California is In Trouble

- Climate Change
- Energy Security
- Budget Shortfalls
- Health Care Costs
- Failing Schools
- Energy Prices
- Water Shortages
- Political Gridlock
- Asthma Rates
- Obesity
- Housing Costs
- Failing Infrastructure
- Housing Costs
Land Use is the Answer

at least part of
Vision California
Next Generation Sketch Models

RapidFire

✓ Fully Operational
✓ Multiple Deployments

UrbanFootprint

✓ Pilot Deployment Underway
Scenarios and Metrics

Trend

Blueprints/Alternatives
Environmental
- Greenhouse Gas Emissions
- Air Pollution
- Water and Energy Consumption

Transportation
- Vehicle Miles Traveled
- Transit, Walk, Bike Mode share
- Vehicle Emissions

Fiscal
- Capital Infrastructure Costs
- O&M/Public Works Costs
- City Revenues
- Household/Business Costs

Social
- Public Health Impacts
- Housing Diversity & Affordability
- Access to Jobs and Services
- Cost of Living
Peer Review & Technical Advisory

UC Davis
Urban Land Use and Transportation Center
of the Institute of Transportation Studies

Victoria Transport Policy Institute

California Environmental Protection Agency
Air Resources Board

Department of Water Resources
State of California

SACOG

Fehr & Peers
Transportation Consultants

The California Energy Commission

Caltrans

Metro

ACEEE
American Council for an Energy-Efficient Economy

Berkeley Lab

Calthorpe Associates
Urban Designers, Planners, Architects
RapidFire Deployments

✓ Vision California: Statewide Scenarios and Analysis
✓ Southern California: SCAG SCS/RTP Alternatives
  Development and Modeling; SCS/RTP EIR Scenarios
✓ Bay Area: YouChooseBayArea Scenarios Process
✓ San Diego: North County Scenarios and Analysis
✓ Honolulu: Corridor and Island-Scale Scenarios and Analysis
California Rapid Fire Scenarios
Land Use Mix for Growth Increment (2005-2050)

- **Urban**
  - Business As Usual: 5%
  - Growing Smart: 10%

- **Compact**
  - Business As Usual: 25%
  - Growing Smart: 55%

- **Standard**
  - Business As Usual: 70%
  - Growing Smart: 35%
Housing Product Mix
2050 Total (Base + Increment)

Existing (2005)  Business As Usual  Growing Smart

- **Multifamily**
  - 31%
  - 25%
  - 33%

- **Attached**
  - 7%
  - 10%
  - 14%

- **Small Lot**
  - 22%
  - 20%
  - 23%

- **Large Lot**
  - 40%
  - 45%
  - 30%
Who We Are (Really)

Source: US Census Bureau, American Community Survey 2005-2009
California Housing Demand 2035

New Units Needed by 2035

Four Largest MPOs Only – SCAG, SANDAG, MTC, SACOG

Thousands

- Multifamily: 2,538
- Townhouse: 1,441
- Small Lot: 1,588
- Large Lot: -2,136

Urban Oakland Uptown
Urban University Avenue

Opportunity Sites

Urban University Avenue

CALTHORPE ASSOCIATES
URBAN DESIGNERS, PLANNERS, ARCHITECTS
Urban Jackson Taylor Neighborhood
Standard

Antioch

Valencia, California ~ 4 November 2005
photographed by Matt Jalbert ~ www.exuberance.com

Valencia

Source: Matt Jalbert, www.exuberance.com
California Rapid Fire Scenarios
Land Use Mix for Growth Increment (2005-2050)

Business As Usual

- Urban: 70%
- Compact: 25%
- Standard: 5%

Growing Smart

- Urban: 55%
- Compact: 35%
- Standard: 10%

Calthorpe Associates
Urban Designers, Planners, Architects
Land Consumed
For New Growth to 2050 (mi²)

More land than Delaware and Rhode Island combined

Business As Usual
Growing Smart

5,600
3,750 square miles saved
1,850
Infrastructure Cost for New Growth
Capital Costs for New Growth to 2050

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

*Dollars Billions

- $165.4 Business As Usual
- $32 Billion Saved*
- $133.4 Growing Smart

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

Flickr: sl-engineer

CALTHORPE ASSOCIATES
URBAN DESIGNERS, PLANNERS, ARCHITECTS
O&M Costs for New Growth
Engineering & Public Works Costs for New Growth to 2050

$15 Billion Saved : $334 Million Per Year

*Includes City General Fund engineering and public works functions
Revenues from New Growth
City Tax and Fee Revenue from New Growth to 2050

$2.7 Billion/Year in Additional Revenue to Cities

*Includes City revenues from Vehicle License Fees, Property Tax, and Sales Tax

www.livinginplainfield.com
Vehicle Miles Traveled (VMT)
Cumulative to 2050

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

18,719

4.2 Trillion Miles Reduced

14,492

Business As Usual    Growing Smart

Flickr: trash-photography
Auto Fuel Cost
Cost Per Household in 2050

$3,100 Annual Savings Per Household in 2050
Building Energy
Cumulative to 2050

Would Power ALL Homes in California for 8 Years

74 Quad Btu
6 Quadrillion BTUs Saved
68 Quad Btu

Business As Usual  Growing Smart

Flickr: arbyreed
Residential Water Use
Cumulative to 2050

Water Savings Could Fill Hetch Hetchy 50 Times

<table>
<thead>
<tr>
<th>Acre Feet Millions</th>
</tr>
</thead>
<tbody>
<tr>
<td>328</td>
</tr>
<tr>
<td>18 Million Acre Feet Saved</td>
</tr>
<tr>
<td>310</td>
</tr>
</tbody>
</table>

Business As Usual  Growing Smart
$7,300 Savings Per Household in 2050
Public Respiratory Health Impacts
Total Annual in 2035

Can save 140 premature deaths and 105,000 health incidences annually

Based on Analysis of Vision CA Results by TIAX, LLC
Respiratory Health Costs
Total Annual in 2035

Saves $1.66 billion annually by 2035

Based on Analysis of Vision CA Results by TIAX, LLC

Flickr: Lance Page

American Lung Association
Fighting for Air

Calthorpe Associates
Urban Designers, Planners, Architects
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.

Business As Usual Growing Smart

- Passenger Vehicles
  - 156 MMT CO₂e
  - 117 Reduced/Year

- Buildings
  - 76 MMT CO₂e
  - 102 Reduced/Year

www.exuberance.com

A1 v C1
Envision Bay Area County-Level Deployment

Explore Jobs-Housing Balance Issues

Capture Regional VMT and Climate Variation

You Choose
Your home, your future, your choice
Web-Based Outreach Platform

Envision Bay Area (Beta)

Our Challenge How should we plan for future growth?

Welcome!
Your message, logo, etc. here

By 2035 the nine-county Bay Area is expected to add roughly 2 million new residents and up to 1.6 million new jobs.

This represents an increase of over 25 percent from the 2009 population of 7.4 million.
Web-Based Outreach Platform

Envision Bay Area (Beta)

2 Set Priorities What is most important to you as we grow?

- Low maintenance homes
- Public Health
- Large homes with big yards
- Clean air
- Vibrant downtown areas
- Shorter commutes
- Lower fees and taxes
- Walkable neighbourhoods
- Easy access to transit
- Lower cost of living
- Smaller eco-footprint

Agricultural Land

Lorem ipsum dolor sit amet, consectetur adipiscing elit...

About this Priority

When done, click CHOICES. You can change your priorities later.

Send Feedback

Share:
Web-Based Outreach Platform

Envision Bay Area (Beta)

3 Make Choices What combination will best match your priorities?

Jobs/Housing Balance
Where should we focus new housing development?

- Balanced

Development
How should we plan for increased traffic?

- Planned Future

About these Choices

1 After selecting a combination of choices, click OUTCOMES.
Web-Based Outreach Platform

Envision Bay Area (Beta)

See Outcomes What could your choices affect?

View: Summary

Compared to Scenario 1A (Current Trend):

- 421 square miles open space saved
- 2,900 $ household costs savings
- 16.6 billion fewer miles driven
- 71 trillion Btu less energy used

- 20,100 tons less air pollution
- 150 billion $ infrastructure cost savings
- 4.9 million metric tons fewer GHG emissions
- 262 thousand acre-ft. less water used

Order by: Your Top 7 Priorities

Rate this Future:

- Lower fees and taxes
- Agricultural land
- Shorter commutes
- Vibrant downtown areas
- Low maintenance homes
- Walkable neighbourhoods
- Smaller eco-footprint

About this Future: 2B

Change the choices and drag the time slider to see things change.
Web-Based Outreach Platform

Envision Bay Area (Beta)

See Outcomes What could your choices affect?

View: Open Space

Open Space Developed 673 square miles

Open Space Developed 252 square miles

savings 421

Compared to Scenario 1A (Current Trend), your choices (2B) save 421 square miles of open space and agricultural lands from development, the equivalent of 8.5 San Franciscos.

Order by: Your Top 7 Priorities

worse than today ← worse than today better than today

- Lower fees and taxes
- Agricultural land
- Shorter commutes
- Vibrant downtown areas
- Low maintenance homes
- Walkable neighbourhoods
- Smaller eco-footprint

About this Future: 2B

Change the choices and drag the time slider to see things change.

Calthorpe Associates
Urban designers, planners, architects
FIGURE 4.2 Workshop Scenario Elements

DEVELOPMENT LOCATION
COMMUNITY/NEIGHBORHOOD DESIGN
HOUSING OPTIONS and MIX
TRANSPORTATION INVESTMENTS

New housing is mostly single family (58 percent), with an increase in smaller-lot single-family homes, as well as an increase in multi-family homes (27 percent). The transportation system is based on the package of improvements in the 2008 RTP. While these investments tend to favor automobile infrastructure, they also support new transit lines and other non-auto strategies and improvements.

Scenarios 2. This scenario favors more growth in walkable, mixed-use communities and in existing and planned high-quality transit areas. Under this scenario, there would be an increase in investments in transit and non-auto modes as compared to the 2008 RTP. Employment growth is focused in urban centers, around transit. Fewer new homes (23 percent) are single-family homes, as this scenario comes closer to meeting demand for a broader range of housing types, with new housing weighted less toward large-lot single-family homes (27 percent) and more toward smaller-lot single-family homes (27 percent), and multi-family condos, townhomes and apartments (70 percent).

FIGURE 4.3 Workshop Scenarios (2035)

DEVELOPMENT LOCATION
COMMUNITY/NEIGHBORHOOD DESIGN
HOUSING OPTIONS AND MIX

SCENARIO 1
Greenfield Land Consumption
Refill Growth 70%
Mixed-Use Walkable
Standard Suburban Urban Infill
31% 27% 8% 34%

SCENARIO 2
Greenfield Land Consumption
Refill Growth 83%
Mixed-Use Walkable
Standard Suburban Urban Infill
31% 27% 22% 40%

SCENARIO 3
Greenfield Land Consumption
Refill Growth 88%
Mixed-Use Walkable
Standard Suburban Urban Infill
31% 18% 11% 40%

SCENARIO 4
Greenfield Land Consumption
Refill Growth 90%
Mixed-Use Walkable
Standard Suburban Urban Infill
31% 14% 8% 47%

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URBAN DESIGNERS, PLANNERS, ARCHITECTS

Regional Transportation Plan
2012 RTP
Sustainable Communities Strategy
Towards a Sustainable Future
Southern California RapidFire

Developed for the Southern California Association of Governments (SCAG)
UrbanFootprint
Open Source
Geo-Spatial Model

True Open Source Platform

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

- Pilot deployment underway
- Will be fully loaded with all major California MPO base data by June 2012

www.calthorpe.com for model info
UrbanFootprint Model Schema

Base Data
Automated Normalize Data Loaded Grid

Common Language
Place Types Building Types

Translation
Convert Input Scenarios to Future Scenarios

Painting
Scenario Sketching Scenario Editing

Analysis
• 8D Travel
• Health
• Fiscal
• Energy
• Water
• Emissions
Place Type Studies (90+)

Downtown San Diego (Gaslamp District)
San Diego, California

Location: Bounded by E St., 8th Ave., Market St., and 4th Ave.
Planner: (incremental)

Site Statistics:
- Site Size (gross) 30 acres
- Site Size (net) 16.6 acres
- Block Size (average) 200' x 320'
- Density (gross) 28 du/ac
- Density (net) 51 du/ac
- FAR (gross) 1.61
Building Type Studies (300+)

**East End Gateway (Site 1)**  
Sacramento, California

| Location: NW corner of 16th and N Street, Sacramento, CA |
| Developer: Em Johnson Interest & Nehemiah Community Reinvestment Fund Holdings (NCRFH) |
| Architect: Devroux + Purnell Architects; 202.483.2878 |
| Planner: N/A |
| Contact Info: Marc de la Vergne; mdelavergne@cadanet.org; 916.322.2114 |

**Site Statistics:**

<table>
<thead>
<tr>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area</td>
<td>0.7 ac 0.28 ha</td>
</tr>
<tr>
<td>Length</td>
<td>190 ft 57.9 m</td>
</tr>
<tr>
<td>Width</td>
<td>160 ft 48.8 m</td>
</tr>
<tr>
<td>General Shape</td>
<td>Rectilinear</td>
</tr>
<tr>
<td>Orientation</td>
<td>W-NW to E-SE</td>
</tr>
<tr>
<td>FAR</td>
<td>2.66</td>
</tr>
</tbody>
</table>

**Building Statistics:**

<table>
<thead>
<tr>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>100 ft 30.5 m</td>
</tr>
<tr>
<td>No. of Stories</td>
<td>8 floors</td>
</tr>
<tr>
<td>Construction Type</td>
<td>Type II (assumed)</td>
</tr>
<tr>
<td>Efficiency (GLA/total area)</td>
<td>85% (assumed)</td>
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</tbody>
</table>

**Program:**

<table>
<thead>
<tr>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retail Area</td>
<td>6 k-sqft 557 sqm</td>
</tr>
<tr>
<td>Residential Area</td>
<td>75 k-sqft 6,967 sqm</td>
</tr>
<tr>
<td>No. of Units</td>
<td>98 du</td>
</tr>
<tr>
<td>Unit Type</td>
<td>Condominium</td>
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</tbody>
</table>

**Parking:**

<table>
<thead>
<tr>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parking Area</td>
<td>38,400 sqft</td>
</tr>
<tr>
<td>No. of Parking Stalls</td>
<td>120 stalls</td>
</tr>
<tr>
<td>Parking Typology</td>
<td>Below grade structure</td>
</tr>
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</table>

**Other Information:**

<table>
<thead>
<tr>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Cost</td>
<td>$37 MM</td>
</tr>
<tr>
<td>Construction (start date)</td>
<td>2010 (Oct)</td>
</tr>
<tr>
<td>Construction (completion)</td>
<td>2012 (Jan)</td>
</tr>
</tbody>
</table>
Faster and More Efficient

Place Type Translation for 8-County San Joaquin Valley

Run Time

12 days

ArcGIS

Open Source

8 minutes
Scenario Reports & Model Documentation

www.calthorpe.com
www.visioncalifornia.org
www.youchoosebayarea.org
www.scag.ca.gov/rtp2012

Calthorpe Associates
Urban Designers, Planners, Architects

Joe DiStefano
joed@calthorpe.com
Honolulu TOD Study
Land Consumed
2010-2050

11 sq. mi developed 1992 - 2005

Developed Land
1992: 141 sq. miles
2005: 152 sq. miles

2050
Bus. As Usual: 209 sq. miles
TOD Future: 162 sq. miles

53
44 square miles saved

Business As Usual  TOD Future

flickr – beatjoan9
Driving Impacts

Vehicle Miles Traveled

<table>
<thead>
<tr>
<th></th>
<th>Business As Usual</th>
<th>TOD Future</th>
</tr>
</thead>
<tbody>
<tr>
<td>Billions</td>
<td>7.8</td>
<td>4.6</td>
</tr>
</tbody>
</table>

- 3.1 billion fewer miles/year by 2050

Greenhouse Gas Emissions

<table>
<thead>
<tr>
<th></th>
<th>Business As Usual</th>
<th>TOD Future</th>
</tr>
</thead>
<tbody>
<tr>
<td>MMT</td>
<td>2.4</td>
<td>1.4</td>
</tr>
</tbody>
</table>

- 64 Billion Fewer Miles by 2050
- Like Removing All Cars From Oahu’s Roads for 14 Years
- 2010: 4.7 billion

- 40% Lower
Total Costs & Emissions

Annual Household Costs

- Business As Usual: $16,400
- Auto Fuel + Ownership: $11,100
- Home Energy & Water: $5,300
- TOD Future: $16,400
- Auto Fuel + Ownership: $11,100
- Home Energy & Water: $5,300

- $5,300 saved/year

- Total Costs & Emissions: 21% Lower

$16,400

$5,300

$11,100

Greenhouse Gas Emissions

- Business As Usual: 2.38 MMT
- TOD Future: 1.42 MMT

- 21% Lower

- Annual GHG Emissions Reductions Equivalent to That Offset by a Forest the Size of Oahu

- Auto Fuel + Ownership
- Home Energy & Water
- Business As Usual: 2.38 MMT
- TOD Future: 1.42 MMT

- $16,400
- $11,100

- 2010 Dollars

- Annual Household Costs

- Greenhouse Gas Emissions

- Passenger Vehicles
- Res Bldgs
San Joaquin Valley
Valley-wide Hybrid
UPlan Original
San Joaquin Valley
Valley-wide Hybrid
UrbanFootprint