REGIONAL PLANNING
COMMITTEE

Friday, March 5, 2010
12 Noon to 2 p.m.
SANDAG Board Room
401 B Street, 7th Floor
San Diego

AGENDA HIGHLIGHTS

• FINAL CLIMATE ACTION STRATEGY
• DRAFT 2050 REGIONAL TRANSPORTATION PLAN PUBLIC INVOLVEMENT PLAN

PLEASE TURN OFF CELL PHONES DURING THE MEETING

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MISSION STATEMENT

The Regional Planning Committee provides oversight for the preparation and implementation of the Regional Comprehensive Plan that is based on the local general plans and regional plans and addresses interregional issues with surrounding counties and Mexico. The components of the plan include: transportation, housing, environment (shoreline, air quality, water quality, habitat), economy, borders, regional infrastructure needs and financing, and land use and design.
Welcome to SANDAG. Members of the public may speak to the Regional Planning Committee on any item at the time the Committee is considering the item. Please complete a Speaker’s Slip, which is located in the rear of the room, and then present the slip to Committee staff. Also, members of the public are invited to address the Committee on any issue under the agenda item entitled Public Comments/Communications/Member Comments. Speakers are limited to three minutes. The Regional Planning Committee may take action on any item appearing on the agenda.

This agenda and related staff reports can be accessed at www.sandag.org under meetings on the SANDAG Web site. Public comments regarding the agenda can be forwarded to SANDAG via the e-mail comment form also available on the Web site. E-mail comments should be received no later than noon, two working days prior to the Regional Planning Committee meeting.

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<tr>
<th>ITEM #</th>
<th>RECOMMENDATION</th>
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<tbody>
<tr>
<td>1.</td>
<td>APPROVAL OF FEBRUARY 5, 2010, MEETING MINUTES</td>
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<td>FINAL CLIMATE ACTION STRATEGY (Andrew Martin)</td>
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<td>DRAFT 2050 REGIONAL TRANSPORTATION PLAN PUBLIC INVOLVEMENT PLAN (Anne Steinberger)</td>
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Members of the public will have the opportunity to address the Regional Planning Committee (RPC) on any issue within the jurisdiction of the Committee that is not on this agenda. Speakers are limited to three minutes each and shall reserve time by completing a “Request to Speak” form and giving it to the Clerk prior to speaking. Committee members also may provide information and announcements under this agenda item.

REPORT ITEMS (3 through 6)

<table>
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<th>ITEM #</th>
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<tr>
<td>3.</td>
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<td>FINAL CLIMATE ACTION STRATEGY (Andrew Martin)</td>
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<td>DRAFT 2050 REGIONAL TRANSPORTATION PLAN PUBLIC INVOLVEMENT PLAN (Anne Steinberger)</td>
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On February 5, 2010, the RPC accepted the preliminary draft Climate Action Strategy (Strategy) for public distribution and comment. At that meeting, the RPC also discussed and provided comments on the draft Strategy. The draft Strategy also has been reviewed by the Transportation Committee, Regional Energy Working Group, Regional Planning Technical Working Group, and other interested stakeholders. The Strategy will serve as a guide to assist the region in addressing climate change, with a focus on helping SANDAG identify policy measures that will help reduce greenhouse gas emissions from passenger cars and light-duty trucks and comply with Senate Bill 375. The RPC is asked to recommend that the Board of Directors approve the Final Climate Action Strategy, in substantially the same form as attached.

Staff will present an overview of the draft 2050 RTP/SCS Public Involvement Plan. The draft Plan includes goals and objectives as well as strategies and tactics for conducting outreach throughout the RTP and SCS development process. The draft Plan was presented to the Regional Planning Stakeholders Working Group on February 16, 2010. The draft Plan also is being presented to the Transportation Committee for review and comment. The RPC is asked to review and comment on the draft Plan.
The Regional Comprehensive Plan calls for preparation of a smart growth trip generation study (Study) to provide guidance regarding trip generation in smart growth settings. SANDAG has been working with a consultant team to prepare this Study, with ongoing input from members of the San Diego Regional Traffic Engineers Council, the Cities/County Transportation Advisory Committee (local public works directors), and the Regional Planning Technical Working Group (local planning directors). The RPC is asked to recommend that the Board of Directors accept the Study, (in substantially the same form as Attachment 1) for inclusion into the San Diego Traffic Generators Manual as an appendix, and as a resource in the SANDAG Smart Growth Toolbox.

6. UPCOMING MEETINGS

The next meeting of the RPC is scheduled for Friday, April 2, 2010, at 12 noon.

7. ADJOURNMENT

+ next to an item indicates an attachment
The meeting of the Regional Planning Committee was called to order by Chair Jim Janney (South County) at 12:01 p.m. See the attached attendance sheet for Regional Planning Committee member attendance.

Chair Jim Janney (South County) welcomed new members to the meeting: Commissioner Louis Smith (San Diego Unified Port District); Councilmember Teresa Barth (North County Coastal); Southern California Tribal Chairmen’s Association Chairman Allen Larson (San Pasqual Band of Indians).

1. APPROVAL OF MEETING MINUTES (APPROVE)

Action: Upon a motion by Councilmember Lesa Heebner (North County Coastal) and a second by Councilmember Steve Gronke (North County Inland), the Regional Planning Committee unanimously approved the minutes from the December 4, 2009, meeting.

2. PUBLIC COMMENTS/COMMUNICATIONS/MEMBER COMMENTS

Action: There were no public comments/communications/member comments.

3. CHAIR’S REPORT (3)

3.1. STATUS REPORT ON URBAN AREA TRANSIT STRATEGY (INFORMATION)

As part of the development of the 2050 Regional Transportation Plan (RTP), SANDAG is pursuing a visionary strategy to elevate transit as a premier travel option in urban areas. SANDAG has retained PB Americas to assist with this work. A PB team of international transportation and land use experts convened in San Diego in mid January to provide strategic and technical expertise during the creation and evaluation of alternative transit networks that will be incorporated into the 2050 RTP. Carolina Gregor, Senior Planner, provided highlights from the PB consultant team visit and outlined next steps.

Action: This item was presented for information only.
REPORT ITEMS (4 through 7)

4. DISTRIBUTION OF FUNDS FROM CALIFORNIA COASTAL COMMISSION BEACH SAND MITIGATION FUND (APPROVE)

Shelby Tucker, Associate Planner, reported that as an offset to the potential adverse impacts of shoreline protective devices, the California Coastal Commission (CCC) has established a Beach Sand Mitigation Fund supported by fees collected by the CCC through its coastal development permit process. The mitigation fees are deposited in an interest-bearing account managed by SANDAG to be used solely to implement projects which place sand on the applicable city’s beach. The City of Encinitas plans to use $90,000 in mitigation funds to place 20,000 cubic yards of sand from the Scripps Memorial Hospital project underground parking structure onto the northernmost section of Moonlight Beach. The CCC requires that SANDAG approve the release of funds prior to the CCC’s consideration of the City of Encinitas’ request.

Action: Upon a motion by Chairwoman Pam Slater-Price (County of San Diego) and a second by Councilmember Gronke, the Regional Planning Committee unanimously approved the allocation of funds from the Beach Sand Mitigation Fund and directed SANDAG staff to submit the proposal to the Executive Director of the CCC for review and approval.

5. PRELIMINARY DRAFT CLIMATE ACTION PLAN (ACCEPT)

Andrew Martin, Associate Planner, presented an overview of the draft plan. The Climate Action Plan will serve as a guide to help policymakers address climate change, with a focus on helping SANDAG identify policy measures that will help it reduce greenhouse gas emissions from passenger cars and light-duty trucks, and comply with Senate Bill 375. The plan identifies available measures that will help the region integrate climate change considerations into existing planning processes affecting our transportation system, land use patterns, building stock, and energy infrastructure. The projected impacts of climate change to the region are also described.

Action: Upon a motion by Councilmember Sherri Lightner (City of San Diego) and a second by Councilmember Heebner, the Regional Planning Committee unanimously accepted the Preliminary Draft Climate Action Plan for public distribution and comment.

6. PRELIMINARY 2050 REGIONAL GROWTH FORECAST (RECOMMEND)

Beth Jarosz, Senior Research Analyst, reported on the purpose, results, and next steps of the forecast, which is based largely on input received over the past 14 months from each jurisdiction’s local planning staff and elected leaders.

Action: Upon a motion by Councilmember Heebner and a second by Councilmember Gronke, the Regional Planning Committee recommended that the Board of Directors accept the 2050 Regional Growth Forecast for use in the 2050 Regional Transportation Plan and
other planning efforts; and, information regarding the assumptions made in the 2050 Regional Growth Forecast be provided to the Board of Directors.

7. CITY OF SAN DIEGO – AFTER THE GENERAL PLAN UPDATE (INFORMATION)

Bill Anderson, City of San Diego Director of City Planning and Community Investment, reported on the steps the City is taking to implement the recently adopted general plan.

Action: This item was presented for information only.

8. UPCOMING MEETINGS

The next meeting of the Regional Planning Committee is scheduled for March 5, 2010, at 12 noon.

9. ADJOURNMENT

Chair Janney adjourned the meeting at 1:46 p.m.

Attachment: Attendance Sheet
# CONFIRMED ATTENDANCE
## SANDAG REGIONAL PLANNING COMMITTEE MEETING
### FEBRUARY 5, 2010 - 12:00 p.m. to 2:00 p.m.

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<tr>
<th>SUBREGIONAL AREA</th>
<th>JURISDICTION</th>
<th>NAME</th>
<th>MEMBER / ALTERNATE</th>
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<tr>
<td>North County Inland</td>
<td>City of Vista</td>
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<td>Pam Slater-Price</td>
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<td>Caltrans, District 11</td>
<td>Laurie Berman</td>
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<td>Bill Figge</td>
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<td>San Diego County Water Authority</td>
<td>Elsa Saxod</td>
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<td>Susanah Aguilera</td>
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<td>Al Ovrom</td>
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<td>Carl Hilliard</td>
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<td>Johnny Hernandez (Iipay Nation of Santa Ysabel)</td>
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<td>Denis Turner (SCTCA)</td>
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<tr>
<td>Environmental Mitigation Program Advisory Member</td>
<td>Wildlife Conservation Board</td>
<td>Deborah Townsend</td>
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<td>Environmental Mitigation Program Advisory Member</td>
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<td>Steve Juarez</td>
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San Diego Association of Governments

REGIONAL PLANNING COMMITTEE

March 5, 2010

AGENDA ITEM NO.: 3

Action Requested: RECOMMEND

FINAL CLIMATE ACTION STRATEGY

File Number 3200400

Introduction

The Final Climate Action Strategy (Final Strategy) serves as a guide on climate change policy for SANDAG. Recognizing that climate change relates to many issues addressed by existing regional and local plans, the Strategy outlines an approach for integrating climate change considerations into existing plans as they are updated. For example, a primary focus is to assist SANDAG in identifying measures that could help to reduce greenhouse gas (GHG) emissions from passenger cars and light-duty trucks as part of the development of the 2050 Regional Transportation Plan (RTP), in compliance with Senate Bill 375 (SB 375) (Steinberg, 2008). In addition to the on-road transportation sector, the Final Strategy also focuses on the energy sector and resources for local governments. This report describes key background information and provides an overview of the Final Strategy. Attachment 1 lists substantive comments received and describes how they are addressed in the Final Strategy, which is provided as Attachment 2.

The Regional Energy Working Group (EWG) has overseen development of the Final Strategy at its monthly meetings. In addition to comments by the Regional Planning Committee, the Final Strategy reflects the input and suggestions made by members of the Board of Directors, Transportation Committee, local planning directors on the Regional Planning Technical Working Group, and attendees at the February 11, 2010, public workshop.

Discussion

SANDAG is preparing the Final Strategy as part of the multiyear partnership with the California Energy Commission and to satisfy a mitigation measure from the 2007 Regional Transportation Plan (RTP) Environmental Impact Report. A major focus of the Final Strategy is to identify policy measures that could help SANDAG reduce GHG emissions from passenger cars and light-duty trucks as it prepares the 2050 RTP update currently underway. The Final Strategy also provides a foundation for addressing climate change considerations when the Regional Comprehensive Plan is updated.

Overview of the Final Climate Action Strategy

The Final Strategy identifies available policy measures that could help the region address climate change through existing planning processes affecting our transportation system, land use patterns,
building stock, and energy infrastructure. The policy measures are not prescriptive and are only intended to help in the consideration of measures to address climate change. The range of potential measures results from a comprehensive review of other agencies and various authorities working on measures to address climate change and published research on reducing GHG emissions. While some may not ultimately prove viable for the San Diego region, they are presented in the Final Strategy to provide policymakers with a broad range of options for consideration. In most if not all cases, more detailed study and analysis of the measures would be required prior to implementation.

Energy use related to these areas accounts for about 80 percent of the region’s total GHG emissions. Although climate change is a global problem requiring attention at the state, federal and international levels, many of the solutions and especially the impacts will occur at regional and local levels. And although our region has limited influence on global emissions, we can prepare for the projected impacts and do our part to reduce emissions.

Standards and programs at the state level are expected to achieve the majority of GHG reductions needed in the transportation and energy sectors to achieve the statewide 2020 target under Assembly Bill 32 (Pavley 2006). For example, the California Light-Duty Vehicle Greenhouse Gas Standards and Low Carbon Fuel Standard are expected to account for about 90 percent of the reductions needed from the transportation sector. The remaining transportation-related GHG reductions are expected to come from metropolitan planning organizations (MPOs) like SANDAG through coordinated land use and transportation planning, and related measures, policies, and investments to reduce GHG emissions per the requirements of SB 375. Similarly, state level actions will achieve most of the GHG reductions needed from the energy sector, but regional and local efforts can help California meet its goals for reducing GHG emissions.

As a result, the Final Strategy examines available policy measures for regional agencies and local governments to reduce GHG emissions in these areas, particularly for passenger cars and light-duty trucks as required in future updates of the RTP. The Final Strategy also describes how the region may be impacted by the changing climate. Regional and local governments have authority and influence over three essential areas that contribute to climate change and that could be threatened by its impacts:

1. Land use patterns and transportation infrastructure
2. Building construction and energy use
3. Government operations

The Final Strategy identifies a range of available policy measures SANDAG, local governments, or other regional entities could choose to implement or influence to reduce GHG emissions in these three essential areas. Also addressed are measures and resources to help local governments lead by example and reduce emissions from their operations. In certain cases where authority is lacking at the regional or local level, the plan identifies policy measures for which our region may want to consider pursuing legislative changes or similar actions to enable regional or local action.

Other main components include an introduction to climate change, guiding principles for climate change action, overview of the climate change policy and regulatory framework in California, summary of the region’s major sources of GHG emissions, and description of the impacts climate change may have on the region.
Next Steps

At its March 26, 2010, meeting, the Board of Directors will be asked to approve the Final Climate Action Strategy.

CHARLES "MUGGS" STOLL
Director of Land Use and Transportation Planning

Attachments: 1. Comments and Responses on the Preliminary Draft Climate Action Strategy
2. Final Climate Action Strategy

Key Staff Contact: Andrew Martin, (619) 699-7319, ama@sandag.org
This table summarizes the proposed SANDAG staff responses to comments and input received on the Preliminary Draft Climate Action Strategy from the following SANDAG public meetings, as well as other comments provided by elected officials, local government staff, members of the public, or other stakeholders: Regional Energy Working Group, January 14, 2010; Regional Planning Technical Working Group, January 14, 2010, and February 11, 2010; Board of Directors, January 14, 2010; Transportation Committee, February 5, 2010; Regional Planning Committee, February 5, 2010; Public Workshop on the Climate Action Strategy, February 11, 2010.

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<tr>
<th>THEME OF COMMENT OR DISCUSSION</th>
<th>PROPOSED STAFF RESPONSE</th>
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<tr>
<td><strong>1</strong> Introduction: Revise the Introduction section to focus more on the purpose and scope of the Strategy and less on the causes of climate change; cite scientific studies to provide support statements describing climate change; clarify the intent of available policy measures, including those at the local government level.</td>
<td>The Introduction has been reorganized and revised to focus more on the purpose and scope of the Climate Action Strategy and less on the causes of climate change. The Introduction now begins with the heading, “Overview of the Climate Action Strategy” and a discussion of the purpose and scope of the Strategy. The discussion of climate change has been moved after the overview of the Strategy, given the heading, “Overview of Climate Change,” and revised to include citations supporting descriptions of climate change and its potential impacts. The revised Introduction also includes the following revised description of the intent of the policy measures identified in the Strategy:</td>
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<td>“The policy measures contained in this document are intended to be a list of potential options – “tools in the toolbox” – for consideration as SANDAG updates its Regional Transportation Plan and Regional Comprehensive Plan, and as local governments update their general plans and other community plans. The policy measures are not requirements for SANDAG, local governments, or any other entity. Moreover, it is the discretion of each agency to decide whether and how to best implement the various policy measures listed in this plan. For example, a policy measure at the local government level could be implemented through a local government regulation, incentive, program, public-private collaboration or by a variety of entities such as a local government, private developer, business, nonprofit, quasi-government entity, or even some combination thereof. Many actions at the local government level also could benefit by supportive regional actions from entities like SANDAG.”</td>
<td>“The range of potential measures results form a comprehensive review of other agencies and various authorities working on measures to address climate change and published research on the topic of reducing GHG emissions. While some measures may not ultimately prove viable for the San Diego region, they are presented in the Strategy to provide decision-makers with a broad range of options for considerations. In most, if not all cases, more detailed study and analysis of the measures would be required prior to implementation.”</td>
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<td><strong>Evaluation Criteria:</strong> Differentiate among the policy measures using evaluation criteria such as magnitude of GHG reduction and cost.</td>
<td>Staff agrees that climate change policy measures will need to be evaluated on criteria like GHG reductions, costs, and a variety of economic, environmental, and social equity indicators prior to implementation. This type of analysis is currently underway as part of development of the 2050 RTP and will be provided to decision-makers throughout the RTP process.</td>
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<td><strong>Specific Numeric Targets and Goals:</strong> Establish GHG reduction targets for all economic sectors; establish a numeric goal for reduction of vehicle miles traveled.</td>
<td>Staff agrees that targets for reducing GHG emissions and related performance indicators like vehicle miles traveled can play an important role in formulating policies to address climate change. In California, the state has taken the lead role in developing economy-wide and sector-specific targets for reducing GHG emissions, including the transportation sector. For example, Senate Bill 375 (Steinberg, 2008) will lead to the establishment of GHG reduction targets for passenger cars and light-duty trucks and other new requirements as SANDAG prepares future updates of its Regional Transportation Plan. The state also has identified emissions reductions and regulations and other mechanisms to achieve those reductions for other sectors of the economy, including energy (electricity and natural gas) and a voluntary reduction target for local governments. Rather than establish regional targets that may conflict with or not necessarily complement the State targets, the SANDAG Climate Action Strategy takes the approach of identifying policy measure options that local governments and SANDAG have the opportunity or authority to implement, and which could contribute to state goals and targets for GHG reduction.</td>
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<td><strong>Regional Roles and Responsibilities Associated with Climate Change:</strong> Identify regional climate priorities for GHG reduction and responsibilities for adaptation, regardless of SANDAG and/or local government limitations; Coordinate with San Diego County Water Authority (SDCWA) to identify common goals between SANDAG and SDCWA.</td>
<td>Staff agrees that identifying priorities for GHG reduction and responsibilities for adaptation planning are fundamental components of policy to address climate change. The intent of the Strategy is to provide decision-makers with potential options – “tools in the toolbox” – for consideration as SANDAG updates its Regional Transportation Plan and Regional Comprehensive Plan, and as local governments update their general plans and other community plans. Staff also agrees that many agencies are likely to have a role in adaptation planning for the potential impacts of climate change. Decisions on which climate action measures to pursue and the responsible entities are best debated among regional and local officials and the general public during the development of these subsequent public policy documents (and related regulatory mechanisms). As a means to implement the SANDAG Climate Action Strategy and Regional Energy Strategy, staff could seek a meeting(s) with San Diego County Water Authority staff to identify areas for collaboration and coordination on mutual goals related to energy, water supply, and climate change.</td>
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<td>Theme of Comment or Discussion</td>
<td>Proposed Staff Response</td>
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<td><strong>5 Carbon Trading:</strong> Describe carbon trading opportunities for the region, for example requiring new development projects to pay a fee per unit of GHG emitted and then using the revenue for projects that reduce GHG emissions.</td>
<td>Staff agrees that information from other agencies, regions, or published research on potential carbon trading opportunities could be helpful to its member agencies and the region, and staff is researching available information for inclusion in the final Strategy. However, staff believes that detailed discussion of potential carbon trading programs in the San Diego region is outside the purview of the SANDAG Climate Action Strategy. A future update to the Regional Comprehensive Plan, for example, would be a more appropriate time to consider the role of a carbon trading program in the region's broader climate change-related and other public policy efforts.</td>
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<td><strong>6 Smart Growth:</strong> Provide evidence supporting statements about the benefits of smart growth, in the San Diego region if available; discuss how SANDAG can further support smart growth, for example through its transportation funding criteria; discuss the relationship among housing type/compact land use and water use; discuss the role among the SANDAG Smart Growth Concept Map and Sustainable Communities Strategy in the 2050 RTP; address the role among protection of sensitive resources and planning for smart growth and compact urban form.</td>
<td>The Smart Growth Land Use and Low-Carbon Transportation section now includes a reference to the SANDAG study Trip Generation for Smart Growth: Guidelines for the San Diego Region, which shows that existing smart growth areas in the San Diego region have fewer vehicle trips and vehicle miles traveled and a greater number of walking, bicycling and public transit trips than conventional development due to characteristics like mixture of uses and activities, variety of nearby destinations, transportation infrastructure and urban design conducive to walking and bicycling, and high quality access to public transit. This study is scheduled to be presented to the Transportation Committee and Board of Directors in March 2010 for acceptance as an appendix to the SANDAG San Diego Traffic Generators guidance document. In addition, analysis of the GHG reduction potential of various land use and transportation-related measures being performed to facilitate development of the 2050 RTP will show how smart growth and other policy measures could affect GHG emissions in the San Diego region. The following policy measures have been added under Objective 1a. Create smart growth neighborhoods and communities in which most if not all basic daily needs and public transit service are safely accessible on foot or by bicycle:</td>
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| | • Give strong consideration to existing and planned smart growth areas in the prioritization of transportation projects and related investments and decisions to reduce GHG emissions  
• Identify additional ways SANDAG can support the planning and development of smart growth areas through its transportation investments and other funding decisions  
• Use the Smart Growth Concept Map as a starting point for the land use component of the Sustainable Communities Strategy  
• Integrate sensitive resource area protection activities with efforts to promote compact smart growth development patterns and reduce transportation-related GHG emissions |
| The discussion of smart growth and compact urban form also has been updated to note that smart growth leads to lower water consumption and related household and infrastructure costs than conventional development patterns, and would contribute to the goal to reduce water-related energy use and GHG emissions identified in the Clean Energy and Efficient Buildings section of the Strategy. The Strategy has been updated to include more discussion on the relationship among habitat protection, smart growth planning, and transportation strategies to reduce GHG emissions. |  
|---|---|
| **Affordable Housing, Regional Housing Needs Assessment, and Senate Bill 375:** Discuss the relationship among affordable housing, the Regional Housing Needs Assessment (RHNA) process, and reducing transportation-related GHG emissions; Clarify statements in the Strategy addressing local government requirements under Senate Bill 375. | The Smart Growth and Land Use section and related discussions of Senate Bill 375 describe the role of planning for affordable housing, the Regional Housing Needs Assessment (RHNA) process, and reducing transportation-related GHG emissions. The Strategy has been revised to clarify that coordination of local land use planning, including the identification of sites for affordable housing with regional transportation planning, is essential to the successful implementation of Senate Bill 375.  

The Strategy includes the following discussion on the topic of integrating planning for affordable housing with planning for land use, transportation, and GHG reductions:  

“The affordability of housing and transportation and access to employment play a critical role in determining where people live, how much they travel, and therefore, directly affect transportation-related GHG emissions. Integrating social equity considerations like affordability, displacement, gentrification, and jobs-housing fit (providing affordable housing that matches well with wage levels of nearby jobs) in smart growth development can lower VMT and contribute to GHG reductions by allowing groups with moderate and lower incomes to live affordably in areas closer to their jobs with improved access to services and affordable travel options like public transit. Failure to consider social equity factors may lead to exclusion, limited employment opportunities, dispersed development, and therefore higher VMT.” |
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| 8 California Standards for Low-Carbon Fuels and More Fuel Efficient Vehicles: Provide greater detail on the significant GHG reductions that are expected to result from State efforts to increase the use of low-carbon, alternative fuels and improve the fuel efficiency of passenger cars and light-duty trucks; discuss strategies at the local and regional level to support a transition to alternative fuel vehicles. | The Strategy has been revised to make clear that standards and programs at the State level are expected to achieve the majority of the GHG reductions needed in the transportation sector to achieve the statewide 2020 target under Assembly Bill 32. The California Light-Duty Vehicle Greenhouse Gas Standards and the Low Carbon Fuel Standard are expected to account for about 90 percent of the reductions needed from the transportation sector. Additional transportation-related GHG reductions will need to come from actions at the regional and local levels. The remaining approximately 10 percent of needed transportation-related GHG reductions are expected to come from Metropolitan Planning Organizations like SANDAG through coordinated land use and transportation planning, and related measures, policies, and investments to reduce GHG emissions per the requirements of Senate Bill 375. 
Goal 3. Promote the Use of Low-Carbon, Alternative Fuels, of the Smart Growth Land Use and Low-Carbon Transportation section identifies available policy measures the region could take to facilitate the transition of the passenger vehicle fleet to alternative fuels through measures like support for the installation of infrastructure such as electric car charging points. |
| 9 Transportation Policy Measures: The Strategy identified some policy measures that may not be viable for the San Diego region, including the conversion of existing general purpose lanes to toll facilities or high occupancy toll (HOT) facilities or reduction of the maximum speed limit to 55 miles per hour. | The range of potential measures results from a comprehensive review of other agencies, regions, and various authorities working on measures to address climate change and published research on reducing GHG emissions. While some measures may not ultimately prove viable for the San Diego region, they are presented in the Strategy to provide decision-makers with a broad range of options for consideration. In most, if not all cases, more detailed study and analysis of the measures would be required prior to making a decision regarding their implementation. Moreover, pricing policies are an option for managing the use of transportation facilities, particularly when there is limited capacity, such as during rush hours. Conversion of existing HOV facilities to high occupancy toll (HOT) lanes, or general purpose facilities to toll facilities, are ways in which pricing could be used to manage demand. In the San Diego region, development of new HOT lanes and new toll lanes – rather than the conversion of existing facilities – has been the adopted approach to pricing. |
| 10 Transportation: Add new policy measure to address adaptation as improvements to coastal infrastructure are made. | Objective 4b. Protect transportation infrastructure from sea level rise and associated higher storm surges, of the Smart Growth Land Use and Low-Carbon Transportation section has been updated with the following new policy measure: 
- Address adaptation issues in the design of new projects and when improvements are made to existing infrastructure. |
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<td><strong>11</strong> Land Use and Transportation: Address reducing “cold starts” as another GHG reduction measure in the land use and transportation section.</td>
<td>Staff agrees that policy measures intended to reduce the number of “cold starts” (i.e., total vehicle trips) are one approach to reduce GHG emissions and miles of vehicle travel. The Strategy identifies available policy measures that would reduce the number of cold starts by promoting smart growth development and transportation alternatives such as public transit, walking, bicycling, and ridesharing.</td>
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<td><strong>12</strong> Land Use and Transportation: Revise a “Guiding Principle” from “Design” walkable communities to “Build” walkable communities.</td>
<td>The Climate Action Strategy Guiding Principle to, “Design Communities for Walking, Bicycling, and Public Transit” has been revised to read “Build Communities for Walking, Biking, and Public Transit.”</td>
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<td><strong>13</strong> Parking: Comprehensive parking reform is fundamental to reducing transportation-related GHG emissions. The Climate Action Strategy should describe the need to develop detailed and feasible strategies to price both parking and driving.</td>
<td>Staff agrees that policy measures related to parking and pricing of driving are two of the many options available to address transportation-related GHG emissions. The list of policy measures identified in the Strategy includes changes to current parking requirements, parking management, and multiple available pricing strategies. Staff is researching other agencies, regions, and published literature on the relationship among parking policies, travel behavior, and GHG emissions and proposes to include a brief summary in the final Strategy.</td>
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<td><strong>14</strong> Transportation Policy Measures: Include a policy measure to reduce GHG emissions by using concrete surfaces instead of asphalt for transportation improvements.</td>
<td>Staff is further researching the issue raised by this topic and proposes to include a brief discussion on the relationship among pavement type, vehicle fuel efficiency, and GHG emissions in the final Strategy.</td>
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<td><strong>15</strong> Trees and Landscaping: Reference information about the ability of different tree and landscaping species and materials to sequester greenhouse gases.</td>
<td>Staff agrees that this information would be helpful to local governments and is researching available information for inclusion in the final Strategy.</td>
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| **16** Energy and Water: Under Objective 3b. Use reclaimed water to decrease the amount of GHG emissions attributed to meeting regional water needs, list indirect potable reuse (IPR) projects as a policy measure to reduce embedded energy use and indirect GHG emissions from water use. Also describe the City of San Diego IPR project. | The discussion under Objective 3b. has been revised to include a description of the City of San Diego’s IPR project and include the following policy measure:  
- Support projects to meet water demand by treating and reusing processed reclaimed water to potable water standards, such as the City of San Diego IPR project (SANDAG and local governments). |
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<td><strong>17 Energy and Water:</strong> Provide information on the energy and GHG emissions impacts of available water supply options.</td>
<td>The discussion under Goal 3. Reduce Water-related Energy Use and GHG Emissions, has been revised to include the embedded energy of various options for meeting future water demand. The more energy intensive water supply options will generally result in higher GHG emissions than the less energy intensive water supply options.</td>
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<td><strong>18 Energy and Water:</strong> Differentiate between the energy intensity of providing drinking water through indirect potable reuse and reclaimation.</td>
<td>As of this writing staff has not been able to locate a further breakdown of the energy intensity of recycled water by the categories of indirect potable reuse and reclaimation. Staff will continue to research this information for inclusion in the final Strategy (if it is available).</td>
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<tr>
<td><strong>19 Energy and Buildings:</strong> Make clearer the magnitude of the utility's role, state's role and local/regional government role in achieving GHG reductions from the energy sector.</td>
<td>The opening narrative for this section has been revised to clarify the large roles that the utility, and state agencies undertake in energy efficiency and renewables, followed by ways that local governments can leverage these efforts to further reduce GHG emissions.</td>
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<td><strong>20 Energy and Buildings:</strong> Provide greater emphasis to policy measures related to energy and buildings with greater GHG reduction potential, e.g. signify that greater GHG reductions come from retrofitting existing building more than reach codes for new construction.</td>
<td>Buildings and Energy section has been revised to describe the scale of GHG benefits from targeting energy reductions in existing and new construction. Figures showing the region's electricity and natural gas consumption by end use sector have been included. Also, staff acknowledged that a top priority of the Regional Energy Strategy is development of a regional building retrofit program.</td>
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<td><strong>21 Green Buildings:</strong> Describe new state green building standards.</td>
<td>The Clean Energy and Efficient Buildings section, under Goal 1, has been revised to include discussion of the new California Green Building Standards.</td>
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<td><strong>22 Energy Dependence and National Security:</strong> Research energy independence and national security implications of climate change and whether they need to be addressed in this Strategy.</td>
<td>The discussion under The Smart Growth Land Use and Low-Carbon Transportation section, Goal 3. Promote Use of Low-Carbon Alternative Fuels, has been revised to include the connection among alternative fuels, high efficiency vehicles, and energy independence. The promotion of low carbon, alternative fuels provides the added benefit of reducing regional reliance on imported petroleum. The federal Energy Independence and Security Act of 2007 identified increased vehicle efficiency and increased supply of alternative fuels as two measures to enhance national energy security and reduce the nation’s reliance on petroleum imports. By coordinating a regional alternative transportation infrastructure effort and supporting local alternative fuel developers, SANDAG and local governments can help the San Diego region become more energy independent.</td>
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<td>**23 ** <strong>Review of the Strategy:</strong> Include the military in review of the draft Strategy.</td>
<td>Representatives of the military have been included in the process of soliciting input and comments on the Strategy: they are included on distribution lists at the working group level and for Board of Directors meetings. In addition, SANDAG coordinates with military entities on transportation demand management programs such as the Regional Vanpool Program.</td>
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<td>**24 ** <strong>Local Government Resources:</strong> Incorporate relevant information from the General Plan Guidelines currently being updated by the Governor’s Office of Planning and Research (OPR).</td>
<td>The update to the OPR General Plan Guidelines is not complete nor is a draft version available as of this writing. However, the Strategy identifies policy measures available to local governments for their consideration if and when they prepare updates to their General Plans.</td>
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| **25 ** **Local Government:** In addition to local governments, identify actions SANDAG can take to reduce GHG emissions from its operations. | Staff proposes that the Local Government Operations section be revised to the read “SANDAG and Local Government Operations.” In addition, a new objective could be added such as Objective 1b. “SANDAG assess energy use of its own operations”  
Potential policy measures to address SANDAG operations could include:  
- Establish a cross-department team to address climate change mitigation and adaptation  
- Regularly update a countywide inventory of municipal and communitywide GHG emissions  
- Perform an energy assessment of SANDAG operations  
- Based on the assessment, identify opportunities to reduce inefficient use of electricity, natural gas, and petroleum in SANDAG operations |
SAN DIEGO ASSOCIATION OF
GOVERNMENTS

CLIMATE ACTION STRATEGY

DRAFT

February 2010
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INTRODUCTION

Overview of the Climate Action Strategy

While climate change is undoubtedly a global problem requiring attention at the state, federal, and international levels, many of the solutions and especially the impacts will occur at the regional and local levels. While our region cannot influence global emissions, we can prepare for the projected impacts and do our part to reduce emissions.

The SANDAG Climate Action Strategy (Strategy) serves as a guide to help policymakers address climate change as they make decisions to meet the needs of our growing population, maintain and enhance our quality of life, and promote economic stability. It does so in the context of the significant action on climate change happening in California.

The State of California is taking a strong approach to address climate change, and has jurisdiction over important sources of GHG emissions like vehicle fuel efficiency and power plants. In addition, the federal government has recently become more involved in climate change, and as of this writing, legislation to reduce GHG emissions is pending before Congress. Nevertheless, there are roles for local and regional governments. SANDAG, local governments, and other regional entities have authority and influence over three essential areas that contribute to climate change:

1. Land use patterns, transportation infrastructure and related public investments
2. Building construction and energy use
3. Government operations

As a result, the Strategy focuses on these areas where regional and local agencies have the authority or opportunity to influence emissions and make our region more resilient to the changing climate. The opportunity and ability to reduce the three largest sources of GHG emissions in our region are in the following areas:

- On-road transportation (i.e., passenger vehicles, light-, medium- and heavy-duty trucks, and motorcycles),
- Electricity generation, and
- Natural gas end uses (e.g., space heating, cooking, etc.).

When combined, these three sources account for about 80 percent of emissions in the San Diego region, with on-road transportation alone responsible for about 46 percent of the total. Just as important, our transportation and energy infrastructure systems also are threatened by climate change impacts.

Successfully responding to climate change will require us to mitigate our GHG emissions and adapt to the changes it will bring. Reducing our emissions will require a foundation of improved land use and transportation planning, and changes in the amounts and types of energy we use. A major purpose of the Strategy is to identify land use and transportation policy measures that could reduce GHG emissions and help SANDAG meet or exceed its Senate Bill 375 (SB 375) (Steinberg, 2008) targets for reducing GHG emissions from passenger cars and light-duty trucks.

The Strategy identifies goals, objectives, and policy measures in the areas of transportation, land use, buildings, and energy use. Also addressed are measures and resources to help local governments reduce emissions from their operations and in their communities. While a small fraction of our total climate change contribution, reducing GHG emissions from local government operations can save taxpayer dollars and set an example for the greater community.
The policy measures contained in this document are intended to be a list of potential options – “tools in the toolbox” – for consideration as SANDAG updates its Regional Transportation Plan and Regional Comprehensive Plan, and as local governments update their general plans and other community plans. The policy measures are not requirements for SANDAG, local governments, or any other entity. Moreover, it is the discretion of each agency to decide whether and how to best implement the various policy measures listed in this plan. For example, a policy measure at the local government level could be implemented through a local government regulation, incentive, program, public-private collaboration or by a variety of entities such as a local government, private developer, business, non-profit, quasi-government entity, or even some combination thereof. Many actions at the local government level also could benefit by supportive regional actions from entities like SANDAG.

The range of potential measures results form a comprehensive review of other agencies and various authorities working on measures to address climate change and published research on the topic of reducing GHG emissions. While some measures may not ultimately prove viable for the San Diego region, they are presented in the Strategy to provide decision-makers with a broad range of options for considerations. In most, if not all cases, more detailed study and analysis of the measures would be required prior to implementation.

Decisions on which climate action measures to pursue are best debated among regional and local officials and the general public during the development of these subsequent public policy documents (and related regulatory mechanisms).

Climate Change and SANDAG Regional Planning

The SANDAG Regional Comprehensive Plan (RCP) provides the long-term strategic planning framework for our region to address the many issues affecting our quality of life and move us toward a more sustainable future. The RCP, which was adopted in 2004, does not include a discussion of climate change and its effects on the region. However, our contributions to climate change and its impacts to our region are not considered in the RCP. At the time the RCP was prepared, climate change was not a significant public policy issue at the regional and state levels. When the issue of climate change is integrated within the broader RCP framework, it is expected that this is important because some certain regional strategies for promoting our quality of life may contribute to climate change and aspects of our quality of life are threatened by climate change. For example, different success in reducing our GHG emissions will require consideration of how investments in areas like transportation infrastructure investment strategies may affect our GHG emissions in the region to varying degrees, as well as how the changing climate might impact those investments. In addition, some investments called for in the RCP, such as investments in low lying coastal areas, may face threats from climate change.

The quality of life experienced by future generations in the San Diego region is influenced by the decisions we make today. Indeed, realizing the RCP vision for the region will never be realized without being dependent on effective climate action. Fortunately, many strategies discussed in the RCP provide a foundation for addressing climate change: smart growth land use planning and compact urban form, providing transportation alternatives like walking, bicycling, ridesharing, and public transit, and reducing energy consumption all contribute to lower GHG emissions and a healthier climate. In addition, the types of changes required to address climate change reinforce the RCP principles of smart growth and sustainability.

Regional Comprehensive Plan Vision

“To preserve and enhance the San Diego region’s unique features - its vibrant and culturally diverse communities, its beaches, deserts, mountains, lagoons, bluffs, and canyons, and its international setting - and promote sustainability, economic prosperity, and an outstanding quality of life for everyone.”
In many cases responding to climate change will provide benefits in other areas related to our quality of life such as job creation, social equity, public health, biodiversity and air quality protection, and financial savings. Many of the available measures to reduce GHG emissions also help promote sound energy policy and reduce our dependence on volatile energy sources and supplies. However, the interdependent nature of these issues means that climate action also could have unintended adverse impacts on other important quality of life indicators. For example, the interaction among climate action and issues like job creation and implementation costs will require careful examination in light of the high unemployment, budget cuts and other issues characterizing our current economic situation. Economic factors. In any event, integrating climate action planning into the broader planning framework of the RCP and other local and regional planning processes will allow us our region to make climate change related decisions based on evaluation and understanding of the potential affects on a comprehensive set of quality of life indicators important to the region.

Taking climate change action requires building on the foundation of smart growth and sustainability established in the RCP and integrating important considerations like greenhouse gas (GHG) emissions and climate impacts into existing planning processes at the regional and local level. This Climate Action Strategy provides a basis for addressing climate change in the context of regional and local decision making affecting our transportation system, land use patterns, building stock, and energy infrastructure. While climate action is most directly focused on reducing our emissions and preparing for its impacts, success will ultimately be determined by our ability to do so in ways that also create jobs, improve social equity, and protect our environment – in short, promote sustainability.

Overview of Climate Change

Climate change is happening now and its impacts are readily apparent, with temperatures increasing, Arctic sea ice disappearing, glaciers melting at historic rates, and sea levels rising beyond climate scientists’ worst-case estimates. Recently it was reported that January 2000 to December 2009 was the warmest decade on record. Recent atmospheric measurements of carbon dioxide and methane (two important greenhouse gases) exceed the natural range over the last 650,000 years. The predicted rate of temperature change by 2050 as a result of these greenhouse gas levels is 10-50 times faster than the temperature changes that occurred when the ice ages receded.

Our changing climate is the result of greenhouse gases produced by the fossil fuel energy we burn to power our society. We are largely dependent on fossil fuels to generate electricity, drive our vehicles, transport goods, heat and cool our homes, produce and deliver food, convey and treat water, and provide power to our businesses and industries. When too many GHG emissions are released into the air, they act like a blanket, trapping heat in the atmosphere and altering weather patterns throughout the world. A shift in global temperature threatens the favorable ecological conditions in which human beings have thrived for thousands of years, such as ample water supplies, increasing food production, and constant sea levels.

Climate change is expected to affect the San Diego region. Over the next several decades, if no action is taken to reduce or minimize climate change and its impacts, we face the prospect of water shortages, rising sea levels along our coast, more frequent and intense wildfires, longer and more severe heat waves, loss of native plants and animals, worsening air quality, and difficulty meeting peak energy needs. Many citizens currently lack the resources to respond to these impacts and the resulting economic losses. A report cited in the 2009 California Climate Adaptation Strategy estimates that the cost of no action in California would be on the order of “tens of billions of dollars in direct costs” and would “expose trillions of dollars of assets to collateral risk.”

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1 Available at: http://www.nasa.gov/home/hqnews/2010/jan/HQ_10-017_Warmest_temps.html
4 Available at: http://www.climatechange.ca.gov/adaptation/index.html
SANDAG Transportation and Land Use Planning Integration

As the regional planning consolidated agency for transportation, SANDAG serves as the forum for regional decision-making among the 18 cities and county government. SANDAG builds consensus, makes strategic plans, obtains and allocates resources, plans, engineers, and builds public transportation, and provides information on a broad range of topics pertinent to the region’s quality of life. In its federal and state roles, SANDAG funds the region’s transportation network and develops the Regional Transportation Plan to implement a long-range vision for transportation in the region. SANDAG provides the regional framework to connect our land use to our transportation systems through the Regional Comprehensive Plan. Integrated land use and transportation planning is a core element of successfully reducing greenhouse gas emissions. The climate action strategy can serve as a foundation for addressing climate change when these plans, summarized below, are updated.

SANDAG Regional Comprehensive Plan

Adopted in 2004, the RCP serves as the foundation for integrating land use, transportation, infrastructure needs, and public investment strategies in the San Diego region. The RCP defines a vision and provides a framework to connect local and regional policy decisions that support our shared vision of the future. It balances regional population, housing, and employment growth with habitat preservation, agriculture, open space, energy, and other infrastructure needs in a way that moves us toward a sustainable future with more choices and opportunities for all residents.

The SANDAG Board of Directors adopted the goals and policy direction of the RCP as the strategic planning framework for our region, in conjunction with other plans and strategies. To implement these goals, the RCP calls for the application of principles of “smart growth” and “sustainability.” Smart growth in the San Diego region means developing the region in a way that creates livable communities by connecting land use and transportation and improving the quality of travel by focusing on better urban design and walkability. The principles of sustainability are based on achieving goals and objectives in three broad areas: a prosperous economy, a healthy environment, and social equity. These “three Es” together provide the foundation for achieving sustainable and livable communities in the San Diego region.

2030 San Diego Regional Transportation Plan

The Regional Transportation Plan (RTP), most recently updated in 2007, serves as the primary transportation element of the RCP, and helps position the region to achieve smarter, more sustainable growth that meets the transportation needs of the growing population and changing region. The RCP calls upon SANDAG to update the RTP and related programming documents in a way that both maximizes opportunities for local governments to implement smart growth and ensures that the design and implementation of regional transportation facilities support local smart growth. The adopted RTP calls for more than $42 billion for transportation investments through 2030. The types of transportation investments identified in the RTP and their relationship with local smart growth will greatly influence the transportation choices people make to reach jobs and services, including driving alone, walking, bicycling, taking public transit, vanpooling, and carpooling. Transportation-related GHG emissions are in large part determined by the sum of individual travel choices, as well as other important factors like vehicle fuel efficiency. Work on development of the 2050 RTP, scheduled for adoption in 2011, is now underway.
While our region needs to reduce its share of global GHG emissions, the speed and severity of the impacts to the San Diego region will ultimately be determined by the outcome of worldwide efforts to reduce the amount of emissions in the atmosphere to a safe level. If global emissions stopped tomorrow, some level of further warming and related impacts are inevitable as a result of the emissions already in the atmosphere. The current climate we are experiencing now is the result of much lower levels of GHG emissions that occurred several decades ago. Several decades from now, future generations will experience the higher levels of GHG concentrations occurring today.

Global emissions are unlikely to cease anytime soon, and the outcome of international efforts to reduce emissions remains uncertain. Worldwide emissions have been increasing year-after-year, and the rate of annual increase has been going up. The longer the trend of greater emissions and temperature increases continues, the greater the risk of triggering “tipping elements” that can rapidly bring about abrupt changes. Tipping elements refer to thresholds where temperature increases cause a chain reaction of mutually reinforcing physical processes that lead to accelerating and possible irreversible climate change.5

While per-capita emissions in the San Diego region are on average lower than the nation as whole, they are among the highest in the world. The United States is currently the world’s second greatest climate change contributor, and historically has been one of the largest contributors to GHG emissions. Climate science tells us that all nations must find ways to decrease their emissions by 50 to 95 percent below today’s levels by the middle of the century, with high-emitting developed nations like ours needing to make the steepest cuts. This process has started in many countries. For example, China recently unveiled its goal to reduce the amount of greenhouse gases emitted per unit GDP by 40-45% by 2020, relative to 2005 levels.6

The San Diego region’s emissions result from our reliance on fossil fuel-based electricity, natural gas, and transportation fuels like gasoline and diesel to support the region’s existing three million residents, one million housing units, and one and a half million jobs. Improving energy efficiency and other actions and advances will help reduce the amount of fossil fuels used to support our region’s population, thereby lowering GHG emissions.

Long-term population and economic growth will complicate efforts to reduce GHG emissions. According to the SANDAG regional growth forecast, the San Diego region is expected to grow by almost one million people (32 percent), add four hundred thousand housing units (26 percent), and add nearly half a million jobs (32 percent) by 2030. Historically, growth in population, the economy, energy use, and GHG emissions have gone hand-in-hand. And these past trends are expected to continue unless deliberate, systematic changes are made in the areas of public policy, private sector decisions, and individual behavior.

How the Strategy is Organized

Where appropriate, the policy measures included in the Strategy are divided into two main categories of authority or influence: (1) SANDAG and (2) local governments. Regional and local coordination will be essential to the success of many of the policy measures identified in this strategy. In certain cases where authority is lacking at the regional or local level, the Strategy identifies policy measures for which our region may want to consider pursuing legislation or similar actions to enable regional or local action. The policy measures for local governments are not prescriptive and only intended as guidance to help them in their consideration of measures to address climate change through planning and permitting processes, local ordinances, outreach and education efforts, and their government operations.

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6 Available at: http://www.chinafaqs.org/policy-actions.
Considerations for evaluating policy measures include: (1) their effectiveness in helping to achieve contribution to short-term (2020) and longer-term (2035 and 2050) goals for GHG emission reduction and (2) their costs, not just to government budgets and the economy, but also social and environmental costs important critical to our quality of life. Toward this end, SANDAG is overseeing the preparation of a study estimating the GHG reductions and costs of several transportation and energy-related policy measures. The study, which is expected to be completed in spring 2010, will serve as a resource to help policy-makers evaluate GHG reduction measures during development of the RTP.

## Mitigation and Adaptation

Mitigation is defined as actions to reduce greenhouse gas emissions, while adaptation refers to actions to avoid, withstand, or take advantage of climate change effects impacts.

Mitigation alone will not prevent climate change from having serious impacts on the San Diego region. The current concentration of greenhouse gases in our atmosphere – without considering continued and accelerated pace of emissions – will continue to change the climate during for the next 30 to 40 years. Adaptation to the changes that have already been set in motion is essential to maintain the region’s economy, ecosystems, and human public health health.

While adaptation and mitigation measures can be complementary and overlapping, they also can also conflict. For example, increased air conditioning use may be beneficial to adapting to extreme heat events, but would be unfavorable for mitigation efforts to reduce energy usage during peak demand periods. Because of this, an integrated approach that coordinates efforts to manage impending climate risks (adaptation) while avoiding climate extremes through
SANDAG Climate Action Strategy Guiding Principles

**GENERAL**

**TAKE IMMEDIATE ACTION**
Climate change is a serious global challenge to public health, the environment, and the economy requiring all levels of government, including SANDAG and its member agencies, to engage in immediate and sustained actions to reduce greenhouse gas emissions and prepare for the impacts of a changing climate.

**PREPARE FOR THE IMPACTS OF A CHANGING CLIMATE**
The region will be prepared for projected impacts of climate change to San Diego, including increased threats to public health, higher sea level, warmer average temperature, more frequent and longer heat waves, increased peak demand for electricity, more vulnerable water supply, more frequent wildfires, and loss of native plant and animal species.

**LEAD BY EXAMPLE**
SANDAG and its member agencies lead by example and increase public awareness of climate change: our actions to reduce GHG emissions from internal operations and prepare for the impacts of climate change encourage residents and the private sector to follow our lead.

**ENSURE SOCIAL EQUITY AND ENVIRONMENTAL JUSTICE**
Climate protection policies and actions promote the principles of opportunity, inclusion, and equal access for disadvantaged populations and ensure fair treatment and meaningful involvement for all people regardless of race, ethnicity, gender, income, national origin or geography.

**LAND USE AND TRANSPORTATION**

**BUILD DESIGN COMMUNITIES FOR WALKING, BIKING, AND PUBLIC TRANSIT**
Regional transportation planning is integrated with improved land use planning and community design to significantly lower demand for vehicle travel by making walking, biking, and public transportation practical choices for everyday travel.

**MINIMIZE GHGS RELEASED WHEN VEHICLES ARE USED**
Programs to reduce demand for single occupancy vehicle trips, such as carpools, vanpools, and telecommuting, and promote efficient travel conditions are an emphasis in regional transportation planning.

**FUND THE REGIONAL TRANSIT NETWORK**
Increasing and securing funding for public transportation planning and operations is recognized as critical to the success of the region’s efforts to reduce GHG emissions.

**PRICE TRANSPORTATION MURDS TO REFLECT THEIR CLIMATE IMPACTS**
Transportation pricing signals lead to travel behavior that supports regional GHG emissions reductions.

**INCREASE USE OF ALTERNATIVE FUELS AND VEHICLES**
Infrastructure and policy promote the transition away from petroleum to vehicles and fuels with lower greenhouse gas emissions on a full fuel cycle basis.

**REDUCE EMISSIONS FROM THE INTERREGIONAL AND BINATIONAL MOVEMENT OF PEOPLE AND GOODS**
Infrastructure, policy, and technology are deployed as necessary to significantly lower GHG emissions associated with the interregional movement of people and goods.

**ENERGY AND BUILDINGS**

**IMPLEMENT THE STATE’S PREFERRED LOADING ORDER**
Following the state’s preferred loading order, new energy resources come first from energy efficiency, demand response, renewable energy, and distributed generation, all before new transmission and natural gas generation are sought.

**PURSUE ENERGY REDUCTIONS IN EXISTING RESIDENTIAL AND COMMERCIAL BUILDINGS**
Net energy usage and costs from the region’s existing building stock are significantly reduced through targeted policies, programs and financing options to promote energy efficiency and clean distributed generation.

**PROMOTE STATE POLICY FOR ZERO NET ENERGY RESIDENTIAL AND COMMERCIAL BUILDINGS**
Consistent with the policy direction of state agencies like CPUC, aggressive strategies, including regulations and incentives, are employed to achieve zero net energy usage in new residential and commercial buildings.
FRAMEWORK FOR CLIMATE ACTION

California has responded to the challenge of climate change in many ways. These state efforts are driving climate change action at the regional and local level. In developing regional and local responses, it is important and helpful to understand and differentiate among international, state, regional, and local authorities, responsibilities, and opportunities. Key efforts are described below.

International Efforts

United Nations Framework Convention on Climate Change

The United Nations Framework Convention on Climate Change (UNFCCC) is an international treaty that sets an overall framework for intergovernmental efforts to address the challenge posed by climate change. The UNFCCC entered into force in March 1994, with ratification by 192 countries (both the United States and Mexico signed the Convention in 1992).

Kyoto Protocol

Linked to the UNFCCC, the Kyoto Protocol sets binding targets for 37 industrialized countries and the European community for reducing GHG emissions. Mexico signed the Kyoto Protocol in 1998 and enacted the legislation in 2005. The United States signed the Protocol in 1998, but it has not been ratified or enforced. The Kyoto Protocol expires in 2012, and negotiations to develop a new protocol are ongoing as of this writing.

State Efforts

California Global Warming Solutions Act of 2006 (Assembly Bill 32)

The California Global Warming Solutions Act of 2006 (Assembly Bill [AB] 32, Chapter 488, Statutes of 2006) establishes the 1990 emissions level as the statewide limit for 2020, which is an approximately 15 percent reduction from the baseline 2006 level. AB 32 calls for regulatory and market mechanisms to achieve the GHG emissions reduction target. Many of the State’s policies and programs are now significantly shaped, at least in part, by the requirements and spirit of AB 32.

Climate Change Scoping Plan

The California Air Resources Board (CARB) Climate Change Scoping Plan (Scoping Plan) report outlines the main strategies for meeting the AB 32 GHG reduction target, which include a range of actions including direct regulations, alternative compliance mechanisms, monetary and non-monetary incentives, voluntary actions, market-based mechanisms like a cap-and-trade system, and a cost of implementation fee to fund the program. CARB and other state agencies must adopt these reduction measures by the start of 2011, and already a number of “early action” measures required by the Scoping Plan have been adopted, such as the Low Carbon Fuel Standard (LCFS). In addition, the Scoping Plan emphasizes the need to better connect land use and transportation planning to help the state achieve its GHG emissions reduction target for 2020.

Governor’s Executive Order S-13-08

Governor’s Executive Order (EO) S-13-08 recognizes that mitigation efforts in California may slow but will not stop all long-term climate impacts, and that adaptation and building resiliency to climate changes are needed. EO S-13-08 directs the California Resources Agency to develop a state Climate Adaptation Strategy through coordination with local, regional, state, and federal public and private entities. It also emphasizes the need for statewide consistency in planning for sea level rise, and requires the National Academy of Sciences (NAS) to complete the first California Sea Level Rise Assessment Report.
Senator Bill 375

As described in the introduction, Senator Bill (SB) 375 (Statutes of 2008) requires metropolitan planning organizations (MPOs) like SANDAG to create a Sustainable Communities Strategy (SCS) that integrates the transportation network with development patterns in a way that achieves GHG emissions reduction targets from passenger cars and light-duty trucks while meeting housing needs and other regional planning objectives. The SCS must demonstrate how changes to land use patterns, transportation infrastructure investments, funding allocations, policies, or any other measures will achieve the targets to be established through the SB 375 process in the next update of the RTP. While local government land use planning and coordination with regional transportation planning will be critical to the ultimate success of the SCS, local governments are not subject to GHG reduction requirements under SB 375. Moreover, local governments retain their land use planning authority under this legislation.

Governor’s Executive Order S-3-05

Governor’s Executive Order S-3-05 establishes a long-term climate goal for the state of reducing emissions an additional 80 percent below the 1990 level by 2050 (an approximately 95 percent reduction from the baseline 2006 level). Although not required by statute, the 2050 target is based on the scientifically-supported level of emissions reduction required for climate stabilization and used as the long-term driver for state policy development.

California’s Preferred Loading Order

The California Public Utilities Commission (CPUC) and California Energy Commission adopted a preferred loading order to meet goals for satisfying the state’s growing demand for electricity while reducing GHG emissions. The preferred loading order places top priority on first increasing energy efficiency and demand response, then with new generation from renewable and distributed generation resources, and finally with clean fossil-fueled generation and infrastructure improvements. This is described further in the SANDAG Regional Energy Strategy (RES).

The California Preferred Loading Order
1. Increase energy efficiency.
2. Increase demand response – temporary reduction or shift in energy use during peak hours.
3. Meet generation needs with renewable and distributed generation resources.
4. Meet new generation needs with clean fossil-fueled generation and infrastructure improvements.

California Attorney General Guidance on Climate Change, CEQA, and General Plan Updates

The California Attorney General’s office has encouraged local governments to take a programmatic approach to climate change, particularly through general plan updates and accompanying California Environmental Quality Act (CEQA) documents. Guidance addressing CEQA, climate change, and general planning is emerging in pending CEQA Guidelines amendments, comments on General Plan updates and Regional Transportation Plans, and ensuing settlements by the Attorney General’s Office.
The Attorney General’s office suggests that if feasible, a city or county’s General Plan update should evaluate at least one alternative that would ensure that the community contributes to a lower-carbon future. Such an alternative might include one or more of the following options:

- Higher density development that focuses growth within existing urban areas;
- Policies and programs to facilitate and increase biking, walking, and public transportation and reduce vehicle miles traveled;
- The creation of “complete neighborhoods” where local services, schools, and parks are within walking distance of residences;
- Incentives for mixed-use development;
- In rural communities, creation of regional service centers to reduce vehicle miles traveled;
- Energy efficiency and renewable energy financing (see, e.g., AB 811);
- Policies for preservation of agricultural and forested land serving as carbon sinks;
- Requirements and ordinances that mandate energy and water conservation and green building practices; and
- Requirements for carbon and nitrogen-efficient agricultural practices.

The selection of measures is subject to the discretion of each local government. (http://ag.ca.gov/globalwarming/pdf/CEQA_GP_FAQs.pdf).

**Regional Greenhouse Gas Emissions Reduction Targets and Goals**

While achieving the near-term goal of reducing statewide GHG emissions to the 1990 level by the year 2020 is ambitious but likely achievable with available policy measures and technology options, however, the long-term goal of reducing statewide GHG emissions to 80 percent below the 1990 level by the year 2050 will require fundamental changes in policy, technology, and behavior.

Although the state does not set economy-wide reduction targets for specific geographic regions of the state, projections showing the theoretical emissions reductions necessary to reach the 2020 and 2050 targets illustrate the magnitude of change the region needs to make during the next four decades (Figure II-1).

**Figure II-1: Theoretical Greenhouse Gas Emissions Reduction Targets for the San Diego Region**

![Graph showing theoretical greenhouse gas emissions reduction targets for the San Diego Region](source: Energy Policy Initiatives Center, University of San Diego, 2008.

Although SB 375 will lead to the establishment of regional GHG emission reduction targets; however, the SB 375 target is limited to passenger cars and light-duty trucks.
By 2030, the region must have met and gone below the 1990 level and be well on its way to doing its share for achieving the 2050 GHG reduction level. It should be noted that deep cuts in GHG emissions required for climate stabilization also must also occur during a period of projected growth in population and economic output.

**SANDAG Energy and Climate Change Planning**

Under a partnership with the California Energy Commission, SANDAG prepared the 2009 Regional Energy Strategy and a Regional Alternative Fuels, Vehicles, and Infrastructure Report. This Climate Action Strategy is also being prepared as part of this partnership. Where applicable, this strategy incorporates the energy policy guidance of the RES and recommendations from the Alternative Fuels report, which are summarized below.

**Regional Energy Strategy**

Approved in December 2009, the updated Regional Energy Strategy (RES) provides information, goals and policy measures for a comprehensive set of energy issues. With its intent to save energy and promote the use of clean and renewable energy sources, the many of the measures identified in the following areas would also reduce GHG emission: (1) Energy Efficiency and Conservation, (2) Renewable Energy, (3) Distributed Generation, (4) Energy and Water, (5) Peak Demand, (6) The Smart Grid, (7) Natural Gas Power Plants, (8) Transportation Fuels, (9) Land Use and Transportation Planning, (10) Border Energy, (11) Clean Energy Economy.

Although there is overlap between the energy policy guidance provided in the RES and the types of policy measures that would reduce GHG emissions addressed in the Climate Action Strategy, energy and climate change are not synonymous issues. As a result, SANDAG is preparing this Strategy to accompany the RES to provide regional policy guidance on climate change and energy issues, respectively.

In light of significant state control over certain energy policy areas like electricity and natural gas, the RES focuses on the multiple opportunities and authorities that SANDAG and its member agencies could take advantage of to address energy issues and achieve both local and regional goals related to energy and climate change. This includes opportunities for SANDAG to address energy considerations through RCP implementation and the next RTP update, as well as options for local governments through mechanisms like the General Plan and participation in the SANDAG Energy Roadmap program. The RES identifies six core strategies that, if implemented, would go a long way toward helping the region meet its energy and climate change mitigation goals. The following strategies are ones that SANDAG and local governments could play an integral role in implementing.

1. Pursue a comprehensive building retrofit program to improve efficiency and install renewable energy systems;
2. Create financing programs to pay for projects and improvements that save energy;
3. Utilize the SANDAG-SDG&E Local Government Partnership funding award to help local government identify opportunities and implement energy savings at government facilities and throughout their communities;
4. Support land use and transportation planning strategies that reduce energy use and GHG emissions;
5. Support planning of electric charging and alternative fueling infrastructure; and
6. Support use of existing unused reclaimed water to decrease the amount of energy needed to meet the water needs of the San Diego region.
Regional Alternative Fuels, Vehicles, and Infrastructure Report

SANDAG developed a regional assessment of alternative transportation fuels, vehicles, and infrastructure that identifies and recommends regional and local government actions to increase the use of alternative fuels and vehicles in the fleets of local governments and their franchisees. While primarily focused on opportunities for local government fleets, the report also provides analysis, tools, and recommendations to facilitate a regional rollout of alternative fuels, vehicles, and infrastructure to the general public.

The report concludes with four sets of recommendations to help local government fleets and the region as a whole increase the use of alternative fuels and vehicles and develop the supportive infrastructure. The SANDAG Board of Directors accepted the final report in September 2009.

Climate Change and SANDAG Borders Planning and Coordination

The SANDAG Borders Planning program addresses planning issues from three perspectives: the binational perspective with relation to our international border with the Republic of Mexico; the interregional perspective regarding issues with our Orange, Riverside, and Imperial County neighbors; and collaboration with tribal governments within San Diego County.

Climate change mitigation and adaptation planning is increasingly receiving attention in at least one of these perspectives: binational and crossborder collaboration with Baja California, Mexico. In the 2009, the topic of the annual SANDAG binational event was “Challenges and Opportunities for Crossborder Climate Change Collaboration.” Stakeholders attending from both sides of the international border received several presentations and participated in discussions on both climate change mitigation and adaptation planning. The 2009 binational event led to development of the following recommendations later approved by the SANDAG Board of Directors:

1. Recognize the importance of encouraging all levels of agencies and stakeholders in our San Diego - Baja California region to mutually agree on priority aspects of climate change collaboration, including mitigation, adaptation, and education strategies.
2. Encourage the inclusion of strategies for collaboration and sharing information on regional climate change action plans in San Diego and Baja California.
3. The Fiscal Year FY 2010 binational event should follow up on topics related to climate change planning.
4. In Fiscal Year FY 2010, produce a progress report on development and actions taken in climate change planning as a result of the 2009 seminar recommendations.
Existing Greenhouse Gas Emissions in the San Diego Region

Energy use is the largest source of our GHG emissions. Table III-1 shows emissions in the four principal categories established by the United Nations Intergovernmental Panel on Climate Change (IPCC). As it shows, 91 percent of all GHG emissions in the region are related to the production and consumption of energy.

<table>
<thead>
<tr>
<th>Intergovernmental Panel on Climate Change Category</th>
<th>Percentage of Total Greenhouse Gas Emissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy</td>
<td>91%</td>
</tr>
<tr>
<td>Industrial (non-fuel)</td>
<td>5%</td>
</tr>
<tr>
<td>Waste</td>
<td>2%</td>
</tr>
<tr>
<td>Agriculture, Forestry, Land Use</td>
<td>2%</td>
</tr>
</tbody>
</table>

Source: Energy Policy Initiatives Center, University of San Diego, 2008.

Existing Greenhouse Gas Emissions by End-Use Category

Although many activities consume energy, most of the region’s energy consumption and related GHG emissions are caused by three categories of energy consumption: the movement of people and goods in the on-road transportation sector, electricity generation that provides power to homes and businesses, and natural gas for end uses like space heating and cooking (Figure III-1).

Figure III-1: Summary of Existing Greenhouse Gas Emissions by End-Use Category

Source: Energy Policy Initiatives Center, University of San Diego, 2008.

On-Road Transportation

The largest emissions category is on-road transportation, which accounts for nearly half (46 percent) of GHG emissions in the San Diego region. Moreover, energy consumed by passenger cars and light-duty vehicles (e.g., pick-up trucks, sport utility vehicles), primarily gasoline for personal automobile transportation, accounts for about 89 percent of on-road transportation emissions, and about 41 percent of total emissions in the region.
The high level of GHG emissions from on-road transportation is due to the region’s near total dependence on petroleum-based gasoline and diesel fuel, average vehicle efficiency, and levels of driving. On-road transportation also comprises a significant proportion of GHG emissions statewide. In response, the state has enacted several transportation-related laws and regulations calling for petroleum reduction, development of low-carbon and alternative fuels, increased vehicle fuel efficiency, and coordinated land use and transportation planning that reduces GHG emissions from passenger cars and light-duty trucks.

**Electricity Generation and Natural Gas End-Use Sectors**

Electricity generation and natural gas end-uses (e.g., space and water heating, cooking, etc.) account for about one-third (33 percent) of GHG emissions in the region. Total consumption levels, efficiency of use, and fuel sources contribute to the level of GHG emissions from electricity generation. About two-thirds (67 percent) of the fuel used to generate the electricity consumed in the region comes from natural gas and out-of-state coal, both of which release GHG emissions when combusted, although natural gas produces fewer GHG emissions than coal and other fossil fuels. The level of efficiency of power plants, buildings, and end-use equipment also are factors that contribute to the level of emissions from electricity generation and natural gas end-uses.

**Existing Greenhouse Gas Emissions by Economic Sector**

GHG emissions also can be analyzed by economic sector. As shown in Figure III-2, the residential sector (i.e., passengers cars, light-duty trucks, electricity and natural gas consumption) accounts for more than half (56 percent) of all GHG emissions. This indicates that energy used by residents for personal travel and home use contribute significantly to regional GHG emissions.

**Figure III-2: Greenhouse Gas Emissions by Economic Sector**

![Figure III-2: Greenhouse Gas Emissions by Economic Sector](image)

Source: Energy Policy Initiatives Center, University of San Diego, 2008.
Future Projections for Greenhouse Gas Emissions

Under a “business-as-usual” scenario in which current energy use trends and policies do not change, GHG emissions in the region will be approximately 43 MMT CO₂E in 2020, approximately 26 percent greater than the 2006 level, and 48 percent higher than the 1990 level. Emissions would be even greater in 2030 under a business-as-usual scenario. The projected increases in GHG emissions for on-road transportation, natural gas, and electricity under business-as-usual scenarios are shown in Figures III-3 to III-5 below. Because the following figures are business-as-usual projections depicting the consequences of not taking action, the effect of new federal, state, and local policies is not shown.

Figure III-3: Projected Greenhouse Gas Emissions from On-road Transportation, 1990-2030

Figure III-4: Projected Greenhouse Gas Emissions from Natural Gas End-Uses, 1990-2030

Source: Energy Policy Initiatives Center, University of San Diego, 2008.
Figure III-5: Projected Greenhouse Gas Emissions from Electricity Generation, 1990-2030

Source: Energy Policy Initiatives Center, University of San Diego, 2008.
THE SAN DIEGO REGION’S CHANGING CLIMATE

Except where otherwise noted, information presented in this section is based on the reports listed below, each of which presents a range of climate change impacts on California or the San Diego region using climate models and emissions scenarios from the Intergovernmental Panel on Climate Change (IPCC), the world’s leading scientific body for the assessment of climate change. Established by the United Nations Environment Program and World Meteorological Organization, the IPCC provides the world with a clear scientific view on the current state of climate change and its potential environmental and socio-economic consequences.

- San Diego Foundation’s Regional Focus 2050 Study. Summary and full versions of the report are available online at: http://www.sdfoundation.org/communityimpact/environment/Initiative-Climate2050.html
- California Climate Change Center’s Climate Change-Related Impacts in the San Diego Region by 2050. a draft version of the report is available online at: http://www.energy.ca.gov/2009publications/CEC-500-2009-027/CEC-500-2009-027-D.PDF

Introduction

The climate of the San Diego region is certain to change under even the most optimistic and aggressive scenarios to reduce global GHG emissions. Substantial emission reductions are essential for avoiding the worst impacts of climate change, but mitigation alone is not enough. Even if global emissions were immediately reduced to zero, the existing concentration of GHG emissions in the atmosphere would continue to cause the climate to change for the next several hundred years. Compounded with projected population growth, climatic changes are expected to become significantly more rapid and severe unless global GHG emissions are leveled off in the next few years and then significantly reduced over the coming decades.

By 2050, average annual temperatures in our region are projected to be between 1.5 and 4.5 degrees Fahrenheit. Greater increases will occur in summer, with peak temperatures consistently reaching the upper 80s and low 90s. Larger temperature increases are expected in inland areas as compared to the coastal zone (the area within about 30 miles [50 kilometers] of the ocean). Though precipitation is expected to maintain the existing Mediterranean pattern with dry summers and most rainfall happening in the winter months, rainfall amounts are expected to vary widely from year to year, leaving the region highly vulnerable to drought.

Adaptation planning can minimize the damage caused by climate change. According to the Pew Center on Global Climate Change, adaptation refers to “Actions by individuals or systems to avoid, withstand, or take advantage of current and projected climate changes and impacts.” (1)

Climate changes and their associated impacts vary greatly from location to location. Although national and international action is essential, many important decisions about how best to manage systems affected by climate change are made at the local and regional levels (1). Regional and local planning should reinforce and complement the recommendations given at the state and federal levels. In an effort to begin a process of collaborative adaptation planning in California, the Governor issued Executive Order S-13-08 (2008), which led to completion of the State’s first comprehensive Climate Adaptation Strategy (CAS) in 2009. The CAS summarizes the best known science on climate change impacts in seven specific sectors and provides recommendations on how to manage against those threats.
The remainder of this section describes the projected impacts climate change is expected to have on the San Diego region by 2050. Because the effects of atmospheric GHG accumulations on the climate are very long-lasting, these impacts will likely worsen after 2050, unless global greenhouse gas concentrations are significantly reduced over the coming years and decades.

It is beyond the scope of the Climate Action Strategy to identify adaptation measures for all of the expected impacts of climate change. However, development and implementation of such measures will be critical to protecting the region from the impacts of climate change. The strategy focuses on adaptation measures available for SANDAG and local government consideration in addressing impacts to transportation and energy infrastructure, which are described in the Smart Growth Land Use and Low Carbon Transportation and Clean Energy and Efficient Buildings sections, respectively.

**Impacts on Public Health**

**Extreme Temperature Events**

Heat waves, which during the past 15 years have killed more Californians than all other declared disasters combined, will be more common, last longer, and reach higher temperatures. Potential health impacts from these extreme heat events include heat stroke, heat exhaustion, and the exacerbation of existing medical conditions. Those at highest risk are the elderly, infants, and socially-isolated people with pre-existing illnesses. Extreme temperature events can be exacerbated in urban areas due to the urban heat island effect. Exposed surfaces like building roofs and pavement absorb heat and cause surface and air temperature in surrounding areas to be hotter than less developed or undeveloped areas. Urban heat islands increase demand for air conditioning, particularly during periods of peak electricity demand.

**Wildfires**

The existing habitat and climate conditions make the region vulnerable to extreme fire events. Warmer temperatures and more frequent droughts caused by climate change will intensify wildfire conditions, marked by drier, more flammable vegetation and longer periods of hot, dry Santa Ana winds. By 2050, these conditions are expected to result in larger, more frequent, and longer-lasting wildfires during summer and especially fall, when Santa Ana wind intensity is at its highest. Larger, more frequent, and longer-lasting wildfires are expected to result in loss of human life, up to billions of dollars in property damage, business closures, increased fire-fighting and emergency services costs, and expensive recovery and restoration efforts.

**Air Quality**

Studies have shown a link between heat and the formation of ground-level ozone, the primary component of “smog.” In the San Diego region, days over 90 degrees Fahrenheit exceed the state ozone standard 16% of the time (2). Ozone is not emitted directly but forms when nitrogen oxide emissions and volatile organic compounds react with heat and sunlight (2). By 2050, the San Diego region is expected to experience greater exposure to ground-level ozone due to a climate change-induced increase in number of hot and sunny days. Increased ground-level ozone tends to aggravate asthma and increase airway reactivity and inflammation.

**Infectious Disease**

The likelihood of changes in temperature, humidity, and rainfall in San Diego will affect the geographic distribution and quantity of arthropod vectors (e.g., mosquitoes, ticks). As a result, the risk of contracting infectious disease from vectors will also be altered by climate change. Climate change may also affect ranges and population densities of animal hosts (e.g., rodents, rabbits).
• West Nile Virus (WNV) (vector: mosquito). Increased variability in precipitation may impact incidence of WNV, though use of municipal water systems by mosquitoes as breeding sites may reduce the impacts of changing precipitation patterns. Higher temperature, on the other hand, is linked to increased dispersal and transmission of WNV (3).

• Hantavirus (vector: rodent). Increased variability in precipitation is likely to increase food supply of rodents during years with higher rainfall and more flooding. Humans contract Hantavirus cardiopulmonary syndrome when they come into contact with infected rodents or their excrement. Increased development and recreational activities within the unincorporated areas of San Diego County in years where host populations are elevated will increase the potential for contact between humans and disease hosts and vectors.

• Plague (vector: flea; host: rodent). Increased variability in precipitation is likely to increase food supply of rodents during years with higher rainfall and more flooding. Increased development and recreational activities within areas like unincorporated San Diego County due to population growth will increase the potential for contact between humans and disease hosts and vectors.

• Malaria and Dengue Fever (vector: mosquito). Higher temperatures for the San Diego region could facilitate the local establishment of these historically tropical diseases.

Impacts on Water Supply

Demand for Water

Based on current projections for growth and extrapolation of current consumption levels, demand for water is expected to significantly outpace the supply available from all sources, in part because of climate change. Extended and more frequent drought conditions would reduce local groundwater supplies about 7 percent per year on average and increase our dependence imported water from distant sources like the Colorado River and Sacramento-San Joaquin River Delta.

Water Supply

Climate change is projected to reduce the amount of water available from the imported sources upon which our region relies. For example, recent projections for the Colorado River range from a 6 to 45 percent decline by 2050 as a result of the changing climate. The amount of water imported to the San Diego region from the Sacramento-San Joaquin River Delta is dependent on several factors. Projections of warmer temperatures and more precipitation falling as rain instead of snow will lead to flooding and increased stress on the already strained Delta levee system (4).

Spring snowmelt, which historically provided a reliable supply of water after winter storms, will likely be lower due to an expected 25 percent snowpack reduction in the Sierra Nevada Mountains by 2050. Other environmental factors may limit the amount of water available for export to our region. For example, efforts such as the CALFED Bay-Delta Program are trying to balance water supply needs with environmental goals supporting freshwater habitat for fish and other wildlife in the Delta. Furthermore, rising sea level threatens the freshwater Delta with saltwater intrusion and increased bayside stress to the already distressed levee system. Overall, our region faces a possible water supply shortfall of 18 percent by 2050, and quite possibly sooner.

Impacts on Agriculture

San Diego’s unique topography creates a wide variety of microclimates supporting over 200 different agricultural commodities (5). In 2008, despite a drought and a slowing economy, the County of San Diego reported a 1 percent annual increase, likely due to increased value of important products like nursery crops and avocados (5). Between now and 2050, climate change could impact our region’s agriculture, and exacerbate our water supply situation, by increasing demand for irrigation to meet higher evaporative demand associated with warmer and drier conditions.
Even today, existing farms are faced with high water costs (5). Climate change also will also change the geographic distribution of crop pests, though understanding the potential for crop loss from pests requires further research (6).

Impacts on Biodiversity and Habitats

Along with one other county, the San Diego region has the most plants and animals at risk of extinction in the continental United States. While in many cases human population growth and development have fragmented critical habitat areas, the impacts of climate change will compound the threats facing already vulnerable plant and animal species. Though most species are often able to adapt to changing conditions, unnaturally rapid shifts in temperature, sea level rise, and drought due to climate change may outpace the ability of some species to adapt and survive.

Forests

Extended drought can stress individual trees, increasing their susceptibility to insect attack by species like the bark beetle. Warmer winter temperatures can also facilitate insect attack by increasing insect survival and populations. Temperature increases will also minimize the extent of the cooler-climate forests. Reduced forest habitat can impact forest-dependent fish and wildlife species. Changes in fire regimes can impact the ability of a forest to recover after wildfire.

Southern California Shrublands

Due to rising temperatures and changes in precipitation, chaparral and coastal sage scrub are expected to seek to move to higher elevations where temperatures are cooler and precipitation is greater. Associated animal species will adjust their ranges, though oftentimes not concurrently with the vegetation, potentially resulting in a new mix of species and ecosystems. Projected increases in non-native grasses and fire frequency could substantially reduce the range and extent of future shrublands.

Deserts

Desert plant and animal species are adapted to extreme conditions of aridity and heat. With climate change, most deserts are expected to become hotter and drier (6), and in California models are predicting expansion of deserts, though not apparent by 2050 (4).

Freshwater Ecosystems and Vernal Pools

Climate change is predicted to directly and indirectly affect the hydrology and ecology of freshwater systems in our region. Freshwater ecosystems, particularly vernal pools, are dependent on annual rainfall and extremely sensitive to pollution, habitat degradation, and invasive species. To date, there has not been extensive study on the effects of climate change on vernal pools (7).

Impacts on Ocean and Coastal Resources

Climate change threatens the coastal resources like beaches, harbors, lagoons, wetlands, and seaside cliffs that comprise our 70 miles of coastline and represent a fundamental element of our region’s beauty, economy, unique identify, and quality of life.

Sea Level Rise

There are three climate change-related causes for the accelerated pace of global sea level rise: increased sea surface temperature creating thermal expansion the water, retreat of arctic sea ice, and melting of alpine glaciers. By 2050, average sea level in San Diego is projected to be 1 to 1.5 feet higher than today, making lasting changes to the coastline and threatening one of our greatest environmental and economic assets.
As ocean water levels rise relative to land, coastal sediments are sequestered offshore (8). Without action, beaches will shrink and some could disappear entirely as a result. Streets, homes, recreation areas, businesses, and boardwalks near the shoreline will experience flooding more often, causing increased risk of damage to property and infrastructure. Other low-lying places like San Diego International Airport will likely be vulnerable to large-scale emergency and evacuation situations, especially during high surf and winter storm periods.

Coastal habitats such as salt marshes and rocky intertidal areas will be exposed to more sea water. When natural or manmade barriers like cliffs, seawalls, or buildings impede the ability of those habitats to retreat landward, their range is reduced until they are completely underwater. Places in the San Diego region like the Cabrillo National Monument and Scripps Coastal Reserve are bordered by steep cliffs and likely to lose much of their intertidal habitats to sea level rise. In all of Southern California, where 91 percent of wetlands have already been lost and many remaining wetlands are stressed by pollution, invasive species, and altered hydrology, sea level rise poses yet another threat to coastal wetland habitats (9).

Ocean Acidification

Oceans absorb and are significantly affected by the carbon dioxide emissions increasingly emitted into the atmosphere. To date, oceans have absorbed about one-third of all anthropogenic carbon dioxide emissions, resulting in a significant acidification of seawater (10). Ocean acidification causes problems similar to those experienced in freshwater lakes from acid rain. In particular, acidification impedes the formation of protective skeletons of crabs, sea urchins, abalones, oysters, and plankton species, potentially having profound impacts on the entire marine food chain. As the oceans become more acidic, the fertilization, development, and metabolic function of many marine species such as kelp, a commercially harvested species for San Diego-based CP Kelco, will be increasingly impacted.
Transportation of people and goods is the single largest source of GHG emissions in our region, with passenger cars and light-duty trucks alone responsible for 41 percent of all emissions. The three primary strategies for reducing GHG emissions in the on-road transportation sector are to: (1) increase vehicle fuel efficiency, (2) reduce the carbon content of transportation fuels, and (3) better coordinate land use and transportation planning, and related measures, policies, and investments. While the majority of needed reductions will come from State-level actions under the first two strategies, local and regional actions under the third strategy also are needed for California to meet its GHG reduction goals.

State agencies like the California Air Resources Board and California Energy Commission are responsible for and in the process of actively implementing regulations and programs related to the first two strategies, although regional and local actions can also contribute to increased use of low-carbon alternative fuels. These standards and programs at the State level are expected to achieve the majority of the GHG reductions needed in the transportation sector to achieve the statewide 2020 target under Assembly Bill 32. The California Light-Duty Vehicle Greenhouse Gas Standards and the Low Carbon Fuel Standard are expected to account for about 90 percent of the reductions needed from the transportation sector. Additional transportation-related GHG reductions will need to come from actions at the regional and local levels.

Local governments and SANDAG have the ability and authority to regulate, provide incentives, collaboratively plan, and make infrastructure investments that affect land use patterns, the transportation system, and other public infrastructure investments. The remaining approximately 10 percent of needed transportation-related GHG reductions are expected to come from Metropolitan Planning Organizations like SANDAG through coordinated land use and transportation planning, and related measures, policies, and investments to reduce GHG emissions per the requirements of Senate Bill 375. Coordination of local land use planning, including the identification of sites for affordable housing with regional transportation planning are essential to the successful implementation of SB 375. And the state has enacted legislation (SB 375) that puts the responsibility for the third strategy at the regional and local government level.

Senator Bill 375 and the Regional Transportation Plan

Federal and state laws require that SANDAG prepare a long-range transportation plan and make an air quality conformity determination every four years – the next RTP update (2050 RTP) is scheduled for adoption in 2011. In the next update, SANDAG will be the first major metropolitan planning organization in the state to prepare an RTP that complies with the provisions of Senate Bill (SB) 375 (Statutes of 2008). In effect, SB 375 requires the next RTP update to achieve targets for GHG reductions from passenger cars and light-duty trucks for 2020 and 2035. The statute requires a new element of the RTP called a Sustainable Communities Strategy (SCS), which must show how regional GHG reduction targets, to be established by the California Air Resources Board (CARB), would be achieved through development patterns, transportation infrastructure investments, and/or transportation measures or policies that are determined to be feasible. The SCS also must address housing needs and protection of sensitive resource areas. If the SCS does not meet regional GHG reduction targets, an Alternative Planning Strategy must be developed to demonstrate how the targets could be achieved. Although local land use planning and coordination with regional transportation planning are essential to the successful implementation of SB 375, local governments are not subject to its GHG reduction targets or other requirements.
Land use and transportation planning seek to identify land, infrastructure and other resources needed to accommodate our growing population and economy while maintaining and enhancing quality of life. In the past, such growth has been associated with increased vehicle miles traveled (VMT) and related GHG emission increases. Since 1980, national VMT has increased about three times faster than population growth. While there are many reasons, factors like land use segregation, long trip distances, and transportation systems, policies and urban design that favor vehicle travel over walking, bicycling and public transit are critical, and are a direct result of past land use planning decisions and transportation investments. Generally speaking, segregated, low-density land use patterns and automobile-oriented transportation investments and urban design do not reduce are not conducive to reducing GHG emissions.

According to its Environmental Impact Report, the transportation projects, funding allocations, policies, and adopted local land use plans identified in SANDAG’s the adopted SANDAG 2030 RTP would increase annual transportation-related GHG emissions by 30 percent by 2030, relative to baseline (2006) conditions. Transportation-related GHG emissions need to be lower than they are today by 2030, although the state California Air Resources Board will not establish final targets for GHG reduction from passenger cars and light-duty trucks until September 2010. The land use plans and transportation investments and policies identified in the adopted RTP collectively do will not contribute to lower transportation-related GHG emissions.

According to the 2030 Regional Growth Forecast, our population is expected to increase by about 32 percent by 2030 relative to 2006. In addition, total daily on-road gasoline and diesel fuel consumption per capita are projected to increase by about 4 percent, and daily VMT per capita is expected to increase by about 3 percent by 2030. This indicates that VMT and transportation-related GHG emissions are projected to increase slightly faster than population growth under adopted regional transportation and local land use plans. Meeting transportation-related GHG reduction targets will require decreases in per capita emissions.

Past investments and decisions that shaped the region’s land use patterns and transportation systems are major determinants of current GHG emissions and will continue to be into the future. Once in place, land use patterns and transportation infrastructure typically remain part of the built environment and influence travel behavior and GHG emissions for several decades, perhaps longer. As a result, it is imperative that future planning take into account the climate change implications of transportation infrastructure and land use investments for the duration of their useful lives. This is important because transportation and land use choices made today will affect our GHG emissions for years and likely several decades into the future.

### Approach for Addressing Climate Change in the Transportation Sector

Acknowledging the critical role of State standards to improve vehicle technology and increase the use of low-carbon alternative fuels, this section focuses on available policy measures SANDAG, local governments, or other regional entities could choose to implement or influence to reduce GHG emissions through coordinated land use and transportation planning and related measures, policies and investments.

The remainder of this section describes and identifies the There are many types of land use and transportation-related policy measure options available to help the region SANDAG and local governments achieve the level of GHG reductions from the on-road transportation sector, with a focus on helping SANDAG identify measures to reduce GHG emissions from passenger cars and light-duty trucks as required in future updates of the RTP. Sought by state goals and legislation and demanded by climate science. While some policy measure options to reduce GHG emissions have not historically been a part of transportation and land use planning in our region, many of the available options to address climate change involve continuing and expanding investments the region has already made and actions we already take for other reasons related to our quality of life.
Past decisions and investments in our efforts to build areas like walkable, smart growth communities, plan, expand and improve public transportation networks, promote bicycling, van pooling and carpooling demand management have a positive impact on overall contribution to lower GHG emissions, and create a foundation on which the region can build to further reduce its GHG emissions over the coming years and decades.

The remainder of this section describes and identifies the types of actions SANDAG and local governments can take to reduce GHG emissions from the on-road transportation sector, with a focus on helping SANDAG identify measures to achieve SB 375 targets for reducing GHG emissions from passenger cars and light-duty trucks. The discussion is organized around three goals that will help the region reduce transportation-related GHG emissions through integrated land-use and transportation planning at the regional and local levels:

1. **Reduce total miles of vehicle travel,**
2. **Minimize GHG emissions when vehicles are used,** and
3. **Support increased use of low carbon, alternative fuels.**

A fourth goal is intended to help the region prepare for potential impacts to the transportation system:

4. **Protect transportation infrastructure from climate change impacts.**

**Purpose of the Transportation-related Policy Measures**

The section identifies objectives for each of the goals, and available policy measures that, if implemented, would achieve the goals and objectives. The goals, objectives and policy measures are intended to serve as a guide for integrating transportation-related climate change considerations into existing plans as they are updated. Since preparing the Regional Transportation Plan is one of the primary responsibilities of SANDAG, the primary focus of this section is in identifying measures that could help to reduce GHG emissions from passenger cars and light-duty trucks and comply with Senate Bill 375.

The goals, objectives or policy measures listed herein are given priority over any other; they are solely intended to inform decision-makers of available options for addressing climate change and complying with new requirements like Senate Bill 375. It is likely that a variety of policy measures from each of the goal areas will need to be considered and implemented if the region is to be successful in reducing greenhouse gases from the transportation sector. The actual mix of measures implemented by SANDAG to reduce GHG emissions from on-road transportation will be determined through the next update development of the 2050 RTP. Further analysis of these broad land use and transportation policy measures will be performed as part of the 2050 RTP update development process to understand a variety of issues associated with their implementation including refined GHG reduction estimates, possible barriers to regional or local implementation, cost implications, and their impact on important regional quality of life indicators related to economic, environmental, and social issues.

The information provided in this section can help inform SANDAG decision-making during its process of developing a Sustainable Communities Strategy to meet or exceed its GHG reduction targets under SB 375 through the next RTP update the development of the 2050 RTP.
GOAL 1. REDUCE TOTAL MILES OF VEHICLE TRAVEL

State-level efforts to reduce transportation-related emissions through fuel efficient vehicles and low carbon fuels are critical but will not succeed if the amount of driving – also known as vehicle miles traveled (VMT) – continues to follow past trends and rates of increase. For example, statewide projections indicate that California will not achieve the long-term 2050 goal for emissions reduction unless VMT is reduced by at least 17 percent on a statewide level. The trend of VMT growth must be slowed, stopped, and soon reversed in order to successfully lower GHG emissions from the on-road transportation sector.

Lowering VMT means providing high-quality opportunities to make trips by alternative means to driving alone such as walking, bicycling, ridesharing, and public transit, and by making vehicle trips shorter. This can be accomplished through improved land use and transportation planning and related measures, policies and investments affecting the options people have when they travel. The following objectives can help the region lower the amount of vehicle travel: design of neighborhoods and communities in accordance with our region’s adopted smart growth principles, expansion and new development of transportation systems to support low-carbon mobility options like public transit, vanpooling, carpooling, walking and bicycling, and reducing demand for single occupancy vehicle travel.

Since existing land use patterns and transportation infrastructure are the result of several decades of investments, the effects of smart growth will likely be incremental in the near term. But over the long term, smart growth neighborhoods and communities will be essential to achieving more significant GHG reductions.

Objective 1a. Create smart growth neighborhoods and communities in which most, if not all, basic daily needs and public transit service are safely accessible on foot or by bicycle.

Using our region’s smart growth principles to create neighborhoods and communities in which most, if not all, daily needs and public transit service are accessible on foot or by bicycle will be critical to reducing our GHG emissions. The regional strategy for accommodating population growth through an adopted smart growth policy lowers VMT by creating neighborhoods and communities in which walking, bicycling, and public transit are viable travel options and vehicle trips are relatively short. The SANDAG study Trip Generation for Smart Growth: Guidelines for the San Diego Region (2010) shows that existing smart growth areas in the San Diego region have fewer vehicle trips and miles traveled and a greater number of walking, bicycling and public transit trips than conventional, non-smart growth development due to characteristics like mixture of uses and activities, variety of nearby destinations, transportation infrastructure and urban design conducive to walking and bicycling, and high quality access to public transit.

Neighborhoods and communities in which people walk, bike, and ride public transit are typically characterized by a more concentrated and diverse mix of land uses complemented by sidewalks, bike paths and lanes, buildings that front directly onto public streets, a variety of housing types and choices, and an interconnected and rich street grid that slows and disperses vehicle traffic. Smart growth also leads to lower water consumption and related household and infrastructure costs than conventional development patterns, and would contribute to the goal to reduce water-related energy use and GHG emissions identified in the Clean Energy and Efficient Buildings section.

9 [http://www.epa.gov/dced/pdf/growing_water_use_efficiency.pdf]
The affordability of housing and transportation and access to employment play a critical role in determining where people live, how much they travel, and therefore, directly affect transportation-related GHG emissions. Integrating social equity considerations like affordability, displacement, gentrification, and jobs-housing fit (providing affordable housing that matches well with wage levels of nearby jobs) in smart growth development can lower VMT and contribute to GHG reductions by allowing groups with moderate and lower incomes to live affordably in areas closer to their jobs with improved access to services and affordable travel options like public transit. Failure to consider social equity factors may lead to exclusion, limited employment opportunities, dispersed development, and therefore higher VMT.

Under SB 375, the areas identified to house all economic segments of the regional population through Regional Housing Needs Assessment (RHNA) process in a manner that is consistent with the land use pattern of the SCS. Planning that integrates the siting of affordable housing (in addition to market rate housing) into pedestrian and bicycle-friendly smart growth areas with access to public transit will increase the potential for transportation-related GHG reductions.

Through an ongoing collaborative process among SANDAG and local jurisdictions, smart growth opportunity areas are identified as places that could accommodate higher residential and employment densities within pedestrian-friendly activity centers connected to other activity centers by public transit. The SANDAG Smart Growth Concept Map (Figure 1) illustrates the nearly 200 locations of existing, planned, and potential smart growth opportunity areas in seven smart growth place type categories, reflecting the notion that smart growth is not a “one-size-fits-all” concept. The Map also shows the relationship between smart growth areas and existing, planned, and potential public transit service.

SANDAG uses the Map to provide funding incentives for transportation and transportation-related infrastructure improvements and planning efforts that support smart growth development through the TransNet Smart Growth Incentive Program (SGIP). Two percent of annual TransNet revenues are allocated to the SGIP, for a total of $280 million or $7 million per year over the life of the 40-year measure. Moreover, the SANDAG Smart Growth Design Guidelines include some discussion of the GHG reduction benefits of smart growth land use and alternative transportation choices like walking, bicycling, and public transportation. The adopted SANDAG Smart Growth Concept Map, along with habitat conservation areas and major employment areas, will serve as a basis for the SCS. Habitat protection and similar efforts to safeguard sensitive resources facilitates smart growth and GHG reductions by limiting development in certain areas and contributing to more compact urban form. Protection of sensitive resources areas, such as including land protected under Habitat Conservation Plans like the Multi-Species Conservation Plan and Multi-Habitat Conservation Program and the TransNet Environmental Mitigation Program to mitigate habitat impacts for regional transportation projects, must be integrated into and consistent with other components of the SCS. Integration of habitat planning and protection of other sensitive resource areas with smart growth planning can help promote more compact urban form and related transportation alternatives that contribute to lower transportation-related GHG emissions.

Continuing and expanding upon our region’s ongoing smart growth efforts will be critical to lowering the amount of vehicle travel and reducing our GHG emissions. In addition, designing neighborhoods in accordance with smart growth principles is essential to the success of the next objective: developing systems to promote low carbon transportation options like walking, bicycling, and public transit.
Policy Measures

Available measures to create smart growth neighborhoods and communities in which most, if not all, basic daily needs and public transit service are safely accessible on foot or by bicycle include:

- Continue to encourage and assist local governments in implementing planned and potential smart growth areas as identified on the Smart Growth Concept Map (SANDAG)
- Give strong consideration to existing and planned smart growth areas in the prioritization of transportation projects and related investments and decisions to reduce GHG emissions (SANDAG)
- Identify additional ways SANDAG can support the planning and development of smart growth areas through its transportation investments and other funding decisions (SANDAG)
- Use the Smart Growth Concept Map as a starting point for the land use component of the Sustainable Communities Strategy (SANDAG)
- Integrate sensitive resource area protection activities with efforts to promote compact smart growth development patterns and reduce transportation-related GHG emissions (SANDAG and local government)
- Implement transportation infrastructure that increases transit connectivity and walking and biking as alternative modes in smart growth areas (SANDAG and local governments)
- Implement supportive policies that promote infill development, higher densities, affordable housing, jobs-housing fit, mixed uses, improved pedestrian and bicycle connections, and open space preservation (SANDAG and local governments)
- Coordinate public investments related to transportation, energy, water supply, parks, open space, and others in a manner that supports smart growth development (SANDAG and local governments)
Figure 1: SANDAG Smart Growth Concept Map
Objective 1b. Expand and Develop New Systems for Low Carbon Modes of Transportation.

Reducing miles of vehicle travel will require expanding existing systems and developing new ones that provide transportation alternatives with low or even zero GHG emissions. These “low carbon” transportation systems will serve pedestrians, bicycles, and public transit. Other transportation system investments may also be needed to promote low carbon travel, such as high occupancy vehicle (HOV) lanes and related infrastructure to facilitate vanpooling and carpooling, and, in certain corridors, public transit service. In particular, infrastructure for low carbon modes of transportation should be integrated with smart growth neighborhoods and infrastructure to create areas in which a resident’s basic daily needs and access to public transit service are safely accessible on foot or by bicycle. Integrating smart growth land uses and low carbon transportation systems will be essential to lowering miles of vehicle travel and achieving significant GHG reductions, particularly over the long-term.

The region has and continues to take steps to expand and develop new systems that promote low carbon alternatives to driving. For example, SANDAG is developing an Urban Area Transit Strategy to evaluate strategies that could significantly increase the attractiveness and use of transit in the urban area and maximize peak-period trips on transit, bicycle, and foot. The results of the study will be incorporated into the next update of the RTP. The study also will also examine short-term action plans and implementation strategies to increase the use of transit. SANDAG is also continues to be actively involved in several efforts to promote walking and bicycling, including developing bicycle and pedestrian infrastructure projects, a regional Safe Routes to School strategy, bicycle master plans, community active transportation studies, neighborhood safety and traffic calming projects, bicycle parking, and as well as education and awareness programs.

While many factors are important, having secure funding sources, particularly for public transit operations, will be critical to our region’s success in developing low carbon transportation systems.

Policy Measures

Available measures to expand and develop new systems for low carbon modes of transportation include:

- Give greater consideration to transportation modes and related investments that contribute to short- and long-term GHG reductions in future RTP updates (SANDAG)
- Increased and priority funding and system investments for public transit (including stable and secure funding for transit operations) for public transit (SANDAG and local governments)
- Implement transit performance improvements (e.g., queue jumps, dedicated lanes, etc.) (SANDAG and local governments)
- Implement transit quality improvements (e.g., real-time information, safety and cleanliness, etc.) (SANDAG and transit agencies local governments)
- Coordination of low carbon transportation funding and investments like walking, bicycling and public transit with smart growth development (SANDAG and local governments)
- Implement regional bicycle corridor improvements and supportive infrastructure (SANDAG and local governments)
- Implement the Regional Bicycle Master Plan (SANDAG)
- Implement the regional Safe Routes to School strategy (SANDAG)
Objective 1c. Reduce Demand for Single Occupancy Vehicle Travel.

Vehicles will continue to be the logical mode choice for many individual trips for the foreseeable future. A primary reason is the automobile orientation of existing neighborhoods and communities and transportation systems. In addition, smart growth and low carbon transportation infrastructure are long term strategies to reduce GHG emissions.

Because of the need to achieve emissions reductions in the near term (e.g., SB 375 identifies 2020 as the near term target year), it is necessary to examine policy measures that can relatively quickly achieve reductions in VMT and GHG emissions while our region creates the smart growth communities, builds low carbon transportation systems, and makes other long-term investments critical to systematically lowering our emissions. Managing demand for single occupancy vehicle travel will be an important strategy for achieving short-term reductions in the amount of vehicle travel and GHG emissions.

The region has and continues to take steps to reduce demand for drive alone trips. The SANDAG's Transportation Demand Management (TDM) Program known as iCommute provides free assistance to San Diego regional businesses and agencies in establishing and implementing customized TDM programs that reduce traffic congestion and GHG emissions. Services offered through iCommute include:

- Regional vanpool program, providing a $400-a-month subsidy for each van in the program,
- On-line ridematching services for carpools, vanpools, and schoolpools via the RideMatcher tool,
- Measurement of TDM benefits to the environment via the TripTracker tool,
- Information on other TDM options including transit, bicycling, and telework options

Additional types of measures to reduce demand include teleworking, carpooling and vanpooling, alternative work schedules, certain vehicle pricing measures as well as parking pricing, and parking management and reform.

Policy Measures

Available measures to reduce demand for single occupancy vehicle travel include:

- Provide financial incentives to support increased vanpooling (SANDAG)
- New or expanded policies, programs, and incentives to promote carpooling (SANDAG and local governments)
- Encourage or require employers to institute telework programs (SANDAG and local governments)
- Encourage or require employers to institute alternative work schedules (SANDAG and local governments)
- Encourage or require employers to institute programs that provide financial incentives for commuters to reduce their vehicle trips and use alternative transportation modes like walking, bicycling, public transit, vanpooling, and carpooling, often as an alternative to subsidized employee parking (SANDAG and local governments). Examples include:
  - Parking Cash Out: commuters offered subsidized parking are offered the cash equivalent if they use alternative travel modes.
  - Travel Allowances: financial payments provided to employees in lieu of parking subsidies. Commuters could use the travel allowance to pay for parking or for another travel mode.
  - Transit and Rideshare Benefits: free or discounted fares provided to employees.
  - Reduced Employee Parking Subsidies: commuters who drive would pay a portion or all of their parking costs.
- Reduce parking requirements and/or initiate parking maximums in smart growth areas (local governments)
- Establish on-street parking fees in smart growth areas (local governments)
- Support investments to provide high-performance broadband connectivity to every business, government agency, non-profit organization, and residence to enable widespread e-commerce and telecommuting (SANDAG and local governments)
- Evaluate and support or implement vehicle pricing measures such as cordon (area) tolls, a fuel or carbon tax, a per mile fee for vehicle travel, and pay-as-you-drive insurance (SANDAG and local governments)
- Implement strategies that prioritize HOVs – carpools, vanpools, and public transit vehicles – on the road and for parking (SANDAG and local governments)
- Implement car and bicycle sharing programs (SANDAG and local governments)

**GOAL 2. MINIMIZE EMISSIONS WHEN VEHICLES ARE USED**

Minimizing emissions when vehicles are used involves measures to promote efficient vehicle travel in the transportation system. Vehicles operating in congested traffic conditions or at higher speeds inefficiently consume fuel and generate a higher level of GHG emissions relative to vehicles operating under more efficient conditions. Creating efficient traffic conditions is also important to promote efficient travel by public transit services and high occupancy vehicle HOVs using our arterial and highway systems. SANDAG can promote operation of vehicles at more efficient speeds through efforts to reduce traffic congestion, limit vehicle speeds, and promote overall fuel efficient driving practices. Pricing policies are an option for managing the use of transportation facilities, particularly when there is limited capacity, such as during rush hours. Conversion of existing HOV facilities to high occupancy toll (HOT) lanes, or general purpose facilities to toll facilities, are ways in which pricing could be used to manage demand. In the San Diego region, development of new HOT lanes and new toll lanes – rather than the conversion of existing facilities – has been the adopted approach to pricing.

**Objective 2a. Reduce Traffic Congestion**

Characteristics of traffic congestion like idling, slow vehicle speeds, and repetitive braking and accelerating lead to inefficient vehicle operation and consumption of fuel, and therefore higher GHG emissions relative to vehicles operating in more efficient conditions. Eliminating or reducing congestion can lead to more efficient travel conditions for vehicles and GHG savings. However, measures to relieve congestion also have the potential to induce additional vehicle travel during uncongested periods, particularly over the long-term, which can partially or fully offset the GHG reductions achieved in the short-term from congestion relief. Since potential for demand inducement will likely vary depending on the type of congestion relief measure, careful study of potential induced demand will be needed to determine a more complete understanding of the effect of congestion relief measures on GHG reductions.

**Policy Measures**

Available measures to reduce traffic congestion include:

- Make improvements to relieve congestion (e.g., bottlenecks) (SANDAG)
- Conduct education campaigns or similar efforts to promote efficient driving habits (eco-driving) (SANDAG and local governments)
- Implement congestion pricing programs on congested highways and regionally significant arterial roadways (SANDAG)
- Implement neighborhood traffic calming projects (e.g., replace stop-controlled intersections with roundabouts) (local governments)
- Continue to coordinate traffic signals to facilitate efficient traffic conditions (SANDAG and local governments)
- Promote transportation alternatives for special events (e.g., professional sporting events, concerts) (SANDAG and local governments)
- Convert general purpose lanes to toll lanes on highways and arterials (SANDAG and local governments)

Objective 2b. Promote Efficient Vehicle Speeds

Similar to vehicles operating in congested conditions, vehicles moving at high speeds result in less efficient engine operations and higher fuel consumption relative to vehicles operating at lower, more fuel efficient speeds. Inefficient driving practices such as quick acceleration also lead to higher fuel consumption. Moreover, slower vehicle speeds can improve overall traffic flow and result in less congestion because slower moving vehicles are less likely to cause accidents that lead to congestion. The current maximum speed limit in the regional transportation system is 65 mph in most cases, though it is not uncommon to find vehicle speeds in excess of that level not being uncommon on our regional transportation system. Changing the speed limit would require state action for interstate highways and state routes. Promoting efficient driving practices or “eco-driving” could be accomplished through education and awareness programs.

Policy Measures

Available measures to promote efficient vehicle speeds include:

- Encourage the State and other appropriate agencies to establish and enforce a lower speed limit (e.g., 55 mph) on the regional transportation system (SANDAG)
- Promote fuel-efficient or “eco-driving” practices, such as reducing idling, slower driving speeds, and gentle accelerations, as a new driver education program or integrated with existing programs (SANDAG and local governments)

Goal 3. Promote Use of Low Carbon, Alternative Fuels

In addition to coordinated land use and transportation planning, our the San Diego region can reduce GHG emissions by promoting the use of alternative “low carbon” transportation fuels. While efforts related to low carbon fuels are primarily happening at the state and federal levels and in the private sector, our the region can promote their implementation by facilitating infrastructure siting and streamlined permitting for infrastructure installation.

SANDAG is a logical entity for helping to coordinate, plan and identify suitable locations for alternative fuel infrastructure. As a regional planning agency, SANDAG can ensure that alternative fuel considerations are integrated with development of the regional transportation network and recommend specific alternative fuel and vehicle technologies for different transportation sectors that are tailored to the unique characteristics of the region. Local governments have authority over siting and permitting of alternative fuel vehicle infrastructures.

State and federal energy policy provides significant opportunities for the region to increase the deployment of alternative fuel vehicles and infrastructure, including funding and tax credits. Moreover, A variety of alternative fuel vehicles in multiple vehicle classes are available now or will be in the near future, including factory-made and commercially available vehicles from major automobile manufacturers and after-market vehicle conversions and retrofits. Much government funding, research, and private sector investment is focused on the development of plug-in hybrids, electric vehicles, and biofuels. In addition, Hydrogen, natural gas, and propane are also the focus of public and private sector research and dollars.
The promotion of low carbon, alternative fuels provides the added benefit of reducing regional reliance on imported petroleum. The federal Energy Independence and Security Act of 2007 identified increased vehicle efficiency and increased supply of alternative fuels as two measures to enhance national energy security and reduce the nation’s reliance on petroleum imports. By coordinating a regional alternative transportation infrastructure effort and supporting local alternative fuel developers, SANDAG and local governments can help the San Diego region become more energy independent.

SANDAG has developed relationships with a variety of regional stakeholders regarding alternative fuels, including the San Diego Regional Clean Fuels Coalition and the Clean Transportation Program at SDG&E. SANDAG will also partner in the recently announced American Recovery and Reinvestment Act (ARRA) funded project between eTec and Nissan North America (eTec Nissan project) to deploy up to 1,000 all-electric vehicles and establish up to 2,250 private and publicly accessible charging points in the San Diego region as part of the largest transportation electrification project in U.S. history.

SANDAG is a logical entity for helping to coordinate, plan and identify suitable locations for alternative fuel infrastructure. As a regional planning agency, SANDAG can ensure that alternative fuel considerations are integrated with development of the regional transportation network and recommend specific alternative fuel and vehicle technologies for different transportation sectors that are tailored to the unique characteristics of the region.

Policy Measures

Available measures to promote the use of alternative fuel vehicles include:

- Create an action plan that incorporates alternative fuel vehicles into SANDAG and local government-owned vehicle fleets, and the vehicle and equipment fleets of contractors and funding recipients, such as the vehicle fleet for the SANDAG Regional Vanpool Program or for local government trash haulers (SANDAG and local governments)
- Develop a regional approach to infrastructure planning for alternative fuels by facilitating continued development of a public-private strategic alliance (SANDAG)
- Support electricity and natural gas tariffs that encourage their use as transportation fuels (SANDAG and local governments)
- Develop streamlined permitting requirements and standardized design guidelines and siting criteria for all types of electric charging stations (e.g., single- and multi-family residential, commercial, public access, etc.) (SANDAG and local governments)
- Accelerate the transition to plug-in hybrid electric and battery electric vehicles by developing a regional plan for the installation of a public access electric car charging network, as recommended in the Regional Alternative Fuels, Vehicles, and Infrastructure Report (SANDAG)
- Work with SDG&E to understand the potential impacts of widespread plug-in hybrid and electric vehicle deployment on the electricity grid (SANDAG)

**GOAL 4. PROTECT TRANSPORTATION INFRASTRUCTURE FROM CLIMATE CHANGE IMPACTS**

In addition to being the number one source of climate change emissions in our region, the transportation sector is also threatened by the impacts of climate change. More frequent extreme hot days and prolonged extreme heat periods would increase the risk of buckling of highways and warping of railroad tracks, along with general premature deterioration or failure of transportation infrastructure. More frequent and more severe wildfires followed by rainfall can increase the risk of mudslides which can disrupt major infrastructure like roadways and rail lines. Accelerated sea level rise and stronger storm surges are likely to cause some of the greatest impacts to California's transportation infrastructure including vital lines of coastal transportation, densely developed urban areas, ports, airports, and other lifeline transportation systems.
Adapting transportation infrastructure to prepare for climate change is emerging as a new concern for designing future projects as well as maintaining our current system. As such, the tools and methodologies for evaluating and adapting to impacts are still in the early stages of development. (12).

**Objective 4a. Protect transportation infrastructure from damage due to extreme heat**

**Policy Measures**

- Direct research at developing materials for transportation infrastructure that is better suited to withstand high temperatures.
- Accelerate inspections schedules and prepare for increased maintenance and costs.
- Utilize adaptive management and monitoring to determine which, if any, adaptive strategies should be incorporated in transportation planning.
- Address adaptation issues in the design of new projects and when improvements are made to existing infrastructure.

**Objective 4b. Protect transportation infrastructure from sea level rise and associated higher storm surges**

**Policy Measures**

- Develop a climate vulnerability plan that will identify areas in San Diego at high risk of damage from sea level rise and storm surges.
- Modify standards for project design and construction to account for increased potential storm surge elevations and frequency.
- Engage a multi-disciplinary team of climate change and coastal experts along with hydraulics and bridge design specialists during scoping process of coastal bridge projects.
- Utilize adaptive management and monitoring to determine which, if any, adaptive strategies should be incorporated in transportation planning.
- Address adaptation issues in the design of new projects and when improvements are made to existing infrastructure.

**Objective 4c. Protect transportation infrastructure from wildfire-associated mudslides**

**Policy Measure**

- Improve bank stabilization and erosion control measures near important transportation lines after wildfires.
- Address adaptation issues in the design of new projects and when improvements are made to existing infrastructure.
Conservation, energy efficiency, and clean onsite generation reduce GHG emissions. The easiest ton of greenhouse gases to remove from the atmosphere is one that is not emitted in the first place. State agency and regional utility actions are responsible for the majority of reductions in the energy sector, but there are actions that regional and local governments can take to leverage existing policies and programs to achieve additional GHG savings.

Electricity generation and natural gas end-uses (e.g., space and water heating) account for about one-third (33 percent) of GHG emissions in the San Diego region. Factors contributing to the level of emissions from electricity include total consumption and fuel sources. About two-thirds (67 percent) of the fuel used to generate electricity consumed in the region are fossil fuels like natural gas and coal. Factors contributing to GHG emissions from energy include:

1. The carbon intensity and location of energy supplies,
2. The efficiency of power plants and the transmission network,
3. The efficiency of buildings, and
4. The efficiency of end-use equipment.

Recommended regional and local government energy policies focus on the following:

- Improved energy planning
- Reducing energy consumption
- Expanding clean energy supply

The State’s Climate Change Scoping Plan identifies local government measures to reduce inefficient energy use from municipal operations and the community-at-large. Local governments have authority to adopt mandatory and voluntary reach codes that require higher degrees of energy efficiency and lower GHG emissions than state codes require. According to a 2009 GHG analysis performed by the Energy Policy Initiatives Center (EPIC) at the University of San Diego, significant potential for regional GHG savings are found by improving the efficiency of existing buildings and new construction (reducing energy consumption), and increasing installation of distributed energy systems like solar photovoltaics, combined heat and power (CHP), and solar water heating. Figures 2 and 3 show regional electricity and natural gas consumption by end-use sector. Commercial and residential sectors consume the most energy and are forecasted to produce the most GHG emissions from electricity and natural gas end uses.

**GOAL 1. REDUCE ENERGY USE IN RESIDENTIAL AND COMMERCIAL BUILDINGS**

Reducing energy use through efficiency is the first priority in the state’s preferred loading order. Energy efficiency provides direct and measurable benefits like cost savings for the end user and reduced GHG emissions for a community. One way local governments can do this is through their ability to regulate existing buildings and new construction. The EPIC analysis shows the vast majority (89 percent) of energy savings potential lies in the region’s existing building stock, with more modest savings potential (11 percent) through new construction.
Existing state and utility programs to reduce electricity and natural gas consumption include building and appliance standards routinely strengthened, wide-ranging energy efficiency and renewable energy programs, and the purchase of renewable energy supplies to meet future electricity demand and replace more carbon intensive options.

The goals and actions outlined here complement the measures detailed in the SANDAG Regional Energy Strategy (RES), which was approved by the Board of Directors in December 2009. The RES includes expanded discussions of these topics.

**Figure 2. Projected Electricity Consumption (Gigawatt-hours), 2007-2030**

![Graph showing projected electricity consumption from 2007 to 2030 with different sectors like Street lighting, Mining, Agricultural, Industrial, TCU, Commercial, and Residential.]

Source: Energy Policy Initiatives Center, University of San Diego, 2008. SANDAG Regional Energy Strategy, Figure 4-3, 2009.

**Figure 3. Existing and Projected Natural Gas Consumption, 2007-2030**

![Graph showing existing and projected natural gas consumption from 2007 to 2030 with different sectors like Agricultural, Mining, Industrial, Commercial, Residential.]

Source: Energy Policy Initiatives Center, University of San Diego, 2008. SANDAG Regional Energy Strategy, Figure 4-6, 2009.

**Green Building Practices**

Green buildings reduce energy consumption, use water more efficiently and utilize materials with recycled content, thus saving money, natural resources, and GHG emissions. Many local governments have adopted voluntary or mandatory reach codes equivalent to the Leadership in Energy and Environmental Design (LEED) green building standards. To ensure the greatest reductions in GHG emissions from green building programs, minimum levels of energy efficiency should be required.

In 2004, Governor Schwarzenegger signed Executive Order S-20-04 regarding Green Buildings, which sets a goal of reducing energy use in state-owned buildings by 20 percent by 2015 (from a 2003 baseline) and encourages the private commercial sector to set the same goal. The state’s Green Building Action Plan provides policy guidance and strategies for how the state will meet this goal.

In January 2010, California became the first state in the nation to adopt mandatory Green Building Standards Code (CALGREEN) requiring all new buildings in the state to be more energy efficient and environmentally responsible. CALGREEN is part of Title 24, California’s building energy code, which will become and it will be effective as of January 1, 2011.
CALGREEN requires every new building constructed in California to reduce water consumption by 20 percent, divert 50 percent of construction waste from landfills, and install low pollutant-emitting materials. According to CARB, these provisions will reduce GHG emissions by approximately 3 million metric tons equivalent in 2020. The California Green Building Directory is an online informational tool providing details about state-owned green buildings that are energy-efficient and environmentally friendly.

**Objective 1a. Retrofit Existing Buildings to Reduce Energy Use**

Six actions were identified in the Regional Energy Strategy that local and regional government should address as top energy priorities. One is to develop a regional building retrofit program to reduce inefficient electricity and natural gas use in our existing building stock. The EPIC analysis identified the residential sector as having the greatest potential for total energy savings at 48 percent, and the commercial sector representing 24 percent.

**A priority of the RES is the retrofit of the region’s existing building stock.** The EPIC analysis identified the residential sector as having the greatest potential for total energy savings at 48 percent, and the commercial and industrial sectors representing 24 percent and 17 percent of potential savings, respectively.

A large proportion of the region’s existing buildings were constructed prior to full implementation of the state’s minimum building energy code (Title 24): approximately sixty percent of residential buildings and forty percent of the commercial buildings. Because the useful life of buildings typically spans decades, a significant number of existing buildings will still be in use in 2030.

Comprehensive programs that integrate all potential energy-saving aspects for a building, creating prioritized packages of measures, achieve larger GHG reductions than singular programs. Also, financing to undertake building retrofits is becoming more available through Property Assessed Clean Energy (PACE) programs, also known as AB 811-style programs in California. PACE programs allow local governments to offer sustainable energy project loans to eligible property owners.

Comprehensive programs that integrate all potential energy-saving aspects for a building, creating prioritized packages of measures, achieve larger GHG reductions than singular programs. In California, financing to undertake building retrofits is becoming more available through Property Assessed Clean Energy (PACE) programs, also known as AB 811 programs. PACE programs allow local governments to offer sustainable energy project loans to eligible property owners. Financing programs need to be identified that address the upfront costs of retrofits.

**Policy Measures**

- Provide energy efficiency planning assistance to local governments through the Sustainable Region Program with SDG&E (SANDAG)
- Establish or support building energy rating and disclosure policies that inform building owners of their energy usage (SANDAG or local governments)
- Promote policies that lead to energy efficiency retrofits in existing buildings (SANDAG and local governments)
- Support increased use of solar water heating in residential, pool, and commercial uses to offset natural gas demand (e.g., pre-plumb policies) (SANDAG or local governments)
- Create financing programs to pay for energy projects and improvements that reduce GHG emissions (SANDAG or local governments)
Objective 1b. Maximize Efficiency in New Residential and Commercial Construction

The EPIC’s GHG analysis of local government policy options to reduce GHG emissions found that energy efficiency beyond Title 24 requirements (i.e., reach codes) could achieve moderate emissions reductions at a low cost in the commercial sector, and much lower GHG savings at a higher cost in the residential sector. Voluntary and mandatory reach codes for new commercial and residential construction yield less GHG savings due to the small amount of new construction as a proportion of the total building stock and the fact that California’s building energy code is stringent and updated regularly.

A big bold strategy of the state’s Long-term Energy Efficiency Strategic Plan calls for Zero Net Energy (ZNE) buildings. Through a combination of energy efficient design features and onsite clean distributed generation, ZNE buildings result in no net purchases from the electricity or gas grid, thereby avoiding the associated GHG emissions from power plants and the grid. Increased installation of high-efficiency technologies like solar hot water heaters and combined heat and power systems are strategies to offset natural gas use and meet energy needs more efficiently.

Policy Measures

- Develop a policy to include energy star appliances in new construction (local governments)
- Exceed Title 24 energy requirements for new construction through regulations or incentives that work toward the state’s goal of zero net energy new homes by 2020 and zero net energy new commercial buildings by 2030 (local governments)
- Increase enforcement of building energy requirements to reduce the rate of noncompliance (local governments)

Goal 2. Increase Use of Renewable Energy

Increasing the use of renewables and distributed energy systems is the state’s second priority for meeting our resource needs. Clean, nonrenewable onsite power like combined heat and power systems also are needed to reduce the GHG intensity of energy consumed in the region, which concurrently also reduced GHG emissions. Local governments have the opportunity to supplement ongoing state and utility efforts to increase the use of renewable energy and help the region achieve additional GHG emissions reductions by encouraging or requiring installation of on-site renewable and combined heat and power systems.

Objective 2a. Promote installation of clean, onsite energy systems

Distributed energy systems like rooftop solar photovoltaics, fuel cells, and combined heat and power systems can produce electricity during peak times and reduce demand on the electricity grid. Distributed energy systems are small-scale power generation technologies located close to the load being served. These decentralized systems are complementary to traditional electric power systems, can increase grid reliability and reduce the need for additional central peaking units. Additionally, installing energy efficient equipment prior to purchase of an onsite power system reduces the carbon intensity of a building.

Policy Measures

- Revise, or support revision of, local zoning policies, homeowner association codes, and other codes to remove hindrances and promote installation of photovoltaic (PV) or other distributed renewable energy systems (e.g., require or provide incentives for new construction to pre-wire for PV installation) (SANDAG or local governments)
- Explore opportunities and applications for local governments to demonstrate advanced energy storage technologies at municipal sites (local governments)
- Combine energy assessments and energy efficiency improvements with installation of distributed energy systems to reduce system costs and maximize energy savings (SANDAG or local governments)
- Establish financing programs (using public or private sources) that residents and businesses can access to install distributed energy systems as well as conduct energy assessments and make energy efficiency retrofits to existing buildings (SANDAG or local governments)
- Monitor and support a feed-in-tariff or other policies that will facilitate increased, cost-effective installation of small-scale renewable energy systems like solar photovoltaics (SANDAG or local governments)
- Identify local barriers to distributed generation DG installations, including combined heat and power systems, and provide supportable and applicable solutions across jurisdictions to reduce confusion for builders, contractors, and officials, about technologies, costs and benefits (SANDAG or local governments)
- Promote the use of high efficiency distributed generation technologies like combined heat and power (SANDAG or local governments)
- Conduct analysis of potential applications for CHP systems in the region (e.g., industrial, hotel, etc.) (SANDAG or local governments)
- Encourage local home builders to participate in the New Solar Homes Partnership to install solar photovoltaics on new homes in the region (SANDAG or local governments)

Objective 2b. Promote large-scale renewable energy projects

The EPIC analysis used in support of this strategy, identified increases in large-scale renewable energy as the top GHG reduction strategy for the energy sector (the state’s Pavley Standard that improves vehicle efficiency is the first), consistent with analysis of the California Air Resources Board’s San Diego region. The primary way to accomplish this is through utility-scale renewable energy systems like wind farms and solar power arrays. California’s Renewables Portfolio Standard (RPS) originally required retail sellers of electricity to procure 20 percent of retail sales from renewable energy by 2017. The 20 percent RPS requirement was later accelerated to the end of 2010 and a 33 percent requirement for 2020 was recommended by multiple state agencies and is in the process of being implemented. SANDAG and local governments can support increased large-scale renewable energy use as described below. More detail on supporting large-scale renewable energy is provided in the Regional Energy Strategy.

Policy Measures

- Identify potential locations in the region that could accommodate utility-scale renewable energy infrastructure (SANDAG or local governments)
- Explore options to pre-permit zones of appropriate land for renewable energy development (SANDAG or local governments)
- Support cost-effective transmission access and related infrastructure that will help the region meet or exceed requirements for procuring renewable resources while protecting environmental and other resources (SANDAG or local governments)


In the San Diego region, water and energy resources are closely connected. Large amounts of energy are needed to pump, treat, deliver, and recycle water, in addition to customer end-uses like heating and cooling water. Power plants primarily use water for cooling, which can impact local water supplies. The preceding section, Smart Growth Land Use and Low Carbon Transportation, describes the relationship among land development patterns, water use, and related energy use and GHG emissions.
California’s water systems are highly embedded with energy relative to national averages. The state’s major conveyance systems move water to end users over hundreds of miles and thousands of feet in elevation. The State Water Project (SWP) consumes energy by pumping water 2,000 feet over the Tehachapi Mountains – the highest lift of any water system in the world.

The San Diego region currently imports more than 80 percent of its water and is at the farthest, most energy intensive, end of the SWP and Colorado River Aqueduct. Imported water from the SWP and Colorado River will likely be constrained by various factors including enforcement of the Colorado River Compact, environmental restrictions on water from the SWP, and the impacts of climate change such as reduced snowpack levels in the Sierra Nevada.

There are various strategies for satisfying additional water demand as the region continues to grow, each of which is embedded with different amounts of energy use and GHG emissions. These strategies include conservation, recycling, additional imports, and desalination. The estimated energy intensity of each strategy should be included in the consideration of various water choices. In 2005, the California Energy Commission estimated energy intensity of water strategies provided below, expressed in kilowatt hours of electricity per acre foot of water (kWh/af). Estimated energy intensity of each strategy according to the California Energy Commission, expressed in kilowatt hours of electricity per acre foot of water (kWh/af), is provided below.

- Status quo: 6,900 kWh/af
- Conservation: 6,030 kWh/af
- Recycling: 6,620 kWh/af
- Imperial Irrigation District Transfer: 6,940 kWh/af
- Additional State Water Project: 7,100 kWh/af
- Seawater desalination: 7,260 kWh/af

Generally speaking, water conservation and recycling have the lowest embedded energy and GHG emissions of available options for meeting future water demand.

**Objective 3a. Integrate measures that save both water and energy into any regional building retrofit program(s)**

As of 2005, water-related energy use annually accounts for 19 percent of the state’s electricity consumption, 30 percent of non-power plant natural gas consumption, and use of 88 million gallons of diesel fuel. Peak demand for water generally coincides with peak demand for electricity. The California Energy Commission identifies water conservation and efficiency as the best, most energy efficient way to serve future demand.

**Policy Measures**

- Coordinate efforts to reduce water and energy use with the San Diego County Water Authority, local water districts and other agencies including the US Environmental Protection Agency’s WaterSense program (SANDAG or local governments)
- Increase energy conservation and efficiency of water end-uses in the residential and commercial sectors, with priority on the largest end uses of water (e.g., landscape irrigation, toilets, and showers) and the water end-uses with the most embedded energy (e.g., dishwashers, residential clothes washers, and commercial laundries) (local government)
- Identify existing and new financing mechanisms (e.g., on-bill financing [property tax or utility] and low interest loans) that end users can utilize to reduce water-related energy consumption (e.g., purple pipe to support use of reclaimed water) (SANDAG or local governments)
- Promote energy efficiency, demand response and clean onsite generation efforts to local governments that own or operate water pumping stations and water or wastewater treatment facilities (SANDAG or local governments)
Objective 3b. Use reclaimed water to decrease the amount of GHG emissions attributed to meeting regional water needs

Water reclamation is the fastest growing source of new supplies in the state. After treatment to stringent health and quality standards, recycled water can displace use of fresh water for power plant cooling, industrial processes, landscape irrigation, and groundwater replenishment. The San Diego region has made substantial investment in water reclamation.

The City of San Diego has constructed two reclamation facilities – North City Water Reclamation Plant and South Bay Water Reclamation Plant. The cities of Encinitas and Solana Beach, acting as the San Elijo Joint Powers Authority, operate the San Elijo Water Reclamation Facility, a wastewater treatment and water reclamation plant. In addition, two recycled water reservoirs provide operational storage for the water reclamation program.

Indirect Potable Reuse (IPR) is another method for using reclaimed water. For example, Orange County has operated a facility since January 2008. As of the writing of this document, the City of San Diego is undertaking a pilot Indirect Potable Reuse (IPR) project to determine the viability and cost-effectiveness of treating existing city-owned wastewater to potable standards and distributing via the existing potable water distribution system. Reuse of processed reclaimed water can reduce GHG emissions to the extent it displaces more energy intensive water supply options in the region. Reuse of processed reclaimed water would save energy and reduce GHG emissions to the extent it displaces the embedded energy of water supply that would have otherwise been used to meet water demand.

Policy Measures

- Support or identify uses for existing unused reclaimed water to decrease the amount of water imported to the San Diego region (SANDAG or local governments)
- Support projects to meet water demand by treating and reusing processed reclaimed water to potable water standards, such as the City of San Diego Indirect Potable Reuse (IPR) project (SANDAG and local governments)
- Identify and support programs for residential re-use of gray water to decrease the amount of energy needed to meet residential water needs (SANDAG or local governments)
- Support landscape design educational programs to help residential and commercial customers install low water use landscaping, thereby reducing water-related energy use (SANDAG or local governments)

GOAL 4. PROTECT ENERGY INFRASTRUCTURE FROM CLIMATE CHANGE IMPACTS

For the San Diego region, protecting energy infrastructure from climate change impacts will focus largely on impacts related to hotter temperatures, longer and more extreme heat waves, and sea level rise. Electricity and natural gas demand is highest when the temperature is high. Hot temperatures increase peak demand for electricity and make the electricity grid less efficient. By 2050, peak electricity demand is expected to increase by 60 percent to 75 percent, particularly during summer months when air conditioners are running. Because much of San Diego’s population growth is projected to occur in hotter inland areas over the next few decades, total electricity demand could strain the existing system and potentially lead to power outages.
By 2050, average sea level is projected to rise one to one and one half feet, which would cause lasting changes to the coastline. Substations, natural gas distribution lines and power lines in low-lying places could face loss or damage. By 2050, average sea level is projected to rise one to one and one half feet, making lasting changes to the coastline. Low-lying shoreline streets and buildings will be flooded more regularly, causing damage to property and infrastructure. Other low-lying places like the airport, the port, and military stations also will face flooding and associated loss or damage to energy infrastructure, especially during high surf and winter storm periods. Although the study of adaptation needs for electricity and natural gas infrastructure is outside the scope of this strategy, SANDAG and local governments should routinely reach out to SDG&E, the California Public Utilities Commission (CPUC), California Energy Commission and others as needed to understand how they are approaching adaptation issues affecting energy infrastructure critical to our region.

Objective 4a. Support modernization of the electricity grid.

Climate change impacts on the electricity system can be reduced by implementing the “smart grid” (i.e., modernizing the electricity grid with smart meters, smart end-use devices, and interactive communication technologies). Smart grid technologies can provide basic information about grid system performance that is not currently available, including problems with power lines and blackouts. Modern technologies will provide better infrastructure monitoring capabilities. In addition, pilot smart metering projects in the San Diego region and across the state have shown that consumers provided with information about their energy use and the actual cost of electricity based on the time of use, modified their consumption and reduced peak demand. The smart grid is one of the energy goals in the Regional Energy Strategy (RES) and is discussed in detail there.

Policy Measures

- Support mechanisms that encourage installation of smart appliances that interface with smart meters and provide real time electricity pricing information to consumers (SANDAG or local governments)
- Support rate structures that reflect the real time price of electricity (SANDAG or local governments)
- Support the rollout of advanced metering infrastructure that enables electric vehicles, distributed generation systems, and electricity consumption to be accurately monitored by end-users and the utility (SANDAG or local governments)
- Support educational information on the smart grid and smart meters (SANDAG or local governments)

Objective 4b. Utilize demand response and energy efficiency measures to reduce GHG emissions during peak periods.

Demand response measures entail reducing electricity and natural gas usage during peak demand periods. Shifting energy use away from peak periods can mitigate the need to run less efficient and higher GHG emitting power plants. Lower peak demand can improve air quality for the region, particularly in areas near peak electricity-producing power plants. Energy efficiency and demand response are each discussed in detail in the Regional Energy Strategy.

Policy Measures

- Participate in peak demand reduction programs and undertake peak demand reduction measures at local government facilities (local governments)
- Support a regional building retrofit program that can reduce overall and peak energy and water use in older structures (SANDAG and local governments)
- Exceed Title 24 energy requirements for new construction through policy or incentives that work toward an overall goal of zero net energy new homes by 2020 and zero net energy new commercial buildings by 2030 (local governments)
- Support fair and reasonable rate designs and incentives that encourage customers to reduce overall electricity consumption as well as during peak demand periods (SANDAG or local governments)
- Provide information and resources about peak demand and climate change, as well as environmental and monetary costs associated with peak electricity demand (SANDAG or local governments)

**Objective 4c. Study range of impacts on energy infrastructure.**

Research is starting to examine the impacts of climate change on the availability of wind power, which in 2009 accounted for about five percent of the total power mix for San Diego. (11) But the projected climate impacts on wind are highly uncertain at this time. Climate change will likely improve conditions for generating solar energy with increased number of warm and sunny days. Changes in precipitation resulting in changes to stream flow will impact hydroelectric generating facilities, particularly during the peak summer months when reservoirs are experiencing low water levels. Accelerated sea level rise and stronger storm surges are likely to cause impacts on any remaining coastal power plants.

**Policy Measures**

- Request periodic briefings from the utility utilities (e.g., SDG&E), the California Public Utilities Commission (CPUC), and California Energy Commission on long-term adaptation issues regarding energy infrastructure (SANDAG or local governments)
- Monitor or participate in state agency adaptation efforts (SANDAG or local governments)
- Coordinate adaptation planning with other local and regional entities (SANDAG or local governments)
SANDAG AND LOCAL GOVERNMENT OPERATIONS

California’s Climate Change Scoping Plan encourages local governments to voluntarily adopt a GHG emissions reduction goal consistent with the statewide AB 32 target. This is equivalent to reducing communitywide GHG emissions to the 1990 level by the year 2020 (an approximate 15 percent reduction from the baseline 2006 level). Where 1990 data on a jurisdictional level is not available, local governments are encouraged to set a target using the most current and best available GHG emissions data for the jurisdiction.

City and county governments are essential partners to contributing to regional and statewide efforts to reduce GHG emissions because of their influence over significant local emissions sources, including land use, transportation, and energy. In addition, state agencies like the Attorney General’s office and various stakeholders are increasingly calling for the integration of climate change considerations into local government processes and decision-making, including their city and county operations, as well as large-scale planning and environmental documents (e.g., General Plan updates, Specific Plans, CEQA documents). Though small by comparison, emissions produced by local government buildings and facilities, vehicle fleets, employee commutes, and other operations offer an opportunity for local governments to lead by example. This section describes resources and approaches for SANDAG and local governments to reduce GHG emissions from their operations and in their communities (where applicable). This section also highlights examples of successful local government climate change efforts.

Goal 1. SANDAG and Local Governments Lead by Example

The California Air Resources Board (CARB), in partnership with the California Public Utilities Commission (CPUC), California Energy Commission, and others has developed a Local Government Toolkit to provide a “one-stop-shop” of guidance and resources to help city and county governments address climate change through local planning and action. The Toolkit’s strategies focus on local government actions that reduce emissions both from government operations and communitywide sources. The California Energy Commission also has updated its Energy Aware Planning Guide which provides additional helpful tools for local governments.

Objective 1a. Local governments prepare and adopt Climate Action Plans.

To help identify and prioritize opportunities to reduce GHG emissions from both municipal operations and more broadly from communitywide emissions, local governments can consider developing a climate action plan. The process of developing a climate action plan can facilitate a collaborative approach to achieving GHG emissions reductions through establishing goals and objectives, comparing short- and long-term strategies based on a number of factors (like cost-benefit), and identifying unique opportunities and circumstances in the community.

| California Cities and Counties with Climate Change Plans or GHG Inventories |
|--------------------------|--------------------------|--------------------------|
| City of Alameda          | City of Fresno           | City of Rohnert Park     |
| City of Albany           | City of Hayward          | City of Sacramento       |
| City of Arcata           | City of Huntington Beach | City of San Diego        |
| City of Benicia          | City of Los Angeles      | City and County of San Francisco |
| City of Berkeley         | City of Manhattan Beach  | City of San Jose         |
| City of Burbank          | City of Martinez         | City of San Rafael       |
| City of Burlingame       | City of Menlo Park       | City of Santa Barbara    |
| City of Chula Vista      | City of Monterey         | City of Santa Cruz       |
| City of Davis            | City of Palo Alto        | City of Santa Monica     |
| City of Emeryville       | City of Pasadena         | City of Sebastopol       |
| City of Fort Bragg       | City of Piedmont         | City of Stockton         |
| City of Burlingame       | City of Richmond         | Town of Windsor          |
| City of Fremont          | City of Riverside        |                           |
| Alameda County           | Marin County             | San Bernardino County    |
| Contra Costa County      | Sacramento County        | Sonoma County            |

Source: Governor’s Office of Planning and Research, October 30, 2009
ICLEI-Local Governments for Sustainability USA, a membership organization of local governments addressing climate change, identifies five milestones associated with local climate action planning. The five milestones provide a flexible framework that can accommodate varying levels of analysis, effort, and availability of data. Local governments interested in developing an action plan according to the five milestones can receive assistance by joining ICLEI.

Milestone 1 – Conduct a Baseline Emissions Inventory
Milestone 2 – Adopt an Emissions Reduction Target
Milestone 3 – Develop a Local Action Plan
Milestone 4 – Implement Policies and Measures
Milestone 5 – Monitor and Verify Results

City of Chula Vista: Climate Action Leader

The City of Chula Vista was one of the first participants in ICLEI’s climate change initiatives, joining in 1992 and drafting its first climate action plan in 1994 and updating it in 2000. In 2001, the Chula Vista City Council approved an energy plan comprised of eight energy management strategies that advance the interests of residents and businesses in energy conservation, supply, and procurement. The city has worked with ICLEI and the California Climate Action Registry to implement its Climate Action Plan. Chula Vista monitors its progress by performing annual emission inventories. In 2009, Chula Vista was the first public agency in San Diego County to receive the “Climate Action Leader” designation from the California Climate Action Registry.

San Diego Regional Climate Protection Initiative

The San Diego Regional Climate Protection Initiative is a partnership between the San Diego Foundation, ICLEI-Local Governments for Sustainability, and local governments in San Diego County. The Initiative was established in 2009 to provide a regional platform for local governments to follow ICLEI’s Five-Milestone climate planning process. Through the Initiative, ICLEI worked with the cities of Carlsbad, Encinitas, Imperial Beach, La Mesa, National City, Poway, San Marcos, Solana Beach, Vista, and the County of San Diego to perform GHG inventories and forecasts; deliver trainings on climate mitigation and adaptation planning; and facilitate an information-sharing regional network. The project also supports workforce development for emerging professionals in the region through its “Climate Fellowship,” in which university students and recent graduates are placed in local government offices to conduct GHG inventories.

In 2009, ten local greenhouse gas inventories were completed and among the first in the state using CARB’s new Local Government Operations Protocol. The inventories included both government operations emissions and community-wide emissions, and were developed through coordination with various stakeholders in the region, including SANDAG, the Air Pollution Control District, and EPIC. Several local jurisdictions are now preparing climate action plans based on these baseline inventories and forecasts.

California Climate Action Network

The Institute for Local Government (ILG) California Climate Action Network (CCAN) has produced a Best Practices Framework offering suggested policy actions to reduce GHG emissions in ten “Climate Leadership Opportunity Areas,” both in agency operations and the community at large.
Policy Measures

The following policy measures could be evaluated as individual programs or as part of a broader set of local government climate action strategies.

- Establish a cross-department team to address climate change mitigation and adaptation (local governments)
- Identify financing mechanisms to support climate change planning, such as low and no cost help from ICLEI, SANDAG's Sustainable Region Program, and grant opportunities (SANDAG and local governments)
- Complete an inventory of municipal and community-wide GHG emissions (SANDAG and/or local governments)
- Develop and adopt a local climate action plan (local governments)

Objective 1b. SANDAG assess energy use of its operations

As detailed through the first half of the Strategy, SANDAG, with its member agencies, must determine how to meet requirements to reduce GHG emissions from cars and light trucks in the region. In addition, SANDAG can have its own operations assessed to determine the agency’s energy use and GHG emissions. With that data, SANDAG can lead by example by setting a GHG reduction target for its commercial building use, office equipment, vehicles and other daily functions. SANDAG can account for the GHG emissions generated by its employee commutes and identify opportunities to reduce its impact. As the metropolitan planning organization and council of governments, SANDAG does not have municipal buildings under its control (e.g., libraries, community centers, police stations and city halls) and SANDAG does not hold land-use authority to adopt building codes and other policy measures that would require changes in land use planning. SANDAG can continue to provide guidance through the development of strategies like this one and the Regional Energy Strategy, to better inform regional decision makers about choices they can make.

Policy Measures

The following policy measures could be evaluated as individual programs or as part of a broader set of regional climate action strategies.

- Establish a cross-department team to address climate change mitigation and adaptation (SANDAG)
- Regularly update a county-wide inventory of municipal and community-wide GHG emissions (SANDAG and/or local governments)
- Perform an energy assessment of SANDAG operations (SANDAG)
- Based on the assessment, identify opportunities to reduce inefficient use of electricity, natural gas and petroleum in SANDAG operations (SANDAG)

Objective 1cb. SANDAG and Local governments use cleaner energy supplies and reduce energy use

Local governments can lead by example by reducing their own energy use and using cleaner supplies like renewable energy and other distributed generation systems. It is easier to approach local businesses and residents about reducing GHG emissions if the local government has taken on this responsibility first. Reducing energy use also has direct and measurable benefits including cost savings that can be applied to other projects.
Energy use can be reduced by two related strategies: conservation and energy efficiency. Energy conservation refers to behavior changes that decrease energy use, such as turning off lights and changing thermostat settings. Energy efficiency includes programs that require buildings and appliances to be constructed in a manner that uses less energy, provide incentives for purchasing energy efficient equipment, and provide information and education to encourage people to save energy. Energy efficiency refers to structural changes, such as replacing appliances with more efficient models or tuning up building systems to improve their energy performance.

Cleaner energy supplies include small-scale power generation technologies such as photovoltaics, small wind turbines, and cogeneration systems located close to where energy is being used. Advantages of distributed energy systems include increased grid reliability, energy price stability, and reduced GHG emissions.

Transportation-related measures to reduce GHG emissions can increase mobility options and reduce the carbon intensity of fuel options. Reducing transportation demand also can be achieved by policies and programs such as telecommuting, alternative work schedules, carpooling or vanpooling, parking pricing, walking and biking.

**Local Resources**

**SANDAG Sustainable Region Program: “Energy Roadmaps for Local Governments”**

Beginning in 2010, SANDAG has undertaken an energy efficiency partnership with SDG&E that assists local governments by providing building energy assessments and energy management plans. SANDAG and SDG&E are calling these energy management plans “Energy Roadmaps” because they benchmark municipal energy usage and identify a framework that local governments can use to improve efficiency while reducing GHG emissions. The roadmaps identify energy-saving measures that can be integrated into local planning and permitting processes, ordinances, outreach and education efforts, and municipal operations. Additionally, the roadmaps include measures that local governments can implement for residents, businesses, and community-wide. This is a three-year expansion of the SANDAG’s Sustainable Region Program (SRP), which began as a pilot with the City of Carlsbad in Fiscal Year FY 2005.

During 2005 and 2006, the pilot SRP with the City of Carlsbad identified almost $200,000 in available energy savings through cost-effective energy efficiency measures, and the City was able to save almost 500,000 kWh in energy consumption through local energy efficiency programs. Carlsbad continued to implement energy-saving measures after the pilot ended and has since achieved greater savings.

Additionally, the City of San Diego, and County of San Diego, and City of Chula Vista have had energy-saving, GHG-reducing partnership programs for several years. In 2008, they jointly produced a guidebook for municipal energy efficiency programs: Best in Class. SANDAG will be coordinating with these local government partners.

**City of San Diego: Climate Change and the General Plan**

In March 2008, the city adopted a General Plan Update that addressed climate change. Within its conservation element, information about climate change and city actions to address it were included. The conservation element included a table listing how climate change mitigation was addressed in several plan elements: Conservation, Land Use and Community Planning, Mobility (Circulation), Recreation, Public Facilities, Services and Safety, and Urban Design.
State Energy Efficiency and Renewable Programs

Since the 1970s, California has promoted energy efficiency through policies and programs that require buildings and appliances to be constructed in a manner that uses less energy. In September 2009, the CPUC approved the newest energy efficiency program cycle spanning 2010 – 2012. The CPUC established a three-year budget of $3.1 billion for Southern California Edison (SCE), Pacific Gas and Electric Company (PG&E), SDG&E, and Southern California Gas Company (SCG) to implement energy efficiency programs. This was the largest commitment ever made by a state to energy efficiency. The state estimates that this funding can create between 15,000 and 18,000 skilled green jobs statewide.

The energy efficiency programs are funded through a public goods charge on ratepayer utility bills. The local government partnerships also receive grant funding from this. These programs include technical assistance, rebates and incentives for various energy efficiency measures, and education and training.

In 2007, the state launched Go Solar California to bring customer awareness to the CPUC California Solar Initiative (CSI), the Energy Commission New Solar Homes Partnership (NSHP), and solar incentive programs offered by publicly-owned utilities. The CSI offers rebates to existing homes and non-residential energy customers installing solar systems in investor-owned utility (IOU) service areas. The NSHP offers incentives for home builders to construct solar homes. The goals of the program are to achieve 400 MW of installed solar capacity by the end of 2016, create a self-sustaining solar market without the need for government incentives, and foster sufficient market penetration in the new residential market so that 50 percent or more of new housing built by 2016 and thereafter will include solar systems. The Self-Generation Incentive Program (SGIP) provides rebates for customers who install wind turbines and fuel cells. SB 412 (Statutes of 2009) revises this program to provide incentives for certain non-renewable distributed generation systems. SGIP is administered by the CPUC and implemented through the IOUs and the California Center for Sustainable Energy.

iCommute Program

iCommute assists regional commuters by providing free carpool and ride matching services, a subsidized vanpool program, transit solutions, the regional bicycle program, Guaranteed Ride Home service, SchoolPool carpooling programs for parents, and information about teleworking. iCommute also provides free assistance to local businesses and local governments to help them develop and implement customized employee commuter benefit programs that lower costs, increase productivity, and help the environment.

The goal of iCommute is to manage and reduce traffic congestion during peak-times, as well as reduce GHG emissions and other environmental pollutants that result from commuters driving to work each day alone. The program is managed by SANDAG as part of the regional 511 transportation information program.

Policy Measures

The following policy measures could be evaluated as individual programs or as part of a broader set of local government climate action strategies.

- Work with other local and regional governments to assess federal and state programs and their impact on GHG emissions and mitigation efforts (SANDAG or local governments)
- Review major policies and programs in the early stages of development to identify ways to reduce related GHG emissions (SANDAG or local governments)
- Establish monitoring and annual reporting responsibilities and procedures for performance on sustainability and climate change (SANDAG or local governments)
- Support the integration of alternative transportation fuels and vehicles into local government fleets and the fleets of contractors (SANDAG or local governments)
- Implement programs and provide incentives to encourage reduced emissions from employee commute, including telecommuting, alternative work schedules, carpooling/vanpooling, and active transportation (SANDAG or local governments)
- Utilize all available rebates and incentives for energy efficiency and distributed generation installations, such as state public good programs and solar programs (SANDAG or local governments)
- Solicit site specific proposals for city facilities and economic development opportunities that include energy efficiency and distributed generation (SANDAG or local governments)
- Convert street lighting, water pumps, water treatment and other energy intensive operations to more efficient technologies (SANDAG or local governments)
- Consider lifecycle GHG emissions in local government purchasing decisions, include as evaluation criteria in selecting vendors, contractors, service providers and the like (SANDAG or local governments)
REFERENCES


DRAFT 2050 REGIONAL TRANSPORTATION PLAN
PUBLIC INVOLVEMENT PLAN  File Number 3100500

Introduction

Public Involvement Plan (PIP)

A PIP is being created to support the development of the 2050 Regional Transportation Plan. The PIP is based on the SANDAG Public Participation Plan that was adopted December 18, 2009. The agencywide PPP provides the foundation for the development of specific public outreach plans prepared for the Regional Transportation Plan (RTP), as well as for transit construction projects, environmental documents, the Regional Transportation Improvement Program (RTIP), the transit fare ordinance, and other projects.

Discussion

The draft 2050 RTP Public Involvement Plan (Attachment 1) establishes a process and outlines specific activities for communicating with and obtaining input from the public concerning the 2050 Regional Transportation Plan (RTP) and its Sustainable Communities Strategy. This initial draft was reviewed at the February 16, 2010, Stakeholders Working Group (SWG) meeting and their input is included.

The strategies and tactics outlined in the plan will guide outreach efforts to build awareness of the regional transportation planning process and identify opportunities to shape the future of the region. The plan also describes SANDAG efforts to secure input on developing project priorities, project selection criteria, transportation networks, funding alternatives, meeting greenhouse gas emissions targets, and other elements of the 2050 RTP. These efforts will coordinate with regular interaction with the Regional Planning SWG and recipients of community-based outreach grants. The Public Involvement Plan also will guide efforts to secure input from individuals, organizations, agencies, and other stakeholders in the development of the 2050 RTP.

Next Steps

Staff will finalize the PIP based on additional input at this meeting and from the Transportation Committee and SANDAG Board of Directors. The final PIP will be updated as needed to guide the outreach efforts to support the development of the 2050 RTP.
2050 Regional Transportation Plan
Draft Public Involvement Plan
# Table of Contents

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1.0 INTRODUCTION

SANDAG is the first major Metropolitan Planning Organization (MPO) in the State of California to develop a Regional Transportation Plan (RTP) and its Sustainable Communities Strategy (SCS) under new state mandates outlined in Senate Bill (SB) 375 and Assembly Bill 32. How the San Diego region complies with these new mandates, identifies how to meet a greenhouse gas reduction target, and creates more sustainable communities will set the stage for other California regions. The 2050 RTP development process promotes strategic planning, emphasizes public involvement, encourages new partnerships, and supports the foundation of the Regional Comprehensive Plan (RCP): better connecting land use and transportation plans. It is important that stakeholders in the San Diego region work together to develop this ground-breaking 2050 RTP. This Public Involvement Plan (PIP) will establish the framework for a dynamic and interactive process to develop the 2050 RTP.

To obtain public input in the development of the 2050 RTP, SANDAG is implementing a comprehensive public outreach and involvement program. A major goal of this effort is to coordinate with the Regional Planning Stakeholders Working Group, community-based organizations that have received Environmental Justice grants, and to involve non-traditional, as well as traditional audiences, to raise their awareness of the transportation planning process under way and the broad goals to better connect transportation and land use planning. Early public involvement and comment about key components of the RTP is important to SANDAG as part of developing transportation public policies and establishing priorities to meet the travel needs of residents now and into the future.

This draft 2050 RTP PIP is an element of the agencywide Public Participation Plan (www.sandag.org/ppp) that was adopted by the SANDAG Board December 18, 2009, following a six-month development, input, and review process. The Public Participation Plan was developed in accordance with guidelines established by Federal Highway Administration for metropolitan transportation planning (23 CFR 450.316). It addresses Title VI, related nondiscrimination requirements, and reflects the principles of social equity and environmental justice. Included in the PPP are procedures, strategies, and outcomes associated with the ten requirements listed in 23 CFR 450.316. The PPP also fulfills various state and federal public involvement requirements.

The 2050 RTP PIP also follows guidelines established in the California Transportation Commission’s 2010 Regional Transportation Plan Guidelines (currently in draft format), specifically Chapter 4 – RTP Consultation and Coordination.

Developing the 2050 Regional Transportation Plan

The 2050 RTP will rely upon the Regional Comprehensive Plan (RCP) and other planning efforts as the foundation for integrating land uses, transportation systems, infrastructure needs, and public investment strategies within a regional smart growth framework. The RTP focuses both on the movement of people and goods, including marine terminals, air cargo facilities, freight rail, and land ports of entry that link our region with Mexico. In accordance with state and federal guidelines, the 2050 RTP is scheduled for adoption by the Board of Directors in July 2011.

With each RTP update, SANDAG starts the planning process by establishing a framework of goals, policy objectives, and performance measures to guide the development of the Plan. This is a key
first step, as it is the policy foundation for the RTP and identifies the “big picture” of what we hope to achieve. The Board of Directors discussed the 2050 RTP vision, goals, and policy objectives to help reach the 2050 RTP goals in fall 2009.

The 2050 RTP goals are structured into two overarching themes: Quality of Travel & Livability, and Sustainability. Quality of Travel & Livability relates to how the transportation system functions from the individual customer perspective (Mobility, Reliability, and System Preservation & Safety), while Sustainability relates to making progress simultaneously in each of the Three “Es” (Social Equity, Healthy Environment, and Prosperous Economy) from a regional perspective.

SANDAG is the first major MPO that is preparing an RTP that will comply with provisions of SB 375. A new regional growth forecast and the results of other studies currently under way—including the Climate Action Strategy, Regional Energy Strategy Update, Regional Bicycle Plan, Urban Area Transit Strategy, Comprehensive Freight Gateway Forecast, airport multimodal planning, high-speed rail planning, and corridor and subregional studies—will be incorporated into the development of the 2050 RTP. Other major tasks include updates to the project evaluation criteria and plan performance measures, economic analysis of investment strategies, and new revenue projections and cost estimates for transportation projects and services.

SB 375: Sustainable Communities Strategy

Per SB 375, the 2050 RTP will incorporate new legislative requirements. The SCS will be a new element of the RTP, and will be designed to show how regional greenhouse gas (GHG) emission reduction targets, to be established by the California Air Resources Board, will be achieved through development patterns, infrastructure investments, and transportation measures or policies that are determined to be feasible. Additionally, the SCS must be consistent with the Regional Housing Needs Assessment (RHNA) and must address protection of sensitive resource areas. If the SCS does not meet regional GHG reduction targets, an Alternative Planning Strategy (APS) must be developed to demonstrate how the targets could be achieved.

The adopted Smart Growth Concept Map will inform the development of the SCS. The Smart Growth Concept Map contains nearly 200 locations within the region that can support smart growth land uses and transportation investments. These locations were identified by transportation and planning staff from all jurisdictions and adopted by the SANDAG Board in 2006 (updated in 2008). These existing, planned, or potential smart growth locations are based on seven smart growth place types: the Metropolitan Center, Urban Centers, Town Centers, Community Centers, Rural Villages, Mixed Use Transit Corridors, and Special Use Centers, reflecting the notion that smart growth is not a “one-size-fits-all” endeavor. Additionally, tactics from the Climate Action Strategy will provide options for additional measures that could reduce GHG emissions.

The Environmental Impact Report (EIR) for the 2050 RTP will require analysis beyond what has been included in previous RTP EIRs. The RTP environmental analysis will include GHG emissions baseline measurements and projections, as well as potential mitigation measures that could reduce those emissions. The EIR also will include analysis of the additional elements required by SB 375, such as the SCS.
A New Regional Growth Forecast

Similar to past RTPs, the 2050 RTP will be based on a new regional growth forecast that includes existing and planned land uses, and potential redevelopment and infill areas from local general plans. However, most general plans have horizon years much earlier than 2050. As a result, SANDAG has received assistance from local jurisdictions to prepare local land use scenarios that will be applied beyond the local general plan horizon year out to the year 2050. This forecast will be SANDAG’s first estimate of population, housing, land use, and economic growth to the end of the TransNet program in 2048.

Urban Area Transit Strategy

SANDAG is developing an Urban Area Transit Strategy to evaluate possible regional transit strategies that significantly increase the attractiveness and use of transit in the urban area and maximize peak period alternative mode share (including transit, carpool, vanpool, bicycle, and walk trips) in the region. Three transit network alternatives will be developed and tested in conjunction with the rest of the transportation system. Public input will be secured at SANDAG Board and Policy Advisory Committee meetings as well as at the Stakeholders Working Group and other public workshops. One of these networks (or an alternative, combination, or variation) will be incorporated into the 2050 RTP as the regional transit network. Additionally, the study will include short-term action plans and implementation strategies.

2.0 2050 RTP Public Involvement Plan

The Public Involvement Plan will support the development of the 2050 RTP. The PIP also will create opportunities for stakeholders to provide input on the development of the Sustainable Communities Strategy. The strategies and tactics outlined in the plan will guide outreach efforts to build awareness of the regional transportation planning process and identify opportunities to shape the future of the region. The plan also describes SANDAG efforts to secure input on developing project priorities, project selection criteria, transportation networks, funding alternatives, meeting greenhouse gas emissions targets, and other elements of the 2050 RTP and its Sustainable Communities Strategy. These efforts will coordinate with regular interaction with the Regional Planning Stakeholders Working Group and recipients of community-based outreach grants. The PIP also will guide efforts to secure input from individuals, organizations, agencies, and other stakeholders in the development of the 2050 RTP.

This public involvement plan is intended to be a “living” document. Because of the fluid nature of the public involvement process, this plan may be adjusted to respond to issues and circumstances that arise throughout the process and will also be updated at major milestones in the planning and development process.

Environmental Justice

Consistent with the guidelines discussed above, the Public Involvement Plan will comply with SANDAG Policy 25, Federal Title VI legislation, the Americans with Disabilities Act (as defined in Title 49, Part 37, of the United States Code), Executive Order 12898 on Environmental Justice,
Executive Order 13166 on Limited English Proficiency, and other relevant regulations to ensure social equity, environmental justice, non-discrimination and accessibility.

To ensure meaningful access to Limited English Proficient (LEP) persons, SANDAG certifies compliance with the U.S. Department of Transportation (USDOT) “Policy Guidance Concerning Recipients’ Responsibilities to Limited English Proficient (LEP) Persons.” The policy guidance includes a “Safe Harbor” provision where the USDOT considers the written translation of vital documents in languages other than English (for eligible LEP language groups consisting of 5 percent or more of the population) to be strong evidence of compliance with the recipient’s obligations under Title VI. Based on the Census 2000 data, Spanish is the only language in the San Diego Region that meets or exceeds the 5 percent LEP trigger. However, SANDAG will print materials (or provide translation services or bilingual representatives) in any other languages deemed appropriate by SANDAG.

While involvement from community-based organizations that have received environmental justice mini-grants will enhance outreach efforts, other proactive steps will be taken to ensure diverse audiences are given the opportunity to provide input into the development of the 2050 RTP and its Sustainable Communities Strategy. These audiences include, but are not limited to, minority groups, non-English speakers, lower income households, individuals with disabilities, the elderly, and transit riders.

To reach these audiences, organizations and media outlets representing these communities will be approached to provide 2050 RTP information, solicit participation and input, and provide a means for communicating back with members of these communities. Participation will be encouraged via presentations to these organizations, involvement in events sponsored by these organizations or targeted at these audiences, publishing articles in organizational newsletters, and publishing notices and articles in ethnic media outlets. SANDAG has identified a number of local organizations that work with or represent underserved populations in the project area. These activities also will be coordinated in collaboration with the community-based organizations that have received SANDAG environmental justice grants.

SANDAG will work with these groups to identify opportunities to communicate with or solicit input from their constituents to meet their transportation needs. A draft list of stakeholders is included as Appendix C.

Public Stakeholder Categories

There are a number of groups — each with a unique perspective — that will be interested in the 2050 RTP development process. Outreach to these groups will be achieved by soliciting input through current channels at SANDAG, the Stakeholders Working Group, and other opt-in electronic outreach. The draft list of stakeholders is included as Appendix C. These include organizations and individuals representing the following interests:
Accessibility Challenged
Affordable Housing Advocates
Business Organizations
Citizens
Commercial & Retail
Commercial Property Interests
Community Planning Groups
Community Services
Commuters
Employers/Businesses
Environmental Advocates
Environmental Groups
Freight Shippers, Providers of Freight Transportation Services
General Public
Health advocacy organizations
Home Builder Representatives
Homeowner Associations
Industry Peers & Associations
Labor
Landowner
Military
Neighborhood and Community Groups
Neighborhoods/Residential
Professional Planning Organizations
Private Providers of Transportation
Representatives of Public Transportation Employees
Representatives of Users of Pedestrian Walkways And Bicycle Transportation Facilities,
Representatives of The Disabled, And Other Interested Parties
Representatives of Users of Public Transportation
Sustainability-focused organizations
Local universities
Students; University Student Associations
Taxpayer Advocates
Tourism
Transit Riders
Transportation Advocates

Government to Government Consultation and Coordination

Native American Consultation
The SANDAG Public Participation Plan details Native American Consultation activities as coordinating with the SANDAG Borders Committee, the Interagency Technical Working Group on Tribal Transportation Issues (Working Group), the Southern California Tribal Chairman’s Association, Reservation Transportation Authority, and other intertribal associations. SANDAG will coordinate with the Tribal Governments to provide input on the 2050 RTP to coordinate transportation and land use planning with tribal nations in
San Diego County. A Regional Tribal Summit is scheduled for April 9, 2010, where SANDAG and Tribal representatives will discuss regional issues, including the 2050 Regional Transportation Plan.

Coordination with Mexico
SANDAG will coordinate transportation planning activities with Mexico through the SANDAG Board and Transportation Committees as well as through the Borders Committee, the Committee on Binational Regional Opportunities (COBRO), and other efforts. SANDAG will engage these groups and conduct other outreach efforts to include joint U.S.-Mexico planning efforts in the 2050 Regional Transportation Plan.

Coordination with California Metropolitan Planning Organizations and Regional Transportation Planning Authorities
Collaborate with the Southern California Association of Governments (SCAG) and other Metropolitan Planning Organizations (MPOs) and Regional Transportation Planning Authorities (RTPAs) on the GHG target setting process and other SB 375 efforts.

3.0 PUBLIC INVOLVEMENT PLAN GOALS, OBJECTIVES AND STRATEGIES

Goals
- Raise awareness of the 2050 RTP as the region’s updated blueprint for a transportation system that enhances our quality of life and meets our mobility needs for the future
- Stimulate dialogue about the transportation challenges facing the San Diego region
- Provide opportunities for the public to provide input into the 2050 RTP and the Sustainable Communities Strategy, required by state climate change legislation
- Develop and incorporate into the plan realistic solutions that address the diverse mobility needs of the region’s residents, visitors, and business people
- Build public support for transportation improvements outlined in the 2050 RTP

Objectives
- Gain input from a broad range of individuals, organizations, agencies and local governments throughout the 2050 RTP development and decision-making process
- Provide timely and accessible public information about the proposed policies and plans contained in the 2050 RTP to a broad range of regional stakeholders
- Make public information accessible in a variety of formats and languages, use easy-to-understand language and concepts, and use a variety of media including innovative visualization techniques
- Hold public workshops and meetings that foster meaningful dialogue and result in effective and inclusive decision-making
- Consider public input at decision-making milestones for the 2050 RTP
- Meet or exceed local, state, and federal guidelines and requirements for public involvement in the RTP planning process
Strategies

The following strategies will be implemented to achieve the goals and objectives discussed above.

- Establish a clear project identity to convey information about the 2050 RTP, the SCS, and other RTP elements.
- Develop materials on the RTP and other components using easily understood language and terms.
- Develop a “marketing campaign” to build awareness and secure input from the public.
- Involve public stakeholders in the process on a regular basis to foster understanding and agreement on issues related to the development of the 2050 RTP.
- Use a variety of communication methods to reach audiences including presentations, one-on-one/small group meetings, public workshops, written materials, online, social media, and news media communication.
- Provide the public with up-to-date information about the 2050 RTP on a regular basis through presentations, the Web site and online communications, written materials and news updates.
- Document and address public comments received during the public involvement process.
- Provide information to the public about the 2050 RTP development process and promote opportunities for input and comments.
- Provide information to decision-makers regarding comments received throughout the public involvement process.
- Utilize traditional and new media to convey project information to a broad audience.
- Assess the effectiveness of the Public Involvement Plan at the conclusion of key phases (i.e., following workshops or release of draft documents) to evaluate how the strategies and tactics worked and what enhancements could be made for future phases.

4.0 Public Involvement Process

Implementing the strategies listed above will involve a number of coordinated tactics executed in conjunction with key 2050 RTP development milestones. These tactics will involve presentations at SANDAG Board, Policy Advisory Committee, and Stakeholder Working Group meetings, as well as with other SANDAG working groups including Cities/County Transportation Advisory Committee, Regional Planning Technical Working Group, San Diego Region Conformity Working Group, Bicycle-Pedestrian Working Groups, and other appropriate internal and external committees. This process also will include written and online communications, and media relations. The public involvement
process will follow key dates/milestones listed in Appendix A that have been identified by SANDAG and are included in the California Regional Transportation Plan Guidelines. Other tactics and methods are listed below.

**Early Public Involvement**

Early public involvement activities provide the opportunity to introduce the public to the 2050 RTP, its components, and its development process; gain initial feedback about how the public would like to be involved; and to prepare successful outreach strategies for the development of the 2050 RTP. Public involvement tactics during this period include:

- **Prepare informational materials to help educate the public about the 2050 RTP**
  Informational materials to support the 2050 RTP include a project Web site ([www.sandag.org/2050rtp](http://www.sandag.org/2050rtp)), fact sheet, and multimedia presentation. These materials will provide information about the RTP and its components, the development process, and information and/or referrals about how to get involved in the process. These materials will be written in easy-to-understand terms with limited jargon. Materials will be updated as needed throughout the process. The Web site will provide an opportunity for residents to learn about the 2050 RTP online and the ability to register for future e-mail updates. It also will provide access to project materials and documents, including fact sheets, news releases, project documents, and outreach efforts.

- **Secure input and feedback at Stakeholders Working Group**
  The Working Group provides a forum for the exchange of information throughout the development of the 2050 RTP. The SWG will be updated regularly on public involvement outreach and activities. One of its principal tasks is to advise SANDAG on the design and implementation of the Public Involvement Plan. The Working Group members are partners in the outreach process.

**Public Involvement during 2050 RTP Development**

A number of efforts will be implemented during this period to expand communication about the project:

- **Promote input opportunities as they come before SANDAG Board, Policy Advisory Committees, Technical and Stakeholder Working Groups**
  The SANDAG Web site includes a calendar that lists dates and times for upcoming meetings. When meetings include opportunities for input into the process or decision-making, they will also be publicized in the following ways:

  - Inclusion in agenda highlights an input opportunity for the 2050 RTP
  - Promotion through rEgion when meetings focus on input and decision opportunities
  - Promotion of key milestones via opt-in e-mail notification
• **Distribute information to local and regional media**
  To promote awareness among the media and foster accurate news coverage, press releases and agenda information will be distributed to local and regional media outlets. Reporters will be kept updated on the development and key milestones of the 2050 RTP. See Media List in Appendix B.

• **Provide news updates for rEgion and other newsletters**
  Numerous organizations in the region publish newsletters to keep their constituencies informed about issues of interest. Regular news updates about the 2050 RTP will be provided for publication in these organizational newsletters. Examples of newsletters to target are rEgion (SANDAG’s electronic newsletter) and publications of chambers of commerce, homeowners associations, community groups, and others.

• **Conduct Public Workshops**
  SANDAG will conduct Public Workshops at key milestones during the development of the 2050 RTP to solicit input on the draft and final 2050 Regional Transportation Plan, the Urban Area Transit Strategy, the draft and final Environmental Impact Report, and other components. (See Appendix A)

• **Implement Social Media and other Web-based communications**
  Use social media and other Web-based communications to build awareness about the 2050 RTP, promote outreach events, provide information, secure input, and facilitate dialogue.

• **Speakers Bureau program**
  To keep the local community and larger regional interests informed about the project throughout the process, the 2050 RTP and other plan elements will be promoted through SANDAG Speakers Bureau. These presentations will serve to share information about the project and the planning and development process.

• **Participate in community events**
  To reach a wider audience, project information will be provided and community input sought through participation in community events and festivals. These events may be sponsored by community groups, or could be targeted toward a specific audience, i.e., minority groups. A portable informational booth will be taken to various festivals, street fairs, etc., to share information about the project and to seek feedback from members of the public through comment cards, surveys and other means.

• **Continue regular news updates**
  SANDAG will continue to provide news updates for rEgion and other relevant Web-based and mailed publications to report newsworthy information.
• Update Informational Materials
  All project informational materials will be updated to reflect any updated or changed information that occurs during the preparation of the 2050 RTP. This will include updates to the project fact sheet, Frequently Asked Questions, Web site, multimedia presentation and any other materials that provide project information.

Community-Based Outreach

To help ensure diverse and direct input into the 2050 RTP and key related components from residents throughout the San Diego region, SANDAG is partnering with community-based organizations in critical communities of concern, providing resources to those community groups. The primary goal of the Community-Based Outreach Mini-Grant program is to engage and encourage diverse, inclusive, and active public participation from stakeholders in specific communities who traditionally may not have been involved in regional public policy planning processes (e.g., low income, seniors, minorities, persons with disabilities, and other identified populations). Through a competitive bid process, SANDAG awarded grant funding to eight community-based organizations to conduct this outreach in coordination with other agency public involvement activities being undertaken to help prepare the RTP, the update of the SANDAG Public Participation Plan, and other key regional initiatives.

In addition to the activities described above, each organization receiving a grant also appointed one representative to serve as a community-based network member of the new Regional Planning Stakeholders Working Group (SWG). The community-based organizations working on this outreach and involvement effort are:

  Able-Disabled Advocacy
  All Congregations Together
  Casa Familiar
  El Cajon Community Collaborative
  Friends of Adult Day Health Care Centers
  Linda Vista Collaborative
  San Ysidro Business Association

5.0 Public Involvement Plan Assessment

To assess the effectiveness of the public involvement efforts, SANDAG will assess the effectiveness of the Public Involvement Plan at key milestones in the project development process. These reports will help SANDAG to evaluate public involvement strategies and tactics and make adjustments along the way, and will inform future public involvement outreach phases of the 2050 RTP.

These reports will include:

  • A summary of all outreach efforts and input received
  • A qualitative assessment of how effective the efforts to obtain input were, i.e., audiences reached, did audience provide required input needed for 2050 RTP and Sustainable Communities Strategy, and how will/is input incorporated into 2050 RTP development
• A quantitative assessment of the public involvement plan including the number meetings/presentations/events participated in, Web site hits, approximate number of people reached, number of comments received, and number of media contacts along with the resulting media coverage

• The Public Involvement Plan will be revised and strategies/tactics adjusted based on assessments at key milestones
Appendix A
Draft 2050 RTP Public Outreach Activities
Proposed Methods and Purpose

These presentations and workshops are in addition to regularly scheduled SANDAG Board and Policy Advisory Committee meetings.

<table>
<thead>
<tr>
<th>Date</th>
<th>Outreach Method</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>March 2010</td>
<td>Presentations and outreach to working groups, stakeholders, interested parties</td>
<td>Build awareness for initial steps to set GHG emission reduction targets</td>
</tr>
<tr>
<td>April 2010</td>
<td>Public Workshop providing overview and target-setting info (one at Board Policy and one at SWG)</td>
<td>SB 375 post-Regional Target Advisory Committee workshop</td>
</tr>
<tr>
<td>July or September 2010</td>
<td>Presentations and outreach to working groups, stakeholders, interested parties</td>
<td>Build awareness and secure input on Sustainable Community Strategy development</td>
</tr>
<tr>
<td>October 2010</td>
<td>Draft SCS review at SANDAG Board meeting</td>
<td>SB 375 requires meeting with members of city council, board of supervisors joint SCS meeting.</td>
</tr>
<tr>
<td>March - early April 2011</td>
<td>Public workshops on draft RTP/SCS</td>
<td>SB 375 three public workshops on SCS requirement met, and two more for other SANDAG subregions. SANDAG to hold minimum of five subregional workshops.</td>
</tr>
<tr>
<td>March – early April 2011</td>
<td>Presentations and outreach to working groups, stakeholders, interested parties</td>
<td>Build awareness and secure input on continued development of RTP and SCS.</td>
</tr>
<tr>
<td>Late April 2011</td>
<td>Public hearings on draft RTP/SCS in at least two different areas of region</td>
<td>Follow up to workshops to further refine RTP/SCS and meet SB 375 requirements.</td>
</tr>
<tr>
<td>Ongoing 2009 -- 2011</td>
<td>Presentations and outreach to working groups, stakeholders, interested parties</td>
<td>SANDAG Speakers Bureau</td>
</tr>
</tbody>
</table>
### Appendix B

#### 2050 Regional Transportation Plan

##### Media List

**San Diego County Media Outlets**

<table>
<thead>
<tr>
<th>Media Source</th>
<th>Radio/TV Station</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alpine Sun</td>
<td>KSDS FM</td>
</tr>
<tr>
<td>American Chinese Times</td>
<td>KSON FM</td>
</tr>
<tr>
<td>Asia</td>
<td>KURS AM</td>
</tr>
<tr>
<td>Asian Journal</td>
<td>KUSI TV</td>
</tr>
<tr>
<td>Beach &amp; Bay Press</td>
<td>KUSS FM</td>
</tr>
<tr>
<td>BIA Builder Magazine</td>
<td>KWST AM/KMXX FM/KSEH FM</td>
</tr>
<tr>
<td>Biz San Diego</td>
<td>KXO AM/FM</td>
</tr>
<tr>
<td>Borrego Sun</td>
<td>KYXY FM</td>
</tr>
<tr>
<td>Business Action</td>
<td>La Jolla Light</td>
</tr>
<tr>
<td>Carlsbad Business Journal</td>
<td>La Jolla Village News</td>
</tr>
<tr>
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Orange and Riverside County Media Outlets

- Los Angeles Times – zoned editions
- Orange County Business Journal
- Orange County Register
- Riverside Press Enterprise
- The Californian

2050 RTP Public Involvement Plan

February 26, 2010 DRAFT 14
# Appendix C
## Draft Stakeholders List

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SMART GROWTH TRIP GENERATION STUDY

Introduction

Smart growth developments are generally perceived to generate fewer vehicle trips and less demand for parking as compared to conventional suburban developments, due to an increased number of trips via transit, walking, or bicycling. However, there has been a lack of empirical data to demonstrate this in the San Diego region. Current trip generation and parking supply guidelines are based on conventional suburban development, perhaps imposing a burden on developers and jurisdictions to provide more roadway and parking capacity than is necessary in smart growth environments. Application of identified trip generation and parking demand rates appropriate for smart growth development could result in cost savings for jurisdictions, developers, homebuyers, and renters. Working with a consulting team, SANDAG staff and local stakeholders have completed Trip Generation and Parking Strategies for Smart Growth: Planning Tools for the San Diego Region. This study is called for as a strategic initiative of the Regional Comprehensive Plan, and is a component of the SANDAG Smart Growth Toolbox; it is intended to be a resource for local agencies as they implement smart growth development.

Discussion

Development of the Study

Trip Generation and Parking Strategies for Smart Growth: Planning Tools for the San Diego Region was developed with input from the San Diego Regional Traffic Engineers Council (SANTEC), the Cities/County Transportation Advisory Committee (CTAC), the San Diego Regional Planning Technical Working Group (TWG), the San Diego Institute of Transportation Engineers (ITE) Task Force, and several stakeholders from these four groups. The consulting team assisting SANDAG included Fehr & Peers, VRPA Technologies and KTU+A.

The stakeholders and working groups listed above provided regular feedback over the course of the study regarding methodology and findings. The study incorporates comments from the stakeholders, as well as the working groups listed above. The study was well received by each of the working groups, whose members expressed that the study release is eagerly anticipated because it represents a substantial improvement over current methods of estimating trip generation in smart growth settings, and that they look forward to using the guidelines in their practice.

The Regional Planning Committee is asked to recommend that the Board of Directors accept Trip Generation and Parking Strategies for Smart Growth: Planning Tools for the San Diego Region (in substantially the same form as Attachment 1) for inclusion into the San Diego Traffic Generators Manual as an appendix, and as a resource in the SANDAG Smart Growth Toolbox.
Content of the Study

Trip Generation and Parking Strategies for Smart Growth: Planning Tools for the San Diego Region builds on a nationwide study completed for the Environmental Protection Agency (EPA) and published by the Transportation Research Board (TRB). The EPA study was authored by Jerry Walters of Fehr & Peers, and renowned transportation experts Reid Ewing and Robert Cervero, among others. Trip Generation and Parking Strategies for Smart Growth: Planning Tools for the San Diego Region identifies vehicle trip generation rates associated with smart growth developments. The study addresses the following questions:

1. Does smart growth development result in lower vehicle trip generation rates and decreased parking demand as compared to traditional development? If so, what rates have been observed?
2. What are the characteristics of smart growth development that account for identified reductions in vehicle trip generation and parking demand?
3. Can identified vehicle trip generation rates associated with smart growth development in other regions be applied in the San Diego region? Have similar results been found locally?

The study findings will be used to:

- Supplement the SANDAG San Diego Traffic Generators Manual (the Manual was last updated in 2000, and currently lists trip reduction guidelines only for mixed-use developments and those located within a quarter-mile of a transit station);
- Provide data as a resource for local jurisdictions when planning smart growth development; and
- Provide data as a resource for planning activities at the specific plan/community plan level.

Extensive research into the nature of smart growth developments has identified seven characteristics that may influence trip generation and parking demand in such settings:

1. Density
2. Diversity of uses
3. Urban design
4. Destination accessibility
5. Distance to transit
6. Demographics
7. Development scale

The consultant team used data collected from smart growth developments in the San Diego region and elsewhere to investigate relationships between trip generation and the above factors. Data collection took place at six smart growth development sites using traffic counts, and at twenty Smart Growth Opportunity Areas (SGOA), using data from the SANDAG Regional Household Travel Behavior Survey.

Study Findings

The study found that at both the site level and at the SGOA level, reductions in vehicle trips were observed for smart growth development, relative to the number of trips that would be expected to occur in typical suburban developments. These findings suggest that trip generation will generally
be overestimated at smart growth developments if appropriate trip reductions are not included in the calculations.

The study also included a review of current literature and best practices regarding parking at mixed-use and transit-oriented developments. The findings were compared to an assessment of parking standards utilized by local agencies in the region. The study found that a number of cities in the region provide accommodations for smart growth development in their parking requirements, but that typical parking requirements in the region provide an excess supply of parking relative to demand documented in nationwide studies. Additional measures to provide parking appropriate to smart growth developments could potentially be implemented, and further study in the region is warranted.

**Next Steps**

With the Regional Planning Committee’s recommendation, the study will be presented to the Board of Directors for acceptance. With the Board’s acceptance, the study will be included in San Diego Traffic Generators Manual as an appendix, and will be distributed in print form and electronically through the SANDAG web site for use by local agencies and transportation professionals, as a resource in the SANDAG Smart Growth Toolbox.

CHARLES “MUGGS” STOLL  
Director of Land Use and Transportation Planning


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The 18 cities and county government are SANDAG serving as the forum for regional decision-making. SANDAG builds consensus; plans, engineers, and builds public transit; makes strategic plans; obtains and allocates resources; and provides information on a broad range of topics pertinent to the region’s quality of life.

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Mexico
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As of February 9, 2010
ACKNOWLEDGEMENTS

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Transportation Committee
San Diego Regional Traffic Engineers Council
Cities/County Transportation Advisory Committee
San Diego Regional Planning Technical Working Group
San Diego Institute of Transportation Engineers
Transportation Capacity and Mobility Task Force

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INTRODUCTION AND STUDY FINDINGS

BACKGROUND

Smart growth developments are generally perceived to generate fewer vehicle trips and less demand for parking as compared to conventional suburban developments due to an increased number of trips via transit, walking, or bicycling. However, there has been a lack of empirical data to demonstrate this in the San Diego region. Current trip generation and parking supply guidelines are based on conventional suburban development, perhaps imposing a burden on developers and jurisdictions to provide more roadway and parking capacity than is necessary in smart growth environments. Application of identified trip generation and parking demand rates appropriate for smart growth development could result in cost savings for jurisdictions, developers, homebuyers, and renters.

SANDAG’S Regional Comprehensive Plan (RCP), adopted in 2004, offers a vision for change in the San Diego region that strongly emphasizes sustainability and smart growth. Trip Generation and Parking Strategies for Smart Growth: Planning Tools for the San Diego Region is called for as a strategic initiative of the RCP and is a component of the SANDAG Smart Growth Toolbox; it is intended to be a resource for local agencies as they implement smart growth development.

The results of the study are intended to provide a richer, more accurate accounting of vehicle trip reduction associated with mixed-use and transit-oriented development (TOD) in smart growth environments, compared to current local and national methods of calculating trip generation. This information is intended to supplement data in the San Diego Traffic Generators Manual, published by SANDAG in 2000, and the accompanying Not-so-Brief-Guide to Trip Generation, published by SANDAG in 2002. Whereas the Not-so-Brief-Guide suggests application of generic vehicle trip reductions of 5 percent for locations within one-quarter mile of transit and 10 percent for mixed-use, the method outlined in this study accounts for the uniqueness of each smart growth development site and proposes reductions based on the specific context in which each site is situated.

STUDY CONTENTS

This study presents an overview of a mixed-use development trip generation method (Mixed-Use Method) recently developed by a team led by Fehr & Peers to improve vehicle trip generation forecasts for mixed-use developments. This method was applied to a series of smart growth sites in the San Diego area. The results are presented in this study.
Introduction and Study Findings

The study also presents an examination of parking requirements in smart growth settings. A summary of current academic literature regarding parking demand and strategies relative to smart growth is included, as well as an analysis of parking requirements throughout the San Diego region. Policy guidance regarding effective parking strategies in smart growth environments based on data from the aforementioned studies also is included.

STUDY FINDINGS

The study found that at both the site level and at the Smart Growth Opportunity Area (SGOA) level, reductions in vehicle trips were observed for smart growth development, relative to the number of trips that would be expected to occur in typical suburban developments. These findings suggest that trip generation will generally be overestimated at smart growth developments if appropriate trip reductions are not included in the calculations.

The study also identified and validated a method to account for the amounts of trip reduction attributable to smart growth development forms. This Mixed Use Method, initially developed for the United States Environmental Protection Agency (EPA) and the Institute of Transportation Engineers, accounts for the degree to which mixed-use sites internally capture travel and the extent to which smart growth site design and context result in walking, biking, and transit use. The study validated the Mixed-Use Method for use within the San Diego region by comparing the method’s trip generation estimates to actual travel data from twenty of the region’s SGOAs and six smaller mixed-use/transit-oriented development (TOD) sites.

The Mixed-Use Method described in this study for calculating vehicle trip reduction in smart growth settings has been developed into a spreadsheet tool for use by local land use and transportation planners and engineers. This tool is intended to accompany this study and is available from SANDAG.

The study also included a review of current literature and best practices regarding parking in smart growth environments. The findings were compared to an assessment of parking standards utilized by local agencies in the region. The study found that a number of cities in the region provide accommodations for smart growth development in their parking requirements, but that typical parking requirements in the region provide an excess supply of parking relative to demand documented in nationwide studies. Additional measures to provide parking appropriate to smart growth developments could potentially be implemented.

The study did not include collection of empirical parking demand data in the San Diego region. Therefore, further study in the region, at a neighborhood level, is warranted to examine if parking demand in San Diego smart growth areas deviates significantly from demand observed in nationwide studies, and to determine appropriate strategies for particular locations. Additionally, the study does not address parking requirements for public transit stations and downtown San Diego.
THE MIXED-USE METHOD:
CALCULATING TRIP GENERATION
FOR SMART GROWTH SETTINGS

BACKGROUND

Development that integrates multiple land use types on a single site has become increasingly common. However, the data presented in The Institute of Transportation Engineers (ITE's) Trip Generation informational report and in the San Diego Traffic Generators Manual is primarily collected at single-use, free-standing sites. This defining characteristic limits the applicability of these “standard” trip rates to mixed-use or multi-use development projects and smart growth environments. While the number of person trips generated by individual uses may be similar to free-standing sites, the potential for interaction among on-site activities can significantly reduce the total number of vehicle trips. Additionally, mixed-use projects located in areas with a variety of nearby destinations and high-quality transit access will produce fewer vehicle trips due to a larger share of trips entering and exiting the site on foot, on bicycle, or by transit.

Development of the Mixed-Use Method

In order to provide a straightforward and empirically validated method of estimating vehicle trip generation at mixed-use developments, the United States EPA (under review by the ITE) sponsored a national study of the trip generation characteristics of multi-use sites. Travel survey data was gathered from 239 mixed-use developments (MXDs) in six major metropolitan regions, correlated with the characteristics of the sites and their surroundings, and validated through cordon traffic counts at 16 additional sites. The findings indicate that the amount of external traffic generated is affected by a wide variety of factors, each pertaining to one or more of the following “D” characteristics: density, diversity, design, destination accessibility, development scale, demographics, and distance to transit.

The characteristics were related statistically to the vehicle trip reductions observed in these developments. Vehicle Trip reduction is defined as a percentage reduction that can be applied to trip generation estimates for individual land uses to account for trips internal to the site and trips taken to nearby sites by walking, bicycling, or by transit. The statistical relationships between the “D” characteristics and the trip reductions observed in the surveys produced equations, collectively known as the Mixed-Use Method, which allow the user to predict the vehicle trip reduction as a function of the D characteristics.

In practice, the Mixed-Use Method is implemented in two steps: first, one computes the theoretical vehicle counts in and out of the site from an external source of standard trip rates or equations (the product of this calculation is known as raw trips). Typically this source is the ITE Trip Generation
informational report, but in this SANDAG-specific study, the source is the San Diego Traffic Generators manual. Then, one applies the predicted trip reduction percentage to the initial raw trips calculation to produce an estimate for the number of vehicle trips traveling in or out of the site.

**Method Structure and Outputs**

The Mixed-Use Method consists of four steps to achieve an estimate of daily vehicle trips on external roadways generated by the mixed-use development. The four steps and outputs are:

1. Compute daily trip estimates using standard rates or equations from an external source (raw trips). These estimates do not assume any internalization, and only minimal trips made by walking and/or transit modes.
2. Compute the probability of a trip staying internal to the mixed-use development.
3. Compute the probability an external trip will be made by walking or bicycling.
4. Compute the probability an external trip will be made by transit.

Mathematically, if we call the above probabilities generated in steps 2-4 above $P_{\text{internal}}$, $P_{\text{walkbike}}$, and $P_{\text{transit}}$, respectively, the desired result of number of external vehicle trips generated by mixed-use/TOD is illustrated in the following equation:

$$\text{External Vehicle Trips Generated by Mixed-Use/TOD Development} = \text{Raw Trips} \times (1 - P_{\text{internal}}) \times (1 - P_{\text{walkbike}} - P_{\text{transit}})$$

It should be noted that although the result of the above equation (the net number of external vehicle trips) has been formally validated, the component probabilities have not, largely due to lack of data for validation.

**Probabilities**

The three probability models ($P_{\text{internal}}$, $P_{\text{walkbike}}$, and $P_{\text{transit}}$) depend on variables that are characteristics of the MXD, either input or calculated by the spreadsheet.

The variables for $P_{\text{internal}}$ are:
- Employment
- Land area
- Jobs/population diversity (a measure of land use balance)
- Number of intersections per square mile (a measure of walkability and connectedness among land uses)
- Average household size
- Vehicles owned per capita

The variables for $P_{\text{walkbike}}$ are:
- Land area
- Jobs/population diversity
- Retail jobs/population diversity
The variables for Employment are:
- Employment within one mile (walking distance)
- Population + employment per square mile
- Number of intersections per square mile
- Average household size
- Vehicles owned per capita

The variables for Ptransit are:
- Employment
- Number of intersections per square mile
- Employment within a 30-minute trip by transit
- Average household size
- Vehicles owned per capita

These variables are all examples of the "7Ds" that are known to influence travel behavior: density, diversity, design, destination accessibility, development scale, demographics, and distance to transit.

**Mixed-Use Method Validation**

In the initial validation of the Mixed-Use Method, a set of 16 independent mixed-use sites that were not included in the initial analysis were tested to help validate the method. Validation sites were comprised of mixed-use developments and areas ranging in size from approximately 5 acres to over 1,000 acres, located in diverse regions across the United States, including Florida, Northern and Southern California, Georgia, and Texas.

The validation tests produced two types of performance measures: root mean squared error (RMSE) and pseudo R-squared. RMSE is a measure of the percentage by which the trip generation estimates produced by the method deviate from the actual trip generation counted at each of the study sites. The lower the RMSE deviation, the more accurate is the prediction method. R-squared is a measure of how well the prediction method accounts for the degree of variation in trip generation from one site to another, with a value of 0.5 indicating an ability to explain 50 percent of the variation among cases and a value of 1.0 indicating a perfect ability to capture the variation in trips from one site to another.

Among the validation sites, use of the Mixed-Use Method produced a significantly better root mean squared error (RMSE) and pseudo-R squared than traditional methods when comparing estimated to observed external vehicle trips. Estimates from the ITE Trip Generation manual had an RMSE of 40 percent and pseudo-R squared of 0.58, and modified estimates using ITE's traditional trip internalization techniques had an RMSE of 32 percent and pseudo-R squared of 0.73. Estimates produced by the Mixed-Use Method had an RMSE of only 26 percent and pseudo-R squared of 0.82. This means that the Mixed-Use Method explains roughly 82 percent of the variation in trip generation among the 16 sites, with the remaining 18 percent attributable to variables not included in the method.
APPLICATION OF THE MIXED-USE METHOD FOR SAN DIEGO SITES

To ground-truth the Mixed-Use Method for use in the San Diego region, a series of tests were performed comparing the method’s estimations with actual traffic count data from a number of sites within the region. This included comparisons at both large SGOAs and smaller mixed-use and TOD sites.

Study Areas

Smart Growth Opportunity Areas

The SANDAG Smart Growth Concept Map identifies a list of SGOAs classified into one of seven place types (Metropolitan Center, Urban Center, Town Center, Community Center, Rural Village, Mixed-Use Transit Corridor, and Special Use Center). Depending on whether the areas meet land use and transit service requirements for their place type, they are identified as either existing or potential SGOAs. SANDAG identified a list of 57 existing SGOAs to be studied in this analysis. These 57 SGOAs were chosen by virtue of having residential and employment densities on the ground that currently meet the prescribed thresholds for their place types.

Travel data for a representative group of SGOAs was compiled from the SANDAG 2006 Regional Household Travel Behavior Survey. The large size of the SGOAs, multiple access points, and potential for through trips made it unfeasible to count vehicle trip generation for these SGOAs explicitly. As a substitute for actual counts, data from the SANDAG 2006 Regional Household Travel Behavior Survey was used for these sites to generate comparisons for results obtained in the Mixed-Use Method. Of the 57 selected SGOAs, 20 were found to have enough trip records from the Travel Behavior Survey to be considered suitable for analysis (at least 100). These are discussed in more detail below under the heading “Analysis: SGOAs.” Appendix B contains more detailed information about the SGOAs that had enough trip records in the survey data to be analyzed. Appendix D contains the data sources for the SGOA land use data.

Small Mixed-Use/TOD Sites

Six additional smaller mixed-use/TOD sites were identified for comparing the Mixed-Use Method estimates to actual counts of vehicles entering and exiting each site. The selected sites were:

- Station Village at Rio Vista Trolley Station, bounded by Camino Del Este, Rio San Diego Drive, Qualcomm Way, and the trolley tracks (residential and retail; trolley station and local bus)
- La Mesa Village Plaza, bounded by La Mesa Boulevard, Acacia Avenue, Orange Avenue, and the train tracks (residential, retail, and office; trolley station)
- The Uptown Center in the Hillcrest neighborhood, bound by University Avenue, Cleveland Avenue, Richmond Street, Washington Street, and SR-163 (residential and retail; high frequency local bus)
- The Village at Morena Linda Vista Trolley Station, bound by Morena Boulevard, Linda Vista Road, Napa Street, and the train tracks (residential and retail; trolley station)
- Hazard Center, bound by SR-163, Friars Road, Frazee Road, and Hazard Center Drive (retail and office; trolley station)
Heritage Town Center at Otay Ranch in Chula Vista, bound by Santa Rita Street, Palomar Street, Santa Andrea Street, and the southern end of the parking lot, not including the houses on Fieldbrook Street (residential, retail, and medical office).

Appendix A shows a set of maps illustrating the sites' locations and the locations where traffic counts were taken.

**Data Collection**

Continuous 24-hour traffic counts were conducted at the six small mixed-use/TOD sites on typical midweek weekdays: Tuesday, Wednesday, or Thursday. Counts were conducted in October of 2008 for Otay Ranch, and in May and early June of 2009 (prior to the end of the K-12 school year) for all other sites at the site entrances shown in Appendix A.

**Analysis: SGOAs**

The Mixed-Use Method starts with a reliable local source of suburban single-use trip generation data, such as San Diego Traffic Generators. It then accounts for vehicle trip reductions attributable to the mix of land uses on the site, the development density, walking and transit options, and site context and regional accessibility. The resulting trip reduction percentage produces a predicted count of vehicles entering or exiting the site. The effectiveness of the method can be tested by comparing the observed counts to the method’s prediction. For most of the SGOAs, obtaining traffic counts entering and exiting the areas was not feasible due to the inability to filter out through trips; however, it also is possible to test the trip reduction percentage itself. Data from the SANDAG Regional Household Travel Behavior Survey was used to collect observed trip reduction percentages, which could be compared to the Mixed-Use Method’s predicted trip reduction percentages.

SANDAG staff provided Fehr & Peers with a data set of “flags” identifying which trips from the survey began and/or ended in one of the SGOAs. The trip data also included travel modes and party sizes. From this information, the total number of origins, destinations, and internalized trips (trips that begin and end in the same SGOA) by auto, walk, bicycle, and transit modes was computed for each SGOA. This was translated into observed values of PInternal, PWalkbike, and PTransit, as defined in the Mixed-Use Method Overview section above.

The analysis was performed for each of the 20 SGOAs that had at least 100 trips recorded in the survey. A cutoff of 100 trip records was chosen because in general, a sample size of between at least 30 to 40 is necessary for meaningful sample probabilities that are unlikely to vary significantly from their true values, and we are drawing three sample probabilities for each record (Pinternal, PWalkbike, and PTransit).

Figure 1 shows the estimated and observed trip reduction percentages for the 20 SGOAs. Vehicle trip reduction at the SGOA level averaged 24 percent relative to raw trip calculations and ranged from as high as 47 percent in downtown San Diego, to 32 percent in North Park/City Heights, and as low as 5 percent in Mira Mesa.

The dotted line represents an ideal model fit for comparison purposes. Overall, the Mixed-Use Method is a conservative predictor of trip reduction, underestimating trip reduction by about 10 percent on average, but the estimated and observed trip reductions are highly correlated.
Figure 1
Net Vehicle Trip Reduction for SGOAs With Greater Than 100 Survey Records

Analysis: Small Mixed-Use/TOD Sites With Counts

For the small mixed-use/TOD sites, preliminary estimates of site trip generation were calculated from San Diego Traffic Generators trip rates and site land uses. These estimates of raw trips use suburban trip generation rates for single use sites and do not consider the effects of mixed-use development or transit access. The Mixed-Use Method was applied to each site and the trip reduction percentages were applied to the raw trips to obtain Mixed-Use Method net trips.

SANDAG staff provided site land uses and values for most of the Mixed-Use Method input variables. Some of the variables were determined by estimation methods, as follows:

- Due to confidentiality restrictions associated with California Employment Development Department data, employment levels for some sites were not always reflective of current land uses in the SANDAG databases; in those cases, they were determined from the building areas and jobs per 1,000 square foot conversion ratios.
- VRPA Technologies performed an independent set of land use data checks, collecting data from traffic studies wherever possible, and estimated building occupancy. Those estimates were taken into account in the calculation of raw trips.
- Vehicle ownership per capita was calculated from 2000 Census data using the census block group(s) that most closely matched the sites’ locations.
- SANDAG staff estimated employment within 30 minutes by transit using their regional travel demand model.
Table 1 shows the SANDAG raw trips, the Mixed-Use Method’s count predictions, and the actual external vehicle trip counts. Detail behind the SANDAG raw trips calculations is provided in Appendix B.

### Table 1

**Mixed-Use Method Analysis for SANDAG Sites**

<table>
<thead>
<tr>
<th>Site Name</th>
<th>Location</th>
<th>SANDAG Raw Trips</th>
<th>Mixed-Use Method Trip Reduction Percentage</th>
<th>Mixed-Use Method Net Trips</th>
<th>External Vehicle Trip Counts</th>
<th>Percent Deviation between Mixed-Use Method and External Vehicle Counts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rio Vista Station Village</td>
<td>San Diego</td>
<td>6,689</td>
<td>17%</td>
<td>5,538</td>
<td>5,307</td>
<td>4%</td>
</tr>
<tr>
<td>La Mesa Village Plaza</td>
<td>La Mesa</td>
<td>5,681</td>
<td>20%</td>
<td>4,539</td>
<td>4,280</td>
<td>6%</td>
</tr>
<tr>
<td>Uptown Center</td>
<td>San Diego</td>
<td>20,214</td>
<td>15%</td>
<td>17,097</td>
<td>16,886</td>
<td>1%</td>
</tr>
<tr>
<td>The Village at Morena Linda Vista</td>
<td>San Diego</td>
<td>6,375</td>
<td>26%</td>
<td>4,690</td>
<td>4,712</td>
<td>0%</td>
</tr>
<tr>
<td>Hazard Center</td>
<td>San Diego</td>
<td>15,051</td>
<td>12%</td>
<td>13,214</td>
<td>11,644</td>
<td>13%</td>
</tr>
<tr>
<td>Heritage Center at Otay Ranch</td>
<td>Chula Vista</td>
<td>10,505</td>
<td>7%</td>
<td>9,730</td>
<td>7,935</td>
<td>23%</td>
</tr>
</tbody>
</table>

(1) Using San Diego Traffic Generators Trip Rates; see Appendix B for details
(2) Application of Fehr & Peers Mixed Use Trip Generation Reduction Percentages to (1)
(3) Actual counts

Source: Fehr & Peers, 2009

Based on the results shown in the table above, the Mixed-Use Method is an excellent predictor of external vehicle trips generated by smart growth development, tending to be slightly conservative, but without overestimating smart growth trips to the same degree as conventional trip generation methods. In all cases listed in Table 1, the Mixed-Use Method results in an estimation of external vehicle trips that is below the levels of estimated trip generation using raw trips alone and at or above the level of trips that were determined through actual counts. On average, the San Diego Traffic Generators trip generation rates for suburban development would overestimate traffic from the six sites by 29 percent, while the Mixed-Use Method reduces the average overestimate to 8 percent.

### Additional Comments

The 20 larger SGOA sites analyzed in Figure 1 provide data for both validation of the Mixed-Use Method and for future refinements. It should be noted that the method’s underestimation of trip reduction is most noticeable when it comes to the transit trips component, and additional data could help improve future versions of the Mixed-Use Method. Data collection at additional sites in urban locations with high transit usage is recommended in order to uncover statistically significant variables that are related to the “distance to transit” characteristic. This will help subsequent versions of the method to do a better job of capturing the beneficial aspects of a TOD site’s proximity to transit.
It is noteworthy that at four of the six sites where actual counts were taken, the Mixed-Use Method predicts vehicle traffic generated within 10 percent of actual counts, and the average percent overestimation is 8 percent. By comparison, the best alternative method of estimating trip generation within the region, the San Diego Traffic Generators manual, would overestimate trip generation at the six sites by an average of 29 percent.

Participants in the study process have noted that the study was conducted during a downturn in the national and local economy. Consideration was given to adjusting the results of the study to account for reduced economic activity; however, it was decided that the results would not be adjusted to account for this factor. Historically, nationwide and local trip-generation counts have not been adjusted for the state of the economy at the time of the counts. Instead, the counts are averaged over a variety of economic conditions to produce an average trip generation rate. In the case of this study, much of the data that was used to calibrate and validate the Mixed-Use Method was collected prior to the current downturn. This includes the nationwide data on which the method was based, as well as the local data collected at SGOA sites. Data collected at the small mixed-use/TOD sites was collected during the economic downturn.

However, efforts were made to adjust the analysis to account for any unusually high vacancy rates found at the study sites. As a result, the comparison of actual traffic counts with estimates produced by the Mixed-Use Method take into account both the economy’s influence on occupancies and the relative accuracy of the method for estimating traffic at a site with a given level of occupancy. Overall, the entire dataset used in the analysis reflects data collected during a variety of economic conditions.

Finally, the method has not been fully validated for application to single-use developments in smart growth settings or large auto-oriented, mixed-use developments. The following comments apply to these types of developments:

- The Mixed-Use Method was explicitly developed for the analysis of mixed-use developments. It has not been formally validated for analyzing single-use developments within mixed-use areas. For analysis of single-use development within a mixed-use area, two possible approaches are suggested:
  1. Define a mixed-use area surrounding the proposed development (and all associated input variables) and run the method with and without the development. The difference in trips between the two calculations represents the net change in the number of external trips generated by the proposed development.
  2. Select one of the SGOAs or counted sites that are documented in these guidelines that most closely resembles the area in which the development project is proposed, and use the external trip reductions from the SGOA or counted site to estimate trip reductions for the proposed development.

- Trial runs suggest the Mixed-Use Method may be too conservative (i.e., will predict too many external vehicle trips) for large, remote, mixed-use suburban/rural auto-oriented developments with little transit service. For such projects analysts may wish to consider using the regional transportation model or the ITE handbook’s mixed-use development procedure in addition to, or in place of, the MXD method.
PARKING FOR SMART GROWTH

INTRODUCTION

Smart growth development sites feature relatively dense development, mixes of compatible land use with pedestrian amenities, bicycle facilities, and optimal access to public transportation. These features favor access by transit, walking, and bicycling. The diversity of uses within close proximity encourages visitors to make journeys within the site by foot, even if they arrive by car. Furthermore, research has shown that vehicle ownership for smart growth residents is lower than for residents of suburban development. All of these factors suggest that parking demand in smart growth areas is lower than elsewhere in the region and that parking supplies should reflect this fact.

The United States EPA has published key guidance on parking provisions for smart growth. Recognizing connections between mixed-use development, driving, and parking, the EPA, in a publication on parking in smart growth developments, has stated:

[T]ypical parking regulations and codes simply require a set amount of parking for a given square footage or number of units, assuming all trips will be by private automobile and ignoring the neighborhood’s particular mix of uses, access to transit and walking, and context within the metropolitan region. Such inflexible parking requirements can force businesses to provide unneeded parking that wastes space and money.... [I]nflexible minimum parking requirements are the norm – but they represent a barrier to better development (EPA, 2006).

It is important to note that lower parking rates can reinforce lower vehicle trip generation rates, a fundamental goal of smart growth. Donald Shoup, Professor of Urban Planning at the University of California, Los Angeles, and an articulate critic of minimum parking requirements, contends that by making parking more scarce and costly, people will become more likely to travel by transit, by bike, or on foot. As the cost to park increases (in terms of out-of-pocket cost or the time-cost associated with searching for scarce parking), drivers will re-evaluate their mode choice and some will change travel behavior to and from destinations. Thus, cities that reduce parking requirements for smart growth also can expect reduced levels of driving.

This study reviews current parking requirements and policies in the San Diego region and highlights relevant smart growth parking demand and policy studies. This review is to establish the reasonableness of lower parking rates for smart growth developments. The study also delineates auxiliary parking management strategies that can and should complement lower parking rates. The study did not include collection of empirical parking demand data in the San Diego region, and it does not address parking requirements for public transit stations and downtown San Diego.
EXISTING LOCAL JURISDICTION PARKING REQUIREMENTS IN THE SAN DIEGO REGION

Ultimately, the amount of parking supplied for new development is controlled by a jurisdiction’s parking code requirements. A review of SANDAG member jurisdictions’ parking codes revealed a few special parking requirements and parking strategies for smart growth developments. Implementation of such special provisions may continue to increase. SANDAG recently released a set of smart growth design guidelines titled Designing for Smart Growth: Creating Great Places in the San Diego Region (June 2009). This document proposes parking policies and design guidelines specifically for smart growth developments.

Current parking standards (as of September 2009) were collected for each of the jurisdictions that comprise SANDAG and are presented in Table 2 on the next page. These standards represent the baseline parking requirements for each jurisdiction.

Exceptions to Standard Parking Requirements: Accommodations for Smart Growth

The jurisdictions listed in Table 2 were contacted to confirm their standard parking requirements and to notify this study of any exceptions to their standards. Several of the jurisdictions commented that they have parking requirement variations for downtown core areas, areas well served by transit, mixed-use areas, and affordable-housing projects. This section details the comments received.

- The City of Carlsbad offers density bonus incentives to affordable housing developments. The following multifamily dwelling unit rates apply: 0- to 1-bedroom unit requires 1 parking space and a 2- to 3-bedroom unit requires 2 parking spaces.
- The City of Escondido reduces its standard retail parking requirements to 3 spaces per 1,000 square feet of gross floor area in their downtown retail core parking district.
- The City of Poway allows a reduced parking rate for affordable housing on a case-by-case basis.
- The City of Vista is working on reduced rates for their downtown smart growth areas as part of their downtown specific plan update (expected approval spring 2010).
- The City of El Cajon provides allowances for parking in smart growth settings within their downtown area.
- The City of La Mesa allows parking reductions in their Mixed-Use Urban Overlay Zone. They allow a minimum of 2 parking spaces per 1,000 square feet of commercial floor area.
- The City of Lemon Grove allows parking reductions in their Downtown Village Specific Plan. Multifamily residential requirements are reduced as follows: studio units require 1 space, 1-bedroom units require 1.25 spaces, 2-bedroom units require 1.75 spaces, and 3-bedroom units require 2 spaces. Commercial office requirements are reduced to 3 spaces per 1,000 square feet. Retail requirements are reduced to 4.3 spaces per 1,000 square feet. There also is a provision for 20 percent mixed-use reduction for a combination of residential, office, and retail.
### Table 2
Typical San Diego Region Parking Standards by Jurisdiction *

<table>
<thead>
<tr>
<th>JURISDICTION</th>
<th>SINGLE-FAMILY RESIDENCE</th>
<th>STUDIO</th>
<th>1 BEDROOM</th>
<th>MULTIFAMILY RESIDENCE</th>
<th>2 BEDROOM</th>
<th>3 BEDROOM</th>
<th>4+ BEDROOM</th>
<th>COMMERCIAL OFFICE</th>
<th>RETAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>San Diego County</td>
<td>2 per du*</td>
<td>1.5 per du*</td>
<td>1 per 10 du*</td>
<td>1.5 per du*</td>
<td>1 per 5 du*</td>
<td>1.5 per du*</td>
<td>1 per 5 du*</td>
<td>2 per du*</td>
<td>2 per du*</td>
</tr>
<tr>
<td>NORTH COASTAL REGION</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carlsbad</td>
<td>2 per du</td>
<td>1.5 per du +</td>
<td>.25 per du &gt; 10 du</td>
<td>1.5 per du +</td>
<td>.25 per du &gt; 10 du</td>
<td>2 per du +</td>
<td>.25 per du &gt; 10 du</td>
<td>2 per du +</td>
<td>.25 per du &gt; 10 du</td>
</tr>
<tr>
<td>Del Mar</td>
<td>2 per du +</td>
<td>1 per 4 du</td>
<td>1 per 4 du</td>
<td>2 per du +</td>
<td>1 per 4 du</td>
<td>2 per du +</td>
<td>1 per 4 du</td>
<td>3 per du +</td>
<td>1 per 4 du</td>
</tr>
<tr>
<td>Encinitas</td>
<td>2 per du &lt; 2.5 ksf</td>
<td>1.5 per du +</td>
<td>.25 per du &gt; 10 ksf</td>
<td>1.5 per du +</td>
<td>.25 per du &gt; 10 ksf</td>
<td>2 per du +</td>
<td>.25 per du &gt; 10 ksf</td>
<td>2 per du +</td>
<td>.25 per du &gt; 10 ksf</td>
</tr>
<tr>
<td>Oceanside</td>
<td>2 per du</td>
<td>1.5 per du +</td>
<td>1 + 20% of units &gt; 10</td>
<td>1.5 per du +</td>
<td>1 + 20% of units &gt; 10</td>
<td>2 per du +</td>
<td>1 + 20% of units &gt; 10</td>
<td>2 per du +</td>
<td>1 + 20% of units &gt; 10</td>
</tr>
<tr>
<td>Solana Beach</td>
<td>2 per du</td>
<td>1 per du +</td>
<td>1 per 4 du</td>
<td>1.5 per du +</td>
<td>1 per 4 du</td>
<td>1.5 per du +</td>
<td>1 per 4 du</td>
<td>2 per du +</td>
<td>1 per 4 du</td>
</tr>
<tr>
<td>NORTH INLAND REGION</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Escondido</td>
<td>2 per du</td>
<td>1 per du +</td>
<td>1 per 4 du</td>
<td>1.5 per du +</td>
<td>1 per 4 du</td>
<td>1.75 per du +</td>
<td>1 per 4 du</td>
<td>2 per du +</td>
<td>1 per 4 du</td>
</tr>
<tr>
<td>Poway</td>
<td>2 per du</td>
<td>1.75 per du</td>
<td>1.75 per du</td>
<td>2.25 per du</td>
<td>2.25 per du</td>
<td>2.75 per du</td>
<td>2.75 per du</td>
<td>2 per du</td>
<td>1 per 300 sf</td>
</tr>
<tr>
<td>San Marcos</td>
<td>2 per du</td>
<td>2 per du</td>
<td>2 per du</td>
<td>1 per 3 du</td>
<td>2 per du</td>
<td>2 per du</td>
<td>1 per 3 du</td>
<td>2 per du</td>
<td>1 per 3 du</td>
</tr>
<tr>
<td>Vista</td>
<td>2 per du +</td>
<td>2 per du</td>
<td>.33 per du</td>
<td>2 per du +</td>
<td>.33 per du</td>
<td>2 per du +</td>
<td>.33 per du</td>
<td>3 per du +</td>
<td>.5 per du +</td>
</tr>
<tr>
<td>CENTRAL REGION</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>El Cajon</td>
<td>2.3 per du</td>
<td>2 per du</td>
<td>2 per du</td>
<td>2.25 per du</td>
<td>2.25 per du</td>
<td>2.25 per du</td>
<td>2.25 per du</td>
<td>1 per 250 sf &gt; 10 ksf floor area</td>
<td>1 per 250 sf &gt; 10 ksf floor area</td>
</tr>
<tr>
<td>La Mesa</td>
<td>2.5 per du</td>
<td>2 per du</td>
<td>2 per du</td>
<td>2 per du</td>
<td>2 per du</td>
<td>2 per du</td>
<td>2 per du</td>
<td>1 per 300 sf</td>
<td>1 per 250 sf</td>
</tr>
<tr>
<td>Lemon Grove</td>
<td>2 per du</td>
<td>1.5 per du +</td>
<td>.25 per du</td>
<td>2 per du +</td>
<td>.25 per du</td>
<td>2 per du +</td>
<td>.25 per du</td>
<td>2 per du +</td>
<td>.25 per du</td>
</tr>
<tr>
<td>San Diego</td>
<td>2 per du</td>
<td>1.25 per du &lt; 400 sf</td>
<td>1.5 per du &gt; 400 sf</td>
<td>2 per du</td>
<td>2.25 per du</td>
<td>2.25 per du</td>
<td>2.25 per du</td>
<td>ranges from 1-3.3 per ksf</td>
<td>ranges from 1-5 per ksf</td>
</tr>
<tr>
<td>Santee</td>
<td>2 per du</td>
<td>1.5 per du +</td>
<td>.25 per du</td>
<td>1.5 per du +</td>
<td>.25 per du</td>
<td>1.5 per du +</td>
<td>.25 per du</td>
<td>2 per du +</td>
<td>.25 per du</td>
</tr>
<tr>
<td>SOUTHERN REGION</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chula Vista</td>
<td>2 per du</td>
<td>1.5 per du</td>
<td>1.5 per du</td>
<td>2 per du</td>
<td>2 per du</td>
<td>2 per du</td>
<td>2 per du</td>
<td>3 per 300 sf</td>
<td>1 per 200 sf</td>
</tr>
<tr>
<td>Coronado Beach</td>
<td>2 per du</td>
<td>no less than 2 per du</td>
<td>no less than 2 per du</td>
<td>no less than 2 per du</td>
<td>no less than 2 per du</td>
<td>no less than 2 per du</td>
<td>no less than 2 per du</td>
<td>1 per 500 sf + 1 per 2 employees</td>
<td>1 per 500 sf + 1 per 2 employees</td>
</tr>
<tr>
<td>Imperial Beach</td>
<td>2 per du</td>
<td>1.5 for special zones</td>
<td>1.5 for special zones</td>
<td>2 per du</td>
<td>1.5 for special zones</td>
<td>1.5 for special zones</td>
<td>2 per du</td>
<td>1.5 for special zones</td>
<td>1.5 for special zones</td>
</tr>
<tr>
<td>National City</td>
<td>2 per du &lt; 25 ksf</td>
<td>1.3 per du +</td>
<td>1.3 per du +</td>
<td>.5 per du &lt; 20 units + .25 per du above 20</td>
<td>1.5 per du +</td>
<td>.5 per du &lt; 20 units + .25 per du above 20</td>
<td>1.5 per du +</td>
<td>.5 per du &lt; 20 units + .25 per du above 20</td>
<td>1.5 per du +</td>
</tr>
</tbody>
</table>

* Based on summary provided by KDA Corporation Summary Table (revised Sep 2006) and updated by KTU+A based on the latest Web site downloads (Jun 2009)
The City of San Diego offers parking reductions for developments located in their Transit Overlay Zone or developments that are deemed “very low-” income. Multifamily residential requirements are reduced as follows: studio units require 1 space, 1-bedroom units require 1.25 spaces, 2-bedroom units require 1.75 spaces, and 3-plus-bedroom units require 2 spaces. Commercial office requirements are reduced to 1.0 - 2.9 spaces per 1,000 square feet. Retail requirements are reduced to 1.0 - 4.3 spaces per 1,000 square feet. The City of San Diego also is in the process of studying parking demand at affordable housing developments, which will likely result in revised parking standards for affordable housing.

The City of Santee offers reduced parking requirements for any affordable housing project.

The City of Chula Vista details special parking requirements for their Urban Core Specific Plan area. Residential multifamily units in their transit focus area have the reduced requirement of 1 parking space per dwelling unit. All other residential units must provide 1.5 spaces per dwelling unit and an additional 1 space per 10 dwelling units for guests. Any nonresidential land use must provide 2 parking spaces per 1,000 square feet of floor area.

The City of Coronado provides reduced parking requirements for their Orange Avenue Corridor Specific Plan. Commercial parking requirements are reduced to 1 parking space per 500 square feet of floor area. The city also provides reductions for affordable housing. For affordable housing the following rates apply: 1-bedroom units require 1 space, 2- to 3-bedroom units require 2 spaces, and 3-plus-bedroom units require 2.5 spaces.

The County of San Diego is currently in the process of updating its parking regulations and is reviewing the potential for parking reductions for shared parking on a case-by-case basis based on findings and recommendations of a qualified parking or traffic consultant.

Local jurisdictions in the region have expressed a great deal of interest in this study and are eager to use the results of this analysis, particularly at the specific plan level. Such interest and the policies listed above suggest that there is recognition at the local level that parking rates should be lower for some types of development, including smart growth projects.

ITE PARKING GENERATION: IMPLICATIONS FOR SMART GROWTH PARKING

This section and the two that follow summarize key research on actual parking demand from a variety of national and local sources. It provides perspective on the San Diego basic parking rates and the reductions currently being granted for smart growth in the region. It should be noted that in the analysis below, the basic parking requirements in Table 2 are used for comparative purposes.

The Institute of Transportation Engineers’ (ITE) Parking Generation (3rd Edition) summarizes actual parking demand for a variety of land uses. It is based on a national database of parking demand studies. The studies that ITE incorporates into the manual are mainly single-use, suburban projects where all parking is provided on-site and free to the user. This single-use, suburban emphasis likely results in parking rates that are too high for Smart Growth sites, where use of non-auto modes and shared parking between different on-site uses serve to reduce parking demand.
On the other hand, it is important to recognize that Parking Generation summarizes parking demand rather than supply. In planning for parking supply, it is a common engineering practice to add a 10 percent buffer beyond the demand figure to allow a margin of safety and to make it possible for drivers to find the last few parking spaces without excessive cruising or idling.

**Residential Parking Demand**

Residential units in smart growth developments would generally fall under Parking Generation’s multifamily residential category. Comparing typical code values against the ITE Parking Generation (3rd Edition) manual shows that the existing typical parking requirements in the region far outstrip observed ratios. Parking Generation shows weekday average peak-period parking demand for low/mid-rise apartments to be 1.20 vehicles per dwelling unit in suburban locations and 1.00 vehicle per dwelling unit in urban locations, for an average value of 1.1 per dwelling unit. By comparison, typical San Diego region parking requirements detailed in Table 2 average 1.75 to 2.00 parking spots per dwelling unit for studio and 1-bedroom multifamily, and 2.00 to 2.50 parking spots per dwelling unit for 2-plus-bedroom multifamily units. The lowest requirement was 1.25 parking spaces per dwelling unit in Solana Beach and Escondido for studio multifamily residential units. Taking the average Parking Generation demand rate (1.1 per 1,000 square feet) and adding the 10 percent buffer (0.11) results in a supply rate of 1.21 spaces per dwelling unit, a rate slightly lower than the lowest parking code rates for studio apartments. For smart growth, rates ranged from 1 to 1.25.

Parking Generation makes note of additional research on vehicles owned per household. It reports that for areas within one-third of a mile of a light rail station and more than ten miles from a central business district (which would describe many of SANDAG’s SGOAs), the average vehicles owned per household was between 1.0 and 1.3. This is substantially lower than the national average of 2.0 vehicles per household in 2000 per the U.S. Census.

**Office Parking Demand**

With respect to office uses, Parking Generation found a weekday average peak-period parking demand of 2.84 vehicles per 1,000 square feet in suburban locations and 2.40 vehicles per 1,000 square feet in urban locations. The overall average demand rate was 2.62. This is lower than any of the San Diego region’s parking requirements as summarized in Table 2; these average roughly 1 parking space per 275 square feet or approximately 3.6 parking spaces per 1,000 square feet. The lowest requirement found is 3.33 parking spaces per 1,000 square feet in Del Mar, Oceanside, and La Mesa. Adding a buffer of 10 percent (0.26) to the average demand rate of 2.62 results a calculated supply rate of 2.88, substantially below the lowest regional requirements for office. For smart growth, rates ranged from 1.95 to 3.

Parking Generation also summarizes demand studies in areas with priced parking and high-quality transit options available. Office parking demand in these areas is substantially lower in such areas than in areas with free parking. Studies in such areas have documented parking ratios between 1.00 and 2.00 vehicles per 1,000 square feet of office building area.
Retail Parking Demand

Retail parking demand varies widely among different types of retail uses. Parking Generation identifies five types of shopping centers: strip, neighborhood, community, regional, and super regional. The scale of the largest shopping centers is much larger than that of the SGOAs studied. The scale of SGOAs could be most closely compared to community shopping centers. The average size of study sites for the shopping center data is around 535,000 square feet. Rates reported in the Urban Land Institute’s (ULI) Shared Parking range from 2.7 to 4.7 per 1,000 square feet for various types of shopping centers on different days of the week and different months. Again, the shopping centers studied are mainly in suburban, auto-oriented settings.

In view of the wide variety of demand rates found in Parking Generation, the Shared Parking (2nd Edition) was examined as a second source. Shared Parking reports parking demand of between 3.6 and 4.5 parking spaces per 1,000 square feet of retail (defined as shopping center).

Current San Diego typical parking requirements from Table 2 show a range of 3.3 (Carlsbad) to 5 (Chula Vista) parking spaces per 1,000 square feet with an average approximately 4 parking spaces per 1,000 square feet. These rates are in conformity with the parking demand rates found by ITE and ULI. For smart growth, parking requirements ranged from 2 to 4.65.

It is noteworthy that both Parking Generation and Shared Parking find that parking demand at retail centers in December is typically 50 percent higher than for the other months of the year. This suggests that if it can be established that the retail component of a smart growth development is not subject to such seasonal peaking (e.g., if the focus is on convenience goods for residents and transit commuters), retail parking rates could be substantially lower.

Table 3 summarizes the foregoing findings regarding parking demand versus current parking supply requirements in the San Diego region for both typical and smart growth development.

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Parking Demand$^1$</th>
<th>Existing Rates for Typical Development</th>
<th>Existing Rates for Smart Growth Development</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Urban</td>
<td>Suburban</td>
<td>Lowest</td>
</tr>
<tr>
<td>Residential Multifamily$^2$</td>
<td>1.00</td>
<td>1.20</td>
<td>1.25</td>
</tr>
<tr>
<td>Office$^3$</td>
<td>2.40</td>
<td>2.84</td>
<td>3.33</td>
</tr>
<tr>
<td>Retail$^3$</td>
<td>3.60-4.50</td>
<td>3.60-4.50</td>
<td>3.30</td>
</tr>
</tbody>
</table>

(1) Residential and office rates from ITE Parking Generation, Retail rate from ULI Shared Parking
(2) Rate is per dwelling unit
(3) Rate is per 1,000 square feet of leasable area

OTHER STUDIES OF SMART GROWTH PARKING DEMAND AND POLICIES

Cervero et al (2009)

A recent study led by Robert Cervero at the University of California, Berkeley found that the weighted average of peak-parking demand for residential units at TODs in the San Francisco Bay Area and Portland, Oregon was 1.15 parking spaces per dwelling unit, close to Parking Generation’s observed average value of 1.20 parking spaces per dwelling unit. By contrast, the weighted average parking supply at these sites was 1.57 parking spaces per dwelling unit, 30 to 35 percent above the observed parking demand. (Cervero et al, 2009).

Figure 2 (based on Cervero et al’s Figure 3) shows the parking demand at individual residential projects. It is noteworthy that even the highest observed demand is below the typical parking requirement in the San Diego region.

Caltrans (2002)

A 2002 study by the California Department of Transportation found evidence supporting parking reductions for commercial and office land uses in TODs. A number of case studies showed that after parking reductions were negotiated by the developer, parking supply was sufficient, but not excessive. Three key case studies are summarized below:

- Pacific Court, a mixed-use, infill development in urban Long Beach, California, is a development containing 142 apartments above 96,000 square feet of retail and commercial development. The site is served by light rail transit (LRT) every 5 to 10 minutes. The developer was able to negotiate a 60 percent reduction in retail parking standards (5 spaces to 2 spaces per 1,000 square feet and elimination of 3 spaces per 10 units for guest parking), and experience has shown parking to be sufficient, but not excessive.

- Pleasant Hill Bay Area Rapid Transit (BART) TOD is a development containing 411,000 square feet of office space, 40,000 square feet of retail space, and around 350 apartments and townhouses in suburban San Francisco Bay Area. The site is served by heavy rail every 5 to 10 minutes during weekday peak hours, every 15 minutes during off-peak hours. The developer was able to negotiate a 34 percent reduction in office parking standards (5 spaces to 3.3 spaces per 1,000 square feet) and 20 percent reduction in retail parking standards (5 spaces to 4.0 spaces per 1,000 square feet). The development appears to have sufficient parking and has been able to lease some spaces on a monthly basis to BART patrons.

- Dadeland South, a TOD in suburban Miami, Florida, is a development containing 500,000 square feet of office and 605 hotel rooms. The site is served by LRT every 5 minutes during peak hours and every 15 minutes during off-peak hours. The site also is served by bus service every 10 minutes. The developer was able to negotiate a 38 percent reduction in office parking standards (1 space per 250 square feet to 1 space per 400 square feet), and experience has shown that there is generally excess capacity in the office garages.
Figure 2
East Bay Results: Peak-Parking Generation Rates*
Relative to Supply Levels and ITE Standard

* parked vehicles per dwelling unit
### Figure 2 (continued)

East Bay Results: Peak-Parking Generation Rates* Relative to Supply Levels and ITE Standard

<table>
<thead>
<tr>
<th>Site</th>
<th>Supply per Unit</th>
<th>Peak Demand per Unit</th>
<th>Demand: % diff. from Supply</th>
<th>Demand: % diff. from ITE Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Beaverton Creek Station</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Center Pointe</td>
<td>1.6</td>
<td>1.23</td>
<td>-23.1%</td>
<td>2.5%</td>
</tr>
<tr>
<td><strong>Elmonica Station</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elmonica Court</td>
<td>1.50</td>
<td>0.90</td>
<td>-40.0%</td>
<td>-25.0%</td>
</tr>
<tr>
<td>Cambridge Crossing</td>
<td>2.15</td>
<td>1.04</td>
<td>-51.6%</td>
<td>-13.3%</td>
</tr>
<tr>
<td><strong>Willow Creek</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wyndhaven</td>
<td>1.35</td>
<td>0.90</td>
<td>-33.3%</td>
<td>-25.0%</td>
</tr>
<tr>
<td><strong>Quantama Station</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Briar Creek Apartments</td>
<td>1.50</td>
<td>1.12</td>
<td>-25.3%</td>
<td>-6.7%</td>
</tr>
<tr>
<td>Quantama Crossing</td>
<td>1.55</td>
<td>1.32</td>
<td>-14.8%</td>
<td>10.0%</td>
</tr>
<tr>
<td>Quantama Village</td>
<td>1.41</td>
<td>1.37</td>
<td>-2.8%</td>
<td>14.2%</td>
</tr>
<tr>
<td><strong>Orenco Station</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Orenco Gardens</td>
<td>1.53</td>
<td>0.76</td>
<td>-50.3%</td>
<td>-36.7%</td>
</tr>
</tbody>
</table>

* parked vehicles per dwelling unit

---

<table>
<thead>
<tr>
<th>Site</th>
<th>Supply per Unit</th>
<th>Peak Demand per Unit</th>
<th>Demand: % diff. from Supply</th>
<th>Demand: % diff. from ITE Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gateway Station</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gateway Terrace</td>
<td>1.58</td>
<td>0.53</td>
<td>-66.5%</td>
<td>-55.8%</td>
</tr>
<tr>
<td>Gateway Park</td>
<td>1.34</td>
<td>0.82</td>
<td>-38.8%</td>
<td>-31.7%</td>
</tr>
<tr>
<td><strong>E. 148th Ave. Station</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rachel Anne</td>
<td>1.41</td>
<td>0.88</td>
<td>-37.6%</td>
<td>-26.7%</td>
</tr>
<tr>
<td>Dalton Park</td>
<td>1.31</td>
<td>1.17</td>
<td>-10.7%</td>
<td>-2.5%</td>
</tr>
<tr>
<td><strong>E. 162nd Ave. Station</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Morgan Place</td>
<td>1.31</td>
<td>0.65</td>
<td>-50.4%</td>
<td>-45.8%</td>
</tr>
<tr>
<td>Sequoia Square</td>
<td>0.84</td>
<td>0.79</td>
<td>-6.0%</td>
<td>-34.2%</td>
</tr>
<tr>
<td><strong>Gresham Central Station</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gresham Central</td>
<td>1.44</td>
<td>1.00</td>
<td>-30.6%</td>
<td>-16.7%</td>
</tr>
</tbody>
</table>

**ALL 15 PORTLAND STATIONS**

**Weighted Average**

1.52 1.07  -30.0%  -11.0%
Table 4 summarizes these findings (Caltrans, 2002).

<table>
<thead>
<tr>
<th>Transit-Oriented Development</th>
<th>Land Use</th>
<th>Parking Reduction</th>
<th>Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pacific Court (Long Beach, CA)</td>
<td>Retail</td>
<td>60%</td>
<td>Parking sufficient, but not excessive</td>
</tr>
<tr>
<td>Pleasant Hill BART Station (Pleasant Hill, CA)</td>
<td>Office</td>
<td>34%</td>
<td>Parking sufficient, leasing space to BART</td>
</tr>
<tr>
<td></td>
<td>Retail</td>
<td>20%</td>
<td></td>
</tr>
<tr>
<td>Dadeland South (Miami, FL)</td>
<td>Office</td>
<td>38%</td>
<td>Excess capacity in office garages</td>
</tr>
</tbody>
</table>

Sources: California Department of Transportation. “Statewide Transit-Oriented Development Study: Parking and TOD: Challenges and Opportunities (Special Report)”, 2002.

COMPLEMENTARY PROGRAMS TO ENSURE AND ENHANCE SMART GROWTH PARKING DEMAND REDUCTIONS

The foregoing sections have established that current typical parking requirements in the region are probably higher than typical parking demand at smart growth development. Intrinsic smart growth development characteristics, such as higher densities, proximity to transit, mixed uses with local-serving retail, and bicycle facilities, serve to reduce parking demand. Other supplementary demand management measures and programs can help ensure and enhance parking demand reductions. Inclusion of measures described in this section can provide a factor of safety for cities who grant smart growth projects reduced parking requirements.

Transit Pass Purchase Programs

Transit pass purchase programs are a popular measure for both transit agencies and consumers. Portland’s TriMet LRT initiated a TOD Pass Program in September 1998 to coincide with the start of the Westside LRT project. From September 1998 to May 1999, there was a 22 percent increase in the number of residents that used transit for commuting purposes (TCRP 128).

Employer Assistance With Transit Costs

Employer assistance with transit costs can also encourage transit use. Figure 3 shows results from a model that predicted the probability of a TOD resident using transit considering the ratio of parking spaces to workers and feeder bus frequency in buses per day. A worker near a TOD station with 400 daily feeder buses heading to a worksite where the employer provides transit assistance and one parking spot per two workers has a likelihood of taking transit of 50 percent (TCRP 128, Lund et al., 2004).
Shared Parking

The concept of shared parking has increasingly gained prominence beyond downtown areas where it is the norm. The ULI Shared Parking defines the ability to share parking spaces as the result of two conditions: variations in the accumulation of vehicles by hour, by day, or by season at the individual land uses and relationships among the land uses that result in visiting multiple land uses on the same auto trip. The Shared Parking manual defines recommended peak-parking demand rates, but then modifies each land use by time of year, week, and day factors. There also are inputs for what the manual defines as “mode adjustment” and “noncaptive ratio.” Mode adjustment is a variable based on the percentage of trips that are made to the site using auto vehicles. Noncaptive ratio is an estimate of percentage of parkers at a land use in a mixed-use development who are not already counted as being parked at another of the land uses. This ratio captures trip-chaining and the essence of shared parking – one parking spot used for multiple land uses (ULI, 2005). Many of the SANDAG member jurisdictions already have adopted shared parking methodologies into their parking zoning ordinances.

Car-Sharing

A recent development with potential for reducing parking demand for residential projects has been the concept of car-sharing. Car-sharing is a neighborhood-based, short-term vehicle rental service that makes cars easily available to residents and commuters whose primary mode of transportation is transit, bicycle, or walking. Car-sharing can eliminate the need to own a vehicle, especially if near quality transit options and mixed-use developments. In San Francisco, approximately 60 percent of households that owned vehicles before joining a car-sharing program have given up at least one of
them within a year. Zipcar, which operates in 50 plus cities across North America and the United Kingdom, reports that 15 percent of members sell their private car. The city of Bremen, Germany, states that each shared vehicle takes between four and ten private cars off the road and out of city parking spaces (Environmental Protection Agency, 2006).

Unbundling Parking

Unbundling parking costs is another concept that can reduce parking demand. Because parking is typically included (bundled) into tenant leases, the true cost of parking is hidden. Unbundling parking addresses this issue. For example the price for an apartment with two parking spaces may be rented for $1,000 per month. However, if the parking spaces were unbundled, the price for rent for the apartment would be $800 per month, plus $100 per month for each space. Unbundled parking helps tenants to understand the cost of parking – and provides an incentive (lower rent) for reducing their parking demand. This can lead to other pricing strategies that can help travel management at the project scale (Metropolitan Transportation Commission, 2007). On-street parking should be carefully considered when proposing unbundled parking. There is a potential for on-street parking impacts in the area surrounding the project with the unbundling of parking if such parking is not priced and managed appropriately.

Table 5 summarizes parking policies that can potentially reduce parking demand and the range of effectiveness observed in case studies.

CONCLUSIONS: SUGGESTED PARKING RATES FOR SMART GROWTH DEVELOPMENTS

Residential Multifamily

ITE’s Parking Generation (3rd Edition) showed weekday average peak period parking demand for low/mid-rise apartments to be 1.20 vehicles per dwelling unit in suburban locations and 1.00 vehicles per dwelling unit in urban locations. A study by Robert Cervero at the University of California, Berkeley found a weighted average of peak parking demand for residential units at transit oriented developments (TODs) in the San Francisco Bay Area and Portland, Oregon of 1.15 parking spaces per dwelling unit. It should be noted that there were outliers in the south San Francisco Bay Area lifting the weighted average for Cervero’s study to higher than what was observed at most of the transit oriented developments. Taking the average of these three demand analyses (1.00, 1.20 and 1.15) gives a blended demand rate of 1.12; adding a 10 percent buffer suggests a parking supply rate of 1.25 parking spaces per dwelling unit. This value represents a reduction from existing typical standards yet still conforms to the upper bounds of observed values for multi-family units.
### Table 5
Potential Reduction in Parking Demand and Effectiveness of Parking Strategies*

<table>
<thead>
<tr>
<th>Potential Effectiveness</th>
<th>REDUCTION</th>
<th>EFFECTIVENESS</th>
<th>MEASURE</th>
<th>DESCRIPTION</th>
<th>SOURCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIGH</td>
<td>10% 50%</td>
<td>Housing With less Parking and Higher</td>
<td>Housing that supports and requires reduced car-ownership housing.</td>
<td>Urban Emissions Model (URBEMIS)</td>
<td></td>
</tr>
<tr>
<td>HIGH</td>
<td>5% 20%</td>
<td>Transit Pass Purchase Programs</td>
<td>Free transit passes for all residents/employees.</td>
<td>Nelson/Nygard and URBEMIS</td>
<td></td>
</tr>
<tr>
<td>HIGH</td>
<td>5% 20%</td>
<td>Higher Charges for Parking</td>
<td>Pricing is known as the most effective way to manage parking demand.</td>
<td>Parking Policies to Support Smart Growth-Metropolitan Transportation Commission-Oakland,</td>
<td></td>
</tr>
<tr>
<td>HIGH</td>
<td>10% 20%</td>
<td>Shared Parking Resources</td>
<td>Depending on the mix of land uses and parking demand in relative close proximity.</td>
<td>Parking Policies to Support Smart Growth-Metropolitan Transportation Commission-Oakland,</td>
<td></td>
</tr>
<tr>
<td>MEDIUM/HIGH</td>
<td>5% 10%</td>
<td>Unbundled Parking or Parking Cashout</td>
<td>Unbundling residential parking (charge for parking separate from housing costs. Parking cashout program (employer pays staff not to drive to work).</td>
<td>Parking Policies to Support Smart Growth-Metropolitan Transportation Commission-Oakland,</td>
<td></td>
</tr>
<tr>
<td>MEDIUM/HIGH</td>
<td>5% 10%</td>
<td>Proximity to Transit</td>
<td>Location within 1/4 mile of a light rail transit or bus rapid transit stop.</td>
<td>Valley Transportation Authority (VTA) and Metropolitan Transportation Commission-Oakland,</td>
<td></td>
</tr>
<tr>
<td>MEDIUM/HIGH</td>
<td>3% 10%</td>
<td>Mixed Uses With Local Serving Retail</td>
<td>Services within a walkable 1/4 to 1/2 mile distance from the project site.</td>
<td>Nelson/Nygard and URBEMIS</td>
<td></td>
</tr>
<tr>
<td>MEDIUM/HIGH</td>
<td>3% 10%</td>
<td>Affordable or Senior Housing</td>
<td>Reducing car-ownership housing resulting in less parking.</td>
<td>Nelson/Nygard and URBEMIS</td>
<td></td>
</tr>
<tr>
<td>MEDIUM/HIGH</td>
<td>2% 10%</td>
<td>Telecommuting</td>
<td>Offset office and work-at-home options can reduce the overall parking requirement.</td>
<td>Nelson/Nygard and URBEMIS</td>
<td></td>
</tr>
<tr>
<td>MEDIUM</td>
<td>3% 9%</td>
<td>Bike Facilities</td>
<td>If area is conducive to cycling, then bike commuting can be enhanced by providing safe and protected bike parking</td>
<td>URBEMIS</td>
<td></td>
</tr>
<tr>
<td>MEDIUM</td>
<td>3% 9%</td>
<td>Transportation Demand Management (TDM) Program</td>
<td>a) Pretax commuter benefit program; b) Guaranteed Ride Home program; c) Reduced parking fee or preferential parking for carpools/ vanpools; d) Transportation coordinator; e) Distribution of TDM information package to all residents/employees; f) Ride-matching assistance; g) Showers/changing rooms; h) Telecommuting and compressed workweek; i) Provision of on-site child care.</td>
<td>Schreffler (1996)</td>
<td></td>
</tr>
<tr>
<td>LOW</td>
<td>2% 5%</td>
<td>Car-Sharing</td>
<td>Having a safety net of car access can decrease car ownership and increase transit use. Free car-sharing memberships for all residents/employees.</td>
<td>Parking Policies to Support Smart Growth-Metropolitan Transportation Commission-Oakland,</td>
<td></td>
</tr>
<tr>
<td>LOW</td>
<td>2% 3%</td>
<td>Shuttle Service</td>
<td>Increased access from origins to destinations and other transit connections can be provided through a shuttle.</td>
<td>VTA methodology</td>
<td></td>
</tr>
</tbody>
</table>

Maximum combined should generally not be more than 75%. Most projects are likely to receive a 25% reduction unless several of these elements are utilized.

1. Amount of actual reduction expected depends on an analysis of area conditions and specific project design element review.
2. Minimum reduction may be useful if specific design and analysis has not been completed or extraordinary measures are not proposed.
3. Maximum reduction should only be used if the project and its setting has been fully analyzed and extraordinary measures are integral to the project.

Additional information on sources:
- Schreffler, Eric. “TDM Without the Tedium.” Presentation to the Northern California Chapter of the Association for Commuter Transportation, March 20, 1996.

* parked vehicles per dwelling unit
**Office**

ITE's Parking Generation (3rd Edition) showed weekday average peak-period parking demand for commercial office to be 2.84 vehicles per 1,000 square feet in suburban locations and 2.40 vehicles per 1,000 square feet in urban locations; adding a 10 percent buffer to each of these rates results in corresponding supply rates of 2.64 and 3.12 spaces per 1,000 square feet.

The 2002 TOD study by Caltrans cites two case studies in which office parking requirements were decreased. The Pleasant Hill BART TOD station negotiated office parking standards of 3.3 spaces per 1,000 square feet, and parking has been sufficient to the point that some spaces are leased to BART patrons. Dadeland South, a TOD in suburban Miami, Florida, was able to negotiate office parking standards of 2.5 spaces per 1,000 square feet and excess parking has been observed.

These four supply rates (i.e., the calculated supply rates of 2.64 and 3.12 and the observed rates of 3.3 and 2.5) average out to 2.9 spaces per 1,000 square feet. This value represents a reduction from existing typical standards while conforming to the upper bounds of observed values for commercial office.

**Retail**

The ULI Shared Parking (2nd Edition) recommends between 3.6 and 4.5 parking spaces per 1,000 square feet of retail based on a nationwide collection of case studies. The 2002 TOD study by Caltrans noted one case study in which retail parking requirements were decreased. Pacific Court, a mixed-use, infill development in urban Long Beach, California, was able to negotiate retail parking standards of 2 spaces per 1,000 square feet, and parking has been sufficient. Several of the case studies document that parking reductions in office and retail land uses for TODs can be granted without resulting in significant parking shortages. While some of the reductions documented are much lower than typical parking rates in use in the region, it is conservatively suggested to reduce the basic retail parking standards only slightly to 3.60 parking spaces per 1,000 square feet. Use of the ULI Shared Parking methodology is recommended to determine the reasonableness of further reductions.

Setting parking rates at levels observed for conventional development in national parking demand studies (specifically, ITE Parking Generation, and ULI’s Shared Parking) would represent a significant reduction from typical current code requirements for residential and office uses. Nonetheless, there would still be a high probability of accommodating actual demand at smart growth sites.

Current parking requirement accommodations for smart growth development in the region are at or below the rates suggested above; however, it should be noted that these smart growth accommodations have not yet become standard practice for smart growth throughout the region, and in many cases are limited to specific plan areas.

Table 6 summarizes the suggested guidance on parking rates for smart growth development based on the studies mentioned above, relative to existing parking requirements in the region in both typical and smart growth settings.
### Table 6
Suggested San Diego Smart Growth Development Parking Rates

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Parking Demand</th>
<th>Typical Current Rates (San Diego Region)</th>
<th>Current Accommodations for Smart Growth (San Diego Region)</th>
<th>Suggested Rates</th>
<th>Reduction From Typical</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Urban</td>
<td>Suburban</td>
<td>Lowest</td>
<td>Average</td>
<td>Lowest</td>
</tr>
<tr>
<td>Residential Multifamily²</td>
<td>1.00</td>
<td>1.20</td>
<td>1.25</td>
<td>1.75-2.50</td>
<td>1.00</td>
</tr>
<tr>
<td>Office³</td>
<td>2.40</td>
<td>2.84</td>
<td>3.33</td>
<td>3.60</td>
<td>1.95</td>
</tr>
<tr>
<td>Retail³</td>
<td>3.60-4.50</td>
<td>3.30</td>
<td>4.00</td>
<td></td>
<td>2.00</td>
</tr>
</tbody>
</table>

(1) Residential and office rates from ITE Parking Generation, Retail rate from ULI Shared Parking
(2) Rate is per dwelling unit
(3) Rate is per 1,000 square feet of leasable area

---

**PARKING MANAGEMENT STRATEGIES FOR SMART GROWTH DEVELOPMENTS**

In addition to reduced parking rates for smart growth developments, other strategies (shown in Table 7) should be pursued to manage and reduce the demand for parking. Such measures will also help ensure that the advantages of mixed-use development are realized to their full potential.

As described earlier in this discussion, shared parking is the most important aspect of a mixed-use development’s ability to realize reductions in parking. The other parking strategies require a change in transportation behavior that is often strongly ingrained in suburban areas, e.g., a modal shift away from personal auto vehicles (towards walking, bicycling, transit and shared cars) and the introduction of transparent parking costs.

---

### Table 7
Recommended San Diego Smart Growth Development Parking Strategies

<table>
<thead>
<tr>
<th>Parking Strategy</th>
<th>Potential Parking Reduction</th>
<th>Cost to Implement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shared Parking</td>
<td>10-20%</td>
<td>More detailed parking analysis during planning stages</td>
</tr>
<tr>
<td>Transit Pass Purchase Program</td>
<td>5-20%</td>
<td>Developer includes in price of building, overall decrease in cost because of fewer parking spaces</td>
</tr>
<tr>
<td>Charging for Parking</td>
<td>5-20%</td>
<td>Charge tied to use of parking</td>
</tr>
<tr>
<td>Unbundled Parking</td>
<td>5-10%</td>
<td>Minor administrative costs</td>
</tr>
<tr>
<td>Car-Sharing</td>
<td>2-5%</td>
<td>Developer dedication of parking spaces to car-sharing operations</td>
</tr>
</tbody>
</table>

These strategies, along with reduced parking rates, can further reduce the number of parking spaces required and thus play to smart growth development’s strength – its ability to bring together accessibility and convenience through diversified land use and accommodation of all transportation modes.

Finally, the following also should be considered:

- While Table 6 rates can be used as defaults for initial planning purposes, further study is required to examine if parking demand in San Diego smart growth areas deviates significantly from demand observed in nationwide studies and to determine appropriate strategies for particular locations. SANDAG, the cities, and the County should conduct their own parking surveys of local smart growth projects in the region on different days of the week and at different times of year. Further analysis should occur at a neighborhood level in order to capture on-street parking demand and to understand the dynamics of parking behavior that occurs at this level.

- Additional study should also be undertaken to analyze parking demand at rural village SGOAs, as such communities do not have the same access to public transportation as TODs in urban locations.

- Smart growth areas should attempt to maximize the utilization of pre-existing parking. To this end it would be useful to conduct areawide parking studies and surveys in infill SGOAs and create parking management districts for such areas. The goals of these actions would be to determine if parking spaces are available, and if so, make arrangements for infill development to utilize them (e.g., through lease agreements).

- As new smart growth developments are approved, cities and the County should monitor parking demand at smart growth developments on a regular basis to establish a regional database on smart growth parking demand and parking demand management effectiveness.

- With respect to parking management practices, SANDAG and the cities should document – and then duplicate – strategies that prove effective.
REFERENCES


Escondido, California, Municipal Code § 17.64, 2009.


San Diego, California, Municipal Code § 142.05, 2009.
Appendix A
Locations of Counted Sites
APPENDIX B - SANDAG RAW TRIPS CALCULATION BACKUP

To calculate “raw trips” as shown in Table 1, the recommended rates from San Diego Traffic Generators were applied to land uses as provided by SANDAG staff and through VRPA Technologies’ independent data checking. The tables below show the detail for each of the six sites. Some of the rates used were modified from the (Not so) Brief Guide of Vehicular Traffic Generation Rates for the San Diego Region report, as follows:

- The (Not so) Brief Guide of Vehicular Traffic Generation Rates has a rate of 1.8 trips / seat for theaters. The trip rate for the theater at Hazard Center was scaled down to 50% 0.9 to reflect the unique characteristics of this theater, consistent with the Hazard Center Traffic Impact Analysis done by Urban Systems in July of 2009.
- The Starbucks cafes at three of the sites were treated as fast food restaurants, and their building areas were estimated from street views.
- The supermarkets at Uptown Center (Ralph’s and Trader Joe’s) were separated out from the general neighborhood shopping center rate, and their building areas were estimated from aerials.

### Rio Vista Station Village

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Units</th>
<th>Amount</th>
<th>Occupied</th>
<th>Daily Trip Rate</th>
<th>Daily Trips</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apartment</td>
<td>d.u.</td>
<td>970.0</td>
<td>95%</td>
<td>6</td>
<td>5,529</td>
</tr>
<tr>
<td>Specialty Retail</td>
<td>1,000 s.f.</td>
<td>13.0</td>
<td>100%</td>
<td>40</td>
<td>520</td>
</tr>
<tr>
<td>Sit Down, High Turnover Restaurant</td>
<td>1,000 s.f.</td>
<td>4.0</td>
<td>100%</td>
<td>160</td>
<td>640</td>
</tr>
<tr>
<td><strong>Total Trips</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>6,689</strong></td>
</tr>
</tbody>
</table>

### La Mesa Village Plaza

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Units</th>
<th>Amount</th>
<th>Occupied</th>
<th>Daily Trip Rate</th>
<th>Daily Trips</th>
</tr>
</thead>
<tbody>
<tr>
<td>Office</td>
<td>1,000 s.f.</td>
<td>14.3</td>
<td>95%</td>
<td>Equation¹</td>
<td>373</td>
</tr>
<tr>
<td>Sit Down High Turn Over Restaurant</td>
<td>1,000 s.f.</td>
<td>20.2</td>
<td>90%</td>
<td>160</td>
<td>2,906</td>
</tr>
<tr>
<td>Fast Food Restaurant (Starbucks)</td>
<td>1,000 s.f.</td>
<td>2.0</td>
<td>100%</td>
<td>700</td>
<td>1,400</td>
</tr>
<tr>
<td>Specialty Retail</td>
<td>1,000 s.f.</td>
<td>8.0</td>
<td>90%</td>
<td>40</td>
<td>288</td>
</tr>
<tr>
<td>Condominium</td>
<td>d.u.</td>
<td>94.0</td>
<td>95%</td>
<td>8</td>
<td>714</td>
</tr>
<tr>
<td><strong>Total Trips</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>5,681</strong></td>
</tr>
</tbody>
</table>

¹ Ln(T) = 0.756 ln(x) + 3.95
### Uptown Center

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Units</th>
<th>Amount</th>
<th>Occupied</th>
<th>Daily Trip Rate</th>
<th>Daily Trips</th>
</tr>
</thead>
<tbody>
<tr>
<td>Condominium</td>
<td>d.u.</td>
<td>311.0</td>
<td>95%</td>
<td>8</td>
<td>2,364</td>
</tr>
<tr>
<td>Neighborhood Shopping Center</td>
<td>1,000 s.f.</td>
<td>67.2</td>
<td>90%</td>
<td>120</td>
<td>7,260</td>
</tr>
<tr>
<td>Supermarket</td>
<td>1,000 s.f.</td>
<td>70.0</td>
<td>100%</td>
<td>150</td>
<td>10,500</td>
</tr>
<tr>
<td>Government Office</td>
<td>1,000 s.f.</td>
<td>3.0</td>
<td>100%</td>
<td>30</td>
<td>90</td>
</tr>
</tbody>
</table>

**Total Trips** 20,214

### The Village at Morena Linda Vista

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Units</th>
<th>Amount</th>
<th>Occupied</th>
<th>Daily Trip Rate</th>
<th>Daily Trips</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apartment</td>
<td>d.u.</td>
<td>185.0</td>
<td>95%</td>
<td>6</td>
<td>1,055</td>
</tr>
<tr>
<td>Sit-Down, High Turnover Restaurant</td>
<td>1,000 s.f.</td>
<td>14.0</td>
<td>100%</td>
<td>160</td>
<td>2,240</td>
</tr>
<tr>
<td>Fast Food Restaurant (Starbucks)</td>
<td>1,000 s.f.</td>
<td>3.0</td>
<td>100%</td>
<td>700</td>
<td>2,100</td>
</tr>
<tr>
<td>Specialty Retail</td>
<td>1,000 s.f.</td>
<td>8.0</td>
<td>100%</td>
<td>40</td>
<td>320</td>
</tr>
<tr>
<td>Transit Station</td>
<td>Occupied Parking</td>
<td>165.0</td>
<td>100%</td>
<td>4</td>
<td>660</td>
</tr>
</tbody>
</table>

**Total Trips** 6,375

### Hazard Center

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Units</th>
<th>Amount</th>
<th>Occupied</th>
<th>Daily Trip Rate</th>
<th>Daily Trips</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specialty Retail</td>
<td>1,000 s.f.</td>
<td>98.7</td>
<td>90%</td>
<td>40</td>
<td>3,553</td>
</tr>
<tr>
<td>Sit-Down, High Turnover Restaurant</td>
<td>1,000 s.f.</td>
<td>18.0</td>
<td>100%</td>
<td>160</td>
<td>2,880</td>
</tr>
<tr>
<td>Fast Food Restaurant (Starbucks)</td>
<td>1,000 s.f.</td>
<td>2.0</td>
<td>100%</td>
<td>700</td>
<td>1,400</td>
</tr>
<tr>
<td>Office</td>
<td>1,000 s.f.</td>
<td>284.0</td>
<td>90%</td>
<td>Equation¹</td>
<td>3,432</td>
</tr>
<tr>
<td>Hotel</td>
<td>Rooms</td>
<td>300.0</td>
<td>80%</td>
<td>10</td>
<td>2,400</td>
</tr>
<tr>
<td>Theater</td>
<td>Seat</td>
<td>1,540.0</td>
<td>100%</td>
<td>0.9</td>
<td>1,386</td>
</tr>
</tbody>
</table>

¹ Ln(T) = 0.756 Ln(x) + 3.95

**Total Trips** 15,051

### Heritage Center at Otay Ranch

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Units</th>
<th>Amount</th>
<th>Occupied</th>
<th>Daily Trip Rate</th>
<th>Daily Trips</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apartment</td>
<td>d.u.</td>
<td>271.0</td>
<td>90%</td>
<td>6</td>
<td>1,463</td>
</tr>
<tr>
<td>Gas Station With Food Mart</td>
<td>Fueling Station</td>
<td>8.0</td>
<td>100%</td>
<td>160</td>
<td>1,280</td>
</tr>
<tr>
<td>Medical Office</td>
<td>1,000 s.f.</td>
<td>67.4</td>
<td>95%</td>
<td>50</td>
<td>3,202</td>
</tr>
<tr>
<td>Neighborhood Shopping Center</td>
<td>1,000 s.f.</td>
<td>38.0</td>
<td>100%</td>
<td>120</td>
<td>4,560</td>
</tr>
</tbody>
</table>

**Total Trips** 15,505
Appendix C
Vehicle Trip Reduction for SGOAs
<table>
<thead>
<tr>
<th>Site Short Name¹</th>
<th>Community Name</th>
<th>Place Type¹</th>
<th>Area (acres)</th>
<th>Dwelling Units</th>
<th>Non-Residential Building Area (1,000 square feet)</th>
<th>Number of Intersections</th>
<th>Jobs Within One mile</th>
<th>Jobs Within 30 Minutes by Transit</th>
<th>Modeled</th>
<th>Surveyed</th>
<th>Trip Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>SD UN-2</td>
<td>Eastgate Mall Road, I-805, UCSD, Nobel Drive</td>
<td>Urban Center</td>
<td>818</td>
<td>120</td>
<td>11,389</td>
<td>2,408</td>
<td>6,234</td>
<td>112</td>
<td>42</td>
<td>37</td>
<td>23,510</td>
</tr>
<tr>
<td>SD CC-1C</td>
<td>Centre City Community Plan Area</td>
<td>Metropolitan Center³</td>
<td>389</td>
<td>9</td>
<td>5,576</td>
<td>2,732</td>
<td>7,508</td>
<td>2,565</td>
<td>23</td>
<td>120</td>
<td>71,350</td>
</tr>
<tr>
<td>SD UP-6</td>
<td>Pennsylvania Avenue/Robinson Avenue, Park Boulevard, Washington Street</td>
<td>Urban Center</td>
<td>383</td>
<td>703</td>
<td>4,070</td>
<td>1,922</td>
<td>552</td>
<td>68</td>
<td>2</td>
<td>160</td>
<td>13,950</td>
</tr>
<tr>
<td>ES-1</td>
<td>Downtown Specific Plan/Mercado Area Plan</td>
<td>Town Center</td>
<td>452</td>
<td>176</td>
<td>648</td>
<td>2,285</td>
<td>566</td>
<td>18</td>
<td>126</td>
<td>165</td>
<td>12,660</td>
</tr>
<tr>
<td>SD UP-1</td>
<td>4th Street &amp; 5th Street from DateStreet to Pennsylvania Avenue</td>
<td>Mixed-Use Transit Corridor</td>
<td>352</td>
<td>317</td>
<td>4,384</td>
<td>622</td>
<td>1,887</td>
<td>113</td>
<td>0</td>
<td>151</td>
<td>81,240</td>
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<tr>
<td>SD CH-3B</td>
<td>University Avenue from Park Boulevard to 54th Street²</td>
<td>Mixed-Use Transit Corridor³</td>
<td>447</td>
<td>1,582</td>
<td>3,943</td>
<td>798</td>
<td>524</td>
<td>85</td>
<td>35</td>
<td>200</td>
<td>15,440</td>
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<td>SD CH-1</td>
<td>Meade Avenue, Wightman Street, 40th Street</td>
<td>Town Center</td>
<td>381</td>
<td>1,279</td>
<td>3,251</td>
<td>765</td>
<td>535</td>
<td>55</td>
<td>0</td>
<td>172</td>
<td>5,420</td>
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<tr>
<td>SD NV-1</td>
<td>I-8, Friars Road, San Diego River, Mission Gorge Road in the east</td>
<td>Town Center</td>
<td>244</td>
<td>2</td>
<td>432</td>
<td>756</td>
<td>511</td>
<td>0</td>
<td>984</td>
<td>26</td>
<td>13,240</td>
</tr>
<tr>
<td>SD NH-1</td>
<td>Park Boulevard at Meade Avenue continuing along Adams Avenue</td>
<td>Mixed-Use Transit Corridor</td>
<td>501</td>
<td>1,993</td>
<td>4,213</td>
<td>586</td>
<td>57</td>
<td>44</td>
<td>0</td>
<td>243</td>
<td>19,020</td>
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<tr>
<td>SD MV-3</td>
<td>I-8, SR 163, I-805, Community Boundary</td>
<td>Urban Center</td>
<td>531</td>
<td>122</td>
<td>3,188</td>
<td>3,975</td>
<td>2,389</td>
<td>147</td>
<td>73</td>
<td>29</td>
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<tr>
<td>SD CC-1E</td>
<td>Centre City Community Plan Area</td>
<td>Metropolitan Center³</td>
<td>290</td>
<td>0</td>
<td>4,492</td>
<td>1,004</td>
<td>383</td>
<td>46</td>
<td>338</td>
<td>47</td>
<td>50,890</td>
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<tr>
<td>SD PB-1</td>
<td>Grand Avenue &amp; Garnet Avenue from Mission Boulevard to Olney Street</td>
<td>Mixed-Use Transit Corridor</td>
<td>502</td>
<td>1,496</td>
<td>4,175</td>
<td>1,479</td>
<td>135</td>
<td>9</td>
<td>0</td>
<td>210</td>
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<td>CO-1</td>
<td>Downtown Coronado Town Center</td>
<td>Town Center</td>
<td>307</td>
<td>554</td>
<td>2,941</td>
<td>2,051</td>
<td>117</td>
<td>13</td>
<td>0</td>
<td>122</td>
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<tr>
<td>SD LJ-1</td>
<td>Prospect Street, Pearl Street, Fay Avenue, Ivanhoe Avenue</td>
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<td>2,220</td>
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<tr>
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<td>Metropolitan Center³</td>
<td>346</td>
<td>77</td>
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<td>1,007</td>
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<td>Site Short Name1</td>
<td>Community Name</td>
<td>Place Type2</td>
<td>Area (acres)</td>
<td>Dwelling Units</td>
<td>Non-Residential Building Area (1,000 square feet)</td>
<td>Number of Intersections</td>
<td>Jobs Within One Mile</td>
<td>Jobs Within 30 Minutes by Transit</td>
<td>Modeled Surveyed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------------</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>SD CH-3A</td>
<td>University Avenue from Park Boulevard to 54th Street</td>
<td>Mixed-Use Transit Corridor</td>
<td>254</td>
<td>735</td>
<td>3,888</td>
<td>770</td>
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<td>94</td>
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<td>Town Center</td>
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<td>2,841</td>
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<td>203</td>
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<td>20</td>
<td>8,640</td>
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<tr>
<td>SD NP-2G</td>
<td>El Cajon Boulevard from Park Boulevard to 79th Street</td>
<td>Mixed-Use Transit Corridor3</td>
<td>319</td>
<td>785</td>
<td>1,519</td>
<td>1,039</td>
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<td>12,360</td>
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<tr>
<td>SD NP-1</td>
<td>30th Street from Adams Avenue to Upas</td>
<td>Mixed-Use Transit Corridor</td>
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<td>141</td>
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<td>Westview Parkway from Capricorn Way to Hillery Drive &amp; Mira Mesa Boulevard from Black Mountain Road to I-15</td>
<td>Town Center</td>
<td>158</td>
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<td>412</td>
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<td>4</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>5,940</td>
</tr>
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</table>

(1) Complete descriptions of the sites can be found in the SANDAG Smart Growth Concept Map Site Descriptions document, dated October 27, 2006
(2) As identified by the San Diego Regional Comprehensive Plan (RCP).
(3) Divided
Appendix D
Data Sources for SGOA Land Use Data
APPENDIX D - DATA SOURCES FOR SGOA LAND USE DATA

The following SANDAG data sources were used as inputs into the MXD model:

- ES-202 and QCEW Industry Employment and Quarterly Wage Data, California Employment Development Department Labor Market Information, 2005
- SANDAG Land Use Database, 2008
- SANGIS Road Network, Q2 2008 (excludes non-pedestrian features such as freeways, but includes alleys and dedicated foot paths)
- SANDAG Transit Stop Inventory, 2008
- SANDAG Smart Growth Concept Map, 2008

Smart Growth Opportunity Areas (SGOAs) were drawn as 2 versions:
1. Using official boundaries as drawn on Smart Growth Concept Map
2. With a ½ mile walkable buffer from the center street for Mixed Use Transit Corridors, and from the SGOA center point for other place types.

Canyons, freeways, rivers, coastline, and other such impediments were clipped out of the SGOA boundaries.
Final Climate Action Strategy

The SANDAG Climate Action Strategy

- Serves as SANDAG climate change guide
- Identifies **options** for SANDAG and local jurisdictions
- Foundation for addressing climate change as existing plans are updated
- Addresses land use-transportation, energy, local jurisdiction operations, potential climate impacts
Policy Measures to Reduce Greenhouse Gases

• Broad range of potential options
• Could contribute to state-wide targets
• Many adopted policies address climate change
• Some measures may not be viable
• Evaluation before implementation
• Also measures to protect transportation and energy infrastructure from impacts

Strategy Process

• RPC provided initial direction, accepted for public distribution in February
• Extensive input on preliminary draft
• Worked with Energy Working Group and Board of Directors to incorporate comments
• EWG recommended the Final to RPC at its February meeting
Major Themes of Comments and Input

- Big impact from State standards, also need regional and local strategies
- Regional coordination to address impacts
- Identify SANDAG measures to support local smart growth
- Expand discussion of measures influencing transportation emissions
- Identify options for SANDAG to reduce greenhouse gases from its operations

Recommendation

The Regional Planning Committee is asked to recommend that the Board of Directors approve, in substantially the same form as attached, the Final Climate Action Strategy.
Final
Climate Action Strategy

March 5, 2010
Smart Growth Trip Generation Study

- More accurate tool for planners in estimating trip generation for smart growth developments
- Strategies for parking in smart growth areas
Recommendation

The Regional Planning Committee is asked to recommend that the Board of Directors accept *Trip Generation and Parking Strategies for Smart Growth* for inclusion into *San Diego Traffic Generators* as an appendix, and as a resource in the SANDAG Smart Growth Toolbox.

Smart Growth
Trip Generation Study
March 5, 2010