SAN DIEGO FORWARD: THE REGIONAL PLAN:
ALTERNATIVE LAND USE AND TRANSPORTATION SCENARIOS

Introduction

As part of the 2050 Regional Transportation Plan and its Sustainable Communities Strategy (2050 RTP/SCS) adopted in 2011, the Board of Directors committed to preparing alternative land use and transportation scenarios to explore what it would take to further reduce greenhouse gas (GHG) emissions beyond those projected in the Plan. The first phase of the project is focused on exploring potential land use alternatives; the second phase will focus on the transportation component. The results will help inform the SCS and transportation network to be included in San Diego Forward: The Regional Plan.

At a joint meeting in July, the Regional Planning and Transportation Committees provided input on potential land use alternatives that could be tested in a sketch model (summarized below). The Regional Planning and Transportation Committees also directed staff to evaluate the role of emerging technologies in reducing GHG emissions. Additional work is underway on emerging technologies and will be presented to the Board this winter.

Setting the Stage

The region’s vision of its future has been evolving for decades. This change is illustrated in the figures below, which show the planned housing and employment growth between 1995 and 2020 compared to the planned housing and employment growth between 2008 and 2050. During the past decade, many jurisdictions have updated their local land use plans and zoning ordinances, collectively moving the region’s planned growth toward more compact development near public transit, and toward greater habitat and open space preservation.
**Proposed Land Use Scenarios**

The evaluation of alternative scenarios will provide information that could help further refine the region’s vision over time. The first phase of this effort is to develop alternative land use concepts that could accommodate the region’s projected job and housing growth, and test those alternatives with the 2050 RTP/SCS transportation network, keeping the transportation network constant. The next phase would focus on exploring transportation alternatives that could be paired with the land use scenarios for a more comprehensive analysis of both land use and transportation collectively, including effects on GHG emissions.

Based upon input received from the Regional Planning and Transportation Committees, the Regional Planning Technical Working Group, the Cities/County Transportation Advisory Committee, and the public, staff has developed three potential land use concepts that illustrate different ways of distributing future growth in the region (shown below).

**Proposed 2050 Land Use Scenario Concepts**

- **Scenario A: Second Units and Infill/Redevelopment in Urban and Suburban Areas**
  
  Scenario A would spread future growth most equally among the incorporated jurisdictions, testing the effects of second units and infill development in our urban and suburban areas. New jobs would be distributed fairly evenly, with the highest employment intensities in existing job centers.

- **Scenario B: Transit Oriented Development**
  
  Scenario B would concentrate new housing and jobs within a mile or so, of existing and future transit stations included in the 2050 RTP/SCS, with the highest intensities closest to the transit station areas. New development would consist primarily of mid-rise, mixed-use buildings.

- **Scenario C: Multiple Dense Cores**
  
  Scenario C takes a different approach and would focus future growth into four dense cores. In this scenario, new housing and jobs would consist of mid- and high-rise, mixed-use buildings.
concentrated along the State Route 78 (SR 78)/SPRINTER/Palomar Airport Road corridor in North County; the Golden Triangle/Sorrento Valley/Mira Mesa area in Mid-County; the Downtown/Kearny Mesa/La Mesa/National City area; and the Chula Vista/International Border area in South County.

The conceptual images contain gradation variations, with the lightest brown in Scenario A, representing the lowest intensities in a larger land area, and the darkest brown in Scenario C, representing the highest intensities in a smaller land area. Each land use concept responds to demographic trends, including the aging of the population and the increasing interest of Generation Y millennials to live in more urban environments.

**Regional Planning and Transportation Committee Comments**

At their joint meeting in July, the Regional Planning and Transportation Committees suggested that staff incorporate the western portion of the SR 78 corridor (in addition to the Palomar Airport Road corridor) into Scenario C to take advantage of the economic opportunities in this area. This change has been reflected in Scenario C, illustrated above. In addition, staff has made minor changes to Scenario A to reflect more accurately the incorporated area boundaries.

At the joint meeting, various committee members expressed preference for some scenarios over others, but there was general recognition that it would be useful to test all three concepts so that the results from this analysis could potentially help inform future updates of local general plans and the Regional Growth Forecast. There also was a desire to recognize local jurisdictions' adoption of general plan updates during the past decade, which have resulted in the planned land use changes between the Series 9 and Series 12 forecasts (shown above). On a separate note, Attachment 1 summarizes feedback on initial land use scenarios discussed at the Regional Plan workshop held on June 21, 2013.

**Economic Perspective**

The Regional Planning and Transportation Committees, the Regional Planning Technical Working Group, and workshop participants also felt that it may be useful to view the land use scenarios through an economic development lens to better address “jobs-housing fit,” or the relationship between wages and housing costs. In other words, a more coordinated spatial matching of jobs and housing could reduce vehicle miles traveled, which could potentially reduce GHG emissions.

To gain additional insights, a workshop was held in August with economic development stakeholders from throughout the region. The stakeholders discussed the importance of recognizing the unique opportunities that the binational region provides in terms of creating job growth and international trade on both sides of the border; adding to our region's group of globally-successful companies; providing more educational and training opportunities for the jobs that we are encouraging; supporting tools and incentives to build more affordable housing, particularly around transit, as one of the main drivers of economic growth; addressing parking at the regional level; providing solutions for the “last mile” issue; recognizing the needs and desires of the millennials for more housing diversity, more walkable and bikeable neighborhoods, and better Wi-Fi connectivity in local neighborhoods and on public transit; and supporting more compact development patterns such as those in Scenarios B and C.
**2050 Regional Growth Forecast, Modeling and Visioning Tools, and Metrics**

Concurrent with the scenario effort, SANDAG is developing the Series 13 Regional Growth Forecast through 2050 (see Agenda Item No. 2). The forecast, which will provide a foundation for the Regional Plan, currently projects nearly one million new people, nearly 500,000 new jobs, and more than 330,000 new homes. The forecast is a separate and independent effort from the scenarios. Depending upon the scenario outcomes and subsequent policy discussions by the Board and Policy Advisory Committees, the scenarios could potentially influence the SCS, the final forecast, and/or policies in the Regional Plan.

SANDAG also is developing new modeling and visioning tools. The new modeling tools include the transportation-related Activity-Based Model (ABM) and the land use-related Production, Exchange, Consumption, and Allocation System (PECAS), which will offer several enhancements by introducing economic conditions and return on investment calculations into the projections of development, redevelopment, and infill. The new visioning tools include a sketch model called “UrbanFootprint” that is being used in California by other metropolitan planning organizations on similar scenario planning efforts. The sketch model will provide visual representations of each land use scenario and initial “easy-to-understand” indicators related to scenario performance. Additional metrics could be considered during the second phase of the project through the use of PECAS and ABM. A demonstration of UrbanFootprint will be scheduled this fall.

**Emerging Technologies and Parking Strategies**

In response to direction by the Regional Planning and Transportation Committees to integrate emerging technologies into the scenario planning effort, staff has been working on a menu of existing and emerging transportation technologies in the categories of personal technology, vehicle technology, and infrastructure technology that could be integrated into the Regional Plan’s preferred transportation network (Attachments 2 and 3). Many of the concepts included in the menu are derived from the SANDAG Intelligent Transportation System Strategic Plan, and were presented at the July 19 joint meeting of the Regional Planning and Transportation Committees.

Regional Planning and Transportation Committee members generally were supportive of the inclusion of emerging technologies in the Regional Plan. In particular, there was interest in providing people with greater mobility choices and greater roadway capacity through technologies that are already available or becoming available in the very near future (e.g., connected vehicles, driverless cars, real-time traveler information via personal devices, and other applications).

Additional work is underway on emerging technologies. Staff is reaching out to individuals and organizations working in transportation technology fields to engage them in a dialogue regarding technologies that have the highest potential to impact the region’s travel patterns and urban form. An important component will be to develop an understanding of which existing, emerging, and advanced technologies could be included in the Regional Plan and to what degree they could be applied, modeled, and used in the next round of Senate Bill 375 (Steinberg, 2008) target-setting.

Staff also is responding to Board direction to analyze parking management strategies in conjunction with the scenario planning efforts, and to prepare a parking toolbox. Parking management strategies such as shared parking, parking maximums, remote parking, unbundled parking, demand-based parking, and other strategies, including pricing strategies, could be considered.
White papers on emerging technologies and parking strategies will be brought to the Board and Policy Advisory Committees this fall and winter.

**Discussion and Next Steps**

Staff is seeking input from the Board on the land use scenario concepts to be tested in the UrbanFootprint sketch model.

During October, SANDAG will hold two public workshops to review the sketch-level performance results of the alternative land use scenarios, and to seek input on alternative transportation ideas that could be tailored to the land use scenarios. The results, as well as feedback from the workshops, will then be presented to the Board and Policy Advisory Committees in November.

Further development and analysis of transportation, emerging technology, and parking strategies will occur over the next several months, and results will be brought to the Policy Advisory Committees and Board as they become available early next year. The final phase of this effort will focus on policy discussions related to the scenario outcomes for potential consideration in the Regional Plan.

GARY L. GALLEGOS
Executive Director

Attachments:  1. Workshop Summary: Focus on Land Use and Transportation, June 21, 2013
              2. Emerging Technologies Illustration Sheet
              3. Existing, Emerging, and Advanced Transportation Technologies

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WORKSHOP SUMMARY: FOCUS ON LAND USE AND TRANSPORTATION - JUNE 21, 2013

More than 125 participants took part in the June 21st workshop on San Diego Forward: The Regional Plan. Below is a summary of input provided by stakeholders on the six topics addressed at the workshop. More information and more detailed notes are available at: www.sandag.org/sandiegoforward.

Land Use Scenarios

- Give more priority to protecting our urban open space, recreation, and habitat areas.
- Expand the higher density core to include Chula Vista and the border area.
- Include the area south of the border for affordable housing opportunities.
- Explore the impacts of each scenario on the economy, health, environment, and quality of life.
- Explore smart growth scenarios that help with transportation choices, transportation costs, and health benefits.
- Consider second units close to the transit oriented development (TOD) areas.
- Look at the redevelopment of the region’s commercial areas and development of shopping malls near transit hubs.
- Address jobs/housing fit and try to do a better job of matching income levels with housing choices to address the range of income levels in a job place (i.e., high-paying jobs versus service workers working in high-tech buildings). The SANDAG modeling process should look at the implications of jobs/housing fit.
- Modify scenarios to acknowledge and better integrate the major employment clusters.
- Conduct a market feasibility analysis on all of the scenarios.
- Map topographic land constraints; many slopes are uninhabitable for human development. River valleys and steep slopes are not suitable for human development.
- Create a scenario with urban growth boundaries.
- Address sea level rise in the scenarios.
- Consider placing just as much emphasis on creating more walkable and bikeable communities than is placed on transit oriented communities so we do not have to invest in so much public transit.
• The TOD scenario is more reflective of where job centers are throughout the region.

• Consider housing costs and affordability in scenarios.

• Consider quality of life issues and transit access to parks, healthcare, education, family resource centers, clinics, childcare, and other community resources/social service facilities.

• Adapt to current trends such as telecommuting, co-work spaces, etc. which are becoming more popular and more sustainable.

Emerging Technologies

• The ability to track the bus is important when people are going somewhere.

• Self-driving vehicles can help reduce accidents.

• When considering emerging technologies, include sustainability, mobility/accessibility, and safety.

• The idea of crowd sourcing would be easy to focus on and easy to do. Provide the cloud to interested individuals and go beyond what is traditionally done.

• Expand Car2Go system geographically so that there is coverage across the whole county.

• Expand the availability of plug-in charging.

• Use technology for information such as real-time traffic information. This would help people decide what mode of transit to take and what route.

• Provide a greenhouse gas calculator application to help change people’s behavior

• Apply emerging technology to infrastructure improvements that reduce reliance on vehicles.

• Consider security and loss of privacy.

• Keep up with technology – signal detection, loops, etc.

• Technology can help with lowering costs.

• Autonomous vehicles are an easy solution to reckless drivers; they would allow more cars on the road without building more lanes, and the idea holds promise.

• The shared economy (Car2Go, etc.) is growing. Consider this in the planning process.

• Provide better traveler information.

• Consider equity as an issue since there are barriers to entry for technology, and not everyone can afford a smart phone, car, or Google glasses.
Parking and Pricing

- Integrate parking with purposeful economic returns.
- Balance demand management strategies (congestion pricing) with alternative transportation modes (public transit, active transportation, etc.).
- Make car-sharing a more attractive option for transit users.
- Develop park-once strategies where people are encouraged to ‘park once’ during a day/trip.
- Use metered parking in a manner that creates turnover of spaces in high demand (for shopping or dining purposes, for example) and allows longer term metered parking (for work/employment) further away.
- Use emerging technologies to connect the public with available parking (available parking spots/vacant lots, variably priced metered parking, etc.).
- Survey communities to better understand their specific needs, in order to create more tailored solutions rather than a one-size-fits-all.
- Consider shared parking strategies that balance the peak AM/PM use and off-peak uses.
- Allocate the parking revenues to contribute to not only to the enhancement of the transit experience, but the walkability of the street.
- On the private side, we need to give carpools priority parking. Cities should require it.
- Companies should be incentivized to reduce employee parking and to subsidize transit passes.

Active Transportation

- Focus on Safe Routes to Transit as a key goal.
- SANDAG is doing an admirable job at trying to connect with communities but needs to do a better job in reaching out.
- SANDAG efforts to reach out and invite participation from groups that traditionally are not engaged in the process are appreciated and beneficial.
- Broaden the active transportation goal to include skateboarding, scooters, etc.
- Implement separated bicycle infrastructure facilities on major corridors.
- Plan according to younger generations that want to live in communities where they can walk and bike.
- Improve systems for carrying bicycles on transit vehicles.
- Engage schools as a method of encouraging kids to walk and bike to school.
• Consider expanding way finding signage to direct users to transit stops which would encourage people to bike.
• Develop infrastructure such as bike stations to encourage more people to bike to transit.
• Separation between bicyclists and vehicles is critical since a fear of safety is a barrier.
• Incorporate the complete streets concept into SANDAG planning efforts.
• Offer incentives to encourage more biking; encourage employers to provide more shower and locker room facilities to employees.
• Encourage bicycle education.
• Emphasize utilitarian trips and not just commuter trips.
• Having an Active Transportation discussion puts health first and foremost including individual and environmental health.

**Mobility**

• Focus on intra-regional mobility which can bring money to outlying areas which can foster regional economic vitality.
• Consider a child bike-share program with helmets as a part of a larger bike-share program.
• Create reliability for developers to invest around transit stations.
• Consider moving air freight travel out of Lindbergh, separating passenger from freight and moving freight to Carlsbad or Brown Field.
• Any type of bike-share program needs to include infrastructure to support safer routes to ride.
• Expand traveler information to ease of use of the systems (e.g., “Next Bus” signs)
• Develop a “transit ambassador” program for seniors.
• Make transit competitive with driving in terms of travel time.
• Apply a complete streets model for main boulevards accommodating multiple modes of travel.
• Provide transit service that reaches hard-to-access job centers (e.g., North County).
• Design transit so that it accounts for different areas (e.g., higher density areas merit light rail projects).
• Improve walk/bike/other connections between bus and rail and to/from destinations.
• Direct growth through transportation investments.
• Encourage growth along Smart Growth transportation corridors.
• Consider public health in decision-making.

• Consider including punitive measures to effect change, rather than just incentivizing change; the 18 cities and Port District should be required to follow the Regional Plan goals and principles.

• Include transportation options for all demographics (e.g., youth without licenses trying to get to beach as well as aging population of baby boomers).

• Promote telecommuting and encourage businesses to offer telecommuting to their employees 1-2 days per week.

• Consider sidewalk access and improvements.

• Look at impacts of freight movement versus other modes – do the needs of trucks conflict with the needs of bikes, for example.

• Make transit convenient, cost-effective, and reliable so that transit is competitive with driving.

Transportation Project Evaluation

• Consider sustainability and return on investment. Can you sustain what you are building?

• Incorporate public health into the evaluation criteria and prioritization of transportation projects.

• Balance return on investment and use of transportation facilities.

• Provide a complete analysis of the costs and benefits of the projects, on other forms of transportation, and compare between all modes of transportation.

• Encourage smart growth, neighborhood shuttles.

• Add reduced greenhouse gas emissions to the criteria.

• Place greater value on community involvement and input in the evaluation of these projects. Make sure the community's voice is heard.

• Focus priority on moving the most people at the least cost and increasing transit frequency.

• Consider density as a factor in determining transit project priorities.

• Think about health costs, too.

• Keep equity in mind ... neighborhoods that don’t have many transportation options should be focused on first.

• Think about students, where they need to get to, and how they get to school, and how they make their connections.
EMERGING TECHNOLOGIES

Introduction
Technology has shaped our lives allowing us to be more connected, more productive, and with the potential to change the way we live, work, and play. We will look at three aspects of emerging technology and compare today with what might be in the future.

Personal Technology

Today
- Cell Phones
- Smart Phones
- Tablets

Application: Mobile 511, Traveler Information, Way Finding, Parking Guidance

Tomorrow
- Wearable Computers
- Google Glass
- Augmented or Enhanced Reality

Application: Enhanced 511, Reduction in Travel Demand – Virtual Shopping, Medical Care

Vehicle Technology

Today
- GPS, Way Finding, Routing
- Driver Assist Technology – Lane Keeping, Forward Collision Warning, Self-Parking

Tomorrow
- Autonomous Vehicle, Automated Vehicle, Connected Vehicle
- Co-operative Adaptive Cruise Control – Self Platooning of Vehicles

Application: Improved Safety, Mobility, Throughput, Reduction of Greenhouse Gases

Infrastructure Technology

Today
- Link Transportation Networks (Freeway, Transit, Arterials, Pedestrian, Bicycle, etc.) to work together
- Real Time and Pro-Active Transportation Management and Operations

Tomorrow
- Smart Roads Communicating with Connected Vehicles

Application: Safety, Mobility, Reduction of Greenhouse Gases
EMERGING TECHNOLOGIES

Personal Technology

Google Glass

Vehicle Technology

Self-Driving Vehicle
Connected Vehicles

Infrastructure Technology

Smart Intersections
<table>
<thead>
<tr>
<th>Transportation Technology</th>
<th>Application to GHG Reduction</th>
<th>When?</th>
<th>Model Application (Y/N)</th>
<th>Primary Responsible Party</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. <strong>Vehicle Automation/Semi-Automation</strong></td>
<td>Less Stop-N-Go/Reduced Idling</td>
<td>Near*, Mid, and Long-Term</td>
<td>Y</td>
<td>Public/Private</td>
<td>Vehicles are partially or fully automated or able to navigate without human input improving roadway performance and safety</td>
</tr>
<tr>
<td>2. <strong>Real-Time Traveler Information Via Personal Devices</strong></td>
<td>Fewer SOV Trips, More Bike/Walk Trips, More Transit/Carpool/Vanpool</td>
<td>Near-Term*</td>
<td>Y</td>
<td>Public/Private</td>
<td>Provides real-time traveler and parking information, available on-the-fly, to influence mode choice, route choice and time of travel</td>
</tr>
<tr>
<td>3. <strong>Arterial, Freeway, and Transit Management System</strong></td>
<td>Fewer SOV Trips, Less Stop-N-Go/Reduced Idling, More Transit/Carpool/Vanpool</td>
<td>Near-Term*</td>
<td>Y</td>
<td>Public</td>
<td>Extension of the Integrated Corridor Management concept for real time and multi-agency congestion management to proactively improve mobility and corridor travel efficiency</td>
</tr>
<tr>
<td>4. <strong>Green GPS Fleet Tracking Systems</strong></td>
<td>Fewer SOV Trips, Less Stop-N-Go/Reduced Idling</td>
<td>Near-Term</td>
<td>N</td>
<td>Public</td>
<td>Reduces GHG emissions and operating costs by using real-time tracking to monitor fuel consumption, route efficiency, etc.</td>
</tr>
<tr>
<td>5. <strong>Corridor Level Signal Timing</strong></td>
<td>Less Stop-N-Go/Reduced Idling</td>
<td>Near-Term*</td>
<td>Y</td>
<td>Public</td>
<td>Improvements to real-time data collection and arterial management, operations, and coordination.</td>
</tr>
<tr>
<td>6. <strong>Dynamic Lanes on Arterials to Support HOV Access</strong></td>
<td>Fewer SOV Trips, Less Stop-N-Go/Reduced Idling, More Bike/Walk Trips, More Transit/Carpool/Vanpool</td>
<td>Near-Term*</td>
<td>Y</td>
<td>Public</td>
<td>Infrastructure and lane control that enables arterial lanes to be switched on-the-fly from general purpose, to HOV use, for certain time periods or based on demand</td>
</tr>
<tr>
<td>7. <strong>Smart Intersections</strong></td>
<td>Less Stop-N-Go/Reduced Idling, More Bike/Walk Trips</td>
<td>Near-Term*</td>
<td>N</td>
<td>Public</td>
<td>Improvements to intersection infrastructure to allow real-time and pro-active signal timing operations and support Multi-Agency Arterial Management. Improved mobility and efficiency</td>
</tr>
</tbody>
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### B. Vehicle and Personal Strategies

<table>
<thead>
<tr>
<th>Transportation Technology</th>
<th>Application to GHG Reduction</th>
<th>When</th>
<th>Model Application (Y/N)</th>
<th>Primary Responsible Party</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. <strong>Car Sharing</strong></td>
<td>Fewer SOV Trips</td>
<td>Near-Term</td>
<td>Y</td>
<td>Public/Private</td>
<td>Transportation service that provides communities with a neighborhood based fleet of shared vehicles available to members for a fee.</td>
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<td></td>
<td>More Bike/Walk Trips</td>
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<td></td>
<td>More Transit/Carpool/Vanpool</td>
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<td></td>
<td>Increased Fuel Efficiency</td>
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<tr>
<td>2. <strong>Variable Speed Limits on Freeway Network</strong></td>
<td>Less Stop-N-Go/Reduced Idling</td>
<td>Near-Term*</td>
<td>Y</td>
<td>Public</td>
<td>Speed limits vary in real-time to respond to congestion levels and roadway conditions to maintain smooth and consistent traffic flow.</td>
</tr>
<tr>
<td>3. <strong>Personal Technology</strong></td>
<td>Fewer SOV Trips</td>
<td>Mid, Long-Term</td>
<td>Y</td>
<td>Public/Private</td>
<td>Transit ticketing via personal devices; trip-tracking and reward reclamation via personal devices.</td>
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<td></td>
<td>More Bike/Walk Trips</td>
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<tr>
<td></td>
<td>More Transit/Carpool/Vanpool</td>
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<tr>
<td>4. <strong>Universal Transportation Account (UTA)</strong></td>
<td>Fewer SOV Trips</td>
<td>Near-Term*</td>
<td>Y</td>
<td>Public</td>
<td>Fully integrated account for accessing all transportation services (transit, bikeshare, carshare, bikelockers, FasTrak, vanpool etc).</td>
</tr>
<tr>
<td></td>
<td>More Bike/Walk Trips</td>
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<tr>
<td></td>
<td>More Transit/Carpool/Vanpool</td>
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<tr>
<td>5. <strong>On-the-Fly Trip Planning and Ride Matching</strong></td>
<td>Fewer SOV Trips</td>
<td>Near-Term</td>
<td>N</td>
<td>Public/Private</td>
<td>Multi-modal trip planning and ridematching in real-time via personal devices enabling travelers to find a ride, where and when they need it, using the mode and time that fits best.</td>
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<tr>
<td></td>
<td>More Bike/Walk Trips</td>
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<tr>
<td></td>
<td>More Transit/Carpool/Vanpool</td>
<td></td>
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<tr>
<td>6. <strong>Enhanced Virtual Office/Telework</strong></td>
<td>Fewer SOV Trips</td>
<td>Near-Term</td>
<td>N</td>
<td>Private</td>
<td>Expansion of virtual collaboration technologies that facilitate telework.</td>
</tr>
<tr>
<td></td>
<td>More Bike/Walk Trips</td>
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<tr>
<td></td>
<td>More Transit/Carpool/Vanpool</td>
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### C. Infrastructure Strategies

<table>
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<tr>
<th>Transportation Technology</th>
<th>Application to GHG Reduction</th>
<th>When?</th>
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</thead>
<tbody>
<tr>
<td>1. Automated Truck Corridors</td>
<td>Less Stop-N-Go/Reduced Idling</td>
<td>Near-Term</td>
<td>N</td>
<td>Private</td>
<td>Hybrid, fuel-cell, battery, corridor-level, etc. for energy efficiency</td>
</tr>
<tr>
<td>2. Alternative Fueling Stations</td>
<td>Increased Fuel Efficiency</td>
<td>Near-Term</td>
<td>N</td>
<td>Private</td>
<td>Fuels under CA’s Low Carbon Fuel Standard</td>
</tr>
<tr>
<td>3. Solar Highways &amp; Parking Lots</td>
<td>Increased Fuel Efficiency</td>
<td>Long-Term</td>
<td>N</td>
<td>Public</td>
<td>Road surfaces and parking lots that generate electricity by solar power</td>
</tr>
<tr>
<td>4. Eco-Driving</td>
<td>Less Stop-N-Go/Reduced Idling</td>
<td>Mid-Term</td>
<td>N</td>
<td>Public/Private</td>
<td>Technologies that control and maintain vehicle speed for optimal fuel efficiency and reduced carbon emission</td>
</tr>
<tr>
<td>5. Mobility Hub – Shared Vehicles</td>
<td>Fewer SOV Trips More Bike/Walk Trips More Transit/Carpool/Vanpool Increased Fuel Efficiency</td>
<td>Mid-Term</td>
<td>N</td>
<td>Public/Private</td>
<td>Interconnected “mobility hubs,” integrate regional transit services with communities. Mobility hubs provide a source of shared vehicles and services including cars, neighborhood electric vehicles, personal electric vehicles, and bicycles, along with supporting amenities and technologies.</td>
</tr>
<tr>
<td>6. Electric Vehicle En-Route Charging</td>
<td>Increased Fuel Efficiency</td>
<td>Near-Term</td>
<td>N</td>
<td>Public/Private</td>
<td>Transition to fully electric bus/vehicle fleets</td>
</tr>
<tr>
<td>7. Electric Vehicle Charging Stations</td>
<td>Increased Fuel Efficiency</td>
<td>Near-Term</td>
<td>N</td>
<td>Public/Private</td>
<td>Expansion of efficient vehicle charging stations to support an increase in electric cars and light duty trucks</td>
</tr>
<tr>
<td>8. Rail Technologies</td>
<td>Less Stop-N-Go/Reduced Idling</td>
<td>Near-Term</td>
<td>N</td>
<td>Public/Private</td>
<td>Electric catenary rail systems, dual-mode locomotives, etc.</td>
</tr>
<tr>
<td>9. Bike Sharing or Other Shared Services</td>
<td>Fewer SOV Trips More Bike/Walk Trips More Transit/Carpool/Vanpool Increased Fuel Efficiency</td>
<td>Near-Term</td>
<td>N</td>
<td>Public/Private</td>
<td>Expand shared transportation services such public bike and car sharing and peer-to-peer carsharing.</td>
</tr>
</tbody>
</table>

**“** Included in the Intelligent Transportation System for the San Diego Region (SANDAG)  
Near-Term = 2013-2020; Mid-Term = 2020-2030; Long-Term = 2030-2050