10%	100%	40%	20%	50%	0%	22%
	2035-2050	10%	100%	40%	20%	50%	0%	26%
<b>3. Smart Growth</b>	2005-2020	25%	100%	55%	40%	20%	0%	47%
	2020-2035	30%	100%	55%	30%	15%	0%	58%
	2035-2050	35%	100%	55%	20%	10%	0%	68%
<b>4. Ultra Smart Growth</b>	2005-2020	55%	100%	55%	70%	10%	0%	74%
	2020-2035	55%	100%	60%	60%	5%	0%	83%
	2035-2050	55%	100%	60%	20%	5%	0%	85%

Load Scenarios  
Restore Default Scenarios

##### b. LAND DEVELOPMENT CATEGORY (LDC) PROPORTIONS

Enter values in cells below, or click button to restore default LDC proportions.

REFILL					GREENFIELD				
Scenario 1 Refill	SF Large Lot	SF Small Lot	Townhome	Multifamily	Scenario 1 Greenfield	SF Large Lot	SF Small Lot	Townhome	Multifamily
Urban	0%	0%	30%	70%	Urban	0%	0%	30%	70%
Compact	5%	40%	30%	25%	Compact	5%	40%	30%	25%
Standard	75%	8%	10%	7%	Standard	75%	8%	10%	7%
Scenario 2 Refill	SF Large Lot	SF Small Lot	Townhome	Multifamily	Scenario 2 Greenfield	SF Large Lot	SF Small Lot	Townhome	Multifamily
Urban	0%	0%	30%	70%	Urban	0%	0%	30%	70%
Compact	5%	40%	30%	25%	Compact	5%	40%	30%	25%
Standard	75%	8%	10%	7%	Standard	75%	8%	10%	7%
Scenario 3 Refill	SF Large Lot	SF Small Lot	Townhome	Multifamily	Scenario 3 Greenfield	SF Large Lot	SF Small Lot	Townhome	Multifamily
Urban	0%	0%	30%	70%	Urban	0%	0%	30%	70%
Compact	5%	40%	30%	25%	Compact	5%	40%	30%	25%
Standard	75%	8%	10%	7%	Standard	75%	8%	10%	7%
Scenario 4 Refill	SF Large Lot	SF Small Lot	Townhome	Multifamily	Scenario 4 Greenfield	SF Large Lot	SF Small Lot	Townhome	Multifamily
Urban	0%	0%	30%	70%	Urban	0%	0%	30%	70%
Compact	5%	40%	30%	25%	Compact	5%	40%	30%	25%
Standard	75%	8%	10%	7%	Standard	75%	8%	10%	7%

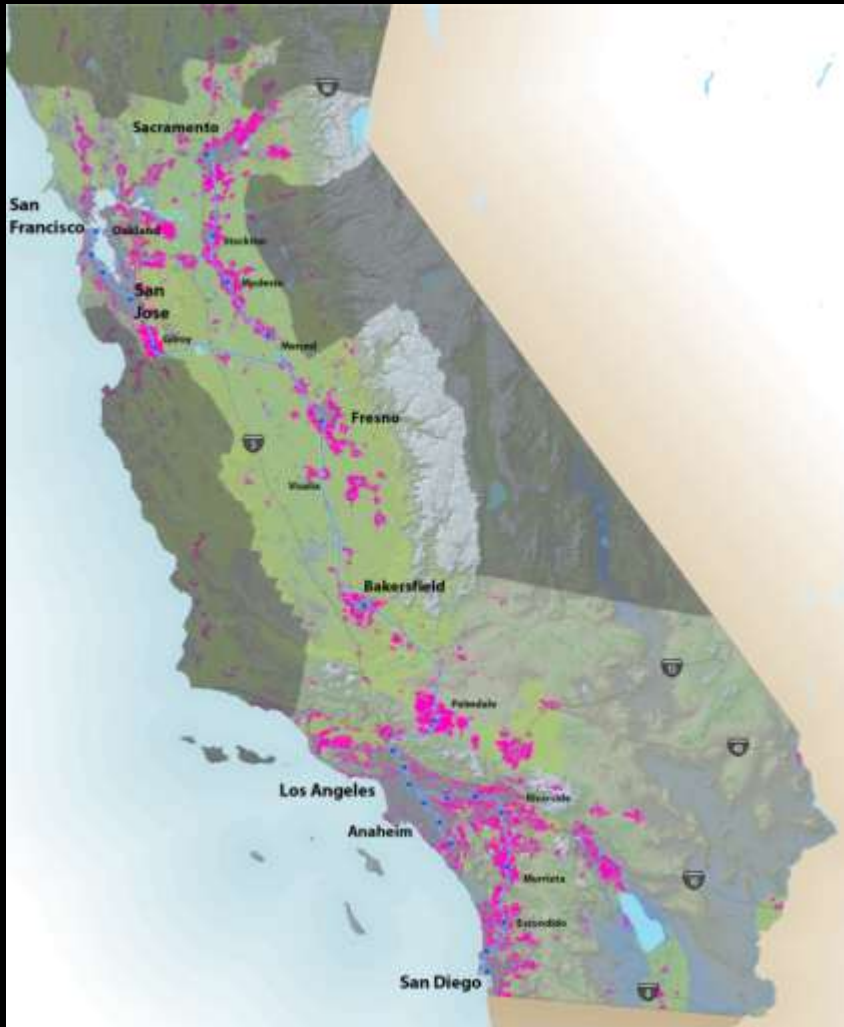
#### 2 SELECT POLICY PACKAGE(S)

Click buttons to load policy group options:

		FULL POLICY GROUPS			AUTO and FUEL TECH	
		A	B	C	A	B
		EMFAC Straight	EMFAC Fuel	Green	Low	Medium
<b>TRANSPORTATION</b>						
ICE vehicle efficiency (mpg)	2020	19.33	23.7	24.7	22.5	24.7
	2035	19.14	27.0	30.3	27.1	38.3
	2050	19.18	27.0	54.2	33.7	54.2
% Alternative/zero-emissions vehicles	2020	0%	0%	0%	0%	0%
	2035	0%	10%	10%	0%	10%
	2050	0%	0%	10%	0%	10%
Battery Electric Vehicle efficiency (mi/kWh)	2020	3.5	3.5	4	2.5	4
	2035	4	4	4.5	4	4.5
	2050	4	4	5	4	5
Plug-in hybrid vehicle efficiency (mi/kWh)	2020	3.5	3.5	4	2.5	4
	2035	4	4	4.5	4	4.5
	2050	4	4	5	4	5
Fuel price (\$/gal, 2005 dollars)	2020	\$4.74	\$3.92	\$3.92	\$3.28	\$3.92
	2035	\$5.24	\$5.60	\$5.80	\$3.64	\$5.80
	2050	\$5.74	\$8.00	\$8.00	\$4.06	\$8.00
Auto ownership and maintenance (\$/mile, 2005 dollars)	2020	\$0.24	\$0.24	\$0.24	\$0.54	\$0.54
	2035	\$0.24	\$0.24	\$0.24	\$0.54	\$0.54
	2050	\$0.24	\$0.24	\$0.24	\$0.54	\$0.54
<b>TRANSPORTATION FUEL EMISSION RATES</b>						
Well-to-Wheels Fuel Emissions (lbs CO <sub>2</sub> e/gal)	2020				24.64 lbs/gal	23.34 lbs/gal
	2035				23.31 lbs/gal	21.20 lbs/gal
	2050				22.52 lbs/gal	18.54 lbs/gal
Tail-to-Wheels Fuel Emissions	2020	19.82 lbs/gal	17.66 lbs/gal	17.66 lbs/gal	18.25 lbs/gal	17.66 lbs/gal
	2035	19.82 lbs/gal	17.66 lbs/gal	13.73 lbs/gal	17.27 lbs/gal	13.73 lbs/gal
	2050	19.82 lbs/gal	17.66 lbs/gal	9.81 lbs/gal	16.68 lbs/gal	8.81 lbs/gal
<b>CO<sub>2</sub>e EMISSION RATES</b>						
Residential & commercial building electricity emissions (lbs CO <sub>2</sub> e/kWh)	2020	0.81 lbs/kWh	0.690 lbs/kWh	0.58 lbs/kWh		
	2035	0.81 lbs/kWh	0.623 lbs/kWh	0.48 lbs/kWh		
	2050	0.81 lbs/kWh	0.581 lbs/kWh	0.35 lbs/kWh		
Residential & commercial building natural gas emissions (lbs CO <sub>2</sub> e/therm)	2020	11.66 lbs/therm	11.66 lbs/therm	11.66 lbs/therm		
	2035	11.66 lbs/therm	11.66 lbs/therm	11.66 lbs/therm		
	2050	11.66 lbs/therm	11.66 lbs/therm	11.66 lbs/therm		
<b>BUILDINGS</b>						
New residential energy efficiency (% reduction from 2005)	2020	10%	10%	30%		
	2035	20%	20%	55%		
	2050	30%	30%	80%		

## Spreadsheet-Based Sketch Model (State, Region, County, Corridor, Jurisdiction)

# California in 2050



Business as Usual

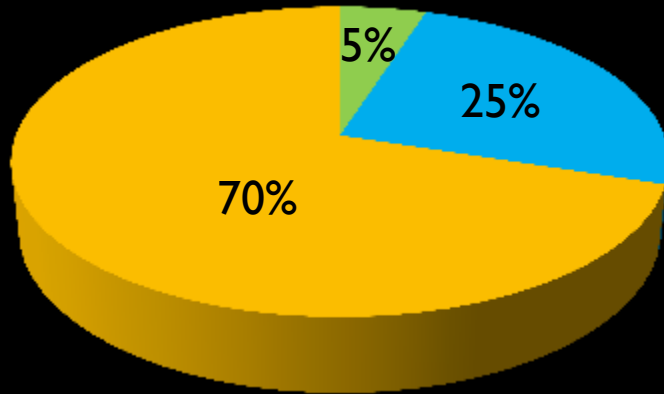


'Growing Smart'

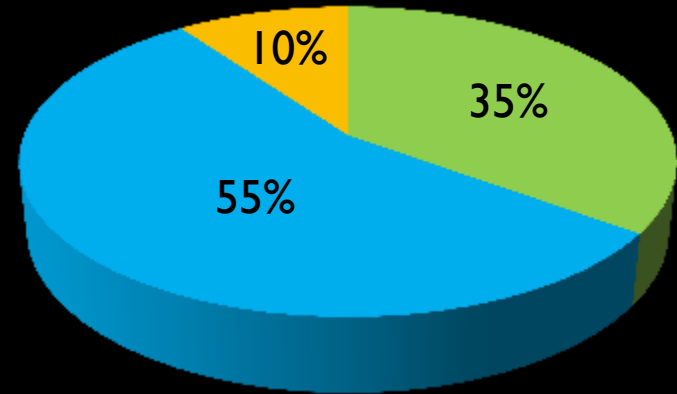
# California **Rapid**Fire Scenarios

## Land Use Mix for Growth Increment (2005-2050)

■ Urban    ■ Compact    ■ Standard



Business As Usual



Growing Smart

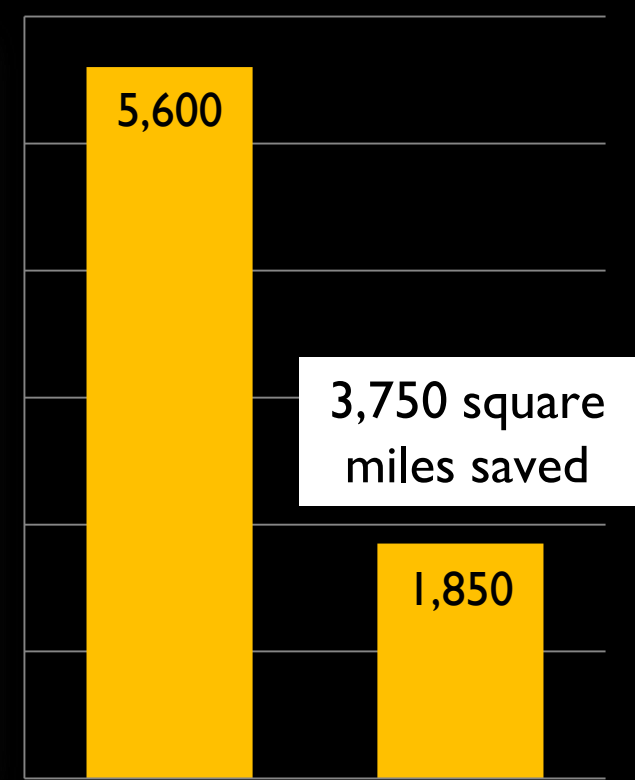




# Land Consumed

## For New Growth to 2050 (mi<sup>2</sup>)

More land than Delaware and Rhode Island combined

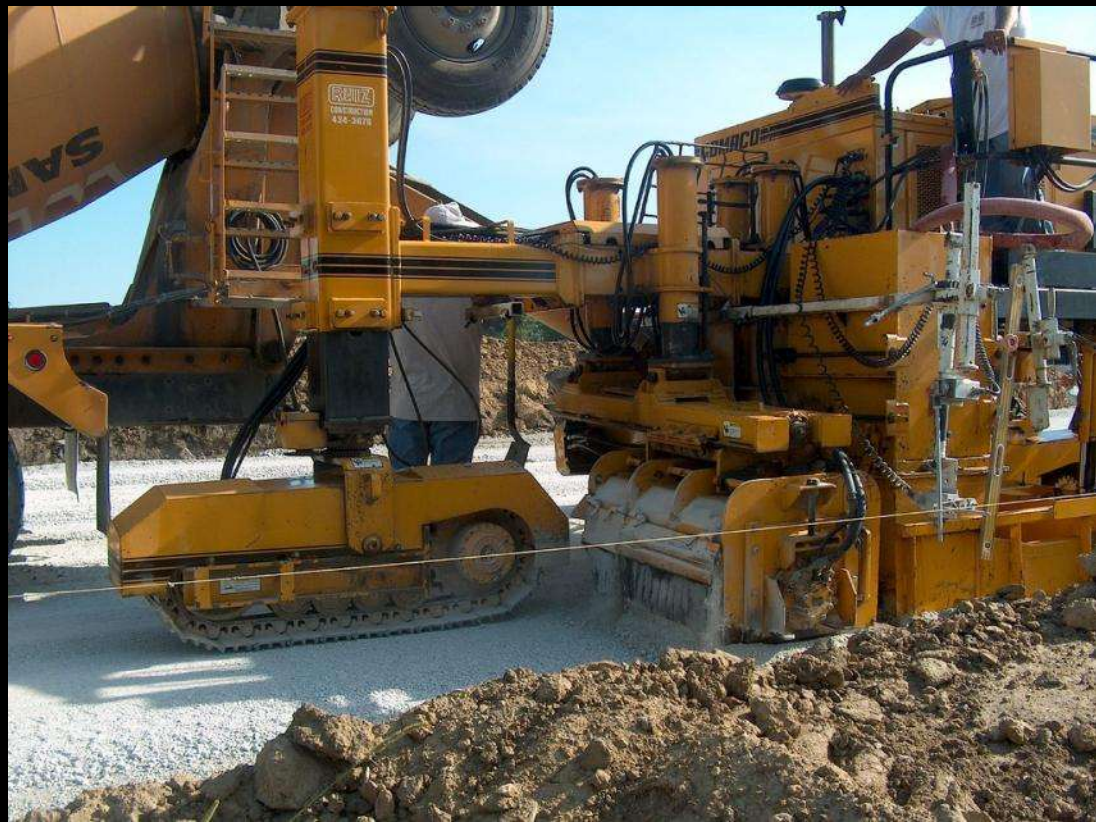


Business As Usual Growing Smart

# Infrastructure Cost for New Growth

## Capital Costs for New Growth to 2050

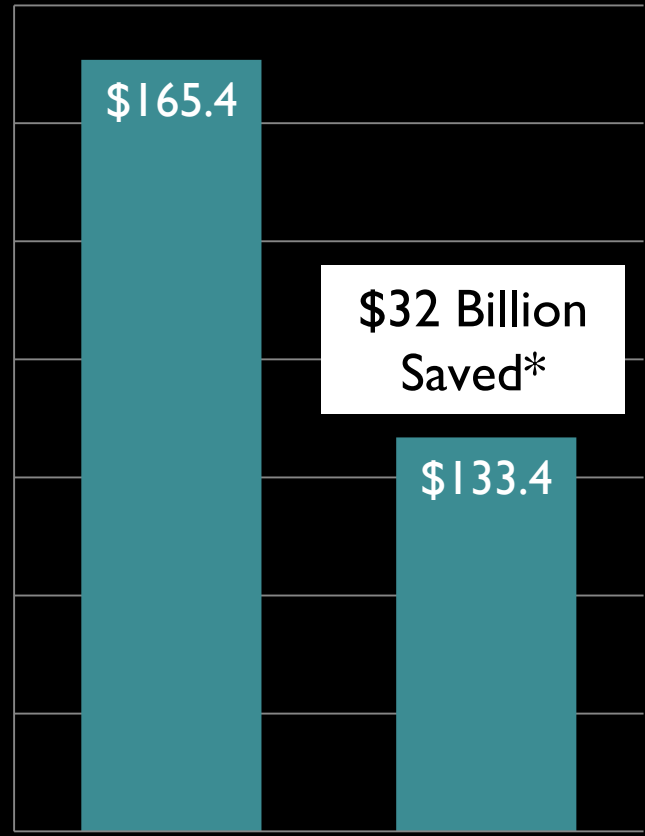
\$4,000 Saved per New Housing Unit : \$710 Million/Year



Flickr: sl-engineer

\*Includes local roads, waste water and sanitary sewer, water supply, and parks & recreation

Dollars Billions



Business As Usual    Growing Smart

# O&M Costs for New Growth

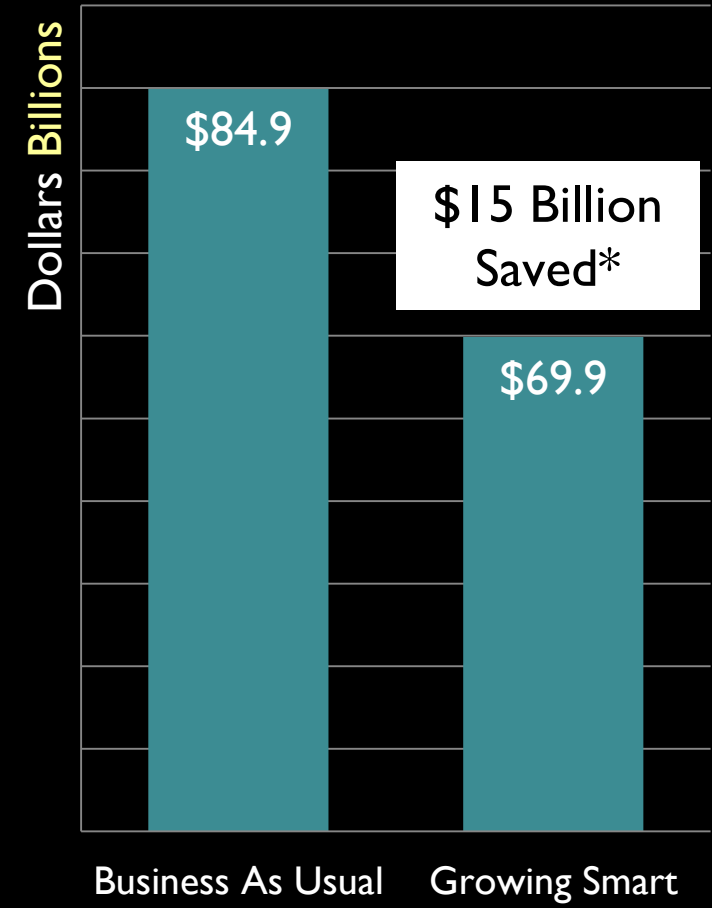
## Engineering & Public Works Costs for New Growth to 2050

\$15 Billion Saved : \$334 Million Per Year



Flickr: watchlooksee

\*Includes City General Fund engineering and public works functions





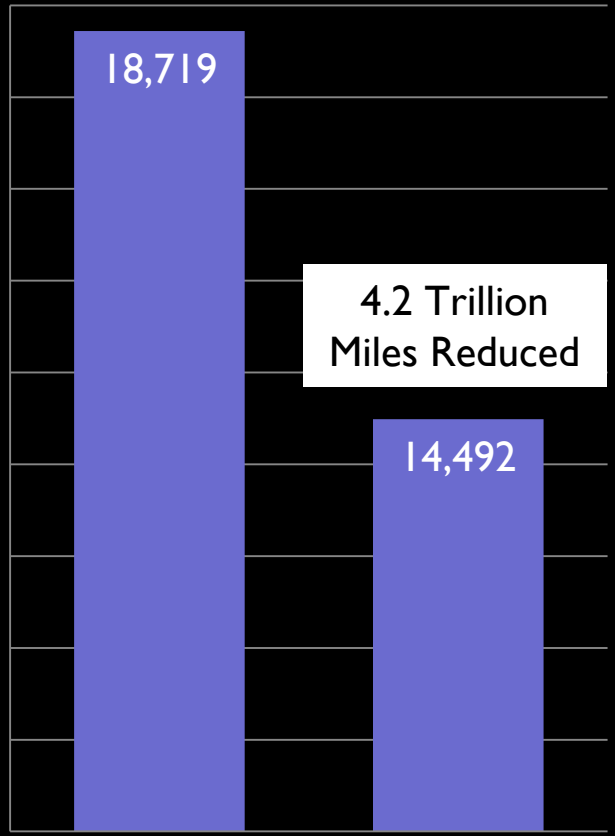
# Vehicle Miles Traveled (VMT) Cumulative to 2050

Equivalent to taking ALL cars off California's roads for 15 years



Flickr: trash-photography

VMT Billions



Business As Usual Growing Smart

# Auto Fuel Cost

## Cost Per Household in 2050

\$3,100 Annual Savings Per Household in 2050



Flickr: TheTruthAbout...



Business As Usual

Growing Smart

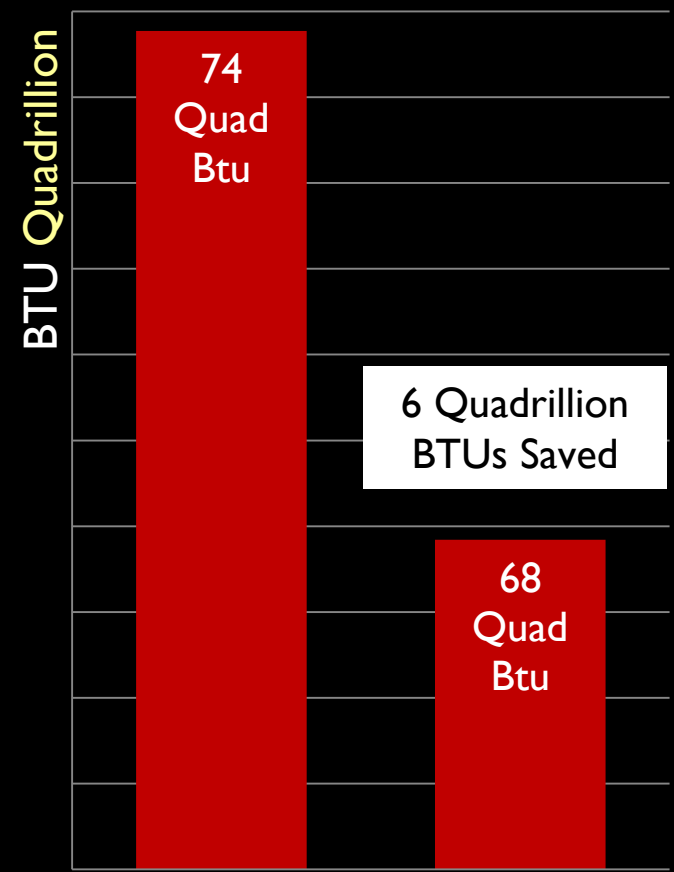
# Building Energy

## Cumulative to 2050

Would Power ALL Homes in California for 8 Years



Flickr: arbyreed



Business As Usual Growing Smart



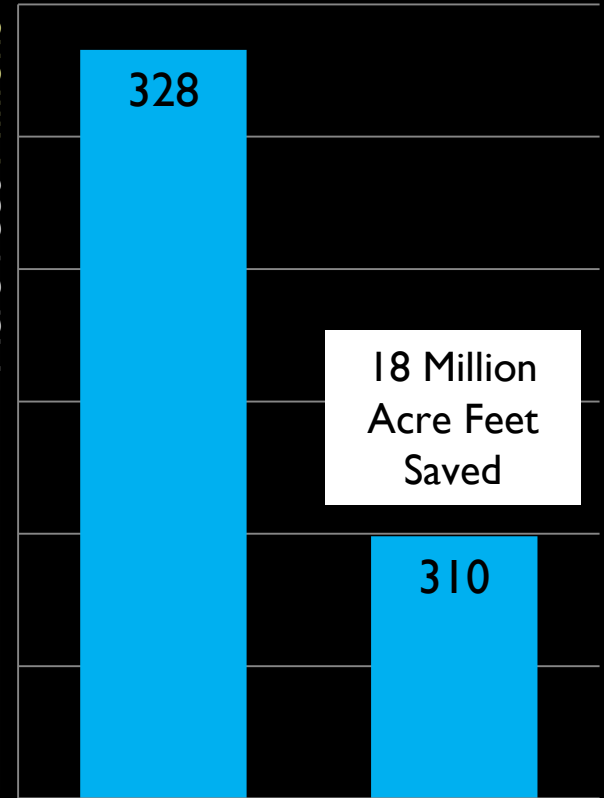
# Residential Water Use

## Cumulative to 2050

Water Savings Could Fill Hetch Hetchy 50 Times



Acre Feet Millions



Business As Usual Growing Smart

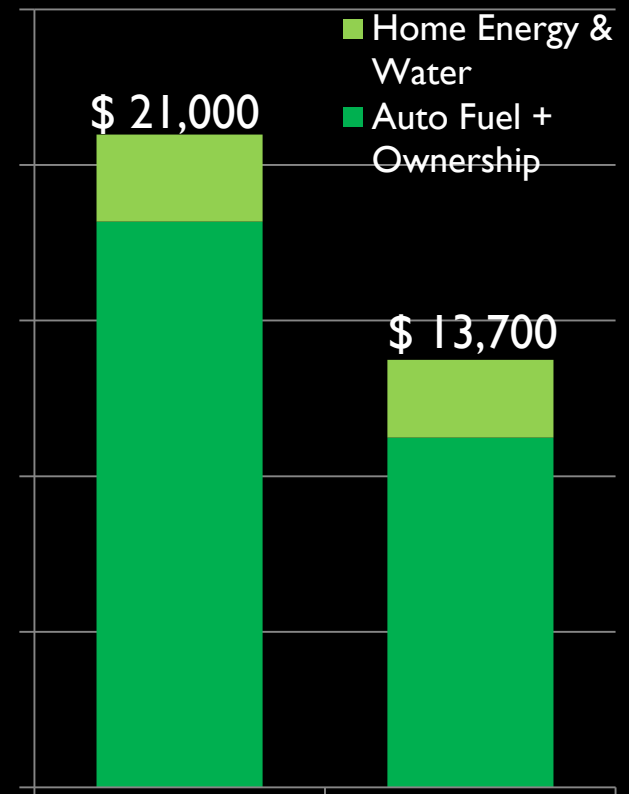
# Annual Household Costs

Per Household Annual in 2050

\$7,300 Savings Per Household in 2050



Flickr: Diablo\_Solar



Business As Usual Growing Smart

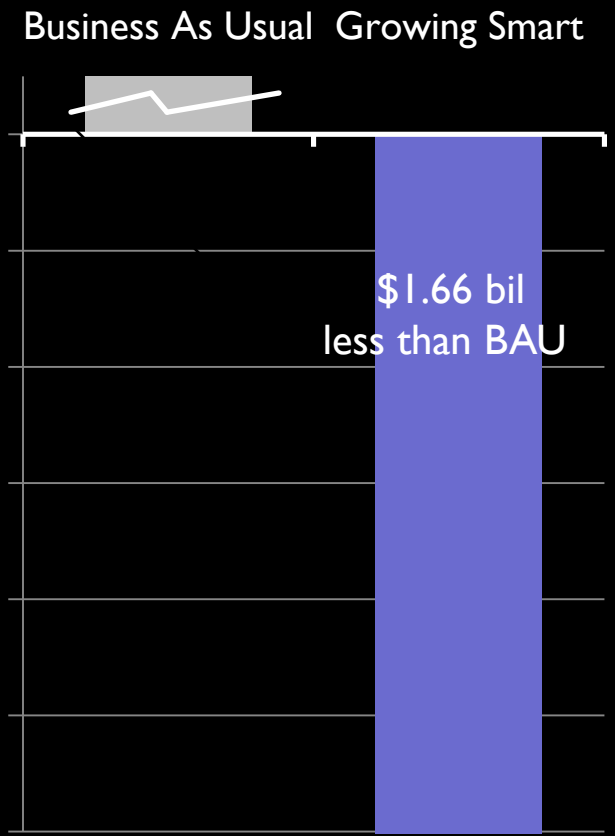
# Respiratory Health Costs

## Total Annual in 2035

Saves \$1.66 billion annually by 2035



Flickr: Lance Page



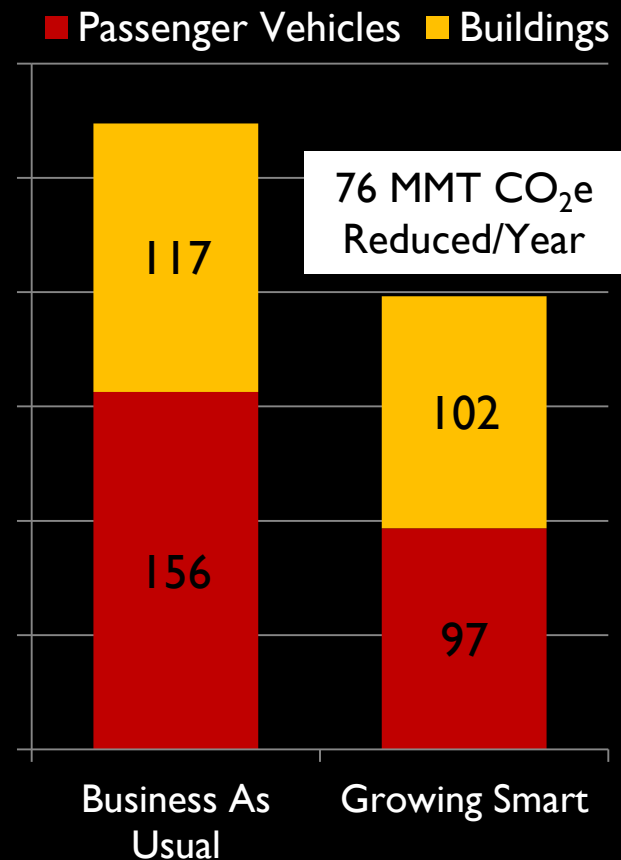
Based on Analysis of Vision CA Results by TIAx, LLC



# Greenhouse Gas Emissions

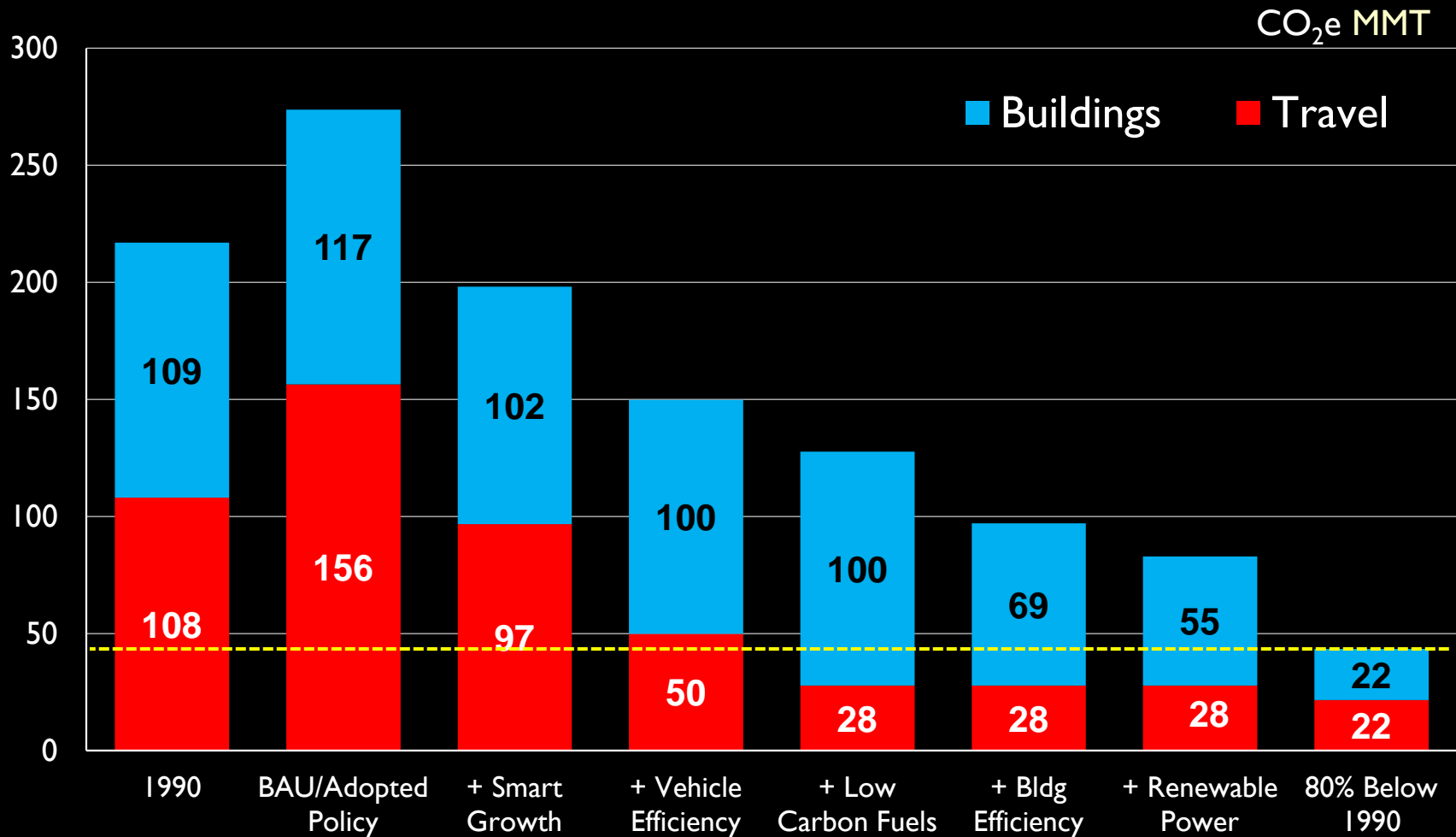
Annual in 2050

Emissions offset by 47,000 square miles of trees in a year.  
A forest covering 1/4 of California.



# California 2050 GHG Emissions

Getting to 80% Below 1990





**SOUTHERN CALIFORNIA  
ASSOCIATION of GOVERNMENTS**

REGIONAL TRANSPORTATION PLAN  
**2012-2035**  
SUSTAINABLE COMMUNITIES STRATEGY  
Towards a Sustainable Future

**RTP**

# Modeling for Southern California 2012 SCS/RTP





SOUTHERN CALIFORNIA  
ASSOCIATION of GOVERNMENTS

REGIONAL TRANSPORTATION PLAN  
2012-2035  
SUSTAINABLE COMMUNITIES STRATEGY  
Towards a Sustainable Future

RTP

# GHG Targets Are Not Very Sexy

(to most people)





SOUTHERN CALIFORNIA  
ASSOCIATION of GOVERNMENTS

REGIONAL TRANSPORTATION PLAN  
2012-2035 RTP  
SUSTAINABLE COMMUNITIES STRATEGY  
Towards a Sustainable Future

What does 13% below per capita  
2005 VMT in 2035 mean?



SOUTHERN CALIFORNIA  
ASSOCIATION of GOVERNMENTS

REGIONAL TRANSPORTATION PLAN  
2012-2035 RTP  
SUSTAINABLE COMMUNITIES STRATEGY  
Towards a Sustainable Future

I need a (better paying) job.  
Can I afford next month's rent/mortgage/bills?

Humans *Do Not* Play a Role in the  
Earth's Warming.....

...but I do know we can't keep doing what we  
have been doing.



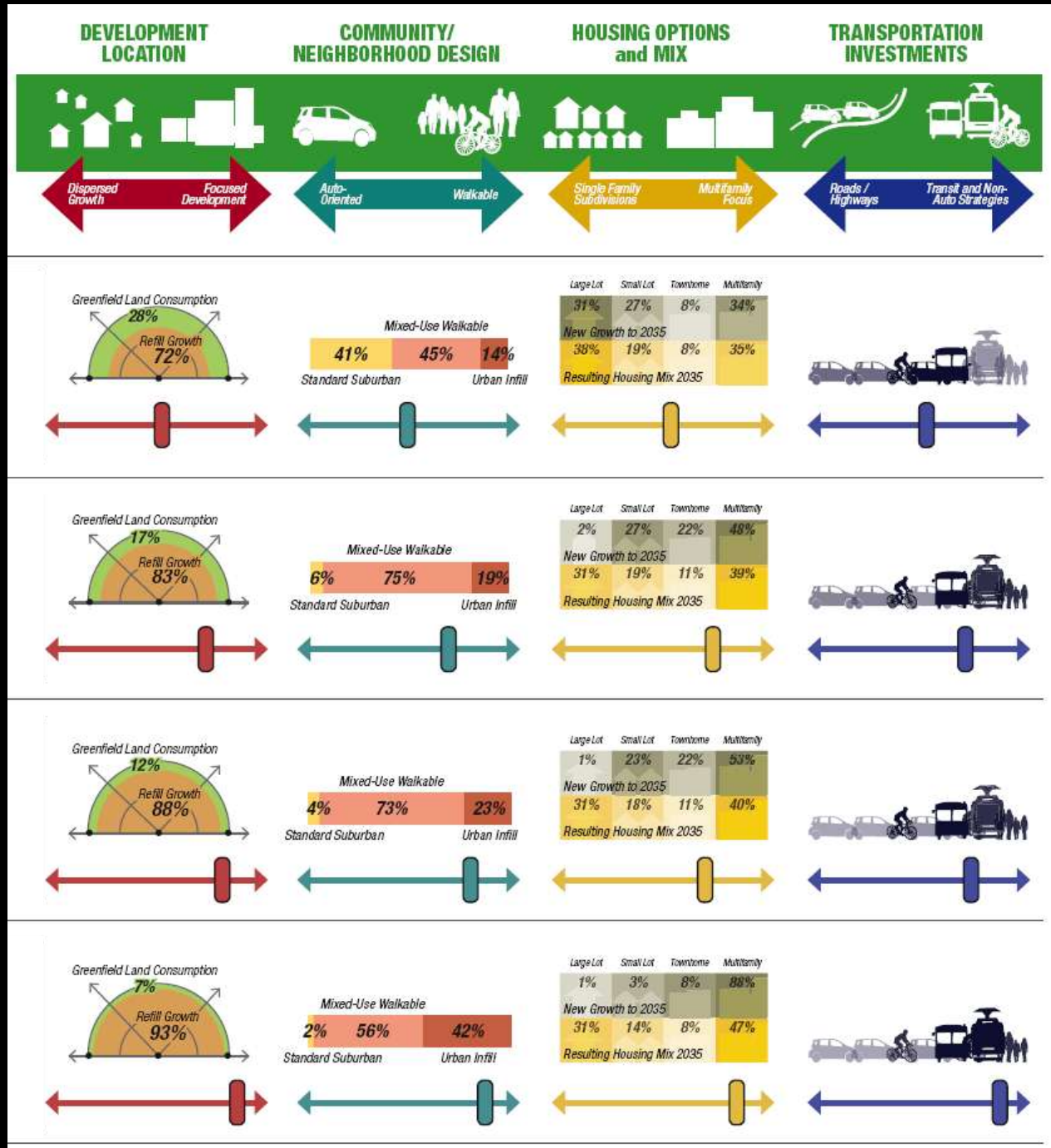
# Scenario Snapshot

1

2

3

4



# Housing Product Mix

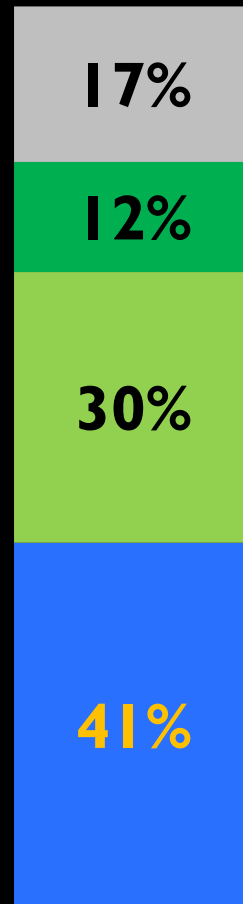
Key Variable in SCS Alternatives



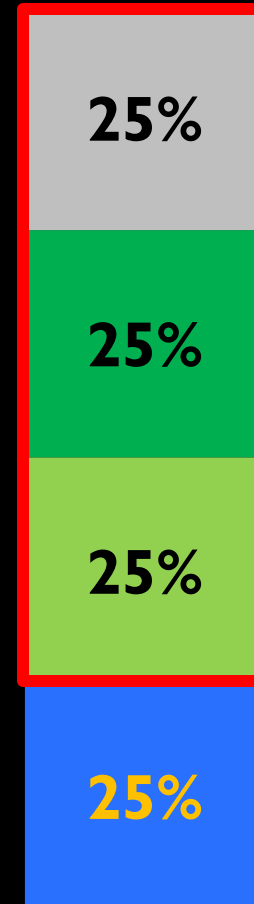
# Where is the long-term housing market headed?

Housing Demand Projections for Southern California: 2010 - 2035

# Who We Are (Really)



1970



2009

California

Singles living alone

Other Households

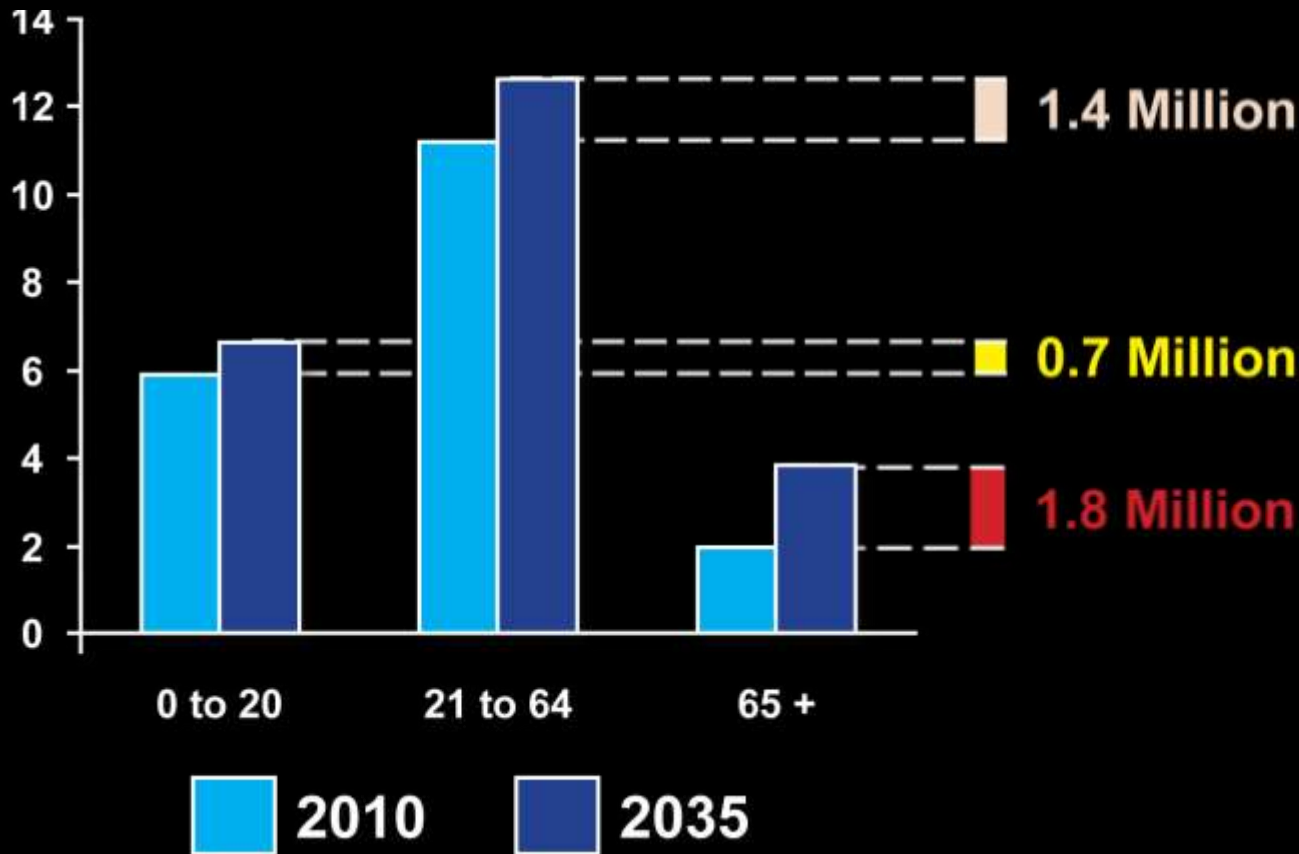
Married couples without children

Married couples with children



# Our Aging Population

SCAG Region, 2010 to 2035



## Seniors

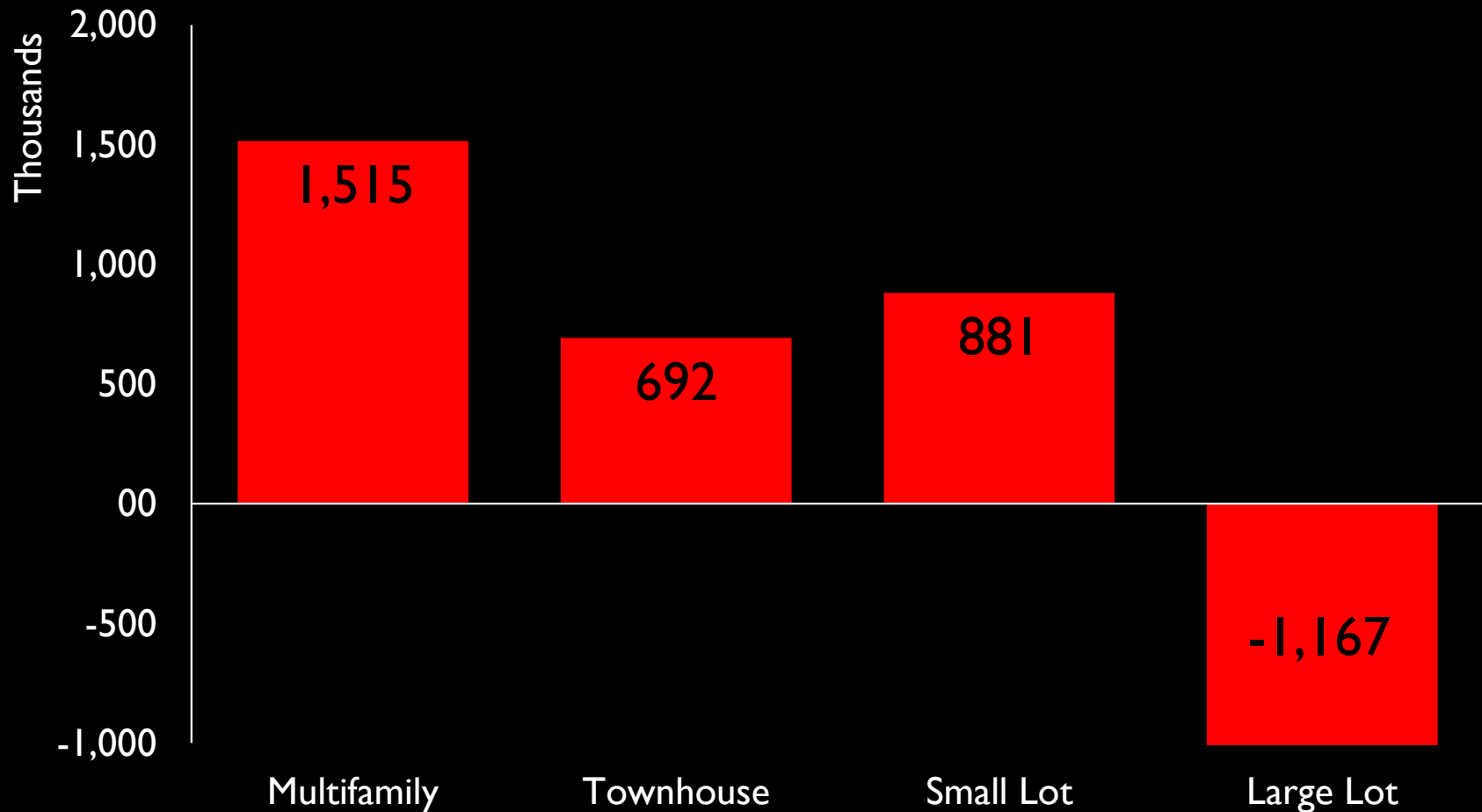


Over  $\frac{1}{2}$   
the demand  
for new  
homes

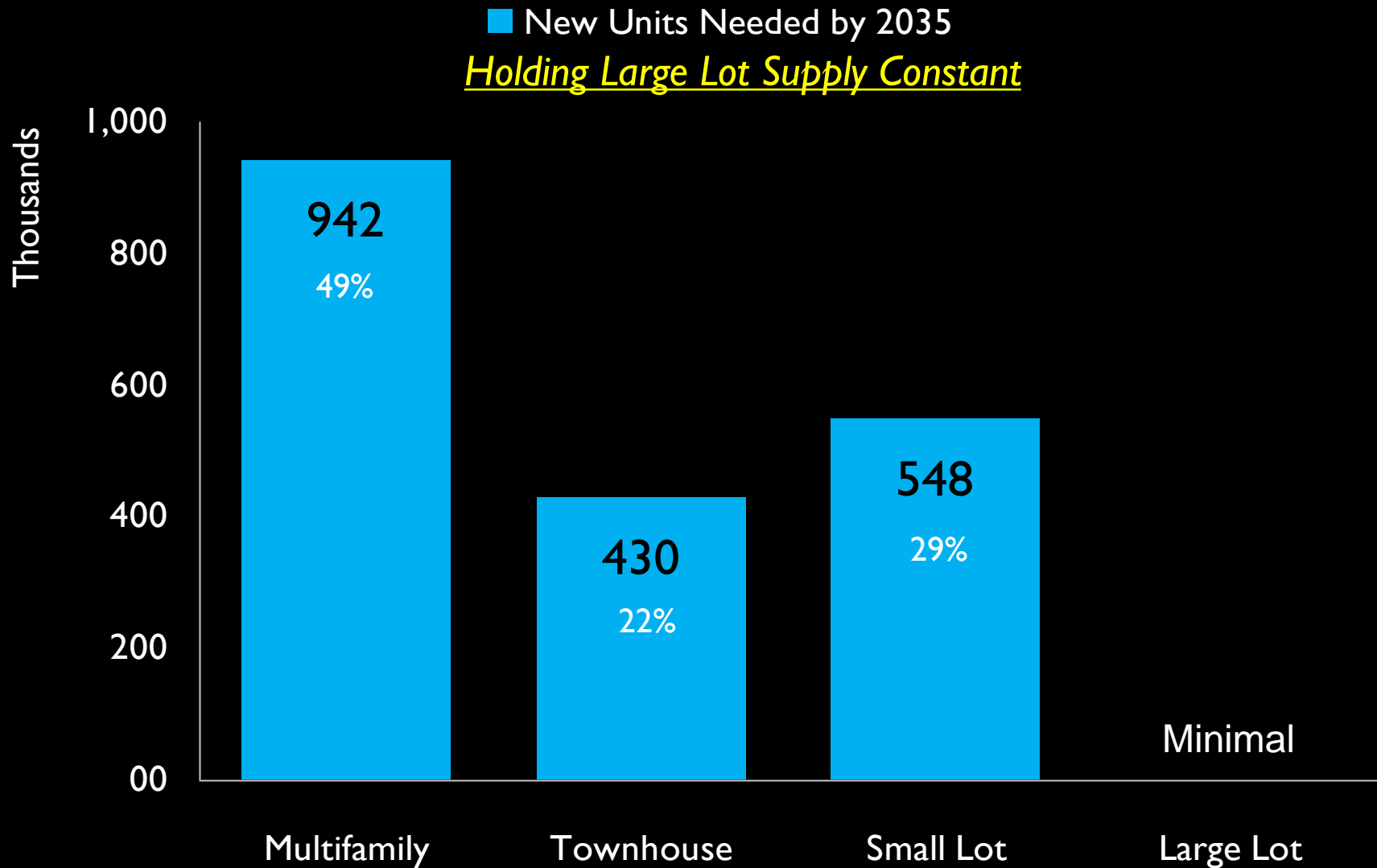
In 2040 **73%** of all  
households will be  
without children

# SCAG Housing Demand 2035

■ New Units Needed by 2035



# SCAG Planning **Bottom Line 2035**



# Southern California RapidFire

## 2012 RTP/SCS PUBLIC OUTREACH WORKSHOPS



SOUTHERN CALIFORNIA  
ASSOCIATION OF GOVERNMENTS

Rev. 25 July 2011

### 2035 SCENARIO DESCRIPTIONS

#### DEVELOPMENT LOCATION



#### COMMUNITY/ NEIGHBORHOOD DESIGN



#### HOUSING OPTIONS and MIX



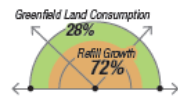
#### TRANSPORTATION INVESTMENTS



### SCENARIO CONSIDERATIONS

The scenarios described here vary in their land use programs and patterns, and in the package of transportation investments that support the quality and location of growth in the scenarios. Ultimately, the RTP and SCS will also consider various transportation strategies and policies aimed at improving mobility while reducing vehicle miles traveled (VMT) and transportation emissions.

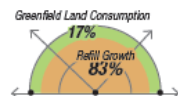
**1** This scenario is based on the general plans prepared by cities. It includes a significant proportion of suburban, auto-oriented development, but also recognizes the recent trend of increased growth in existing urban areas and around transit. New housing is mostly single-family, with an increase in smaller-lot, townhome, and multifamily homes; housing mix still falls short of demand for these types, though. Transportation investments may favor automobile infrastructure slightly, but also support new transit lines and other non-auto strategies and improvements.



Large Lot	Small Lot	Townhome	Multifamily
31%	27%	8%	34%
<b>New Growth to 2035</b>			
38%	19%	8%	35%
<b>Resulting Housing Mix 2035</b>			



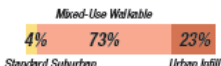
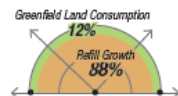
**2** This scenario focuses more growth in walkable, mixed-use communities and in existing and planned high-quality transit areas. It would see increased investments in transit and non-auto modes, with strategies to support growth patterns that are less auto-dependent. Employment growth is focused in urban centers around transit. This scenario strives to meet demand for a broader range of housing types, and new housing is weighted towards smaller-lot single family homes, townhomes, and multifamily condos and apartments.



Large Lot	Small Lot	Townhome	Multifamily
2%	27%	22%	48%
<b>New Growth to 2035</b>			
31%	19%	11%	30%
<b>Resulting Housing Mix 2035</b>			



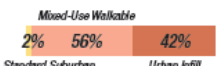
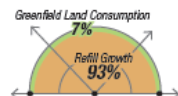
**3** This scenario builds on the walkable, mixed-use focus of the growth in Scenario 2, and also aims to improve fiscal and environmental performance by shifting a portion of the region's growth into areas that are closer to transit, less auto-centric, and less intensive for building energy and water needs. Like Scenario 2, this scenario aims to meet demand for a broader range of housing types, with new housing weighted towards smaller-lot single family homes, townhomes, and multifamily condos and apartments.



Large Lot	Small Lot	Townhome	Multifamily
1%	23%	22%	53%
<b>New Growth to 2035</b>			
31%	18%	11%	40%
<b>Resulting Housing Mix 2035</b>			



**4** This scenario maximizes growth in urban and mixed-use configurations in already developed areas, and around existing and planned transit investments. To support this shift, transportation system investments are heavily weighted towards transit infrastructure and operational improvements, as well as improvements to bicycle and pedestrian infrastructure. Like Scenario 3, this scenario aims to improve environmental performance by shifting a portion of the region's growth into areas that are closer to transit, and have lower demands on building energy and water use.

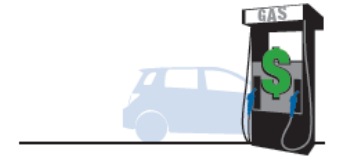


Large Lot	Small Lot	Townhome	Multifamily
1%	3%	8%	88%
<b>New Growth to 2035</b>			
31%	14%	8%	47%
<b>Resulting Housing Mix 2035</b>			



### PRICING EFFECTS

Fuel price, along with other driving costs, have both short and long-term effects on driving decisions. SCAG is working with our partners to explore how pricing could simultaneously impact driving decisions, reduce roadway congestion, support more efficient growth patterns, and raise revenue to support critical transportation system improvements – including those aimed at improving non-auto travel options such as transit, walking, and biking. Each of the scenarios described here assumes a hypothetical 2 cent per mile VMT charge, which on average, would result in a 2% reduction in total VMT.



### VEHICLE and FUEL POLICY

Meeting our greenhouse gas (GHG), pollutant emissions, and energy goals will include a suite of strategies and policies. In addition to the land use and transportation strategies explored in these first RTP/SCS scenarios, the efficiency of our cars and the fuels we use to power them will also play a role, as will the energy and water conservation measures for our homes and businesses. While these first scenarios focus on the impact of land use and transportation investments and strategies in meeting VMT, GHG, pollution, and energy challenges, subsequent analysis will explore the impacts of emerging vehicle technologies, renewable power generation, building measures, and a host of state, regional, and local environmental and energy policies.





# Southern California RapidFire

## 2012 RTP/SCS PUBLIC OUTREACH WORKSHOPS



SOUTHERN CALIFORNIA  
ASSOCIATION of GOVERNMENTS

Rev. 25 July 2011

### 2035 SCENARIO OUTCOMES\*

\* Scenario outputs are meant for comparative purposes only. Model outputs at this stage in the RTP/SCS process are preliminary and subject to refinement as the scenario development and modeling process progresses.

	LAND CONSUMPTION	LOCAL INFRASTRUCTURE COSTS	VEHICLES MILES TRAVELED (VMT)	FUEL CONSUMPTION	HOUSEHOLD COSTS	GREENHOUSE GAS (GHG) EMISSIONS	BUILDING ENERGY USE	WATER CONSUMPTION	PUBLIC HEALTH
	Greenfield (Open Space) Land Consumption	Cumulative Capital Costs and General Fund Operations and Maintenance Expenditures <i>Includes local roads, waste water and sanitary sewer, water supply, and parks and recreation</i>	VMT (Auto Passenger Vehicle Travel)	Automobile Fuel Use	Annual Fuel, Auto Operating, Energy, and Water Costs per Household (HH)	GHG Emissions from Auto Passenger Transportation and Building Energy Use	Annual Commercial and Residential Energy Use	Annual Water Use, Total and per Household (HH)	Annual Savings in Health Costs due to Reductions in Transportation-Related Pollutant Emissions
	[square miles]	[2009 dollars]	[miles]	[gallons]	[2009 dollars]	[Million Metric Tons CO <sub>2</sub> e]	[Btu]	[acre feet and gallons]	[2009 dollars]
<b>1</b>  Mixed-Use Walkable: 41% Standard Suburban, 45% Urban Infill, 14% Large Lot: 31%, Small Lot: 27%, Townhome: 8%, MultiFamily: 34% New Growth to 2035: 38%, 19%, 8%, 35% Resulting Housing Mix 2035	251 sq mi	\$35 bil	20,920 mi per HH	5.5 bil gal	\$15,100 per HH	96 MMT	835 tril Btu	3.0 mil ac ft	\$635 mil Savings from status quo
<b>2</b>  Mixed-Use Walkable: 6% Standard Suburban, 75% Urban Infill, 19% Large Lot: 2%, Small Lot: 27%, Townhome: 22%, MultiFamily: 48% New Growth to 2035: 31%, 18%, 11%, 38% Resulting Housing Mix 2035	127 sq mi	\$31 bil	18,630 mi per HH	4.9 bil gal	\$13,600 per HH	88 MMT	775 tril Btu	2.9 mil ac ft	\$915 mil Savings from status quo
<b>3</b>  Mixed-Use Walkable: 4% Standard Suburban, 73% Urban Infill, 23% Large Lot: 1%, Small Lot: 23%, Townhome: 22%, MultiFamily: 53% New Growth to 2035: 31%, 18%, 11%, 40% Resulting Housing Mix 2035	84 sq mi	\$29 bil	18,250 mi per HH	4.8 bil gal	\$13,350 per HH	86 MMT	760 tril Btu	2.9 mil ac ft	\$960 mil Savings from status quo
<b>4</b>  Mixed-Use Walkable: 2% Standard Suburban, 56% Urban Infill, 42% Large Lot: 1%, Small Lot: 3%, Townhome: 8%, MultiFamily: 88% New Growth to 2035: 31%, 14%, 8%, 47% Resulting Housing Mix 2035	46 sq mi	\$25 bil	17,990 mi per HH	4.7 bil gal	\$13,150 per HH	85 MMT	745 tril Btu	2.8 mil ac ft	\$990 mil Savings from status quo



SOUTHERN CALIFORNIA  
ASSOCIATION of GOVERNMENTS

REGIONAL TRANSPORTATION PLAN  
2012-2035 RTP  
SUSTAINABLE COMMUNITIES STRATEGY  
Towards a Sustainable Future

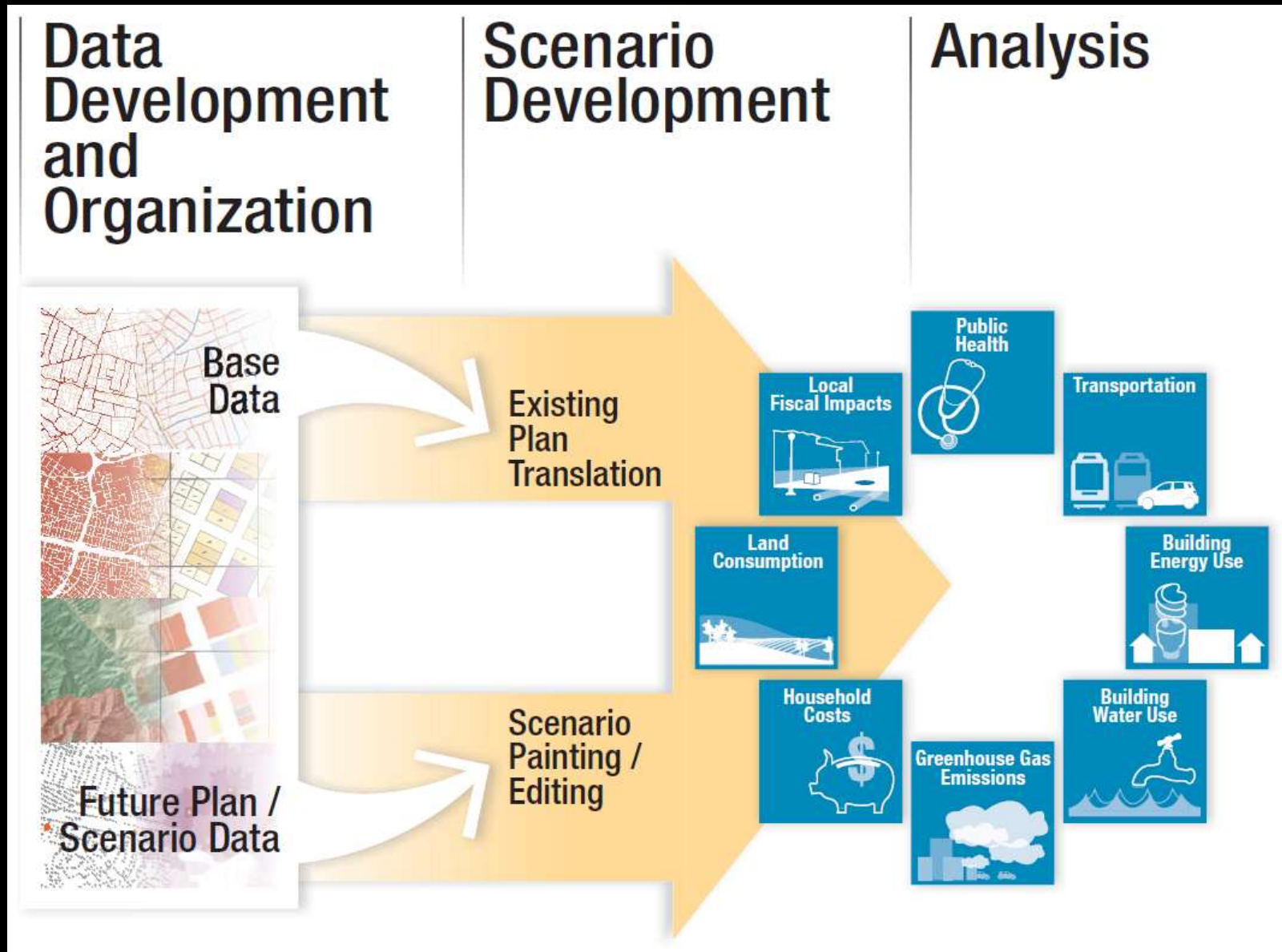
Changed the Story

Brought New Players to the Table

Adversaries to Advocates

Institutional Evolution in Modeling...

# Urban Footprint Scenario Ecosystem



# Open Source Software



## Display/Reporting

Highcharts  
Open Layers



django



## Data Delivery & Queuing

Celery/Redis Queue  
Geoserver



## Database, Analysis, UI

Postgresql/PostGIS  
Python/Django/Apache



ubuntu

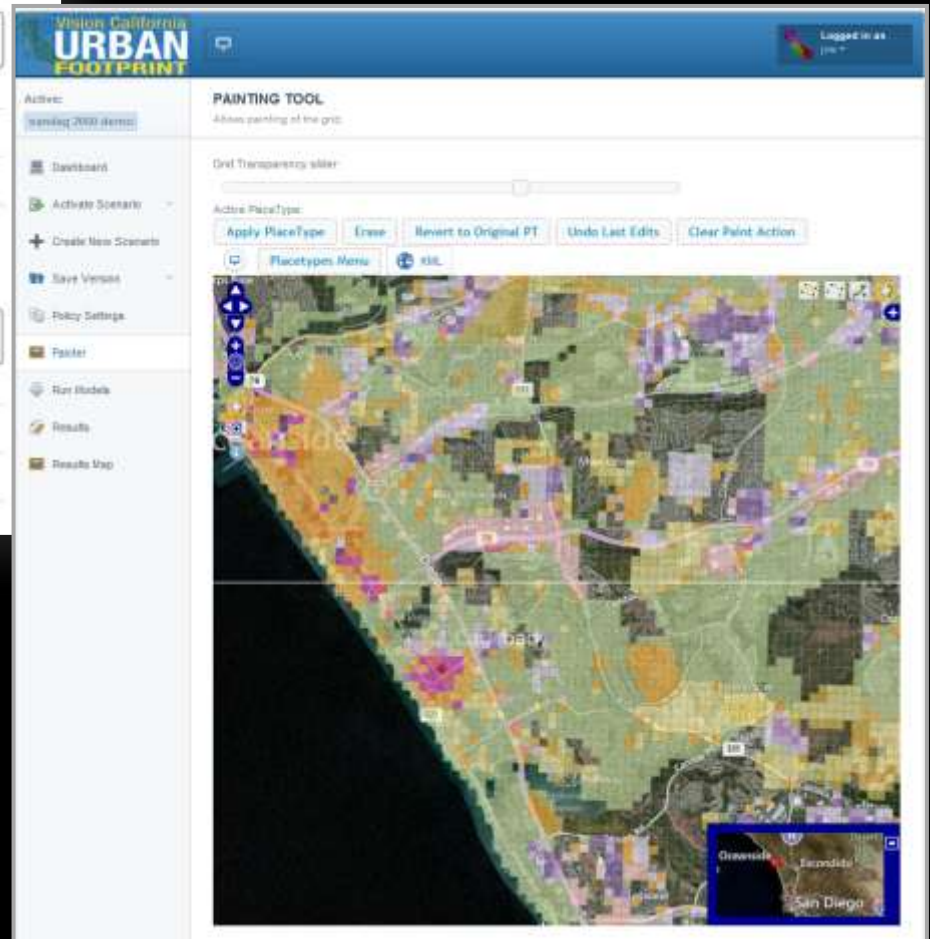
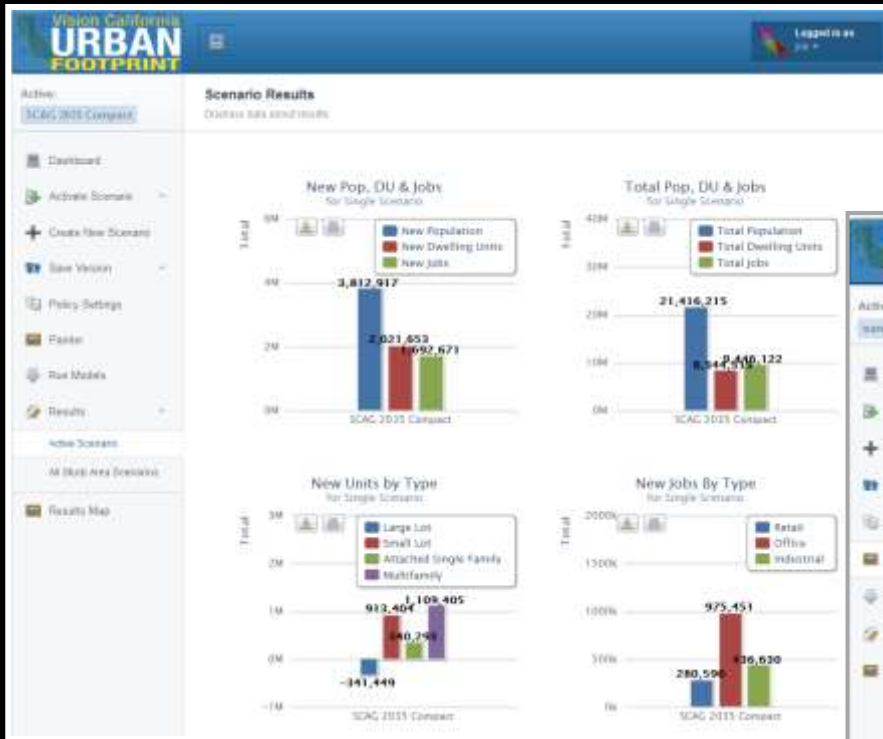
## Operating Environment

Ubuntu 11.10  
Linux



# 'Thin Client' User Interface

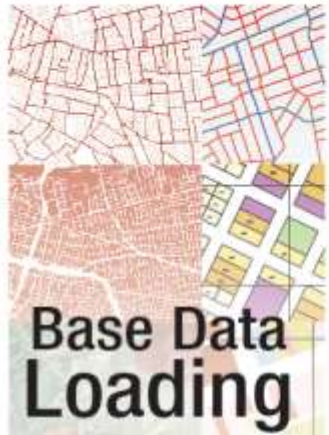
Cloud-Based  
Web Interface



Desktop, Mobile, Tablet  
Ready



# Base Data



**150 meter Grid**

**Transportation**  
*Intersection Density and Transit Proximity*

**Census**  
*Population and Jobs Characteristics*

**Parcels**  
*Housing, Jobs, and Land Uses*

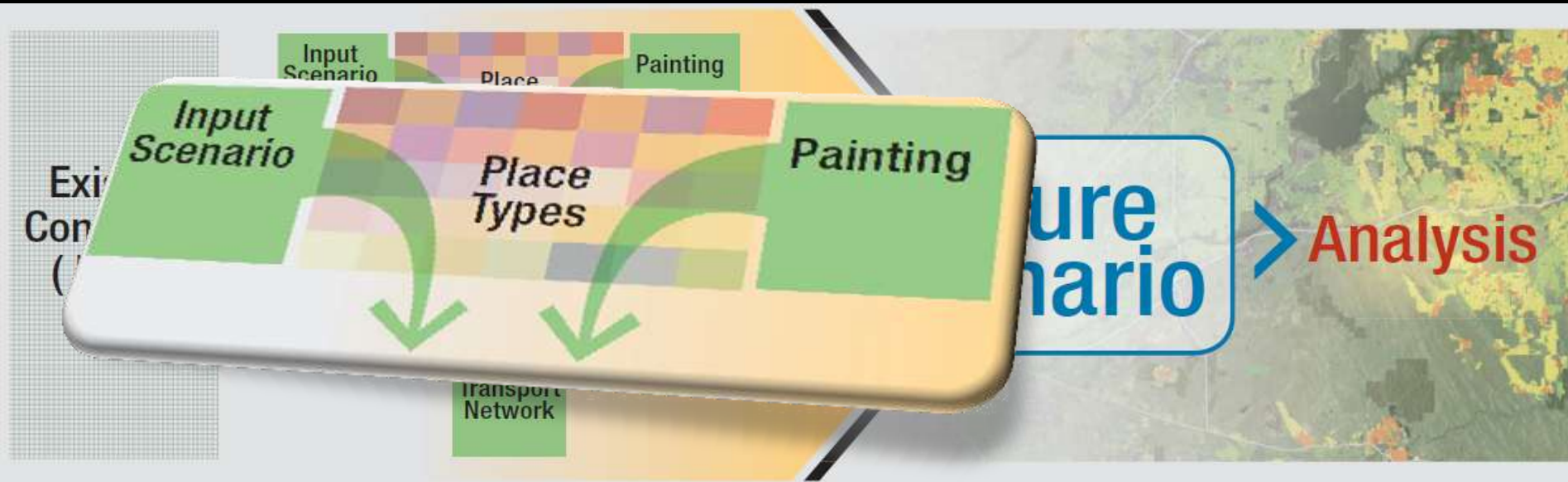
**Land Cover**  
*Urban, Greenfield, and Environmental Features*

Land Consumption  
Local Fiscal Impacts  
Transportation  
Building Energy Use  
Building Water Use

**Analysis**

Greenhouse Gas Emissions  
Public Health  
Household Costs

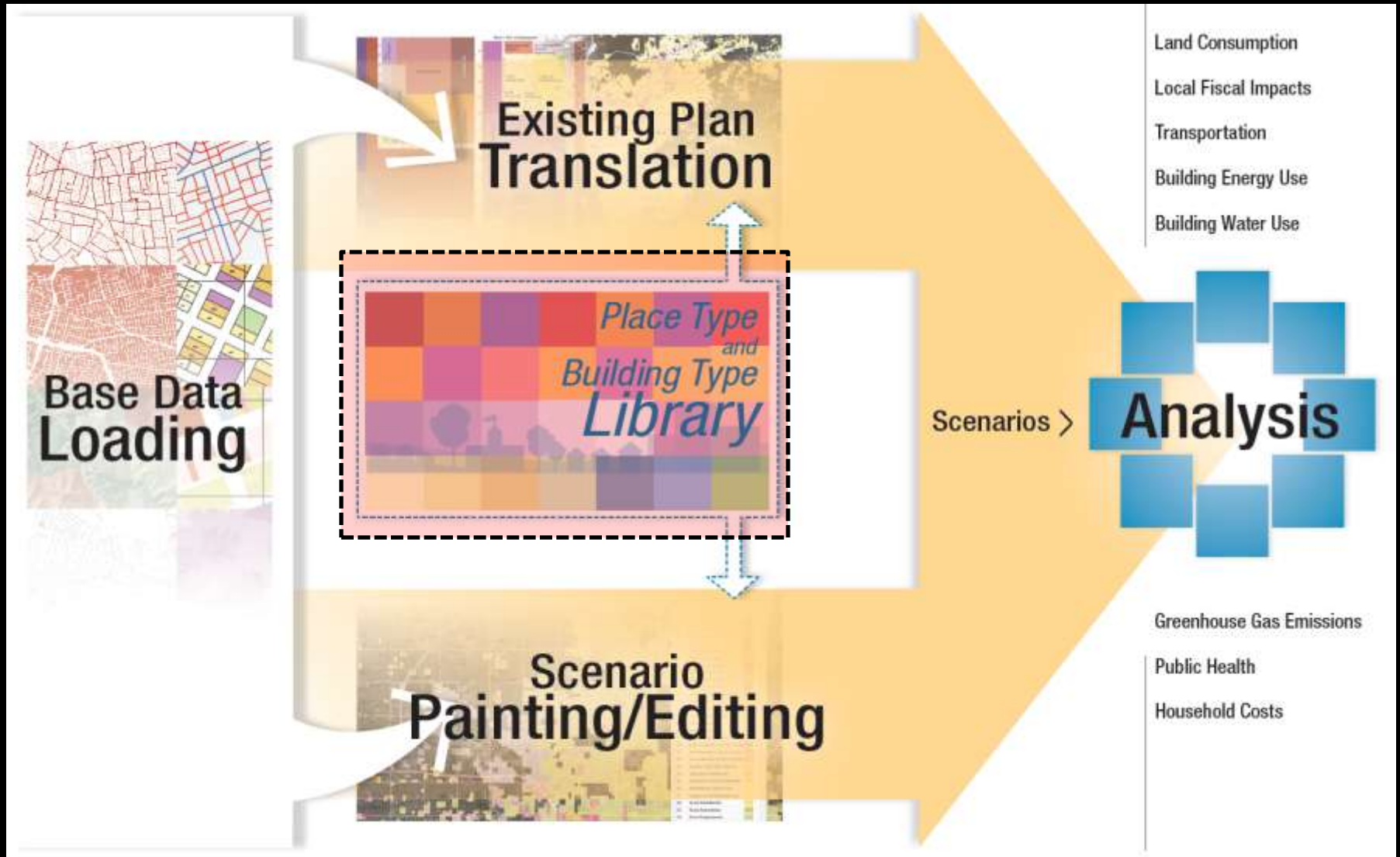
# From Base to Future....





# Place and Building Types

## Common Language for Scenarios





# 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

- 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

- 30 *Rural Residential*
- 31 *Rural Ranchettes*
- 32 *Rural Employment*

## Institutional

- 33 *Campus / University*
- 34 *Institutional*

- 35 *Parks and Open Space*

## Scenario Building Blocks

# Building Types

## Mixed Use

Skyscraper Mixed Use

High-Rise Mixed Use

Mid-Rise Mixed Use

Low-Rise Mixed Use

Parking Structure/Mixed Use

Main Street Commercial/Mixed Use High (3-5 Floors)

Main Street Commercial/Mixed Use Low (1-2 Floors)

## Residential

Skyscraper Residential

High-Rise Residential

Urban Mid-Rise Residential

Urban Podium Multi-Family

Standard Podium Multi-Family

Suburban Multifamily Apt/Condo

Urban Townhome/Live-Work

Standard Townhome

Garden Apartment

## Residential (Con't)

Very Small Lot 3000

Small Lot 4000

Medium Lot 5500

Large Lot 7500

Estate Lot

Rural Residential

Rural Ranchette

## Commercial/Industrial

Skyscraper Office

High-Rise Office

Mid-Rise Office

Low-Rise Office

Main Street Commercial (Retail + Office/Medical)

Parking Structure + Ground Floor Retail

Parking Structure

Office Park High

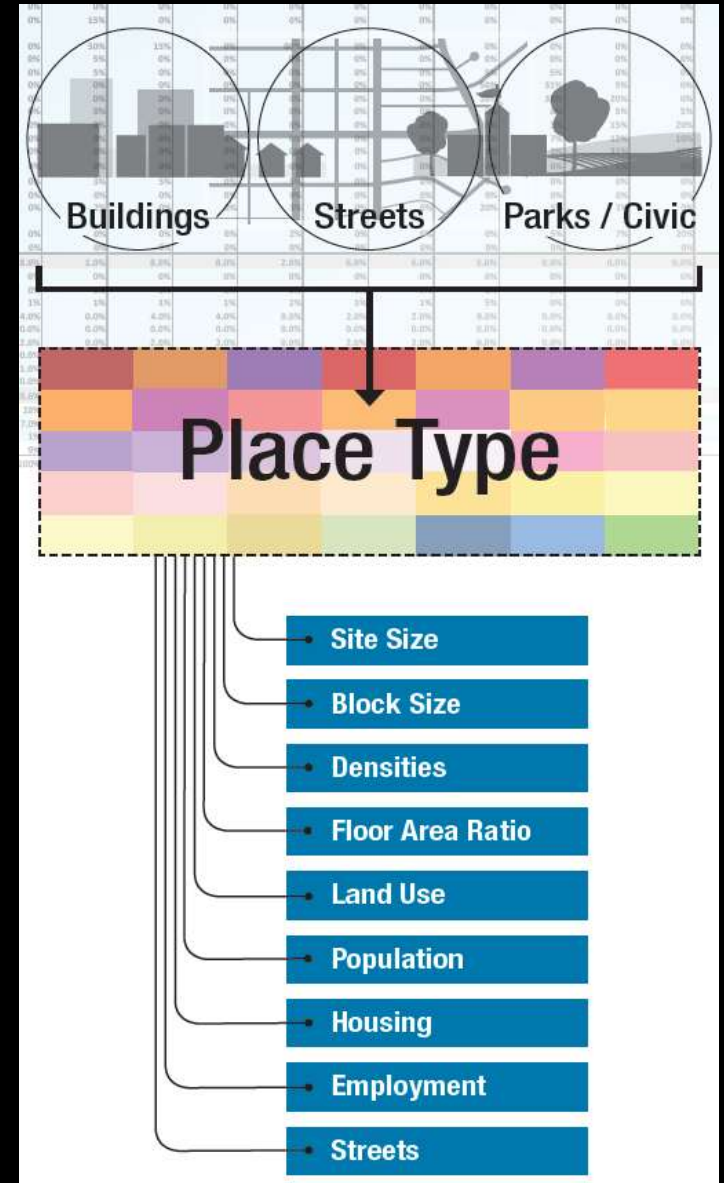
Office Park Low

# Place and Building Type Studies

## Place Type Studies

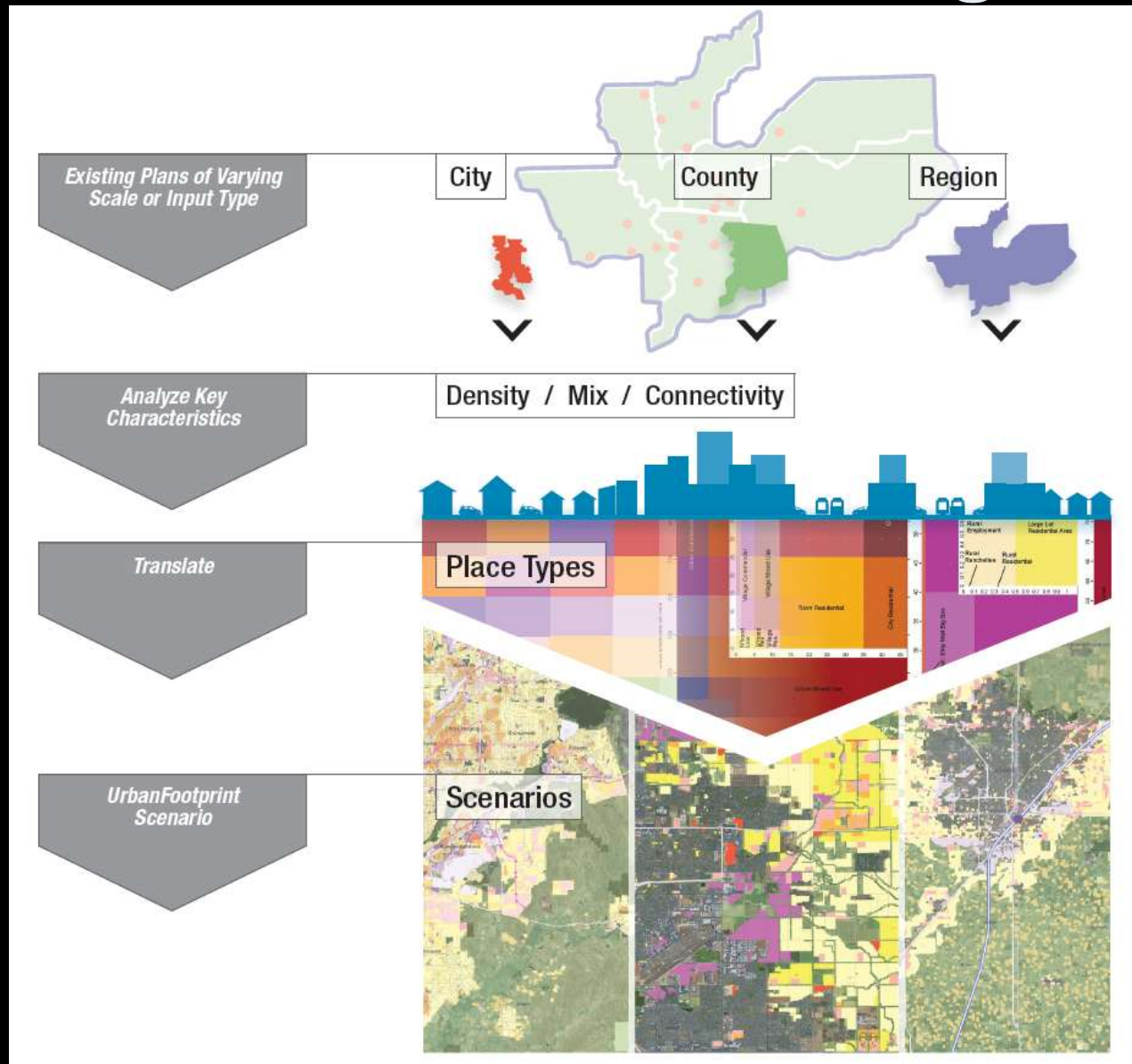


## Building Type Studies





# Translate and Stich Existing Plans

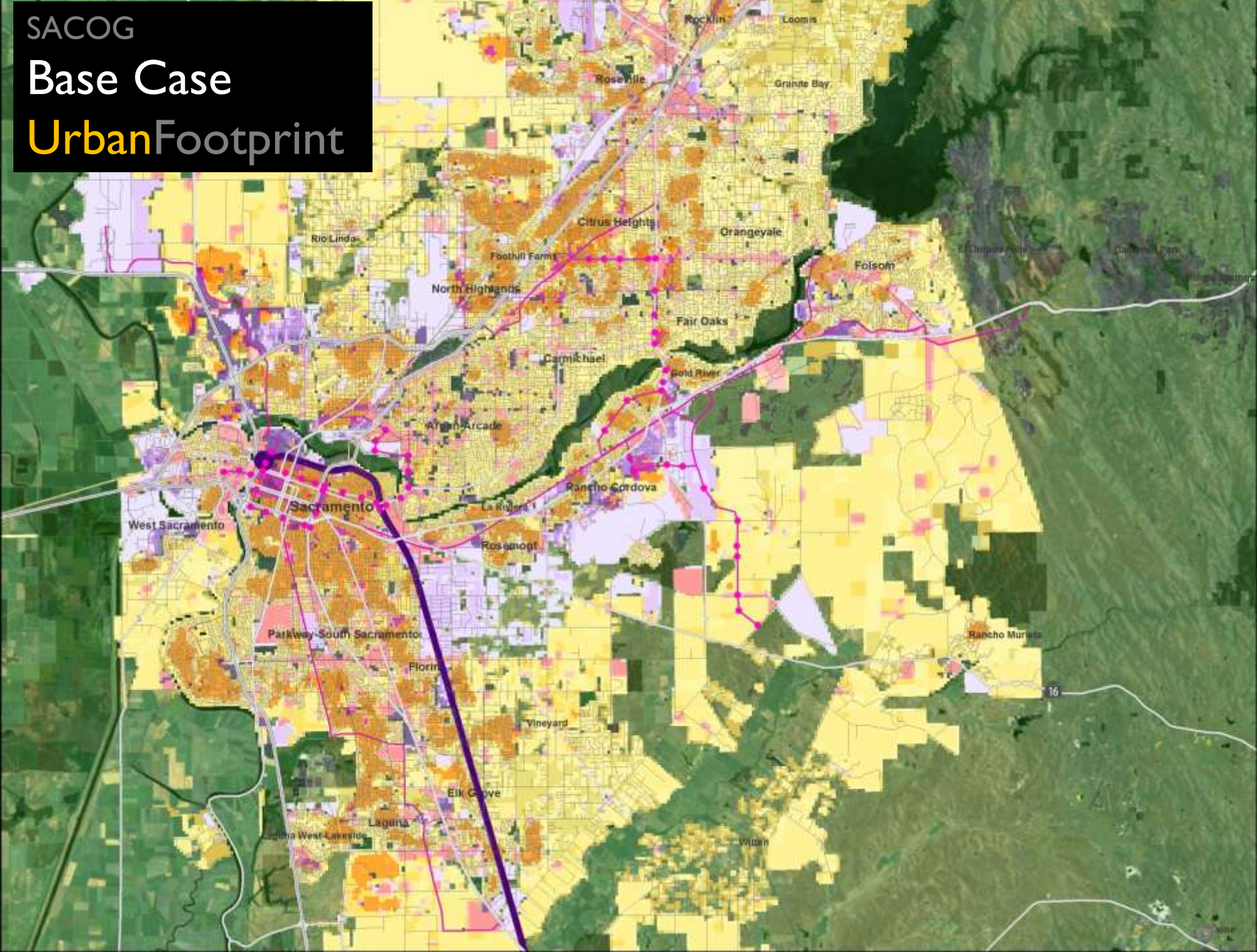




SACOG

Base Case

UrbanFootprint

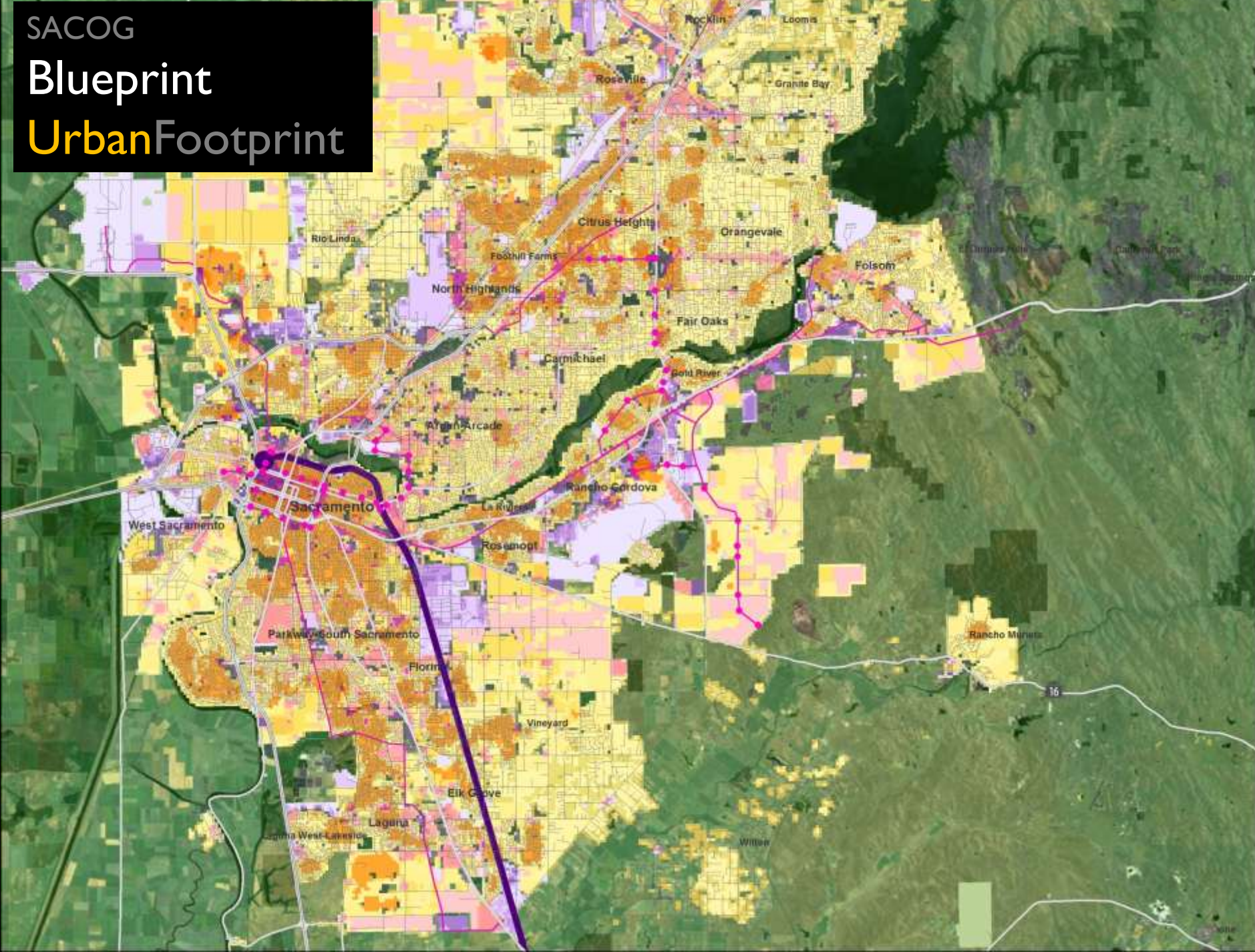




SACOG

# Blueprint

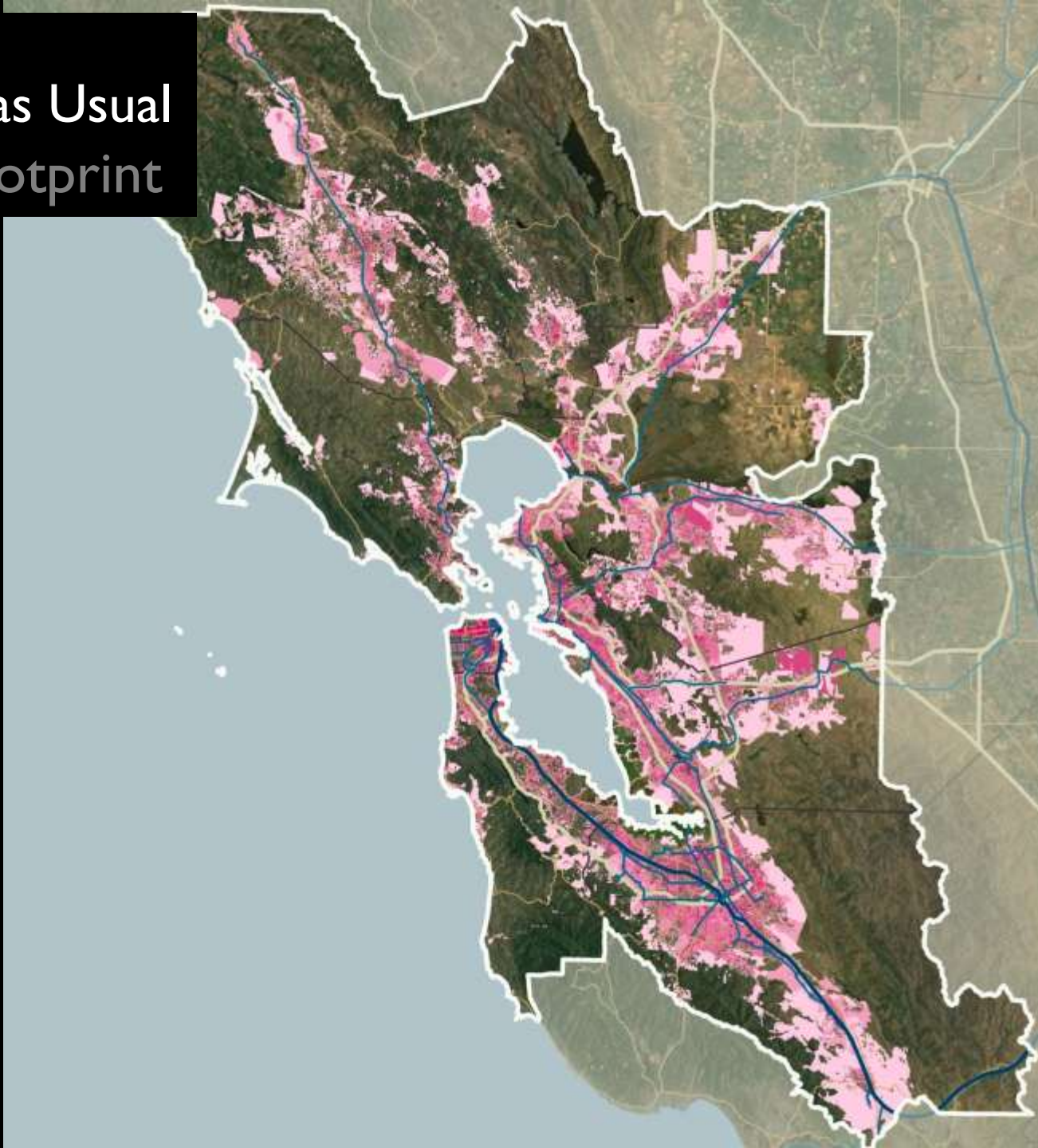
# UrbanFootprint





Bay Area

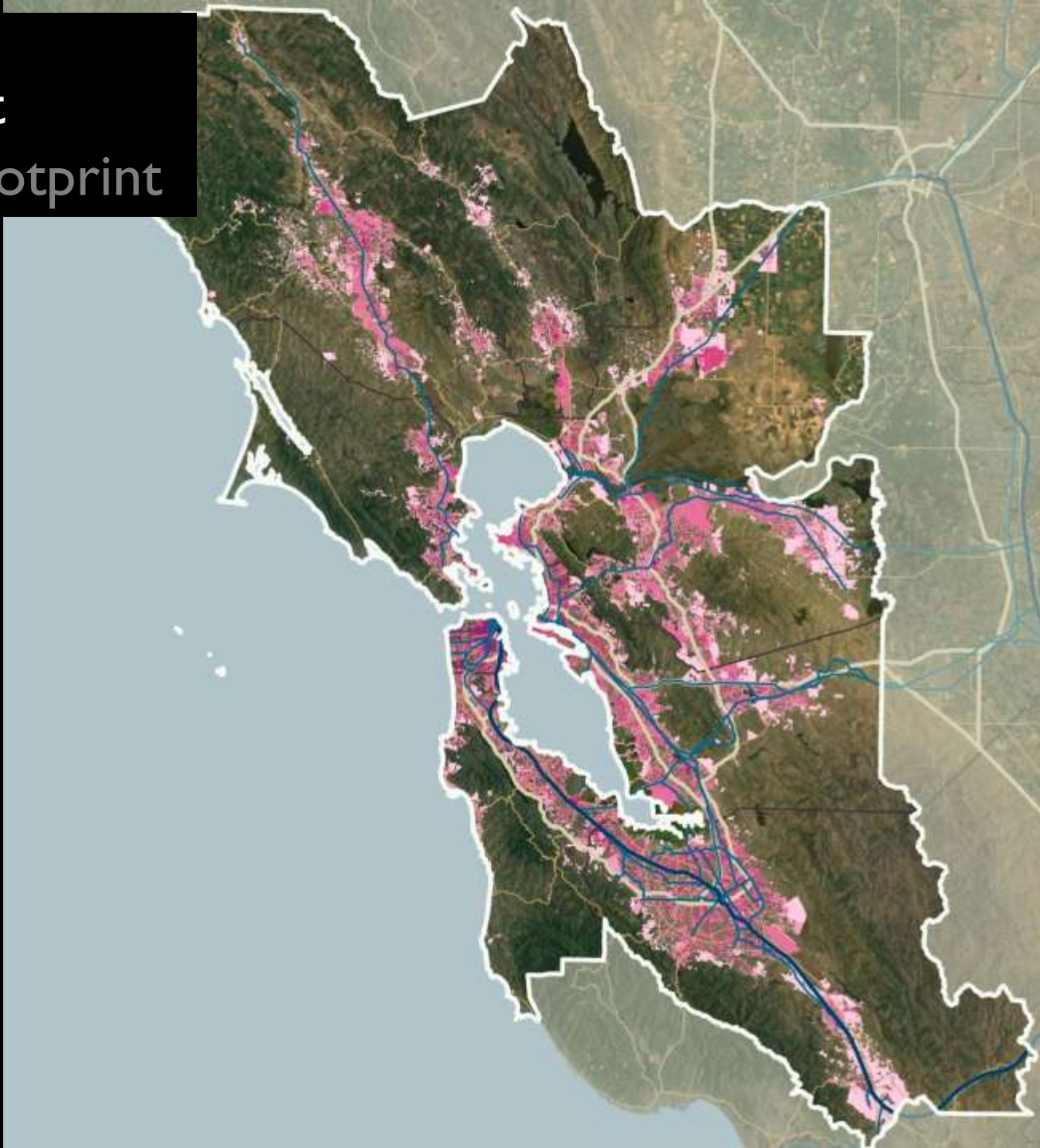
# Business as Usual UrbanFootprint



Bay Area

Compact

UrbanFootprint





# Scenario Painter

## Edit Scenarios + Build New Ones

The screenshot displays the Scenario Painter software interface. The main map shows a detailed view of Los Angeles, with various land use scenarios applied to different areas. The interface includes a top toolbar with options like 'Apply', 'Apply Erase', 'Revert to Base Values', and 'Revert to Previous Values'. A 'Placetypes Menu' is visible, showing the active placetype as 'Urban Mixed Use'. On the right side, there is a 'Placetypes' legend with a table listing 35 different placetypes, each with a unique color and a small icon. The legend is as follows:

PTID	Placetype Name	Color
1	Urban Mixed Use	Dark Red
2	Urban Residential	Red
3	Urban Commercial	Dark Purple
4	City Mixed Use	Red
5	City Residential	Orange
6	City Commercial	Dark Purple
7	Town Mixed Use	Red
8	Town Residential	Orange
9	Town Commercial	Dark Purple
10	Village Mixed Use	Red
11	Village Residential	Orange
12	Village Commercial	Dark Purple
13	Neighborhood Residential	Light Orange
14	Neighborhood Low	Light Orange
15	Office Focus	Light Purple
16	Mixed Office and R&D	Light Purple
17	Office/Industrial	Light Purple
18	Industrial Focus	Light Purple
19	Low-Density Employment Park	Light Purple
20	High Intensity Activity Center	Pink
21	Mid Intensity Activity Center	Pink
22	Low Intensity Retail-Centered	Pink
23	Retail: Strip Mall/ Big Box	Pink
24	Industrial/Office/Res Mixed H	Light Orange
25	Industrial/Office/Res Mixed L	Light Orange
26	Suburban Multifamily	Light Orange
27	Suburban Mixed Residential	Light Orange
28	Residential Subdivision	Light Orange
29	Large Lot Residential Area	Light Orange
30	Rural Residential	Light Orange
31	Rural Ranchettes	Light Orange
32	Rural Employment	Light Orange
33	Campus/ University	Blue
34	Institutional	Blue
35	Parks & Open Space	Green

On the right side of the map, there is a 'Layer' control panel with a list of layers including 'Base Layer', 'Big Hybrid', 'Big Road', 'Big Aerial', 'MapQuest Open Aerial Tiles', 'MapQuest OSM Tiles', 'Onit', 'Base Grid', 'Developable Areas', 'Grid Issue', and 'Culture'. The map also shows various geographical features like roads, parks, and water bodies. The bottom right corner of the map shows a small inset map of California with a red dot indicating the location of Los Angeles.



# Scenario Painting

Active PlaceType:

[Apply PlaceType](#)
[Apply Erase](#)
[Apply Revert to Original](#)
[Apply Undo Last Edits](#)
[Remove Painting Features](#)
[Show Placetypes](#)
[KML](#)

**Placetypes**

PTID	Placetype Name	Color
1	Urban Mixed Use	Dark Red
2	Urban Residential	Orange
3	Urban Commercial	Purple
4	City Mixed Use	Red
5	City Residential	Light Orange
6	City Commercial	Dark Purple
7	Town Mixed Use	Red
8	Town Residential	Orange
9	Town Commercial	Purple
10	Village Mixed Use	Red
11	Village Residential	Light Orange
12	Village Commercial	Purple
13	Neighborhood Residential	Light Orange
14	Neighborhood Low	Light Orange
15	Office Focus	Purple
16	Mixed Office and R&D	Purple
17	Office/Industrial	Purple
18	Industrial Focus	Light Purple
19	Low-Density Employment Park	Light Purple
20	High Intensity Activity Center	Pink
21	Mid Intensity Activity Center	Light Pink
22	Low Intensity Retail-Centered	Light Pink
23	Retail: Strip Mall/ Big Box	Light Pink
24	Suburban Multifamily	Yellow
25	Suburban Mixed Residential	Yellow
26	Residential Subdivision	Yellow
27	Large Lot Residential Area	Yellow
28	Rural Residential	Yellow
29	Rural Ranchettes	Yellow
30	Rural Employment	Yellow
31	Campus/ University	Blue
32	Institutional	Blue
33	Parks & Open Space	Green

Page 1 of 0



# Scenario Painting

54.245.113.124 manifest/scene/20painting\_fullscreen

Placetypes Menu Active Placetype

Apply Apply Erase Restore Base Values Restore Previous Values

Placetypes

PTID	Placetype Name	Color
1	Urban Mixed Use	Dark Red
2	Urban Residential	Red
3	Urban Commercial	Dark Purple
4	City Mixed Use	Red-Orange
5	City Residential	Orange
6	City Commercial	Dark Purple
7	Town Mixed Use	Red-Orange
8	Town Residential	Orange
9	Town Commercial	Dark Purple
10	Village Mixed Use	Red-Orange
11	Village Residential	Orange
12	Village Commercial	Dark Purple
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32	Rural Employment	Light Purple
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34	Institutional	Light Purple
35	Parks & Open Space	Light Purple

Base Layer

- Map Hybrid
- Map Aerial
- Map Open Aerial Tiles
- Map Open DSM Tiles

Overlays

- Grid
- Street One
- Developable Acres
- Editable

Page 1 of 8



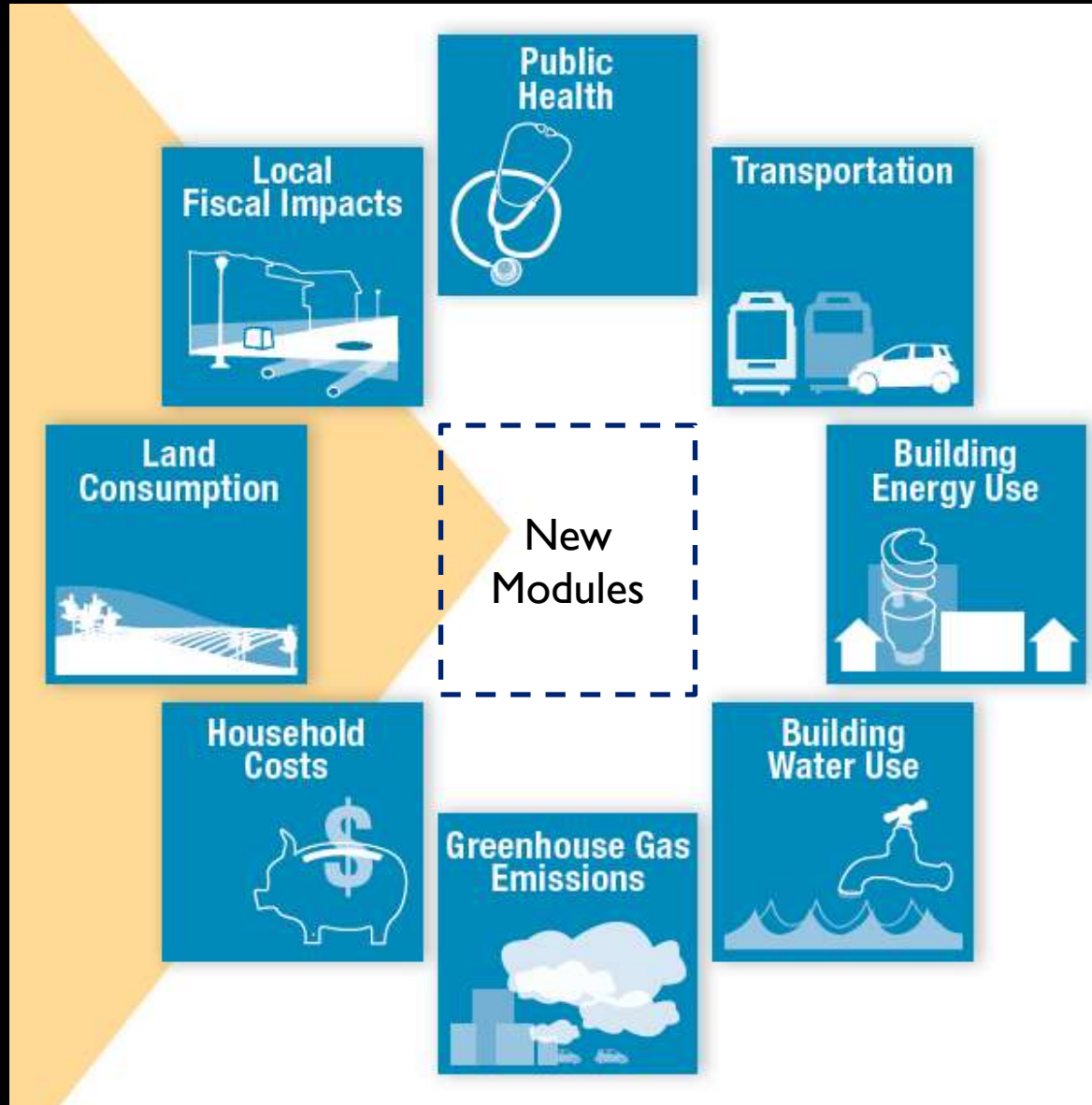
# Oahu TOD Scenarios

The screenshot displays a web-based urban planning tool interface. The main map shows a satellite view of Oahu with various colored overlays representing different TOD scenarios. A legend titled "Placetypes" is visible, listing 33 categories with corresponding colors. The interface includes a toolbar with options like "Apply Placetype", "Erase", "Revert to Original PT", "Undo Last Edits", "Clear Paint Action", and "Placetypes Menu". A "Base Layer" panel on the right shows options for "Grid Hybrid", "Grid Road", "Grid Arterial", "MapQuest Open Aerial View", and "MapQuest OSM View". The bottom status bar shows "Page 1 of 0" and the time "4:00 PM".

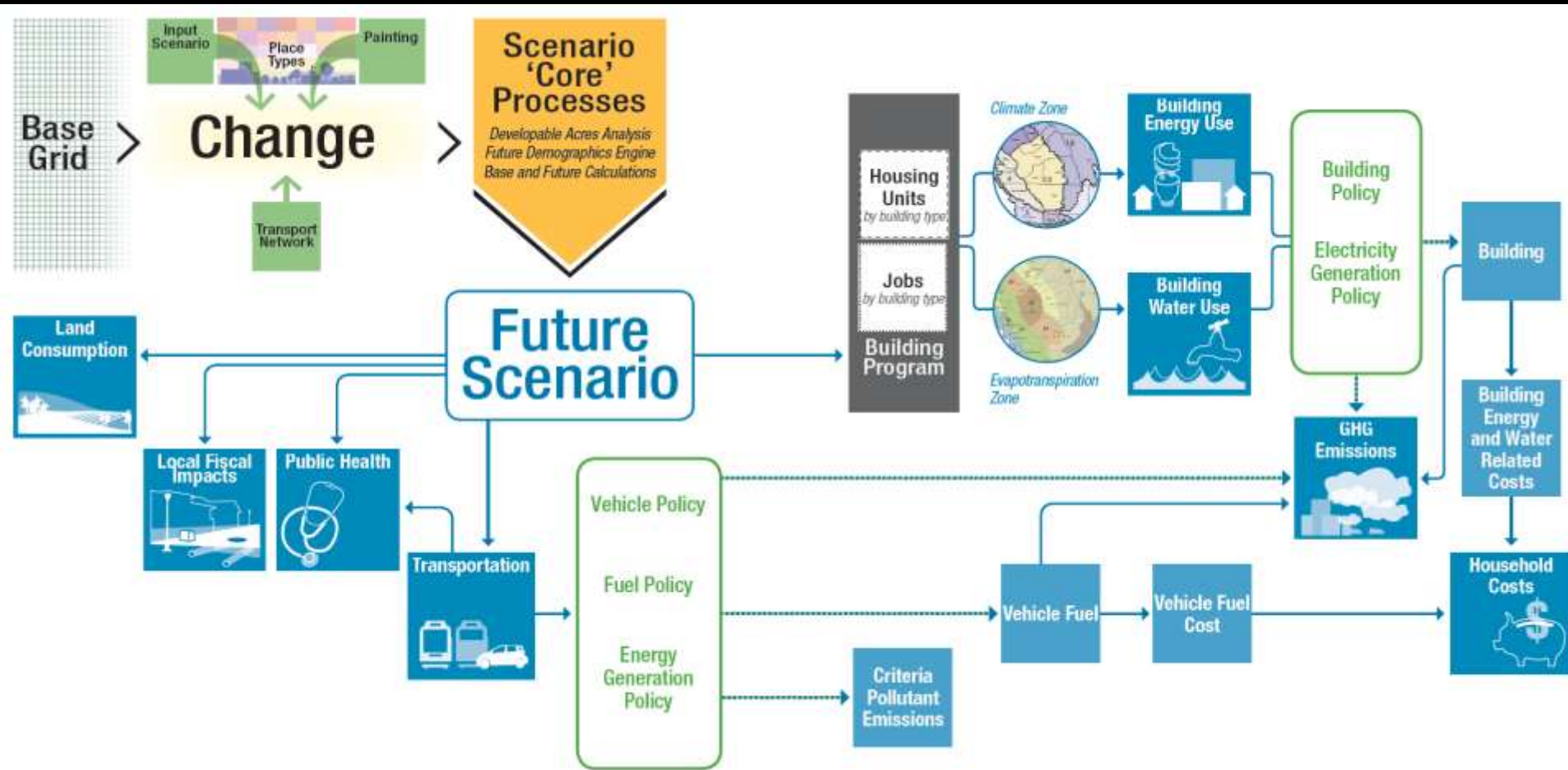
PTID	Placetype Name	Color
1	Urban Mixed Use	Dark Red
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29	Rural Ranchettes	Light Yellow
30	Rural Employment	Light Yellow
31	Campus/ University	Dark Blue
32	Institutional	Dark Blue
33	Parks & Open Space	Green



# UrbanFootprint Analysis Engines

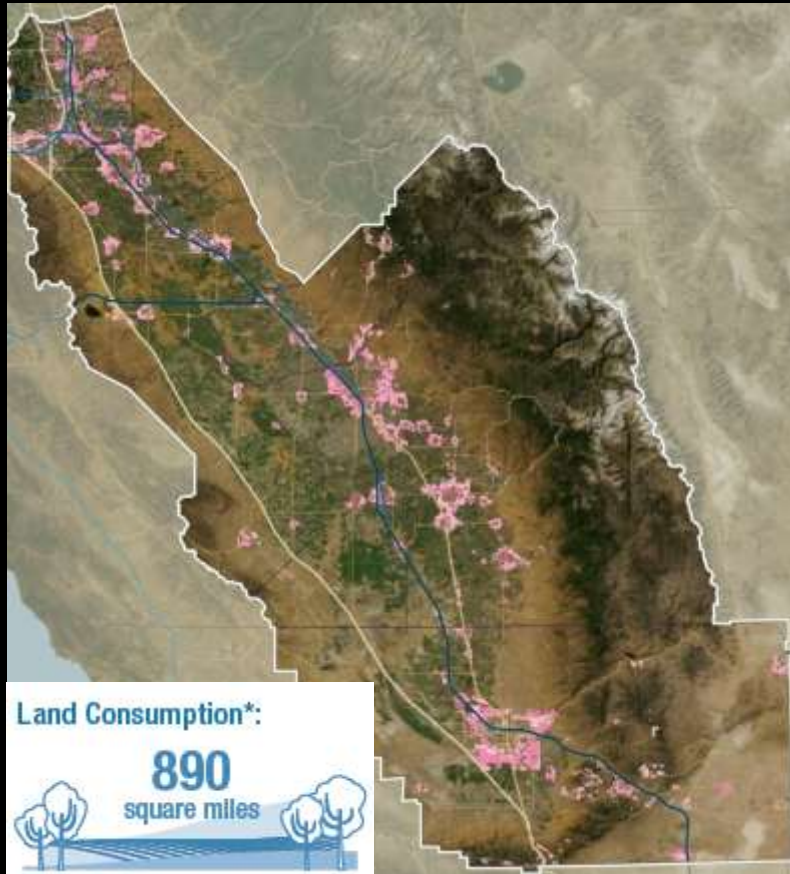


# Urban Footprint Analysis Engines

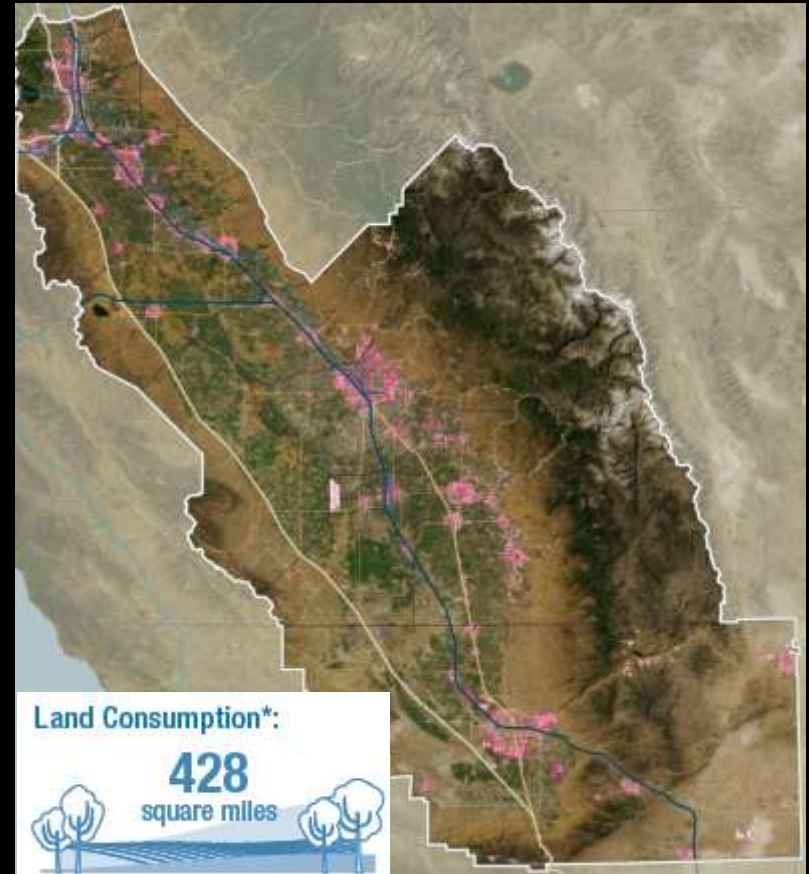


# SJV Land Consumption

## Business As Usual



## Compact Future





# SCAG Land Consumption

Business As Usual

Compact Future



Land Consumption\*:

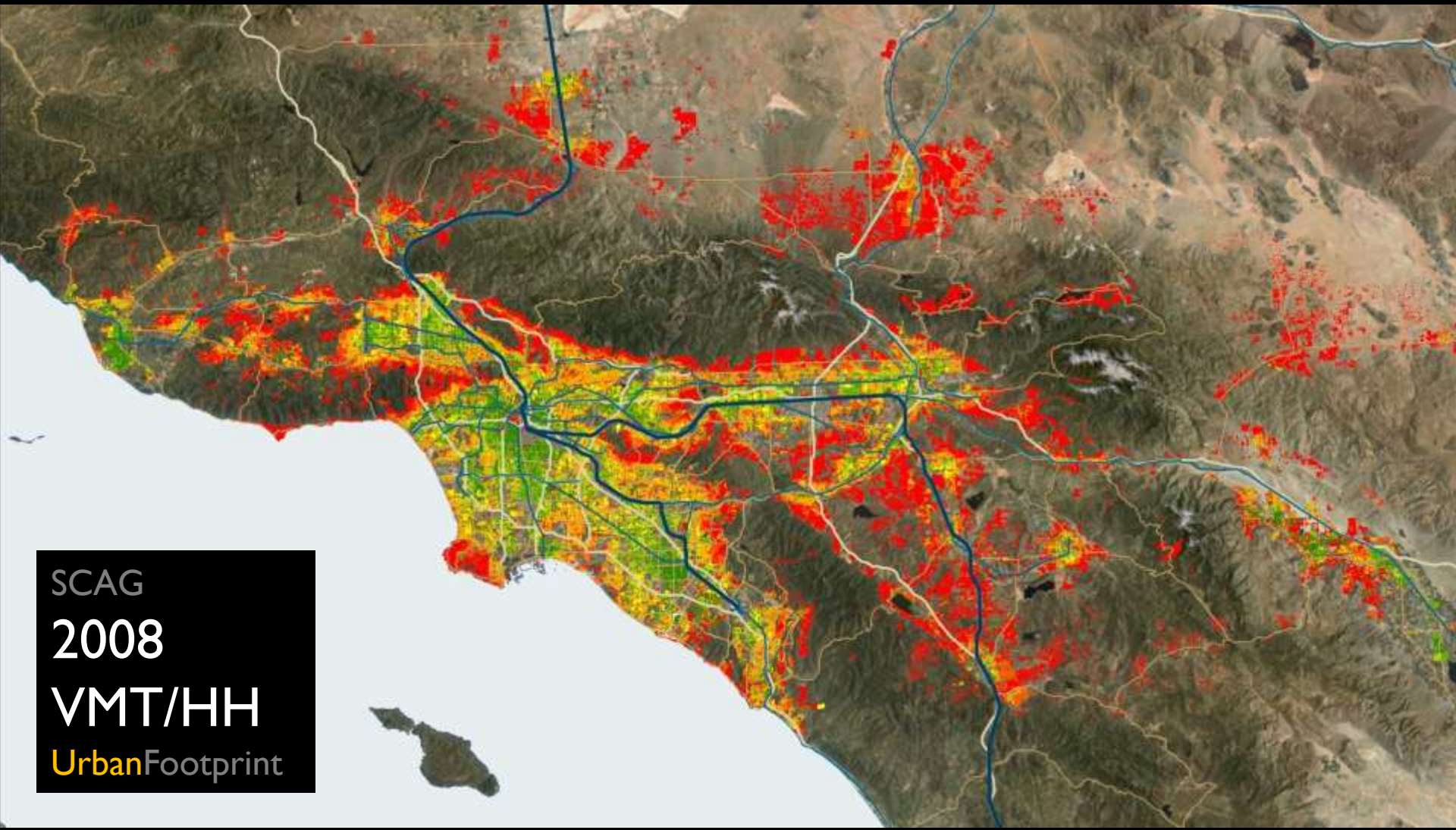
**1,027**  
square miles



Land Consumption\*:

**371**  
square miles

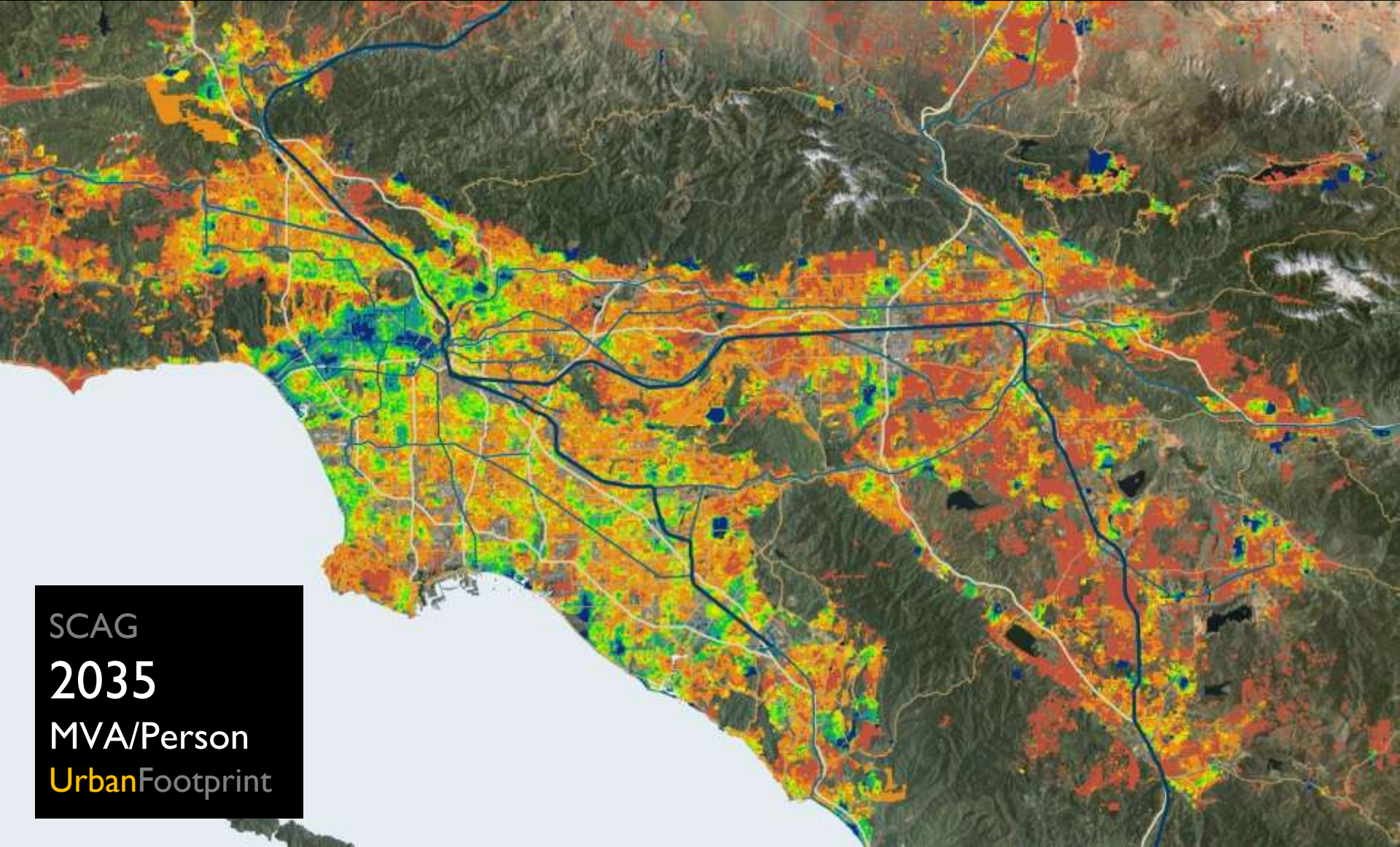




SCAG  
2008  
VMT/HH  
UrbanFootprint



# Activity-Related Health Indicators



SCAG

2035

MVA/Person

Urban Footprint



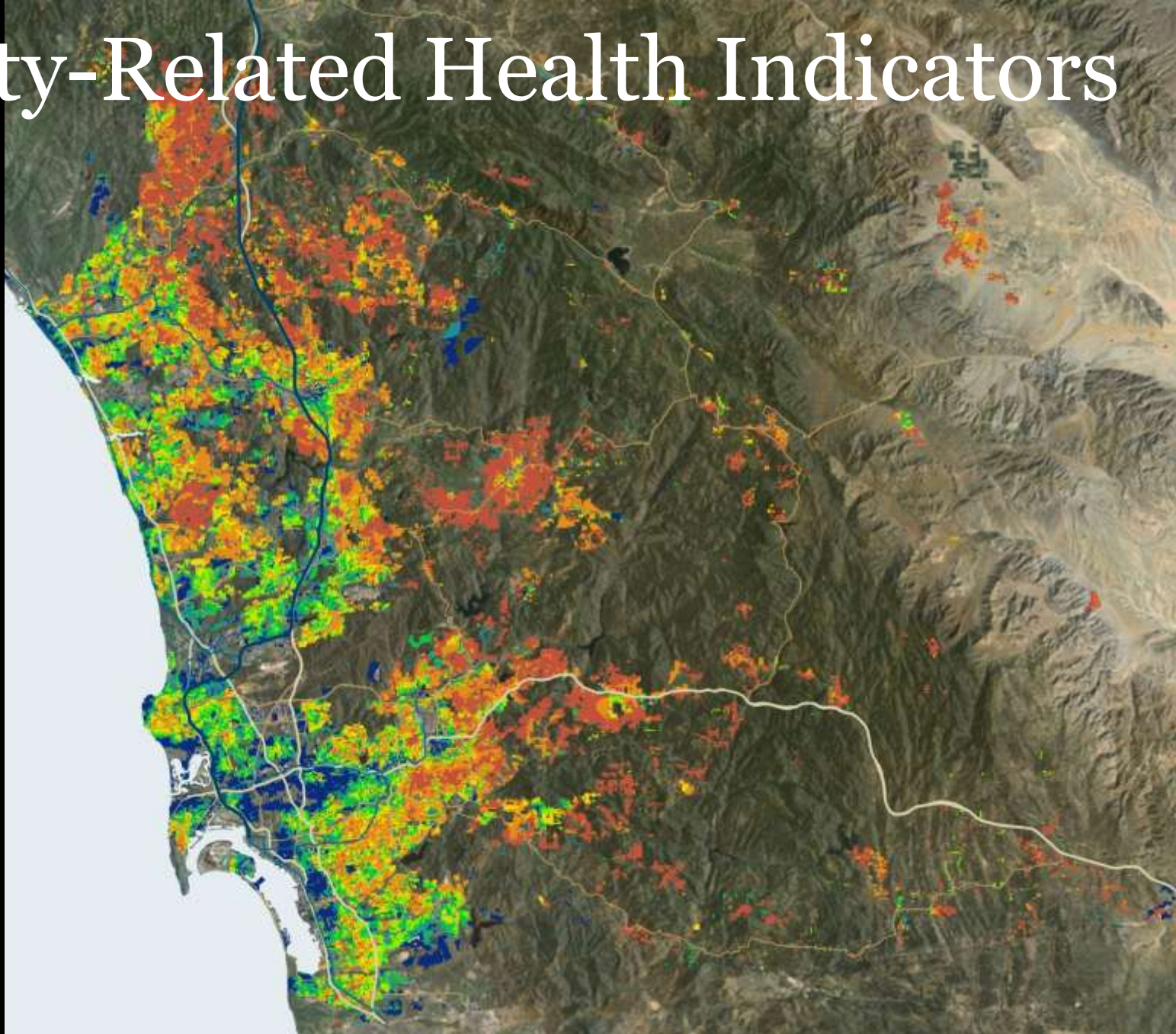
# Activity-Related Health Indicators

SANDAG

2035

MVA/Person

UrbanFootprint





# A Golden Opportunity...



## ...California and Scenario Tool Evolution



Joe DiStefano  
joed@calthorpe.com

New Partners for Smart Growth 08 Feb 2013