SPECIAL JOINT MEETING OF THE
REGIONAL COUNCIL;
COMMUNITY, ECONOMIC AND HUMAN DEVELOPMENT;
ENERGY AND ENVIRONMENT; AND
TRANSPORTATION COMMITTEES

Please Note Date and Time
Thursday, June 18, 2015
9:00 a.m. – 11:00 a.m.

SCAG Main Office
818 W. 7th Street, 12th Floor
Board Room
Los Angeles, CA 90017
(213) 236-1800

See Videoconference Locations on next page

If members of the public wish to review the attachments or have any questions on any of the agenda items, please contact Tess Rey-Chaput at (213) 236-1908 or via email at REY@scag.ca.gov. In addition, regular meetings of the Joint Meetings may be viewed live or on-demand at http://www.scag.ca.gov/NewsAndMedia/Pages/SCAGTV.aspx

Agendas & Minutes for the Joint Meetings are also available at:
http://www.scag.ca.gov/committees/Pages/default.aspx

SCAG, in accordance with the Americans with Disabilities Act (ADA), will accommodate persons who require a modification of accommodation in order to participate in this meeting. SCAG is also committed to helping people with limited proficiency in the English language access the agency’s essential public information and services. You can request such assistance by calling (213) 236-1908. We request at least 72 hours (three days) notice to provide reasonable accommodations. We prefer more notice if possible. We will make every effort to arrange for assistance as soon as possible.
Available via Videoconference at the following SCAG Regional Offices:

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El Centro, CA 92243

ORANGE
OCTA Building
600 South Main Street, Suite 906
Orange, CA 92868

RIVERSIDE
3403 10th Street, Suite 805
Riverside, CA 92501

SAN BERNARDINO
1170 West 3rd Street, Suite 140
San Bernardino, CA 92410

VENTURA
950 County Square Drive, Ste. 101
Ventura, CA 93003

Also available via Videoconference at the following videoconferencing sites:

CITY OF PALMDALE
38250 Sierra Highway
Palmdale, CA 93550

Coachella Valley Association of Governments (CVAG)
73-710 Fred Waring Dr., Suite 200
Palm Desert, CA 92260

South Bay Cities Council of Governments (SBCCOG)
South Bay Environmental Services Center
20285 S. Western Avenue, Suite 100
Torrance, CA 90501
JOINT MEETING OF THE
REGIONAL COUNCIL AND POLICY COMMITTEES
(COMMUNITY, ECONOMIC AND HUMAN DEVELOPMENT COMMITTEE; ENERGY AND ENVIRONMENT COMMITTEE; TRANSPORTATION COMMITTEE)
AGENDA
THURSDAY, JUNE 18, 2015

CALL TO ORDER & PLEDGE OF ALLEGIANCE
(Hon. Cheryl Viegas-Walker, President)

PUBLIC COMMENT PERIOD – Members of the public desiring to speak on items on the agenda, or items not on the agenda, but within the purview of the Council, must fill out and present a Public Comment Card to the Assistant prior to speaking. Comments will be limited to three (3) minutes per speaker. The President has the discretion to reduce the time limit based upon the number of speakers. The President may limit the total time for all public comments to twenty (20) minutes.

PRESENTATION ITEMS

1. 2016-2040 Regional Transportation Plan/Sustainable Communities Strategy (2016 RTP/SCS) - Goals, Guiding Policies and Performance Measures, and Preliminary Scenario Results Discussion (Land Use/Urban Form, Shared Mobility and Technology)
   (Hasan Ikhrata, Executive Director)
   Attachment 20 mins. 1

2. 2016-2040 Regional Transportation Plan/Sustainable Communities Strategy (2016 RTP/SCS) – Scenario Results Focusing on Land Use and Urban Form
   (Joe DiStefano, Principal, Calthorpe Analytics)
   Attachment 30 mins. 15

3. 2016-2040 Regional Transportation Plan/Sustainable Communities Strategy (2016 RTP/SCS) – Road Charge and the Future of Transportation
   (Jim Madaffer, Commissioner, California Transportation Commission)
   Attachment 30 mins. 42

DISCUSSION

ADJOURNMENT

SCHEDULE OF THE NEXT JOINT MEETINGS:

- Thursday, July 23, 2015
- Thursday, August 6, 2015
DATE:       June 18, 2015

TO:         Regional Council (RC)
            Transportation Committee (TC)
            Community, Economic and Human Development (CEHD)
            Energy and Environment Committee (EEC)

FROM:       Hasan Ikhrata, Executive Director, 213-236-1944, Ikhrata@scag.ca.gov

SUBJECT:    2016-2040 Regional Transportation Plan/Sustainable Communities Strategy
            (2016 RTP/SCS) – Overview

EXECUTIVE DIRECTOR’S APPROVAL:

RECOMMENDED ACTION:
Discuss and provide input to staff.

EXECUTIVE SUMMARY:
This is the first of a series of three (3) Special Joint Regional Council and Policy Committees
meeting regarding an overview of key elements expected to be addressed in the 2016-2040
Regional Transportation Plan/Sustainable Communities Strategy (2016 RTP/SCS). Hasan
Ikhrata, Executive Director, will provide an update of the existing 2012 RTP/SCS Goals,
Guiding Policies, and Performance Measures; and provide an overview for the 2016
RTP/SCS. Joe DiStefano, Principal, Calthorpe Analytics, will provide an overview of the key
findings from the scenario analysis work associated with the 2016 RTP/SCS, and potential
benefits and impacts of key transportation and land use policies. Jim Madaffer,
Commissioner, California Transportation Commission, will discuss about shared mobility and
implications of future technology on mobility and sustainability. The next series of Special
Joint meetings will be held in July and August, 2015.

STRATEGIC PLAN:
This item supports SCAG’s Strategic Plan, Goal 1: Improve Regional Decision Making by
Providing Leadership and Consensus Building on Key Plans and Policies; Objective: a) Create
and facilitate a collaborative and cooperative environment to produce forward thinking regional
plans.

BACKGROUND:
Every four years, SCAG prepares and updates the long-range Regional Transportation Plan and
Sustainable Communities Strategy (RTP/SCS) for the six-county region. As SCAG goes through
the RTP/SCS update process, overarching goals, guiding policies, and performance measures are
assessed for whether they need to be adjusted. In addition to making refinements to the RTP/SCS
goals, guiding policies, and performance measures, SCAG has also been assessing different
urban forms and land uses in coordination with the proposed investments to improve and
enhance transportation choices for people as well as goods. A SCAG consultant will provide an
overview of the preliminary findings of this effort and discuss the potential policy benefits and
implications for the 2016 RTP/SCS.
Jim Madaffer, a California Transportation Commissioner and a policy leader on a host of public policy issues, will discuss shared mobility and transportation technology.

RTP/SCS Goals, Guiding Policies, and Performance Measures

Since the adoption of the 2012 RTP/SCS, several developments have occurred that were considered as a part of this assessment, including:

- The Moving Ahead for Progress in the 21st Century Act (MAP-21) surface transportation funding and authorization bill was passed by Congress on June 29, 2012 and signed into law by President Obama on July 6, 2012, and adopted specific goals, namely safety, infrastructure condition, congestion reduction/system reliability, freight movement & economic vitality, and environmental sustainability. MAP-21 required the use of specific performance measures related to transportation safety and preservation. Subsequent draft MAP-21 rulemaking required that Metropolitan Planning Organizations (MPOs) set targets for these performance measures.
- The rapid advancement of new technologies (e.g. real-time traveler information, on-demand shared mobility services enabled by smartphone applications, car share, bike share, etc.) is influencing travel behavior, encouraging more efficient transportation choices, and helping public agencies manage the multi-modal transportation system more efficiently.
- There is increasing emphasis on reducing greenhouse gas (GHG) emissions. Most recently, on April 29, 2015 Governor Brown issued an Executive Order\(^1\) that establishes a California GHG reduction target of 40 percent below 1990 levels by 2030. Because the transportation sector is the largest contributor to California’s GHG emissions (more 36%), we anticipate updated and more stringent regional GHG goals are forthcoming.

RTP/SCS Goals

The RTP/SCS goals are intended to help carry out the vision for improved mobility, economy, and sustainability. The following goals were adopted in the 2012 RTP/SCS:

1. Align the plan investments and policies with improving regional economic development and competitiveness.
2. Maximize mobility and accessibility for all people and goods in the region.
3. Ensure travel safety and reliability for all people and goods in the region.
4. Preserve and ensure a sustainable regional transportation system.
5. Maximize the productivity of our transportation system.
6. Protect the environment and health of our residents by improving air quality and encouraging active transportation (non-motorized transportation, such as bicycling and walking).
7. Actively encourage and create incentives for energy efficiency, where possible.

8. Encourage land use and growth patterns that facilitate transit and non-motorized transportation.
9. Maximize the security of the regional transportation system through improved system monitoring, rapid recovery planning, and coordination with other security agencies.

Staff believes that these goals already address the aforementioned developments as follows:

- All MAP-21 goals are specifically addressed by the 2012 RTP/SCS goals.
- Goal 2 (Maximize mobility and accessibility for all people and goods in the region) and Goal 5 (Maximize the productivity of our transportation system) are supportive of leveraging emerging technologies.
- Goal 3 (Ensure travel safety and reliability for all people and goods in the region) and Goal 4 (Preserve and ensure a sustainable regional transportation system) address MAP-21 performance measurement requirements.
- Goal 6 (Protect the environment and health of our system by improving air quality and encouraging active transportation) and Goal 7 (Actively encourage and create incentives for energy efficiency, where possible) also support leveraging emerging technologies as well as reducing GHG emissions.

Staff therefore recommends adopting the same goals for the 2016 RTP/SCS.

RTP/SCS Guiding Policies

The RTP/SCS guiding policies are intended to help to focus future investments on the best-performing projects and strategies that seek to preserve, maintain, and optimize the performance of the existing system. The following guiding policies were adopted in the 2012 RTP/SCS:

1. Transportation investments shall be based on SCAG’s adopted regional Performance Indicators.
2. Ensuring safety, adequate maintenance, and efficiency of operations on the existing multimodal transportation system should be the highest RTP/SCS priorities for any incremental funding in the region.
3. RTP/SCS land use and growth strategies in the RTP/SCS will respect local input and advance smart growth initiatives.
4. Transportation demand management (TDM) and non-motorized transportation will be focus areas, subject to Policy 1.
5. HOV gap closures that significantly increase transit and rideshare usage will be supported and encouraged, subject to Policy 1.
6. Monitoring progress on all aspects of the Plan, including the timely implementation of projects, programs, and strategies, will be an important and integral component of the Plan.

Staff believes that two additional guiding policies should be added. The first addition (proposed Guiding Policy 6) addresses emerging technologies and the potential for such technologies to reduce accidents, improve traveler information, reduce demand for single occupancy vehicle use,
and reduce congestion related to incidents and other non-recurring circumstances (i.e. non-recurrent congestion). The second addition (proposed Guiding Policy 7) recognizes the potential for transportation investments to improve both the efficiency of the transportation network and the environment. Staff recommends adopting the following guiding policies (the new guiding policies are underlined).

1. Transportation investments shall be based on SCAG’s adopted regional Performance Indicators.
2. Ensuring safety, adequate maintenance, and efficiency of operations on the existing multimodal transportation system should be the highest RTP/SCS priorities for any incremental funding in the region.
3. RTP/SCS land use and growth strategies in the RTP/SCS will respect local input and advance smart growth initiatives.
4. Transportation demand management (TDM) and non-motorized transportation will be focus areas, subject to Policy 1.
5. HOV gap closures that significantly increase transit and rideshare usage will be supported and encouraged, subject to Policy 1.
6. The RTP/SCS will support investments and strategies to reduce non-recurrent congestion and demand for single occupancy vehicle use, by leveraging advanced technologies.
7. The RTP/SCS will encourage transportation investments that result in cleaner air, a better environment, a more efficient transportation system, and sustainable outcomes in the long run.
8. Monitoring progress on all aspects of the Plan, including the timely implementation of projects, programs, and strategies, will be an important and integral component of the Plan.

RTP/SCS Performance Measures

Performance measures quantify the impacts of the investments and strategies contained in the RTP/SCS. The 2012 RTP/SCS included the following performance measure outcomes and indicators:

<table>
<thead>
<tr>
<th>Performance Outcome</th>
<th>Related Performance Measures</th>
</tr>
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<tbody>
<tr>
<td>Location Efficiency</td>
<td>• Share of growth in High-Quality Transit Areas (HQTAs)</td>
</tr>
<tr>
<td></td>
<td>• Land consumption</td>
</tr>
<tr>
<td></td>
<td>• Average distance for work or non-work trips</td>
</tr>
<tr>
<td></td>
<td>• Percent of work trips less than 3 miles</td>
</tr>
<tr>
<td></td>
<td>• Work trip length distribution</td>
</tr>
<tr>
<td>Mobility and Accessibility</td>
<td>• Person delay per capita</td>
</tr>
<tr>
<td></td>
<td>• Person delay by facility type (mixed flow, HOV, arterials)</td>
</tr>
<tr>
<td></td>
<td>• Truck delay by facility type (highways, arterials)</td>
</tr>
<tr>
<td></td>
<td>• Travel time distribution for transit, SOV, HOV for work</td>
</tr>
</tbody>
</table>
These outcomes and measures address all of the MAP-21 requirements and are consistent with measuring GHG emissions and the impacts of leveraging transportation investments. However, recognizing that the RTP/SCS integrates transportation and land use and has impacts beyond those exclusively transportation-related, staff recommends adding performance measures for safety and health, which are as follows:

- Air-pollution-related health measures;
- Physical activity-related health measures; and
- Mode share of walking and biking.

SCAG staff did not have the capability to quantify these measures during the 2012 RTP/SCS development process. Since then, however, SCAG has acquired new tools to provide that capability, and as a result, staff recommends adding these measures to the 2016 RTP/SCS.

SCAG staff also recommend the addition of performance measures that better quantify the location efficiency and system sustainability outcomes, including:

- Vehicle Miles Traveled (VMT) per capita;
- Mode share of transit;
- State Highway System Pavement Condition; and
- Local Roads Pavement Condition.

These additional performance measures will help SCAG strengthen its monitoring of the location efficiency and system sustainability outcomes and further support the implementation of MAP-21.

SCAG makes a special effort to gauge the effects of the 2016 RTP/SCS on the region’s low-income and minority populations through the RTP/SCS Environmental Justice (EJ) analysis. EJ-specific performance measures are included in the RTP/SCS to assess the impacts of the RTP/SCS on different low-income and minority populations. Consistent with federal policies and regulations, the EJ analysis and measures are intended to:
• Avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority populations and low-income populations;
• Ensure the full and fair participation by all potentially affected communities in the transportation decision-making process; and
• Prevent the denial of, reduction in or significant delay in the receipt of benefits by minority and low-income populations.

There are a number of EJ measures that will be quantified and reported in the 2016 RTP/SCS, including:

• RTP revenue source in terms of tax burdens;
• Share of transportation system usage;
• RTP/SCS investments;
• Distribution of travel time savings and travel distance reductions;
• Jobs-housing imbalance or jobs-housing mismatch;
• Accessibility to employment and services;
• Accessibility to parks;
• Gentrification and displacement;
• Air quality health impacts along freeway and highly traveled corridors;
• Environmental impacts of plan and baseline scenarios;
• Aviation noise impacts;
• Roadway noise impacts;
• Active transportation hazard; and
• Rail-related impacts.

Staff believes that the addition of the new performance measures to the previous 2012 RTP/SCS measures along with the EJ findings address all aforementioned developments since the 2012 RTP/SCS adoption. Therefore, staff recommends adopting the revised set of performance measures for the 2016 RTP/SCS update as reflected in the table that follows. Updates to the 2012 RTP/SCS list are underlined.

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<td>• Percent of work-trips less than 3 miles</td>
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<td>• Person delay per capita</td>
</tr>
<tr>
<td></td>
<td>• Person delay by facility type (mixed flow, HOV, work)</td>
</tr>
</tbody>
</table>
| **Safety and Health** | • Collision/accident rates by severity by mode  
• Criteria pollutant emissions  
• Air-pollution-related health measures  
• Physical activity-related health measures  
• Mode share of walking and biking |
<table>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Environmental Quality</strong></td>
<td>• Criteria pollutant and greenhouse gas emissions</td>
</tr>
</tbody>
</table>
| **Economic Well-Being** | • Additional jobs supported by improving competitiveness  
• Additional jobs supported by transportation investment  
• Net contribution to gross regional product |
| **Investment Effectiveness** | • Benefit/cost ratio |
| **System Sustainability** | • Cost per capita to preserve multi-modal system to current and state of good repair conditions  
• State Highway System Pavement Condition  
• Local Roads Pavement Condition |
| **Environmental Justice** | • No unaddressed disproportionately high or adverse effects for low income or minority communities (as further described above) |

**2016 RTP/SCS Preliminary Scenarios Results**

As part of the development of the 2016 RTP/SCS, staff conducted a planning exercise – scenario development – to represent different conceptual futures of land use and transportation through the duration of the plan, year 2040, in the six-county SCAG region. Staff developed four scenarios which explore the degree to which growth will be focused within our region’s cities and towns over the next twenty-five years. The scenarios take into consider the potential shape and style of neighborhoods and transportation systems. These scenarios model land consumption, travel, energy, water, and pollutant impacts related to varying combinations of land use and transportation strategies. This exercise was conducted to inform the public, SCAG technical working groups, SCAG policy committees and the Regional Council of the impacts of the different land use and transportation policies that will be considered in the Draft Preferred Alternative for the 2016 RTP/SCS.

Attachment #2 provides an in-depth presentation on the scenario development process and results. The presentation has been provided in its entirety for reference.
Next Steps

Staff will document the discussion and input provided by this body and incorporate into the Draft 2016 RTP/SCS for consideration by the Regional Council and/or appropriate policy committees for approval to release for public review and comments in October of this year.

**FISCAL IMPACT:**
Work associated with this item is included in the Fiscal Year 2014-2015 Overall Work Program (WBS Number 15-010.SCG00170.01: RTP Support, Development, and Implementation).

**ATTACHMENTS:**
2. PowerPoint Presentation: 2016-2040 RTP/SCS Preliminary Scenario Results -
GOALS, GUIDING POLICIES, & PERFORMANCE MEASURES UPDATE

Joint Policy Committee
June 18, 2015

Outline for Today’s Workshop

• Overarching vision/goals/policies/performance objectives for 2016 RTP/SCS

• 2016 RTP/SCS Scenario Results – Land Use and Urban Form to be presented by Joe DiStefano, Calthrope Analytics

• Shared Mobility and New Technology to be presented by Jim Madaffer, California Transportation Commissioner
Purpose of Goals, Policies, & Performance Measures

Goals, policies, and performance measures are intended to:

- Help carry out the vision for improved mobility, economy, and sustainability
- Help focus future investments on the best-performing projects and strategies that seek to preserve, maintain, and optimize the performance of the existing system
- Track progress after plan adoption

Why Revisit Goals, Policies, & Performance Measures?

- Moving Ahead for Progress in the 21st Century (MAP-21) goals and performance measures
- Advancement of new technologies (e.g. smartphone travel and transit applications, car share, bike share, etc.)
- Increasing emphasis on reducing GHG emissions
- Interest in measures for monitoring the health of residents
2016 RTP/SCS Goals (no changes proposed)

1. Align the plan investments and policies with improving regional economic development and competitiveness.
2. Maximize mobility and accessibility for all people and goods in the region.
3. Ensure travel safety and reliability for all people and goods in the region.
4. Preserve and ensure a sustainable regional transportation system.
5. Maximize the productivity of our transportation system.
6. Protect the environment and health of our residents by improving air quality and encouraging active transportation (non-motorized transportation, such as bicycling and walking).

2016 RTP/SCS Goals (no changes proposed)

7. Actively encourage and create incentives for energy efficiency, where possible.
8. Encourage land use and growth patterns that facilitate transit and non-motorized transportation.
9. Maximize the security of the regional transportation system through improved system monitoring, rapid recovery planning, and coordination with other security agencies.
2016 RTP/SCS Guiding Policies (2 additions)

1. Transportation investments shall be based on SCAG’s adopted regional Performance Indicators.

2. Ensuring safety, adequate maintenance, and efficiency of operations on the existing multimodal transportation system should be the highest RTP/SCS priorities for any incremental funding in the region.

3. RTP/SCS land use and growth strategies in the RTP/SCS will respect local input and advance smart growth initiatives.

4. Transportation demand management (TDM) and non-motorized transportation will be focus areas, subject to Policy 1.

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8. Monitoring progress on all aspects of the Plan, including the timely implementation of projects, programs, and strategies, will be an important and integral component of the Plan.
2016 RTP/SCS Performance Measure Categories

• Location Efficiency
• Mobility and Accessibility
• Safety and Health
• Environmental Quality
• Economic Well Being
• Investment Effectiveness
• System Sustainability
• Environmental Justice

Proposed Performance Measures (new)

• Vehicle Miles Traveled (VMT) per capita
• Mode share of transit
• Air-pollution-related health measures
• Physical activity-related health measures
• Mode share of walking and biking
• State Highway System Pavement Condition
• Local Roads Pavement Condition
Thank you!

Learn more by visiting www.scag.ca.gov.
Today’s Presentation

• Brief Scenarios Review
  • 2016 RTP/SCS Alternatives Development Process (in brief)
  • Scenarios Overview

• Preliminary Scenarios Analysis Results
  • Benefits outputs
    • Land Consumption
    • Travel Outputs
    • Public Health Analysis
    • Energy and Water Consumption
    • Household Costs
    • Local Infrastructure Costs
    • Greenhouse Gas Emissions
Introduction to the 2016 RTP/SCS Alternatives

Perspectives on Southern California Growth

Changing Age and Household Types

Growth to 2040: 3.75 million people, 1.53 million households

Current & Future Population by Age Group

Source: CA Department of Finance, 2014

Current & Future Population by Household Type

Source: US Census Bureau, American Community Survey 2012
**Perspectives on Southern California Growth**

*A Life Cycle of Housing Preferences*

<table>
<thead>
<tr>
<th>Housing Preferences by Age</th>
<th>18-29</th>
<th>30-39</th>
<th>40-49</th>
<th>50-59</th>
<th>60+</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attached</td>
<td>50%</td>
<td>32%</td>
<td>38%</td>
<td>40%</td>
<td>21%</td>
</tr>
<tr>
<td>Small Lot</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Conventional</td>
<td></td>
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</tbody>
</table>

Source: National Association of Realtors (2011)

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**Perspectives on Southern California Growth**

*The Market is Changing (or has changed)*

**November 1, 2013**

**Americans Prefer to Live in Mixed-Use, Walkable Communities**

According to the National Association of REALTORS® 2013 Community Preference Survey, 60 percent of respondents favor a neighborhood with a mix of houses, stores, and other businesses that are within walking distance, rather than neighborhoods requiring driving between home, work, and recreation. Respondents indicated that while the size of a home or yard does matter, most are willing to compromise size for a preferred neighborhood and less commuting.

Source: National Association of Realtors (2013)
Perspectives on Southern California Growth

The Market is Changing (or has changed)

Younger Americans Place Higher Priority on Alternatives to Driving, Affordable Housing and Urban/Suburban Revitalization

Walkability and Age-Diversity Gaining in Importance

Changes in important Factors in Deciding Where to Live

Source: National Association of Realtors (2013)

Perspectives on Southern California Growth

New Mobility Options

- Neighborhood Electric Vehicles (NEVs)
- Urban Mobility Platforms
- eBikes
- Car/Bike Sharing
- Travel Planning Apps
- Connected Vehicle Technologies
- Semi-automated drive modes
- Adaptive Cruise Control
- Lane centering
- Fully Autonomous Vehicles
Building the Scenario Alternatives

- Develop a solid **base year** data canvas
  - 2012 ‘Local Inputs’ Base Year

- Calibrate **analytical engines** and policy assumptions
  - Energy and water use baselines
  - Energy portfolio mix and carbon intensity
  - Vehicle fleet mix and efficiency, fuel mix
  - Local infrastructure cost and O&M by land pattern
  - Trip distance and travel skim matrices

- Integrate 2040 Local Plans for ‘**2012 Updated**’ Scenario
- Develop **Policy A & B** alternatives
Place Types - Walkability

Standard

Compact

Intersections / mi²
- Under 80
- 80 to 150
- Over 150

Place Types - Intensity and Mix of Use

Standard

Compact

Households and Jobs per acre
- Under 0.5 (not shown)
- 0.5 to 6.0
- Over 6.0
Place Types - Household Driving

Standard

26,500 miles/year

Compact

12,000 miles/year

Miles traveled per hh/year
- Under 5,000 (not shown)
- 5,000 to 14,000
- Over 14,000

Urban

4,500 mi/yr

39 mil btu/yr

55,000 gal/yr

35 min/day

5 MT/year

$17,300 $/HH

Compact

12,000 mi/yr

58 mil btu/yr

82,000 gal/yr

23 min/day

9 MT/year

$22,600 $/HH

Standard

26,500 mi/yr

79 mil btu/yr

142,000 gal/yr

7 min/day

16 MT/year

$26,300 $/HH

Land Development Category Comparison (Typical Household, 2012)

Household VMT

Residential Energy Use

Residential Water Use

Walking

Carbon Emissions

Local Infrastructure Cost
### 2016 RTP/SCS Scenario Alternatives

#### MAJOR COMPONENTS

<table>
<thead>
<tr>
<th>Theme</th>
<th>TREND</th>
<th>2012 PLAN UPDATE</th>
<th>POLICY A</th>
<th>POLICY B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Past trends extrapolated forward</td>
<td>How does the 2012 Plan look 4 years later?</td>
<td>More focused land use based on new policy considerations and shifting demographics/reference</td>
<td>Pushing the envelope with more aggressive transit investments, land use coordination, technology change</td>
</tr>
</tbody>
</table>

#### Projections (2012-2040)

- **2012** Base Year: 18 million population, 6.4 million homes, 7.4 million jobs
- **2012-2040** Change: 3.7 million population, 1.6 million homes, 2.4 million jobs
- **2040** End State: 21.7 million population, 8 million homes, 9.8 million jobs

#### Transportation Network

- Updated 2012 RTP Network
- Updated 2012 RTP Network
- HQTAs/TPA Focus per plans
- Additional HQTAs
- Active Transport Investment
- Improved Walkability
- ‘Last-Mile’ Focus
- Updated 2012 RTP Network
- Increase in bus headways
- Additional Active Transport Investment
- Improved Walkability
- ‘Last-Mile’ Focus

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### 2016 RTP/SCS Scenario Alternatives

#### LAND USE VARIABLES

<table>
<thead>
<tr>
<th>Housing Mix</th>
<th>TREND</th>
<th>2012 PLAN UPDATE</th>
<th>POLICY A</th>
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</thead>
<tbody>
<tr>
<td>Based on Past Trends</td>
<td>Based on Local Plans</td>
<td>Based on Shifting Demand</td>
<td>Based on Shifting Demand</td>
<td></td>
</tr>
<tr>
<td>Growth Increment</td>
<td>Growth Increment</td>
<td>Growth Increment</td>
<td>Growth Increment</td>
<td></td>
</tr>
<tr>
<td>67% Single Family</td>
<td>4.4% Single Family</td>
<td>31% Single Family</td>
<td>69% Single Family</td>
<td></td>
</tr>
<tr>
<td>33% Multi-family/Townhome</td>
<td>56% Multi-family/Townhome</td>
<td>69% Multi-family/Townhome</td>
<td>73% Multi-family/Townhome</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Land Use/Transit Coordination</th>
<th>2040 Housing/Jobs Transit Focus</th>
<th>2040 Housing/Jobs Transit Focus</th>
<th>2040 Housing/Jobs Transit Focus</th>
<th>2040 Housing/Jobs Transit Focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Quality Transit Areas:</td>
<td>High Quality Transit Areas:</td>
<td>High Quality Transit Areas:</td>
<td>High Quality Transit Areas:</td>
<td>High Quality Transit Areas:</td>
</tr>
<tr>
<td>35% home/42% jobs</td>
<td>48% home/60% jobs</td>
<td>53% home/64% jobs</td>
<td>64% home/76% jobs</td>
<td>64% home/76% jobs</td>
</tr>
<tr>
<td>Transit Priority Areas:</td>
<td>Transit Priority Areas:</td>
<td>Transit Priority Areas:</td>
<td>Transit Priority Areas:</td>
<td>Transit Priority Areas:</td>
</tr>
<tr>
<td>15% home/20% jobs</td>
<td>20% home/28% jobs</td>
<td>21% home/29% jobs</td>
<td>33% home/44% jobs</td>
<td>33% home/44% jobs</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>3% Urban Infill</td>
<td>15% Urban Infill</td>
<td>20% Urban Infill</td>
<td>24% Urban Infill</td>
<td></td>
</tr>
<tr>
<td>11% Compact Walkable</td>
<td>26% Compact Walkable</td>
<td>36% Compact Walkable</td>
<td>55% Compact Walkable</td>
<td></td>
</tr>
<tr>
<td>86% Standard Suburban</td>
<td>59% Standard Suburban</td>
<td>45% Standard Suburban</td>
<td>22% Standard Suburban</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Conservation &amp; Climate Resilience</th>
<th>Avoid New Growth in:</th>
<th>Most Critical Habitat Areas (CHAP Level 5)</th>
<th>5 Foot Sea Rise Zones (NOAA/CalAdapt Year 2100)</th>
</tr>
</thead>
</table>
**Land Patterns**  
**New Growth (2012-2040)**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>URBAN</td>
<td>81%</td>
<td>86%</td>
<td>56%</td>
<td>32%</td>
<td>21%</td>
</tr>
<tr>
<td>COMPACT</td>
<td>2%</td>
<td>3%</td>
<td>13%</td>
<td>13%</td>
<td>16%</td>
</tr>
<tr>
<td>STANDARD</td>
<td>17%</td>
<td>11%</td>
<td>31%</td>
<td>55%</td>
<td>63%</td>
</tr>
</tbody>
</table>

**Land Patterns**  
**End State (2040)**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>URBAN</td>
<td>81%</td>
<td>82%</td>
<td>76%</td>
<td>71%</td>
<td>69%</td>
</tr>
<tr>
<td>COMPACT</td>
<td>2%</td>
<td>2%</td>
<td>4%</td>
<td>4%</td>
<td>5%</td>
</tr>
<tr>
<td>STANDARD</td>
<td>17%</td>
<td>16%</td>
<td>20%</td>
<td>25%</td>
<td>26%</td>
</tr>
</tbody>
</table>

(Fehr & Peers)
Housing Mix  New Growth (2012-2040)

- **Multifamily**
  - Existing (2012): 37%
  - Trends: 30%
  - 2012 Plan Update: 47%
  - Policy A: 58%
  - Policy B: 60%

- **Townhome**
  - Existing (2012): 8%
  - Trends: 5%
  - 2012 Plan Update: 7%
  - Policy A: 11%
  - Policy B: 12%

- **Single Family Small Lot**
  - Existing (2012): 17%
  - Trends: 21%
  - 2012 Plan Update: 24%
  - Policy A: 21%
  - Policy B: 23%

- **Single Family Large Lot**
  - Existing (2012): 38%
  - Trends: 43%
  - 2012 Plan Update: 22%
  - Policy A: 10%
  - Policy B: 4%
**Housing Mix End State (2040)**

- **Multifamily**
  - Existing (2012): 37%
  - Trends: 36%
  - 2012 Plan Update: 39%
  - Policy A: 41%
  - Policy B: 42%

- **Townhome**
  - Existing (2012): 8%
  - Trends: 7%
  - 2012 Plan Update: 8%
  - Policy A: 8%
  - Policy B: 9%

- **Single Family Small Lot**
  - Existing (2012): 17%
  - Trends: 18%
  - 2012 Plan Update: 19%
  - Policy A: 18%
  - Policy B: 19%

- **Single Family Large Lot**
  - Existing (2012): 38%
  - Trends: 39%
  - 2012 Plan Update: 34%
  - Policy A: 32%
  - Policy B: 31%

---

**HQTAs & TPA Focus**

*Households and Jobs in High Quality Transit Areas (HQTAs) and Transit Priority Areas (TPAs) - 2040*

- **Households in HQTAs**
  - Existing (2012): 15%
  - Trends: 20%
  - 2012 Plan Update: 29%
  - Policy A: 32%
  - Policy B: 31%

- **Households in TPAs**
  - Existing (2012): 20%
  - Trends: 19%
  - 2012 Plan Update: 32%
  - Policy A: 34%
  - Policy B: 32%

- **Jobs in HQTAs**
  - Existing (2012): 22%
  - Trends: 20%
  - 2012 Plan Update: 28%
  - Policy A: 29%
  - Policy B: 44%

- **Jobs in TPAs**
  - Existing (2012): 23%
  - Trends: 22%
  - 2012 Plan Update: 32%
  - Policy A: 34%
  - Policy B: 32%
1. Trend

2. 2012 Plan Update
3. Policy A

4. Policy B
Multi-Metric Analysis = More Informed Decisions
Land Consumption

*New (greenfield) land consumed to accommodate new growth, 2012-2040*

<table>
<thead>
<tr>
<th>Reduction from Trend</th>
<th>Trend</th>
<th>2012 Plan Update</th>
<th>Policy A</th>
<th>Policy B</th>
</tr>
</thead>
<tbody>
<tr>
<td>-88 sq. miles</td>
<td>491 mi</td>
<td>403 mi</td>
<td>339 mi</td>
<td>308 mi</td>
</tr>
<tr>
<td>-152 sq. miles</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-184 sq. miles</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Compared to Trend:**

*Land saved in Policy A is equivalent to 3 times that of the City of Anaheim.*

Household Driving

*Passenger Vehicle Miles Traveled (VMT) per Household*

<table>
<thead>
<tr>
<th>Reduction from Trend</th>
<th>2012</th>
<th>Trend</th>
<th>2012 Plan Update</th>
<th>Policy A</th>
<th>Policy B</th>
</tr>
</thead>
<tbody>
<tr>
<td>-2,500 mi/yr</td>
<td>24,450 mi</td>
<td>23,950 mi</td>
<td>21,400 mi</td>
<td>20,500 mi</td>
<td>19,550 mi</td>
</tr>
<tr>
<td>-3,500 mi/yr</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-4,400 mi/yr</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Compared to Trend:**

*Households in Policy A are driving 3,500 fewer miles per year.*
Household Driving

Annual Passenger Vehicle Miles Traveled (VMT), 2040

<table>
<thead>
<tr>
<th>Year</th>
<th>VMT Traveled (Billion)</th>
<th>Reduction from Trend</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>144.0</td>
<td></td>
</tr>
<tr>
<td>Trend</td>
<td>177.7</td>
<td>-19 billion miles</td>
</tr>
<tr>
<td>2012 Plan Update</td>
<td>158.6</td>
<td>-26 billion miles</td>
</tr>
<tr>
<td>Policy A</td>
<td>152.0</td>
<td>-33 billion miles</td>
</tr>
<tr>
<td>Policy B</td>
<td>144.8</td>
<td></td>
</tr>
</tbody>
</table>

Compared to Trend:

VMT reduction in Policy A is like taking 2 million cars off SoCal roads.
Fuel Use

Passenger Vehicle Fuel Use, Cumulative, 2012-2040

<table>
<thead>
<tr>
<th>Gallons of Fuel</th>
<th>Reduction from Trend</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trend</td>
<td>161.4</td>
</tr>
<tr>
<td>2012 Plan Update</td>
<td>151.5</td>
</tr>
<tr>
<td>Policy A</td>
<td>148.1</td>
</tr>
<tr>
<td>Policy B</td>
<td>144.4</td>
</tr>
</tbody>
</table>

2040 on road passenger vehicle fleet average = 28mpg

Costs of Driving

Fuel, Ownership, & Maintenance Costs Use, Annual, 2040

<table>
<thead>
<tr>
<th>$ (billion)</th>
<th>Reduction from Trend</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trend</td>
<td>$62.4</td>
</tr>
<tr>
<td>2012 Plan Update</td>
<td>$55.7</td>
</tr>
<tr>
<td>Policy A</td>
<td>$53.3</td>
</tr>
<tr>
<td>Policy B</td>
<td>$50.8</td>
</tr>
</tbody>
</table>

2040 gasoline price = $4.00/gallon (2015 dollars)

Compared to Trend: Policy A saves SoCal households $131 billion in automobile-related costs from 2012-2040.
Costs of Driving
Fuel, Ownership, & Maintenance Costs Use, Annual, 2040

Compared to Trend:
Policy A saves the average SoCal household $2,000/year in automobile-related costs.

Respiratory Health Impacts
Cost Reduction from ‘Trend’ Due to Criteria Pollutant-Related Health Incidences, Annual in 2040

Compared to Trend:
Policy A reduces health incidences by 14% and saves more than $670 million in 2040.
Active Transportation & Health Impacts

Base Year (2012)
Walking (min/day)
Building Energy Use

*Residential & Commercial Buildings, Cumulative (2012-2040)*

- Energy Savings Would Power Homes For a Year
  - 5.7 million homes
  - 9.8 million homes
  - 11.9 million homes

**Compared to Trend:**
*Policy A saves the average SoCal household 10% on their electric and gas bills.*

---

Building Energy Costs

*Residential & Commercial Buildings, Cumulative (2012-2040)*

- Reduction from Trend
  - $15 billion
  - $26 billion
  - $32 billion

**Compared to Trend:**
*Policy A saves SoCal households $2.1 billion in annual electricity and gas costs.*
Building Water Use

Residential & Commercial Buildings, Cumulative (2012-2040)

<table>
<thead>
<tr>
<th></th>
<th>Trend</th>
<th>2012 Plan Update</th>
<th>Policy A</th>
<th>Policy B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acre Feet (AF)</td>
<td>118.4</td>
<td>116.8</td>
<td>116.0</td>
<td>115.2</td>
</tr>
</tbody>
</table>

Reduction from Trend

- 1.6 M Acre Feet
- 2.4 M Acre Feet
- 3.2 M Acre Feet

Water Savings Would Supply Homes For a Year

- 3.7 million homes
- 5.7 million homes
- 7.6 million homes
Building Water Costs

Residential & Commercial Buildings, Cumulative (2012-2040)

Compared to Trend:
Policy A saves SoCal households $230 million on annual water bills.

Household Costs

Transportation and Home Energy/Water Use, All Households, Annual (2040)

Compared to Trend:
Policy A saves SoCal households $16.8 billion on annual auto and utility costs.
Local Infrastructure & Service Costs

Capital and Operations & Maintenance Costs to Support New Growth, 2012-2040

Compared to Trend:
Policy A saves $168 million per year on capital and O&M costs.

Greenhouse Gas Emissions

From Transportation, Building Energy, and Water Use, Annual, 2040

Compared to Trend:
Policy A GHG reductions are like taking 3 million cars cars off SoCal roads.
ROAD CHARGE AND THE FUTURE OF TRANSPORTATION

Southern California Association of Governments
2016 RTP/SCS
Joint Policy Committee
June 18, 2015

Jim Madaffer
Commissioner
California Transportation Commission
I HAVE SEEN THE FUTURE
GENERAL MOTORS FUTURAMA

TOMORROW-LAND

High spot of the New York World's Fair reopening this Spring—GM Futurama!
You can look over GM's exciting "idea" cars—Freelander IV with television screen; game table; refrigerator; GM-X with jet aircraft cockpit and controls—fascinating design and engineering innovations right out of tomorrow!
An efficient transportation system is critical to California’s economy and quality of life…

California Infrastructure Report Card

✔ $59 Billion - Deferred Transportation Maintenance
   Source: Governor Brown’s 2015 Five-Year Infrastructure Plan

✔ 45th - State Ranking for Overall Highway Performance
   Source: Reason Foundation’s 21st Annual Report on the Performance of State Highway Systems

✔ $296 Billion - Ten-Year Project Funding Shortfall
   Source: California Transportation Commission’s 2011 Statewide Transportation Needs Assessment
California Infrastructure Report Card

Pavement

58% of California Roadways Require Rehabilitation or Pavement Maintenance

87% of California’s Counties have an Average Pavement Rating of “At Risk” or “Poor”

25% of Local Streets and Roads will be in “Failed” Condition by 2022 under our Current Funding Levels

6 of the Nation’s 10 Worst Urban Area Pavement Conditions

Our transportation system is in financial crisis

- Vehicle Miles Traveled
- Gas Consumption with Increased Efficiency

VMT Growth

Revenue Loss Due to Increased Fuel Economy

The Gas Tax is DEAD

State Motorist Taxes and Fees

- Gasoline Excise Taxes
- Diesel Taxes
- Commercial Vehicle Weight Fees
- Motor Vehicle Fees

Note: The figures contained in this presentation are derived from the Fiscal Year 2015-16 Proposed Governor’s Budget.
Base Excise Tax (Gasoline)

- **18¢**
- **$2.8 Billion**
- **36% Local Streets & Roads**
  - **$1.0 Billion**
- **64% State Highway Account**
  - **$1.8 Billion**

Note: The figures contained in this presentation are derived from the Fiscal Year 2015-16 Proposed Governor's Budget.

Swap Excise Tax (Gasoline)

- **$1 Billion**
- **Weight Fee Revenue Backfill**

- **OFF THE TOP REMAINDER**
  - **44% Local Streets & Roads**
  - **44% State Transportation Improvement Program**
  - **12% State Highway Operations & Protection Program**
  - **$100 Million**

Note: The figures contained in this presentation are derived from the Fiscal Year 2015-16 Proposed Governor’s Budget.
Base Sales Tax (Diesel)

4.75%  $450 Million

50% State Transit Assistance (Local)  $225 Million

50% State Transit Programs  $225 Million

Note: The figures contained in this presentation are derived from the Fiscal Year 2015-16 Proposed Governor's Budget.

Swap Sales Tax (Diesel)

1.75%  $170 Million

100% State Transit Assistance (Local)

Note: The figures contained in this presentation are derived from the Fiscal Year 2015-16 Proposed Governor's Budget.
Excise Tax (Diesel)

52% Local Streets & Roads
$218 Million

48% State Highway Account
$202 Million

Note: The figures contained in this presentation are derived from the Fiscal Year 2015-16 Proposed Governor’s Budget.

Commercial Vehicle Weight Fees

100% State General Fund for Transportation Bond Debt-Service

Note: The figures contained in this presentation are derived from the Fiscal Year 2015-16 Proposed Governor’s Budget.
Motor Vehicle Fees

Driver’s License

Vehicle Registration

$3.1 Billion

California Highway Patrol
Department of Motor Vehicles
Other Agencies

Note: The figures contained in this presentation are derived from the Fiscal Year 2015-16 Proposed Governor’s Budget.

Motor Vehicle Fees ( Continued)

0.65% Vehicle License Fee

$570 Million

Local Cities & Counties
State Highways

Note: The figures contained in this presentation are derived from the Fiscal Year 2015-16 Proposed Governor’s Budget.
Summary

Total State Revenue $10.3 Billion
- Other State Agencies $3.7B
- Debt-Service $1.0B
- Transit $0.6B
- Capacity Increasing Projects $0.4B

Road Maintenance, Rehabilitation, & Operations $4.6 Billion

Note: The figures contained in this presentation are derived from the Fiscal Year 2015-16 Proposed Governor’s Budget. Does not include federal funds, local measure funds, general sales tax that goes to locals, and reimbursements.

Revenue Solutions

- Near-Term Solutions
  - Truck Weight Fees
  - Excise Tax
  - VLF/VRF
  - Early Loan Repayments
  - Cap & Trade
  - New legislation . . . Speaker Atkins & Senator Beall

- Long-Term Sustainable Solutions
  - Congestion Pricing/Tolling
  - Public Private Partnerships (P3’s)
  - Road Charge Program (SB 1077)
Proposed Funding Legislation

Assembly Speaker Atkins Proposal:
- $1 billion per year by returning truck weight fees.
- $200 million per year by accelerating repayment of transportation loans.
- $1.8 billion per year by establishing a new road user fee.
  - $800 million for transportation.
  - $1 billion to back fill the loss of truck weight fees to the general fund.

Senate Bill 16 (Beall)
- Increases gas excise tax: $0.10/gallon.
- Increases diesel excise tax: $0.12/gallon.
- Return approximately $1 billion in weight fees over five years.
- Vehicle License Fee: non-commercial vehicles .07% income each year until VLF is 1.00% by July 1, 2019.
  - Back fill the loss of truck weight fees to the general fund.
- Vehicle Registration Fee: $35 per vehicle plus an additional $100 for zero emission vehicles.
- Repay transportation accounts for past year loans to general fund over three years beginning in 2016.
In 2014, Senate Bill 1077 was signed into law

- Directs the California Transportation Commission (CTC) to establish a Technical Advisory Committee
- TAC to report recommendations to the California State Transportation Agency (CalSTA)
- Requires CalSTA to implement a pilot program by January 2017
- Requires a report of findings and recommendations by June 2018

Road Charging is …

- A policy whereby motorists pay for use based on the distance they travel on the roadway network.
- A “User Pays” principle – the more you drive, the more you pay.
- Similar to other utilities such as electricity, water, telephone.
Road Charge Technical Advisory Committee Composition

- 15 members:
  - Telecommunications Industry
  - Data Security & Privacy Industry
  - Privacy Rights Advocacy Organizations
  - Regional Transportation Agencies
  - Members of the Legislature
  - Highway User Groups
  - National Research & Policymaking Bodies
  - Other Relevant Stakeholders

The Technical Advisory Committee is examining all dimensions of a Road Charge

- Revenue sustainability
- Privacy protection
- Equity implications
- Technology alternatives
- Environmental sustainability
- Out-of-state travelers
- Communications & public outreach
- Organizational framework
As we design the pilot test, we want the public to participate

**We Are Here**
- Establish a pilot program design
- Evaluation criteria

**Phase 1**
- Pre-pilot planning
- Develop pilot program test plan
- Procure independent evaluator

**Phase 2**
- Conduct live pilot
- Concurrent independent evaluation

**Phase 3**
- Report findings and evaluation results
- Next steps

---

Input from California residents and businesses is integral to our effort

- Focus Groups
- Telephone surveys
- Website
- Online Questionnaire
- Twitter
- Facebook
- Public Meetings
TAC monthly meetings around the state

<table>
<thead>
<tr>
<th>Meeting Date</th>
<th>Meeting Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>April 24</td>
<td>Monterey</td>
</tr>
<tr>
<td>May 29</td>
<td>Fresno</td>
</tr>
<tr>
<td>June 26</td>
<td>Sacramento</td>
</tr>
<tr>
<td>July 24</td>
<td>Tahoe City</td>
</tr>
<tr>
<td>August 28</td>
<td>San Diego</td>
</tr>
<tr>
<td>September 25</td>
<td>North State</td>
</tr>
<tr>
<td>October 23</td>
<td>Bay Area</td>
</tr>
<tr>
<td>November 20</td>
<td>Los Angeles</td>
</tr>
<tr>
<td>December 11</td>
<td>Riverside</td>
</tr>
</tbody>
</table>

Road Charge Pilot Program Timeline

Exploration of the potential for RUC in California will take several years, beginning with a preliminary investigation and feasibility analysis, which is currently underway. Under SB 1077 a Demonstration Program will begin by January 2017 and a final report will be completed by June 2018. Full implementation would require future legislation.
2007 DARPA Urban Challenge

‘Boss’ CMU Tartan Racing, 60 miles urban, 4h:10m
2008 Levandowski’s Pribot

Delivered pizza across SF Bay bridge

2010 Audi ‘Pikes Peak’

12 mile hill climb, 156 turns, 27min (cf 11m48s)
2011 AutoNOMOS Labs Berlin drive

50 miles of autonomous driving on Berlin roads

2013 Vislab BRAiVE, Parma

Rural-urban demo, in real, complex traffic, vision
2013 Daimler/Mercedes Bertha Benz Road Trip

60 mile rural-urban demo, vision based

2014 Google ‘mastering city street driving’

700k miles, cyclists signals, construction zones
2014-2016 Google Prototype ‘Vehicle’ (NEV)

25mph, 100 pilot project CA for 2yrs. 2017-2019?

2015 Tesla ‘Autopilot’ (Autonomous 2023)

‘will go from on-ramp to off-ramp autonomously’
2015 Mercedes Benz F 015 Concept

“Innovative perspective into the future of mobility.”
Mercedes Benz Future Truck 2025

Many technological elements already available

2020-2025 Nissan Autonomous Drive

Range of Commercially viable AVs on road
Figure 2: Several driver-assistance systems are currently using radar technology to provide blind-spot detection, parking assistance, collision avoidance, and other driver aids (courtesy Analog Devices).
ROAD CHARGE AND THE FUTURE OF TRANSPORTATION

Southern California Association of Governments
2016 RTP/SCS
Joint Policy Committee
June 18, 2015

Jim Madaffer
California Transportation Commission
Jim@Madaffer.com