MEETING NOTICE
AND AGENDA

ENERGY WORKING GROUP
The Energy Working Group may take action on any item appearing on this agenda.

Thursday, May 22, 2008
11:30 a.m. to 2 p.m.

SANDAG, Seventh Floor Board Room
401 B Street, Suite 800
San Diego, CA 92101-4231

Staff Contact: Brian Holland
(619) 699-6915
bho@sandag.org

AGENDA HIGHLIGHTS

• DRAFT ALTERNATIVE FUEL INFRASTRUCTURE STUDY
• LARGE-SCALE UTILITY-OWNED PHOTOVOLTAIC PROGRAMS

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<table>
<thead>
<tr>
<th>ITEM #</th>
<th>RECOMMENDATION</th>
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<tbody>
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<td>1.</td>
<td>WELCOME AND INTRODUCTIONS</td>
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<td>2.</td>
<td>APPROVE</td>
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<td>3.</td>
<td>PUBLIC COMMENT AND COMMUNICATIONS</td>
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<td>4.</td>
<td>INFORMATION</td>
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<td>5.</td>
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<td>6.</td>
<td>DISCUSSION</td>
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1. **WELCOME AND INTRODUCTIONS**

2. **SUMMARY OF APRIL 24, 2008, ENERGY WORKING GROUP (EWG) MEETING**

   The April 24, 2008, meeting summary is attached for the EWG review and approval.

3. **PUBLIC COMMENT AND COMMUNICATIONS**

   Members of the public who would like to address the EWG on a topic not on the agenda should do so at this time. Speakers are limited to three minutes each.

4. **REGIONAL TRANSPORTATION PLAN ENVIRONMENTAL IMPACT REPORT SETTLEMENT AGREEMENT**

   Staff will present information on a settlement agreement reached in May 2008. The agreement includes commitments to perform work related to greenhouse gas emissions and transportation.

5. **SUSTAINABLE REGION PROGRAM UPDATE**

   Staff will provide an update on the Sustainable Region program work underway in Poway, Solana Beach, Imperial Beach, and Coronado.

6. **DRAFT ALTERNATIVE FUELS INFRASTRUCTURE STUDY**

   Staff will present a Draft Alternative Fuels Infrastructure Study, prepared under the California Energy Commission (CEC) agreement. EWG members are requested to provide comments and revisions that should be incorporated into the Final Study due to the CEC in October.

7. **MAY 2008 DISTRIBUTED GENERATION AND RENEWABLE RATE STRUCTURE**

   Staff and SDG&E representatives will present information on the new DG-R rate available to retail electricity customers with sizable photovoltaic installations.
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<td>8.</td>
<td><strong>SUBCOMMITTEE UPDATE: LARGE-SCALE UTILITY-OWNED PHOTOVOLTAIC PROGRAM</strong></td>
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<td>Subcommittee chairs will update the EWG on the subcommittee’s discussion of the proposed Southern California Edison photovoltaic program and other strategies for encouraging large-scale photovoltaic installations.</td>
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<td>9.</td>
<td><strong>SCHEDULING AGENDA ITEMS FOR FUTURE MEETINGS</strong></td>
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<td>EWG members are invited to suggest topics for the upcoming June 26, 2008, meeting.</td>
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+ next to an item indicates an attachment
AGENDA ITEM #1: WELCOME AND INTRODUCTIONS

Energy Working Group (EWG) Chair Carrie Downey, City of Coronado, called the meeting to order at 11:37 a.m. and welcomed the group, saying she was honored to have been selected as the group’s new chair.

AGENDA ITEM #2: SUMMARY OF MARCH 27, 2008, MEETING

Ms. Downey asked working group members to look over the meeting summary and to approve it if there were no changes.

Donna Frye, City of San Diego, asked for clarification on page 4, paragraph 3. The last sentence states that it is not unprecedented for a staff recommendation to be given to the Regional Planning Committee which differs from the Working Group recommendation. Ms. Frye wanted to confirm that this in fact had happened before. Brian Holland, SANDAG, clarified that a staff recommendation and a working group recommendation both go forward on every action item for every working group at SANDAG. In past EWG meetings, the staff has agreed with the working group. This instance was the first time that the staff had disagreed with the group.

Noting this clarification, Ms. Frye motioned to approve the minutes as amended. Dave Carey, Port of San Diego, seconded the motion, which passed without opposition. Ms. Downey and Laura Hunter, Environmental Health Coalition, abstained due to their absence at the meeting being discussed.

AGENDA ITEM #3: PUBLIC COMMENT AND COMMUNICATIONS

Members of the public were given the opportunity to address the EWG on a topic not on the agenda.

Leo Miras, Environmental Health Coalition, informed the group of an upcoming meeting in Sacramento. On May 2, 2008, there will be a workshop on the Distributed Generation (DG) component of the AB 32 Scoping Plan hosted by the California Air Resources Board (ARB), Public Utilities Commission (PUC), and California Energy Commission (CEC). The workshop will look at things like combined heat and power, renewables, and energy efficiency. He invited members who
are interested in DG to attend and to invite others with expertise in the subject. The ARB is hoping to release a draft scoping plan this summer.

Ms. Hunter stated that she had a copy of Southern California Edison's (SCE) testimony on their 250MW rooftop solar project that she would distribute to the group. She said that members should familiarize themselves with the project and ask SDG&E or the CPUC why there are not projects like this in the region. Andrew McAlister, CCSE, noted that the estimated cost for SCE’s project indicated that the price of solar could come in under the Market Price Referent, which would be a very important development.

Mike Evans, San Diego Regional Chamber of Commerce, asked if we could explore why this type of solar project was being pursued by entities with fixed cost recovery like utilities and municipalities and not by commercial entities in a competitive marketplace. We should look at the structural issues that prevent adoption like challenges in permitting and meter aggregation. Rich Caputo, Renewable Energy Society, noted that SCE had been refused permission by the PUC in the 1970s for a widespread solar water-heating program. Even though it was more efficient for a utility to lead such a program, the PUC had expressed a preference to a program based on consumer choice.

Linda Wagner from Councilman Castaneda’s office thanked EWG members for their ongoing support.

**AGENDA ITEM #4: REGIONAL CLIMATE ACTION PLAN: TRANSPORTATION GREENHOUSE GAS REDUCTION TARGET AND SCENARIO**

Mr. Holland said that at the last meeting, members looked at existing conditions and business-as-usual (BAU) forecasts for greenhouse gas (GHG) emissions from the transportation sector. Many members expressed concern that there was a 30% increase in GHG emissions under the BAU scenario, but he would now present various reduction scenarios.

Through a combination of efforts, the region could come close to meeting hypothetical transportation GHG reduction targets of about a 50% reduction from current levels by 2030. Fuel efficiency, alternative fuels, and reducing travel demand are key components to meeting this goal. The state’s Pavley fuel efficiency standard (AB 1493) is the basis for future fuel efficiency estimates; although the implementation of this standard is currently on hold pending EPA approval. The state’s Low Carbon Fuel Standard (LCFS) will be the basis for alternative fuel reduction scenarios. Travel demand reduction is needed to make up the difference and this is an area where SANDAG can take the lead.

SANDAG’s travel reduction scenario is based on increasing transit use, low-carbon land use, and Transportation Demand Management (TDM). Using the existing transit alternative of the Regional Transportation Plan, transit mode share could be increased by increasing the frequency of service and adding new service. Since SANDAG does not have direct land-use regulation authority, low-carbon land use will be harder to implement, but SANDAG does promote a regional vision for growth. The scenario would channel all regional growth into smart growth, transit-oriented areas, and attempt to balance jobs and housing. The scenario would have a variety of impacts that may make it infeasible, but it is a useful exercise to see the maximum reduction in vehicle miles traveled (VMT) possible.
There was some discussion of potential problems with the implementation of such a scenario. Mr. Holland clarified the measures were chosen to explore the impacts of extreme policy changes before looking at more feasible policy, and were not intended for implementation. Despite the stringent criteria, there was only a small reduction in GHG emissions. Due to the large amount of automobile-centered development already in place, aggressive land use strategies have limited impact on overall emissions. There also may be problems with the transportation model, and other models may demonstrate greater sensitivity to land use-related smart growth strategies.

The GHG reduction scenario will also feature an aggressive TDM component. This includes a 40% telecommute rate, increased fuel cost either through tax or natural increase, increase in parking price, pay-as-you-go insurance, and reduced transit fares.

There was some discussion of the possibility electric cars and PHEVs could have in GHG reduction. The feeling was that this technology was credible, viable, and would soon reach the market. Mr. Holland indicated that the LCFS included electric-powered vehicles. Mr. McAlister suggested that SANDAG commute data be used to develop market penetration scenarios for electric/hybrid vehicles based on round-trip commute.

Ms. Frye noted that it was unlikely that transit fares would ever be reduced. As routes have been cut, the system serves less people. We need to look at getting people where they need to go, since the current system does not do this at any cost. It will take additional public investment to make the transit system viable. Mr. Holland suggested that we need to make this point to the state since SANDAG and MTS can't do it on our own.

Mr. McAllister noted that what was being discussed would be for the benefit of future generations. The ARB has been tasked with the very difficult job of developing the LCFS and other GHG reduction regulations, and it recently lost one of its best minds. UC Berkeley professor Alex Farrell passed away on April 13, 2008, at the age of 46. Dr. Farrell’s work was having a major impact on state and national policy, and his passing is a huge loss both for those who knew him personally and for those who used his research. To solve the problems facing us we need the best minds we can get.

Ms. Downey said the she appreciated all the experts who gave up their time to sit on the EWG. The Board of Directors also appreciated the EWG's work, even when they do not agree on the recommendation. The work the group is doing today will benefit the region far into the future.

Teresa Quiroz, a resident of City Heights, said that transit is the most important component in reducing GHG emissions, and that she was pleased it had been discussed by members of this group. It often seems to be brushed off at meetings of the City or SANDAG since there is the attitude that most people won't use transit. We need to educate the population as to all the positive effects of transportation. SANDAG should talk to existing transit riders to see how it can better serve them beyond simply reducing fares or increasing frequency, and should also talk with those who don’t ride transit to see how to get them on trains, trolleys, and buses. We need public investment in transit. As long as service is being cut and fares continue to rise, transit cannot serve more people. Since the working group has acknowledged that transit is important, it should work to actually improve transit service.
AGENDA ITEM #5: REGIONAL ENERGY STRATEGY UPDATE: NATURAL GAS EXISTING CONDITIONS AND FORECAST

Jennifer Porter, CCCSE, presented her work on the natural gas (NG) portion of the Regional Energy Strategy (RES) update. Currently, the region gets its gas from a SoCalGas/Sempra-owned pipeline that comes from the east through Blythe and then south into the region. With the construction of the liquefied natural gas (LNG) facility at Costa Azul, Baja California, it is expected that gas will flow north from Mexico into the region. The plant is expected to come on-line soon. Despite statewide attempts for energy efficiency, demand for natural gas will continue to grow due to population growth. Use of NG for electricity generation is expected to see the biggest increase.

There was some discussion as to how much of the gas from the LNG facility would actually come into the region. With Mexican demand increasing, graphs showing the majority of the region’s supply coming from Mexico may be inaccurate. Members also expressed some preference for a map showing a combination of both the SoCalGas pipelines along with the infrastructure in Mexico. There was also a request for more detail on NG facilities within the county. The current map shows all the high-pressure transmission lines, but not any of the lower pressure lines that might serve industry or small peakers.

Mr. Caputo noted that according to the EIA sourced graph, the cost of NG will stay flat for the coming decades. He felt that this was a very unlikely scenario and would skew any projections based on it. Because the text talks about continued uncertainty in gas prices, it was suggested that including the chart showing stable prices would be counterproductive or confusing.

Ms. Hunter asked if there was any consideration of the environmental justice and other impacts of increasing reliance on LNG. She offered to help dig up more life-cycle information on LNG. There was also the concern that LNG could lead to less stable prices. Ms. Porter said that the text of the report stated that LNG may have 20%-40% higher GHG emissions than domestically sourced NG and also mentioned continued volatility in prices.

Mr. Carey asked if the region needed more infrastructures to increase capacity and ensure reliable NG supply. Mr. Evans said that with both the line coming from Blythe and the TGN line connecting in at Otay, the region had effectively doubled supply, which will ensure price stability to the region; the graph showing all of the region’s resources coming from the TGN line may be inaccurate and should be removed. Mr. Evans was also concerned about the assertion that LNG had 20%-40% higher GHG emissions and if it was a fair comparison to local natural gas supplies, which also produce emissions from exploration and transportation. Mr. Holland indicated that the figure could be cited and explained in greater detail.

AGENDA ITEM #6: REGIONAL CLIMATE ACTION PLAN: NATURAL GAS GREENHOUSE GAS REDUCTION TARGET AND SCENARIO

Mr. Holland said that a similar process is being followed for the Climate Action Plan section on natural gas as for transportation fuels. After assessing existing conditions, we will set a reduction goal and look at scenarios to meet the target. NG used for electricity generation will be excluded from this section, but there will be a separate section on electricity. The remaining NG use is mostly related to water heating, space heating, cooking, and industrial uses.
The reduction for 2030 is based on 1990 levels, but GHG emissions from NG fuels have been relatively flat since 1990, so the targeted reduction basically continues the current trend. While overall emissions remain flat, this is actually a 26% reduction in per capita emissions due to population growth.

Ms. Downey asked if there was analysis of why growth had been flat and if it could be attributed to things like greater insulation and more efficient appliances. Bob Resley said that a lot could be attributed to turnover in the housing stock and newer buildings codes. He also cautioned that there would be diminishing returns for increasing standards and a further reduction may not be possible. Mr. Holland said that keeping emissions flat may be a suitably aggressive goal and that a number of steps could be taken to meet that goal. Solar water heating, building envelope improvements, and passive solar heating are a few of the possible options. SANDAG is also looking at new ways to model building energy usage based on the IPlaces land use modeling software.

Ms. Hunter said that this study was a great illustration that regulation works. Just as mandating low-flow water fixtures helped keep water use flat despite population growth, energy efficiency mandates had kept gas usage flat. She thought there was room for additional reductions through green building standards for new construction and retrofits. Mr. Caputo mentioned that high-efficiency solar water heaters could actually drive compression cycle air conditioners or heat water for industrial processes. The technology has improved in recent years and there are some projects going on in IID territory. There is some uncertainty as to whether these kinds of projects should be classified as gas or electric efficiency measures, but we should give consideration to these kinds of technologies.

**AGENDA ITEM #7: LOCAL GOVERNMENT PATNERSHIP APPLICATION**

Susan Freedman, SANDAG, said that she is working to obtain funds for the Sustainable Region program that began with Carlsbad in 2005-2006. It is currently continuing with support of the CEC in Solana Beach and Poway, and in Imperial Beach and Coronado with SDG&E support. The program includes energy audits and the development of energy efficiency and GHG reduction plans for municipal facilities. SANDAG has been working with SDG&E on a local government partnership that comes from a portion of the public goods fund to fund the project, which will use expertise from CCSE. The follow-up report on the Carlsbad program will be sent to members.

Mr. McAlister said this program would be very valuable for the region. Lessons learned by one city can be used in other cities and the region will benefit from everyone working together. Some of the lessons learn can be used in other commercial buildings, and is also a good example for citizens.

Mr. Carey said the Port had entered into an MOU with SDG&E for efficiency programs and was also applying for additional local government partnership grant funds.

**AGENDA ITEM #8: SCHEDULING AGENDA ITEMS FOR FUTURE MEETINGS**

Ms. Hunter said that she would like the group to draft a letter to SDG&E asking for better distributed generation projects and would also like the group to look at how a greater network of DG can help meet the region’s energy needs.
Mr. Caputo said that a while back the group had discussed the strange rate structure that had some commercial customers with PV systems paying higher rates. This issue seems to have fallen off the radar and we could use an update. Members indicated that Joe Velasquez from SDG&E would be discussing this as well as part of the Senate Public Utilities Committee hearing in Old Town on Friday, April 25. Some members of the EWG will be attending and could report back to the group.

**AGENDA ITEM #9: ADJORN**

The meeting was adjourned at 1:26 p.m. The next meeting will be May 22, 2008.
# SANDAG ENERGY WORKING GROUP MEETING
## ATTENDANCE April 24, 2008

<table>
<thead>
<tr>
<th>GEOGRAPHICAL AREA/ORGANIZATION</th>
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<td>Independent Power Producer</td>
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<td>Steve Hoffmann</td>
<td>Member</td>
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<td>Tim Hemig</td>
<td>Alternate</td>
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**OTHERS**
Jim Cron, American Standard Renewable Fuels
Alexandra Hart, IBEW 569
Julie Gelfat, IBEW 569
Cari Dale, City of Carlsbad
Mary Ann Kempczenski, City of San Diego
Tom Blair, City of San Diego
Alessandra Ho
Jack Key, SD County Grand Jury
Emery McCaffery, Ecology & Environment
Jennifer Porter, CCSE
Sephra Ninow, CCSE
Theresa Quiroz, City Heights Resident
Bob Resley
Susan Freedman, SANDAG
Brian Holland, SANDAG
Kevin Wood, SANDAG
The SANDAG Regional Transportation Plan (RTP) and RTP Environmental Impact Report (EIR) were adopted on November 30, 2007. After adoption, a group of interested parties gave notice of a claim against SANDAG under CEQA, alleging insufficiencies in the EIR. SANDAG denied these allegations and entered into settlement negotiations with the parties. A settlement agreement was entered into on April 30, 2008.

Under the agreement, SANDAG agrees to do the following:

- Continue to participate in the Downtown Transportation Plan being prepared by the Centre City Development Corporation.
- Develop a regional long-range transit plan and five-year and ten-year transit action plans, with an emphasis on improving transit in urban core areas.
- Undertake a comprehensive study on impediments to public transit use.
- Seek to expedite the schedule of the coastal rail double tracking project.
- Update the Smart Growth Concept Map and the Smart Growth Incentive Program.
- Develop a “Safe Routes” to School strategy.

These actions are intended to reduce greenhouse gas emissions associated with regional transportation activities.

Attachment: 1. Settlement Agreement

Key Staff Contact: Brian Holland, (619) 699-6915, bho@sandag.org
SETTLEMENT AGREEMENT
WITH RELEASE OF ALL CLAIMS

This Settlement With Release Of All Claims (hereinafter “Agreement”) is entered into by and between Save Our Forest and Ranchlands and Duncan McFetridge (hereinafter “SOFAR”), Affordable Housing Coalition of San Diego County, Citizens for Responsible Equitable Environmental Development, and San Diego Public-Transit Riders’ Alliance (hereinafter collectively referred to as “Alliance”) and the SAN DIEGO ASSOCIATION OF GOVERNMENTS and its Board of Directors, employees, officers, representatives, insurers, attorneys, agents, successors, and assigns (hereinafter “SANDAG”).

WHEREAS, on November 30, 2007, SANDAG and the SANDAG Board of Directors approved the 2030 Regional Transportation Plan, Pathways for the Future (“2007 RTP” or “Project”), certified the Final Environmental Impact Report (“FEIR”) for the Project, and posted a Notice of Determination for the Project pursuant to the California Environmental Quality Act (Public Resources Code, § 21000 et seq.) (“Project Approval”); and

WHEREAS, Alliance and SOFAR (hereinafter collectively “Petitioners”) gave notice of a claim against SANDAG under CEQA alleging insufficiencies in EIR for the Project (the “CEQA Claims”) and challenging the Project Approval; and

WHEREAS, SANDAG denies Petitioners’ allegations; and

WHEREAS, Petitioners and SANDAG, without admitting or acknowledging any liability and solely to avoid the expense of litigation and buy their peace, desire to settle fully and finally any and all current or future differences between them concerning the Project Approval, including, but in no way limited to the CEQA Claims, under the terms and conditions set forth below; and

WHEREAS, SANDAG is committed to addressing climate change impacts pursuant to the California Global Warming Solutions Act of 2006;

NOW THEREFORE, in consideration of the mutual covenants and promises herein contained and other good and valuable consideration, receipt of which is hereby acknowledged, Petitioners and SANDAG hereby agree to all of the following conditions and terms in this Agreement:

1. Petitioners hereby release and unconditionally absolve SANDAG from any and all liabilities, debts, or obligations of any kind or character that it has had, now has, or may have in the future, which arise from or are in any way related to, the CEQA Claims or the Project Approval, relating to events that have occurred as of the date of this Agreement. Petitioners will not file any complaints, claims, grievances, or other actions against SANDAG with any state, federal, or local agency or court with regard to or related to the CEQA Claims or the Project Approval relating to events that have occurred as of the date of this Agreement. This Agreement releases and forever discharges SANDAG from any and all past, present, or future charges, complaints, claims, lawsuits, and liabilities of any kind or nature whatsoever, known or unknown, suspected or unsuspected regarding events that have occurred as of the date of this Agreement and arising from or relating to the CEQA Claims or the Project Approval, to the maximum extent permitted by law. All such claims are forever barred by this
Agreement without regard to whether those claims are based upon any alleged breach of duty arising in a statute, contract, or tort; any alleged unlawful act; any other claim; and regardless of the forum which it might be brought.

2. SANDAG hereby releases and unconditionally absolves Petitioners from any and all liabilities, debts, or obligations of any kind or character that it has had, now has, or may have in the future, which arise from or are in any way related to, the CEQA Claims or the Project Approval. This Agreement releases and forever discharges Petitioners from any and all past, present, or future charges, complaints, claims, lawsuits, and liabilities of any kind or nature whatsoever, known or unknown, suspected or unsuspected regarding events that have occurred as of the date of this Agreement and arising from or relating to the CEQA Claims or the Project Approval, to the maximum extent permitted by law. All such claims are forever barred by this Agreement without regard to whether those claims are based upon any alleged breach of duty arising in a statute, contract, or tort; any alleged unlawful act; any other claim; and regardless of the forum which it might be brought.

3. In consideration of the foregoing and without admitting to the viability of any of Petitioners' claims, SANDAG shall pay SOFAR $58,000 and Alliance $16,250 for alleged attorneys' fees, without any deductions or withholdings. These amounts shall be payable by check within 30 days following execution of this Agreement by SANDAG's Executive Director. Payment to SOFAR shall be via check made out to "Shute, Mihaly & Weinberger LLP" and mailed to SOFAR's legal counsel, Rachel Hooper, of Shute, Mihaly & Weinberger at 396 Hayes Street, San Francisco, California 94102. Payment to Alliance shall be made payable to "Briggs Law Corporation, in trust for Affordable Housing Coalition of San Diego County, Citizens for Responsible Equitable Environmental Development, and San Diego Public-Transit Riders' Alliance" and mailed to: Briggs Law Corporation, 99 East "C" Street, Suite 111, Upland, CA 91786. These amounts shall be the full and final amount of compensation paid by SANDAG to Petitioners for all Petitioners' claims relating to the CEQA Claims or Project Approval.

4. For projects requiring environmental review under CEQA (requiring, for example, an EIR or a negative declaration), SANDAG will not tier off of or otherwise rely upon the FEIR for the 2007 RTP. Furthermore, without limiting the foregoing, SANDAG agrees to conduct project level environmental documents for specific projects in the 2007 RTP instead of tiering off of the FEIR for the 2007 RTP.

5. Additionally, SANDAG agrees to do the following:

Downtown Transportation Plan

A. Continue to participate in the development of the Downtown Transit Plan ("Study") being prepared by Center City Development Corporation ("CCDC"), the results of which Study SANDAG understands will be analyzed in an EIR and presented to the San Diego City Council to approve, reject or modify.

B. Should the City of San Diego adopt the "Transit Oriented Alternative" (Alternative), SANDAG shall analyze the transit projects included in the Alternative as components of the preferred alternative analyzed in the environmental impact report for the 2011 Regional Transportation Plan (2011 RTP EIR). Notwithstanding the foregoing, the parties expressly recognize that SANDAG is obligated to include
in the EIR only those projects of regional importance that are typically and appropriately contained in a Regional Transportation Plan (RTP).

C. Prior to the adoption of the 2011 RTP, seriously consider implementing transit projects included in the Alternative that do not require an RTP amendment and that are adopted by the City of San Diego.

D. Include transit mode share goals for various regional communities and corridors, including downtown San Diego, as part of the 2011 RTP, and factoring the goals into the regional long range transit plan referenced below in this Agreement.

E. If SANDAG places a “Quality of Life” sales tax measure on the ballot that includes a transit component, a portion of the sales tax will be allocated to fund capital and/or operating costs for transit projects to the extent they may be included in the Alternative adopted by the City of San Diego.

Transit Plan with Urban Core Emphasis

F. Develop a regional long-range transit plan, and five-year and ten-year transit action plans ("Plans"), with emphasis given to the urban core, which for purposes of this Agreement the parties understand to mean that geographic sub-area that includes the downtown San Diego Trolley Ring and National City. The Plans would not, however, constitute an approval to implement the specific transit projects included in the Plans unless such projects are selected following all environmental reviews required by CEQA.

G. Incorporate the work from the Downtown Transit Plan, the 2007 RTP, the Regional Comprehensive Plan, the Air/Rail Network Planning Study, Climate Change Action Plan, and other recent, relevant studies when preparing the urban core portion of the long range transit plan.

H. Include the following components in the long range transit plan:

   i. An investigation of regional, corridor, local, and neighborhood transit services (e.g., transit capital improvements; operational changes; fare restructuring; design of intermodal transfer facilities) that would make transit time competitive with the private car;
   ii. An investigation of transit capital and operational funding strategies;
   iii. A public education program regarding transit services;
   iv. Strategies for increasing pedestrian and bicycling use;
   v. A parking management program; and
   vi. Identification of transit mode share targets or goals.

I. Use SANDAG's standard process for selecting a consultant to develop the long range transit plan, which includes developing a potential list of consultants, public advertisement, consultant interviews and selection, and then working with the top ranked consultant to finalize the scope of work. As part of this consultant selection process for the long range transit plan, Petitioners will be given the opportunity to do the following, provided, however, SANDAG shall have final authority for consultant selection:
i. Consult with SANDAG on the RFP Scope of Work;
ii. Supplement the list of consultants that will be sent a notice of the RFP;
iii. Provide input regarding the evaluation criteria that will be used to select a consultant;
iv. Review the proposals of the consultants short-listed for interviews by the SANDAG evaluation committee; and
v. Conduct separate interviews of the short-listed consultants and provide feedback to the evaluation committee.

J. Provide petitioners with the opportunity to participate in the long range transit plan work, including meetings and review of draft plans after such plans have been reviewed internally by SANDAG staff and approved for release to the Petitioners by SANDAG’s attorneys.

K. Analyze the transit projects included in the Plans in the environmental impact report for the 2011 Regional Transportation Plan (“2011 RTP EIR”) at a level at least equal to the EIR’s analysis of projects located in the urban core that are included in the 2011 RTP EIR’s preferred alternative. Notwithstanding the foregoing, the parties expressly recognize that SANDAG is obligated to include in the EIR only those projects of regional importance that are typically and appropriately contained in a Regional Transportation Plan.

**Study Regarding Impediments to Public Transit**

L. SANDAG shall undertake a comprehensive study, and thereafter issue a final report that identifies and analyzes (i) all known and reasonably foreseeable financial impediments to maintaining long-term public-transit service levels throughout San Diego County; (ii) all known and reasonably foreseeable impediments to maintaining long-term public-transit ridership throughout San Diego County; and (iii) all known and reasonably foreseeable recurring sources (i.e., not one-time sources) that provide or can provide funding to cover operational expenses for public transit throughout San Diego County. The study and report may be completed independently or in conjunction with any other project or activity undertaken by SANDAG. The identification and analysis of financial impediments shall include, but not be limited to, information on the third-party requirements for SANDAG to obtain and use such funding. The identification and analysis of ridership impediments shall include, but not be limited to, surveys of actual and potential riders for the purpose of determining how best to structure public transit so as to increase and maintain long-term ridership. The final report shall include alternatives SANDAG could implement in order to overcome impediments identified in the report, increase and maintain service levels, and increase and maintain funding for operational expenses to the fullest extent possible. SANDAG's Board of Directors shall consider implementation of the alternatives at a public meeting to be held not more than 60 days after issuance of the final report. The final report, along with all supporting and other back-up materials, shall be available to the public. The report shall be completed and posted on SANDAG's Web not more than 12 months after the execution of the Agreement.
Double Track Coastal Rail

M. Not later than 12 months after the execution of this Agreement, provide a status report of double-tracking projects to the Petitioners, which includes identifying those segments that are to be implemented within next five years.

N. Seek the funding to implement an expeditious schedule for remaining segments that have been identified for double tracking in the coastal rail corridor.

O. Prepare a schedule to estimate when the remaining double track segments will be constructed, based on estimates of future available/pending funding.

P. Provide matching funds for coastal rail segments if Proposition 1B funds or other early funding sources become available for double track projects.

Q. Continue to work with NCTD, Caltrans, and Amtrak on improvements to the coastal rail corridor.

R. Continue to work at the regional, state, and federal levels to make improvements to the rail corridor as funding becomes available.

S. If SANDAG places a sales tax measure on the ballot, it will consider and fully evaluate dedicating a portion of the proceeds from the measure to unfunded segments of double-tracking of the Coastal Rail.

Smart Growth Incentive Program

T. Invite feedback from Petitioners in developing Smart Growth Incentive Program criteria.

U. Update the Smart Growth Concept Map to delineate areas that are served by existing and/or planned and “funded” transit.

V. When developing the criteria for eligibility, SANDAG will give priority when ranking projects to areas near transit and areas with the greatest potential for increasing walking and biking and shortening vehicle trips.

W. Explore opportunities for increasing funding of the Smart Growth Incentive Program and leverage Smart Growth Incentive Program funds with federal, state, and other local funds when they are available.

Safe Routes to School Strategy

X. Work through its Bicycle and Pedestrian Working Group to determine how SANDAG can expand Safe Routes to School programs in the region.

Y. Leverage state and federal funding for Safe Routes to School programs with other funding that may be available to accomplish the same or similar goals.

Z. Prepare, adopt and implement a Safe Routes Strategy (“Strategy”) and provide the resources necessary for SANDAG to carry out its responsibilities under the Strategy.
AA. Include recommendations on steps for implementation and identify the roles and responsibilities of entities who should be involved in the implementation of the Strategy.

BB. Research efforts in Marin County and SACOG to determine how programs such as these can be implemented in the San Diego region as part of preparing the Strategy.

CC. Work with school districts in the region on Safe Routes to School Programs by:
   i. Offering technical expertise and training (including holding workshops);
   ii. Working with jurisdictions to identify necessary infrastructure improvements as part of preparing the Strategy;
   iii. Collaborating on a public awareness campaign to educate parents, teachers, and students about the benefits of walking and biking to school; and
   iv. Serving as a clearinghouse for Safe Routes to School programs and opportunities upon request by a school district.

5. The parties hereto hereby agree that all rights under section 1542 of the Civil Code of the State of California are hereby waived by the Parties. Section 1542 provides as follows:

A general release does not extend to claims which the creditor does not know or suspect to exist in his favor at the time of executing the release, which if known by him must have materially affected his settlement with the debtor.

Notwithstanding the provisions of section 1542 of the Civil Code of the State of California, Petitioners hereby irrevocably and unconditionally release and forever discharge SANDAG and all persons acting by, through, under, or in concert with any of them from any and all charges, complaints, claims, and liabilities of any kind or nature whatsoever, known or unknown, suspected or unsuspected which Petitioners at any time heretofore had or claimed to have or which Petitioners may have or claim to have regarding events that have occurred as of the date of this Agreement, including, without limitation, any and all claims related to or in any manner incidental to the CEQA Claims or the Project Approval.

6. Petitioners and SANDAG acknowledge and agree that they:

A. Have had a reasonable opportunity and a reasonable time to consider this Agreement before ratifying and executing it.

B. Knowingly and voluntarily agree to all the terms and conditions in this Agreement.

C. Knowingly and voluntarily agree to be completely legally bound by and to all the terms and conditions in this Agreement.

D. Have been advised and hereby are advised again in writing to consult with an attorney prior to ratifying and executing this Agreement.
E. Have consulted with an attorney prior to ratifying and executing this Agreement.

7. Petitioners understand that this Agreement shall not be binding on SANDAG unless or until it is approved and executed by SANDAG's Executive Director.

8. The parties hereby represent and acknowledge that in executing this Agreement they do not rely and have not relied upon any representation or statement made by any of the parties, agents, officers, employees or representatives with regard to the subject matter, basis, or effect of this Agreement or otherwise, other than those specifically stated in this written Agreement.

9. This Agreement shall be binding upon the parties hereto and upon their heirs, administrators, representatives, executors, successors, assigns; and shall inure the benefit of said parties and to their heirs, administrators, representatives, executors, successors and assigns. Petitioners expressly warrant that they have not transferred to any person or entity any rights, causes of action, or claims released in this Agreement.

10. This Agreement shall be governed and construed under the laws of the State of California. Should any provision of this Agreement be declared or be determined by any court of competent jurisdiction to be wholly or partially illegal, invalid, or unenforceable, the legality, validity, and enforceability of the remaining parts, terms, or provisions shall not be affected thereby, and said illegal, invalid, or unenforceable part, term, condition or provision shall be severed from this Agreement.

11. The individual executing this Agreement hereby represent that they are authorized to bind the parties they represent to this Agreement.

12. This Agreement sets forth the complete and entire agreement between the parties hereto and fully supersedes any and all prior agreements or understandings, written or oral, between the parties hereto pertaining to the subject matter hereof. No modification or addendum to this Agreement shall be effective or binding unless in writing and signed by the parties hereto. This Agreement may be signed in counterparts. Each signed copy of the Agreement shall be treated as an original.

13. This Agreement shall be interpreted in accordance with the plain meaning of its terms and not strictly for or against any of the parties hereto.

14. This Agreement may be executed in counterparts, all of which, when taken together shall constitute a fully executed original.

15. Each party agrees to cooperate and to perform such further acts and to execute and deliver any and all further analysis that may be reasonably necessary to effectuate the express purpose of this Agreement.

16. It is further understood and agreed that if, at any time, a violation of any term of this Agreement is asserted by any party hereto, that party shall have the right to seek specific performance of that term and/or any other necessary and proper relief, including but not limited to damages, from any court of competent jurisdiction, and the prevailing party shall be entitled to recover its reasonable costs and attorneys' fees.
17. Any notice to be given or other document to be delivered by any party to another party under this Agreement may be deposited in the United States mail in the State of California, duly certified or registered, return receipt requested, with postage prepaid, or by Federal Express or other similar overnight delivery service, or by facsimile addressed to the party for whom intended as follows:

To Alliance: Briggs Law Corporation
5663 Balboa Avenue, No. 376
San Diego, CA, 92111-2705
Attn: Cory J. Briggs
Phone No: (909) 949-7115
Facsimile No: (909) 949-7121

To SANDAG: 401 B Street, Suite 800
San Diego, California 92101
Attn: Julie Wiley, General Counsel
Phone No: (619) 699-1900
Facsimile No: (619) 699-1995

To SOFAR: PO Box 475
Descanso, CA 91916.
Attn: Duncan McFetridge
Phone No: 619-445-9638
Facsimile No: 619-659-8962

To SOFAR Counsel: Shute, Mihaly & Weinberger LLP
396 Hayes Street
San Francisco, CA 94102
Attn: Rachel B. Hooper
Phone No: (415) 552-7272
Facsimile No: (415) 552-5816

To SOFAR Counsel: Coast Law Group
169 Saxony Road, Suite 204
Encinitas, CA 92024
Attn: Marco Gonzalez
Phone No: 760-942-8505
Facsimile No: 760-942-8515

Any party may from time to time, by written notice to the other, designate a different address, which shall be substituted for the one above specified. Unless otherwise specifically provided for in this Agreement, all notices, payments, demands, or other communications shall be in writing and shall be deemed to have been duly given and received (i) upon personal delivery, or (ii) as of the business day after mailing by United States registered or certified mail, return receipt requested, postage prepaid, addressed as set forth above, or (iii) the immediately succeeding business day after timely deposit with Federal Express or other equivalent overnight delivery system, or (iv) if sent by facsimile, upon confirmation if sent before 5:00 p.m. on a business day or otherwise on the business day following confirmation of such facsimile, and provided that notice is
facsimile, upon confirmation if sent before 5:00 p.m. on a business day or otherwise on
the business day following confirmation of such facsimile, and provided that notice is
also sent on the same day by one of the methods described above.

18. Failure to insist on compliance with any term, covenant, or condition contained in this
Agreement shall not be deemed a waiver of that term, covenant or condition, nor shall
an waiver or relinquishment of any right or power contained in this Agreement at any
one time or more times be deemed a waiver or relinquishment of any right or power
at any other time or times.

SAN DIEGO ASSOCIATION OF GOVERNMENTS

GARY L. GALLEGOS
Executive Director

Date

DUNCAN MCPHERIDGE

Date

SOFAR

Approved as to form

JULIE D. BURY
Office Of General Counsel

Date

Approved as to form by counsel for SOFAR

RACHEL HOOPER
Shute, Mihaly & Weinberger

Date

AFFORDABLE HOUSING COALITION OF
SAN DIEGO COUNTY; CITIZENS FOR
RESPONSIBLE EQUITABLE ENVIRONMENTAL
DEVELOPMENT, AND SAN DIEGO PUBLIC-
TRANSIT RIDERS’ ALLIANCE BY THEIR
ATTORNEY: CORY BRIGGS OF BRIGGS LAW
CORPORATION

Date

CORY BRIGGS
Briggs Law Corporation
SUSTAINABLE REGION PROGRAM UPDATE

Overview

The SANDAG Sustainable Region program is an energy-saving program for local governments, which provides technical assistance and staff support to cities that either have not participated or have minimally participated in regional energy efficiency, renewable, and green building programs available to them. The program addresses energy-saving measures for existing buildings and new construction as well as policy measures that local governments can adopt. A final product for each city will be an energy management plan tailored to their needs.

SANDAG has undertaken this program in cooperation with the California Center for Sustainable Energy (CCSE) and San Diego Gas & Electric (SDG&E). It is an expansion of a Carlsbad pilot project that this team successfully worked with in 2005-2006.

The Sustainable Region program has expanded to four cities through financial assistance from the California Energy Commission and SDG&E. CCSE and SDG&E are providing technical assistance. The following cities are participating in the expanded Sustainable Region pilot program:

- City of Solana Beach
- City of Poway
- City of Imperial Beach, and
- City of Coronado.

Work is expected to be completed in early 2009. Going forward, SANDAG intends to provide this service to any member agency that expresses a need.

Key Staff Contact: Susan Freedman, (619) 699-7387, sfr@sandag.org
May 22, 2008

AGENDA ITEM NO.: 6

Action Requested: DISCUSSION

DRAFT ALTERNATIVE FUELS INFRASTRUCTURE STUDY

Staff has prepared a draft of the Alternative Fuels Infrastructure Study that is a deliverable under the current California Energy Commission (CEC) agreement. This draft was submitted to the CEC on May 15, 2008, and will be circulated to the EWG, the ad hoc alternative fuels working group, and the public in order to solicit comments and recommended revisions.

The EWG is asked to review the draft document and provide comments and recommended revisions for incorporation into the Final Study. The Final Study is due to the CEC on October 31, 2008.

Attachment: Draft Alternative Fuels Infrastructure Study

Key Staff Contact: Brian Holland, (619) 699-6915, bho@sandag.org
ALTERNATIVE FUELS INFRASTRUCTURE STUDY

DRAFT

May 15, 2008
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.

**BOARD OF DIRECTORS**

**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.**

### CHAIR

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### FIRST VICE CHAIR

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As of May 9, 2008
# TABLE OF CONTENTS

1. **INTRODUCTION: PLANNING FOR ALTERNATIVE FUELS INFRASTRUCTURE** .......... 1

   **STUDY OVERVIEW** ............................................................................................................. 1

   **STATE ALTERNATIVE FUELS PLANNING** ........................................................................ 2

   - Assembly Bill 2076.................................................................................................................. 2
   - Climate Change Goals............................................................................................................. 2
   - Bioenergy Action Plan ............................................................................................................ 2
   - Low Carbon Fuel Standard .................................................................................................... 3
   - State Alternative Fuels Plan .................................................................................................. 3

2. **EXISTING FUELS, FLEETS, AND INFRASTRUCTURE IN THE SAN DIEGO REGION** ..... 4

   **ELECTRICITY** ...................................................................................................................... 4

   **ETHANOL** ........................................................................................................................... 4

   **BIODIESEL** ......................................................................................................................... 5

   **NATURAL GAS** .................................................................................................................... 5

   **HYDROGEN** ....................................................................................................................... 6

3. **SCENARIOS AND STRATEGIES FOR ALTERNATIVE FUELS ADOPTION** .............. 10

   **ELECTRICITY** .................................................................................................................... 10

   **ETHANOL** .......................................................................................................................... 13

   **BIODIESEL** ....................................................................................................................... 15

   **NATURAL GAS** .................................................................................................................... 18

   **HYDROGEN** ....................................................................................................................... 20

Appendix A: Existing Alternative Fuels Infrastructure Locations
LIST OF FIGURES

FIGURE 2-1: EXISTING ELECTRIC CHARGING STATIONS ................................................................. 7
FIGURE 2-2: EXISTING E85 AND BIODIESEL FUELING STATIONS .............................................. 8
FIGURE 2-3: EXISTING NATURAL GAS AND HYDROGEN FUELING STATIONS ................................. 9
FIGURE 3.1: POTENTIAL FUELING STATIONS - NORTH ................................................................. 23
FIGURE 3.2: POTENTIAL FUELING STATIONS - SOUTH ................................................................. 24
FIGURE 3.3: POTENTIAL ELECTRIFICATION .................................................................................. 25
FIGURE 3.4: POTENTIAL COMMERCIAL ETHANOL FUELING PUMPS ........................................ 26
FIGURE 3.5: PUBLIC AGENCY FLEETS NEAR FUELING FACILITIES ........................................... 27
FIGURE 3.6: POTENTIAL JOINT USE FACILITIES ........................................................................ 28
FIGURE 3.7: POTENTIAL FUELING FACILITIES AT POPULAR DESTINATIONS ............................ 29
FIGURE 3.8: POTENTIAL LNG FUELING STATIONS IN GOODS MOVEMENTS CORRIDORS ........ 30
Chapter 1

Introduction:
Planning for Alternative Fuels Infrastructure
1. INTRODUCTION: PLANNING FOR ALTERNATIVE FUELS INFRASTRUCTURE

The need for alternatives to petroleum-based transportation fuels has become more acute over the past several years. Climate change caused by greenhouse gas (GHG) emissions from fossil fuels is now a high-priority environmental issue, and alternative fuels are seen as a promising option for reducing those emissions. Concerns about energy security and oil supply constraints can also begin to be addressed by replacing part of the region’s gasoline consumption with alternative fuels. However, the rapid adoption of alternatives is constrained by a number of factors, including the limited availability of alternative fuel infrastructure such as fueling stations, processing facilities, and distribution facilities. State plans and programs are in place to address the shortfall, and regional agencies such as SANDAG can assist by contributing a regional planning perspective to these efforts.

STUDY OVERVIEW

The San Diego Association of Governments (SANDAG) generates regional goals for energy use and climate change mitigation, and alternative fuel infrastructure development is seen as a key step towards meeting those goals. This study examines alternative fuel infrastructure needs in the San Diego region and recommends areas where new infrastructure could be sited to best leverage geographical and financial opportunities. The analysis is focused on infrastructure to serve the needs of public agency fleets, including those of SANDAG member agencies and partners, rather than on commercial infrastructure to serve the general public.

The first objective of this study is to assess existing infrastructure and identify gaps where areas of the region are underserved. Another primary objective is to evaluate the current status of major alternative fuels and vehicles—in terms of technological maturity, cost, and other opportunities and barriers—and to analyze from a strategic perspective how these fuels will fit into the portfolio of options available to the region over the coming years. Because resources for infrastructure development are limited, it is critical that public agencies correctly identify the fuels, vehicles, and infrastructure that show the greatest opportunity for meeting policy goals cost-effectively and sustainably.

This study focuses on the following major fuel types that have the potential to displace some use of fossil fuels and reduce GHG emissions:

- Electricity
- Ethanol
- Biodiesel
The final study objective is to identify areas around the region that are well suited to development of infrastructure such as fueling stations. The study does not call out specific parcels for development, but instead identifies “opportunity zones” where several considerations converge to maximize the value of new infrastructure. Opportunity zones are based on a staff analysis of existing infrastructure and the expected outlook for various alternative fuels.

**STATE ALTERNATIVE FUELS PLANNING**

The State of California has identified alternative fuels as a priority for addressing climate change, localized air pollution, and energy security. This study is intended to translate state goals and plans to the regional level. This section summarizes state laws, regulations, and plans that call for greater adoption of alternative transportation fuels in California.

**Assembly Bill 2076**

Assembly Bill (AB) 2076 (Shelley) was signed into law in 2000, requiring California Energy Commission (CEC) and the California Air Resources Board (CARB) to develop and submit to the Legislature a strategy to reduce petroleum dependence in California. The joint agency report was adopted in 2003. The report recommends an increase in the use of alternative fuels to 20 percent of on-road transportation fuel use by 2020 and 30 percent by 2030.

**Climate Change Goals**

Governor Schwarzenegger signed Executive Order S-3-05 in 2005, establishing a goal of reducing GHG emissions to 80 percent below 1990 levels by 2050. In addition to this long-term goal, a 2020 emissions goal was established in AB 32, the Global Warming Solutions Act of 2006. AB 32 requires that statewide GHG emissions be reduced to 1990 levels by 2020 and charges CARB with developing and implementing regulations in pursuit of this goal.

**Bioenergy Action Plan**

Governor Schwarzenegger approved and released the Bioenergy Action Plan for California in July 2006. The plan offered specific biofuels adoption targets, as follows:

- 0.93 billion gasoline gallon equivalents (GGE) in 2010
- 1.6 billion GGE in 2020
- 2 billion GGE in 2050

In addition, the following goals were established for share of in-state biofuels production:
• 20 percent produced in-state in 2010
• 40 percent in 2020
• 75 percent in 2050

**Low Carbon Fuel Standard**

Development of a Low Carbon Fuel Standard (LCFS) was called for under Executive Order S-1-07 in January 2007. The standard requires fuel suppliers and distributors to reduce the carbon intensity (GHG emissions per unit of energy) by 10 percent by 2020. The standard utilizes a full fuel cycle analysis (“well to wheels”) for determining carbon intensity. In June 2007, CARB identified the LCFS as a “discrete early action measure” under AB 32, requiring that the regulation come into effect no later than January 1, 2010.

**State Alternative Fuels Plan**

The State Alternative Fuels Plan, called for under AB 1007 (Pavley), was adopted by the CEC in October 2007 and was incorporated into the CEC Integrated Energy Policy Report (IEPR) adopted in November 2007. The plan provided several scenarios for alternative fuels market penetration based on the predominance of different fuel types. It established alternative fuels targets, strategies, and actions to increase the use of alternative transportation fuels in a manner that minimizes costs to California and maximizes the economic benefits of in-state production. The 2007 IEPR recommends updating the State Alternative Fuels Plan every two years to correspond with regular biennial IEPR updates.

The State Alternative Fuels Plan included recommendations for metropolitan planning organizations to:

• Assist local and regional government fleets to purchase alternative fuel vehicles and use alternative fuels in a phased-in policy by 2012.
• Establish quantifiable goals to reduce petroleum dependence and curb GHG emissions and establish metrics to measure progress toward meeting these goals. Initiate specific ordinances, zoning requirements, and planning regulations to enforce these reductions.

The State Alternative Fuels Plan and other state transportation energy policies were used as guiding documents in preparation of this study. Several current SANDAG projects regionally address state transportation fuel recommendations, including development of a Regional Climate Action Plan and update of a regional energy plan, the Regional Energy Strategy. This alternative fuels infrastructure study also will serve as the basis of a toolkit for local governments on utilizing more alternative transportation fuels and vehicles.
Chapter 2

Existing Fuels, Fleets, and Infrastructure in the San Diego Region
2. EXISTING FUELS, FLEETS, AND INFRASTRUCTURE IN THE SAN DIEGO REGION

Alternative fuels are used in a wide variety of applications, from private passenger vehicles to publicly-operated vehicle fleets. Many fleets in the San Diego region operate wholly or partly on alternative fuels, and a limited number of fueling stations are distributed throughout the urbanized areas of the region. This section provides a comprehensive description of current alternative fuels use in the San Diego region, upon which the evaluation of infrastructure development opportunities is based.

ELECTRICITY

Most electricity used for regional transportation purposes is consumed by the San Diego Trolley, the light rail system operated by Metropolitan Transit System (MTS). The Trolley consumed approximately 28 million kilowatt hours (kWh) of electricity in 2006. This power is delivered through conventional electricity infrastructure including transmission and distribution lines to electrified overhead wires.

Two additional vehicle classes rely on electricity as fuel: neighborhood electric vehicles (NEV) and electric off-road vehicles like some construction equipment and airport ground support equipment. Currently, these vehicles are limited in number, but there is room for growth. University of California San Diego (UCSD) maintains a fleet of approximately 350 electric vehicles for facilities management and other operations.

As many as 20 regional facilities offer operational, publicly-accessible electric charging stations for light-duty passenger vehicles. Almost all are located at San Diego International Airport, UCSD, Scripps medical facilities, and Costco locations. However, because electric cars have not become a commonly available option for consumers as once envisioned, these stations do not receive much use.

Figure 2-1 illustrates the location of existing electric charging stations in the region.

ETHANOL

Ethanol is an alcohol-based fuel derived from organic feedstocks, including corn and sugar cane. There are no fleet-based E85 (85 percent ethanol—15 percent gasoline) fueling stations in the region, and public access to fueling stations is quite limited. Only the Pearson Fuels station on
El Cajon Boulevard currently offers E85. However, two new E85 pumps will soon be added in Carlsbad and Oceanside under a contract between Pearson Fuels and the CEC. Currently, between 7,000 and 14,000 gallons of E85 are sold monthly in the region, depending on the price differential between E85 and gasoline.

Despite the constrained availability of E85, many “flex-fuel” vehicles are found in the region, capable of running on either gasoline or E85. Flex-fuel vehicles are especially prevalent in fleets of American-made light-duty trucks and sport utility vehicles. E85 is not commonly used in heavy- or medium-duty fleet applications, due in part to the lower energy intensity of the fuel compared to biodiesel or natural gas.

Figure 2-2 illustrates the location of existing E85 and biodiesel fueling stations.

**BIODIESEL**

Biodiesel is a non-petroleum based diesel fuel derived from vegetable oils and animal fats. It is used on a limited basis in personal vehicles, and public fueling stations are located at Pearson Fuels in City Heights and at the Soco Group petroleum distribution facility in El Cajon. Biodiesel is a more common fuel for fleets in the region. The United States Navy and Marine Corps are two of the largest users of biodiesel in San Diego County. The fuel also is used in the City of Carlsbad fleet, in the diesel bus fleet at UCSD, and in Hornblower Cruises vessels that provide tours of the San Diego harbor and coast. UCSD imports approximately 10,000 gallons of biodiesel monthly from an Orange County distributor, while other fleets are served by Soco Group, which sells approximately 25,000 gallons monthly in the region.

Biodiesel is currently produced regionally by New Leaf Biofuels, which collects waste oil from local restaurants and processes it into pure biodiesel (B100). Current 2008 production stands at approximately 13,000 gallons per month. The company is currently developing a new processing facility, to be completed in summer 2008, with a maximum production capacity of 140,000 gallons per month. This fuel will be sold to petroleum distributors for blending into other biodiesel mixes, primarily B20 (20 percent biodiesel—80 percent diesel).

**NATURAL GAS**

Natural gas is used as a transportation fuel in two forms: compressed natural gas (CNG) and liquefied natural gas (LNG). In San Diego, CNG fuels a large proportion of transit buses and LNG fuels Waste Management refuse haulers. Total regional compressed natural gas (CNG) consumption in transportation applications in 2006 was approximately 10,100,000 therms, or 8,080,000 gasoline gallon equivalents. Consumption in 2008 is expected to approach 9 million GGE. A large portion of this fuel is consumed by buses operated by the region’s two transit agencies, MTS and North County Transit District (NCTD). Both agencies exclusively purchase CNG buses, with approximately 75 percent of the MTS fleet and approximately half of the NCTD fleet operated on natural gas. Other primary consumers of CNG for transportation purposes include the Poway, Vista, and San Marcos school districts, military facilities, and airport ground transportation fleets, such as taxis and shuttle buses.
Three public CNG fueling stations are found at San Diego Gas & Electric (SDG&E) service centers in Kearny Mesa, Miramar, and Carlsbad. CNG also is publicly available at the Chula Vista and Poway school district facilities and at two commercial fueling stations—Pearson Fuels in City Heights and a Clean Energy/Shell facility on Pacific Highway near San Diego International Airport. An additional CNG station is scheduled to open to the public at a NCTD facility in Oceanside in 2008.

An additional 1.2 million GGE of LNG was consumed by City of San Diego and Waste Management refuse hauler fleets in 2006.

Figure 2-3 illustrates the location of existing natural gas and hydrogen fueling stations in the region.

**HYDROGEN**

Hydrogen can be used as a transportation fuel in fuel-cell vehicles, which generate electricity from hydrogen. Hydrogen has gained traction as a mid to long term alternative transportation fuel option due to President Bush and Governor Schwarzenegger’s Hydrogen Highway programs. Much national energy funding has been dedicated to hydrogen technologies and research since 2000. However, the technology is still in the research phase, and no fuel-cell vehicles are operated in the region. One hydrogen fueling station is accessible to the public at the City of Chula Vista Corporation Yard. The station was installed when the City began leasing a fuel-cell vehicle from Honda in 2004. However, the station is not commonly used, due to an absence of fuel-cell vehicles on the road.
Figure 2-2: Biofuel Fueling Stations
April 2008

Station Types
- Biodiesel-Public
- Biodiesel-Private
- E85-Public
Figure 2-3: Natural Gas and Hydrogen Fuelling Stations

April 2008

Station Types
- CNG-Public
- CNG-Private
- LNG-Private
- Hydrogen-Public

0 3 6 9 Kilometers
0 7 Miles

SANDAG

UNITED STATES
MEXICO
Chapter 3

Scenarios and Strategies for Alternative Fuels Adoption
3. SCENARIOS AND STRATEGIES FOR ALTERNATIVE FUELS ADOPTION

Alternative fuels infrastructure development should proceed from an analysis of the outlook for various fuel and vehicle types. This section evaluates the short-term and long-term viability of alternative fuels and vehicle technologies and the sectors and fleet types that are most appropriate for each alternative. From that analysis, recommendations for a strategic approach are put forth, and optimal geographic locations for infrastructure are identified.

The focus of this study is on facilitating a fleet transition to alternative fuels. The locations of municipal, County, and transportation agency fleet yards where fueling stations could be installed are shown in Figures 3-1 and 3-2.

ELECTRICITY

Electricity is widely-regarded as a promising resource for powering transportation. Much of the infrastructure and technological knowledge necessary for a shift to electricity is already in place. Benefits are well-documented, and intensive efforts are underway to address current barriers to widespread use.

Vehicle Applications

Electricity can be used in light-duty passenger vehicles, neighborhood electric vehicles (NEVs), and off-road vehicles and equipment. A small start-up company, Tesla Motors, currently is producing an all-electric sports car with adequate horsepower and a range of 250 miles, demonstrating that traditional concerns about power and range can be resolved. General Motors is promoting its Chevy Volt, a plug-in hybrid electric vehicle (PHEV) that travels the first 60 miles of a trip on charged batteries and an additional 600 miles on a gasoline-powered electric generator. The Volt may be available to the public as soon as 2012. These projects are being made possible through advancements in lithium-ion battery technologies, which feature higher energy density and greater range than previous batteries.

In addition to light-duty passenger vehicles, other vehicle types are well-suited for operating on batteries that are charged when the vehicle is not in use. NEVs can be appropriate for personal use on local streets, as well as in fleets that return to base, serve small, concentrated areas, and make many stops and starts. For example, UCSD currently uses a large fleet of NEVs in its campus operations. Similarly, a variety of electric scooters are available for use on surface streets. Electricity also is suitable for off-road vehicles such as airport ground support equipment and forklifts.
Electricity is a valuable resource for public transit applications. Light rail systems such as the MTS Trolley are often powered by overhead wires, while many heavy rail systems such as commuter trains are powered by an electrified third rail. Buses can run on overhead electricity, as in the case of San Francisco’s MUNI local bus system. Electrification of rail and bus transit is an established and cost-competitive practice today. Advanced regenerative braking systems, in which kinetic energy harnessed in braking is stored and reused as electrical energy, are also emerging as a potential technology for buses, light rail, and heavy rail.

Finally, electricity is suitable for stationary applications, where vehicles are currently required to idle for long periods of time on internal combustion engines. For example, shore-based power, also known as cold ironing, is a practice in which sea-going vessels are connected to either grid-based or on-site-generated electricity while in port. Cold ironing allows for the shutdown of diesel auxiliary engines. The Port of San Diego identified cold ironing as a component of its Clean Air Program and is moving forward with developing a project.

Truck stop electrification is similar to cold ironing. Freight truck refrigeration units can be connected to electrical outlets while at rest stops or while queuing at goods movement hubs.

**Benefits and Opportunities**

Electricity presents many potential benefits for use as an alternative fuel, including:

- **Greenhouse Gas (GHG) Emissions.** PHEVs can reduce GHG emissions by approximately 50 percent.

- **Petroleum Independence.** Electric vehicles use no oil, while PHEVs can reduce consumption by 75 to 80 percent.

- **Existing Infrastructure/Smart Grid.** The transmission and distribution infrastructure is largely in place. SDG&E’s Smart Grid Initiative may further facilitate the introduction of electric vehicles by providing a tool to measure and monitor vehicle charge and to deliver electricity to the vehicle at the optimal time of day. The Smart Grid can aid the communication of electricity cost and savings for consumers.

- **Off-peak Generation.** Electricity consumption in the San Diego region follows a daily “load curve” in which consumption peaks in the morning and late afternoon. Generation facilities are under-utilized at night. A considerable number of electric vehicles could be recharged at night, thereby better distributing base-load across the day without creating need for new power plants.

---

1 All GHG and petroleum reduction estimates are from the California Energy Commission State Alternative Fuels Plan, CEC-600-2007-11-CTF, October 2007. The estimates were made on a life-cycle basis, evaluating all energy use and emissions from “well to wheel.”
• **Near-term Viability.** Some electricity applications are already economically viable and in use, including NEVs, transit vehicles, cold ironing, and truck stop electrification. Others, such as the PHEV, are projected to be available as early as 2012.

**Costs and Challenges**

Costs and challenges include:

• **Expensive Battery Technology.** Batteries that can deliver the range required for widespread electric vehicle adoption are currently under-developed and costly, though the expense is declining. When PHEVs are introduced, it is likely that their retail price will remain out of reach for some consumers.

• **Inadequate Range for Long-distance Travel.** PHEVs are an attractive option because they also can operate on gasoline, allowing for long-distance travel without a battery charge. Electric-only vehicles do not feature a gasoline backup and so are limited in range. Until widespread electric charging infrastructure is developed, electric-only vehicles will only be suitable for local uses.

**Recommendations**

Electricity is an attractive alternative fuel for a variety of applications. Its use can reduce GHG emissions and petroleum consumption in the near-term and electrical infrastructure is in place today. The following strategies are consistent with the State Alternative Fuels Plan and should be considered when siting electric charging stations and other infrastructure in the San Diego region:

• For on-road fleets, focus on NEVs. Potential locations for NEV fleet charging stations include university campuses and corporate campuses. NEVs for personal use could be charged at home.

• Promote off-road fleet use at industrial sites for forklifts and similar equipment.

• Promote off-road fleet use at regional airports.

• Examine locations for electrification where trucks idle for long periods of time, such as rest stops, border crossings, and other goods movement hubs. The Otay Mesa border crossing hub may be an attractive location for a stationary electrification facility. Currently, freight trucks wait in long queues to pick up and deliver goods at area warehouses. A facility could be developed at which trucks would queue in a lot where the cabs and refrigeration units could be connected to the grid.

• Evaluate the impact of PHEV penetration on demand for electricity generation, transmission, and distribution infrastructure, in particular distributed generation options.

• Encourage the development of home metering and charging infrastructure in new construction, particularly in urban areas where attached garages with electrical outlets are uncommon.
Monitor the development of electric-only vehicles and potential demand for public access charging stations.

Study the feasibility of electrifying the COASTER commuter rail and SPRINTER light rail systems, or incorporating regenerative braking technologies into the systems.

Figure 3-3 illustrates locations where some of these strategies could be implemented.

ETHANOL

Ethanol is a gasoline alternative that can be used today in passenger vehicles with modified internal combustion engines. The fuel can be produced using domestic corn feedstock, and federal goals call for a six-fold increase in ethanol use by 2022. In California, ethanol is approved for blending in gasoline to E10 (10 percent ethanol—90 percent gasoline) using existing infrastructure. Separate distribution and fueling infrastructure is required for higher blends such as E85 (85 percent ethanol—15 percent gasoline).

Vehicle Applications

“Flex-fuel” vehicles, which can burn either E85 or gasoline, are manufactured by all major American automakers. These vehicles are typically light-duty trucks or SUVs, though some sedans such as late-model Ford Crown Victorias and Chevy Impalas are flex-fuel capable as well. Many automakers plan to expand the availability of different flex-fuel models.

Presently, flex-fuel engines are only available in light-duty vehicles. E85 is not a viable substitute for diesel fuel and is not used in medium- or heavy-duty vehicles.

Benefits and Opportunities

Increasing E85 use in passenger vehicles is desirable in some respects, such as:

- **Petroleum Independence.** E85 produced from American corn consumes 70 to 75 percent less petroleum than California gasoline.

- **Existing Infrastructure for E10.** E10 can be distributed through existing distribution and fueling infrastructure.

- **Oxygenate Additive.** California gasoline contains oxygenate additives that reduce carbon monoxide emissions. Ethanol has replaced the problematic MTBE additive as an oxygenate in California gasoline.

- **Available Vehicles for E85.** Flex-fuel vehicles are available and some fleets may own flex-fuel vehicles, but E85 cannot be used in many existing fleets of conventional gasoline or diesel vehicles.
- **Technological Potential.** Current research is evaluating the potential to produce ethanol from woody biomass, such as agricultural and forestry waste. This “cellulosic” feedstock would result in lower energy consumption and GHG emissions than corn-based ethanol fuels.

**Costs and Challenges**

Costs and challenges include:

- **Net Energy.** Current processes for producing ethanol from corn consume almost as much energy as is produced by burning ethanol in a vehicle engine, resulting in a “energy return on energy invested” (EROEI) ratio of almost 1:1. Net energy for petroleum based transportation fuels has ranged from 30:1 to 200:1. Energy is consumed in planting and harvesting corn, transporting it to processing facilities, processing the corn feedstock, and transporting ethanol to market. In addition, the energy density of ethanol is lower than petroleum fuels, meaning that more fuel must be burned to obtain the same amount of power.

- **GHG Emissions.** Largely because of the energy expended in producing ethanol, the fuel as produced does not represent a significant reduction in GHG emissions. The State Alternative Fuels Plan describes a reduction of approximately 20 percent below California gasoline. However, this total does not take into account changes in land cover (loss of carbon-sequestering vegetation) that further diminish the climate change benefits of corn-based ethanol. Several studies have indicated that the full life-cycle emissions of corn-based ethanol are no less than those of gasoline.

- **Fuel Standards.** Fuel standards must be set to ensure fuel pumps offering E85 will provide a standard energy density.

- **Impact on Food Prices.** Over the past two years, the price of corn has risen dramatically due to increased demand for corn from ethanol refineries. This price increase has had indirect effects on the prices of other food crops, including wheat and rice, as cattle producers switch from expensive corn feed to other grains. Many government and non-governmental organizations have cited ethanol consumption as a primary cause in the ongoing global food crisis.

- **Environmental Considerations.** Corn feedstock for ethanol is produced through “industrial” agriculture methods, which have been demonstrated to contribute to soil erosion, water pollution, aquifer depletion, and desertification. Intensifying industrial corn production will likely exacerbate these environmental problems.

- **Scale Constraints.** It is unlikely that food crop-based ethanol can scale to sufficient levels to displace gasoline as a significant transportation fuel, as a result of the considerations described above.

- **Infrastructure Requirements.** An entirely new pipeline and fueling infrastructure would be required for large-scale ethanol utilization.
Federal Mandates. Corn-based ethanol is the predominant alternative fuel being promoted at the national level for near-term use. However, California is considering a wide range of feedstocks other than corn for ethanol production, specifically sugar cane and cellulosic feedstocks. California alternative fuel choices may differ from what will qualify for federal funding assistance in the future if corn remains the national primary feedstock of choice.

Recommendations

The outlook for significantly expanding corn-based ethanol use is not promising. Events that could improve the outlook for ethanol in general include a loosening of tariffs on Brazilian sugar cane-based ethanol—which has a lower cost, fewer GHG emissions, and less impact on food prices—and the commercialization of cellulosic ethanol. Until one of these developments occurs, the region should proceed slowly with developing ethanol fueling stations.

Nevertheless, operating and monitoring the experience of pilot stations such as those currently planned, or in use, could prove valuable if ethanol becomes a more attractive fuel in the future. Moreover, the State Alternative Fuels Plan calls for the installation of 2,000 ethanol pumps statewide by 2017, with the optimistic expectation that cellulosic ethanol will materialize as a competitive alternative in that timeframe.

The following strategies should be considered when siting ethanol fueling stations:

- Three ethanol pumps will be accessible to the public at the end of 2008, in San Diego, Carlsbad, and Oceanside. Fleets should determine whether their light-duty vehicles are flex-fuel capable, and utilize existing stations if feasible.

- If additional facilities are developed, consider regional distribution. No facilities are currently available or planned for South County.

- If additional commercial facilities are developed, consider partnerships with public agencies’ flex-fuel fleets, such as military, municipal public works, or Caltrans.

- Monitor the results of CEC full life-cycle GHG analysis of ethanol, which will include land cover change, and modify regional strategies accordingly.

Figure 3-4 shows high-volume roadways where new commercial ethanol fuel pumps may be suitable. Most fleet yards in the region’s urbanized areas are within one-mile of the highest-volume roadways, which could facilitate public-private partnerships in developing new infrastructure.

BIODIESEL

Like ethanol, biodiesel is touted as a petroleum replacement that can be produced either domestically or in other politically-stable regions globally. Common feedstocks include soybean oil, palm oil, and waste oils. In terms of the availability of vehicles, infrastructure, and fuel feedstocks, biodiesel is an attractive alternative to petroleum-based diesel in the near-term.
Vehicle Applications

Biodiesel blends can be used in most diesel engines with minor modifications and maintenance requirements. The fuel is not commonly used in light-duty passenger vehicles in California due to the limited availability of approved diesel engines in this class, though some German-made diesel vehicles are currently on the street. More significantly, a wide variety of medium- and heavy-duty vehicles can run on biodiesel immediately, including buses, refuse haulers, on- and off-road construction vehicles, delivery trucks, tractor-trailers, and smaller harbor boats and tug boats.

Benefits and Opportunities

Biodiesel can provide several benefits compared to petroleum-based fuels, including:

- **Petroleum Independence.** Like other biofuels, biodiesel can improve energy security by replacing petroleum fuels.

- **GHG Emissions Reduction.** Biodiesel can be derived from a variety of plant oils, and life-cycle GHG emissions depend on the feedstock utilized. In the case of waste oil feedstocks such as restaurant grease, biodiesel may reduce life-cycle emissions significantly, because the GHG emitted in growing, processing, and transporting the oil are partly associated with the food preparation end-use, while the biofuel processing- and combustion-related emissions are associated with the transportation end-use.

- **Existing Vehicles.** Most diesel engines are capable of running on biodiesel.

- **Existing Fueling Infrastructure.** Biodiesel can be used in existing diesel fuel pumps.

- **Reduced Waste Stream.** Utilizing waste oils as a feedstock reduces the economic and environmental costs of disposal.

- **Regional Economic Development.** New Leaf Biofuels currently collects waste oil and produces biodiesel in the San Diego region. This model may present ongoing economic development opportunities for the region.

Costs and Challenges

Costs and challenges associated with biodiesel include:

- **GHG Emissions.** The tailpipe GHG emissions of biodiesel are lower than those of gasoline. However, while waste oil feedstocks can reduce life-cycle emissions considerably, other “virgin” feedstocks such as soybean and palm oil are more problematic in this respect. Emissions associated with growing, processing, and transporting the feedstocks must be considered. In addition, increased Brazilian soybean production for biodiesel plays a role in deforestation in the Amazon region, the most important asset for carbon sequestration in the world. Palm oil plantations in Southeast Asia also play a role in deforestation and in the destruction of peat bogs, a process that releases tremendous quantities of greenhouse gases. Studies have indicated that this type of biodiesel results in only marginal improvements over gasoline emissions.
- **Perceived Technical Obstacles.** Biodiesel suffers from a problem of perception, after a number of technical problems plagued early adopters, particularly in using higher-blend fuels. These challenges are not insurmountable, but they will require education and information-sharing among fleet operators and fuel suppliers.

- **New Distribution Infrastructure.** Currently, biodiesel is transported by truck in Southern California. Pipeline distribution may be needed eventually to scale up biodiesel use.

**Recommendations**

The outlook for biodiesel is promising, but much depends on how it is produced. The region should be cautious in pursuing a model in which imported biodiesel from virgin plant sources is promoted as a broad-scale alternative to diesel fuel. At the same time, local production from recycled sources is a sustainable, profitable model that should be encouraged as an economic development opportunity. Excess local production capacity will exist from 2008 into the near future, and regional diesel fleets should consider utilizing B20 fuel immediately. This approach is consistent with recommendations of the State Alternative Fuels Plan. Specific recommended strategies include:

- Diesel fleets should consider utilizing existing biodiesel fueling facilities in El Cajon and City Heights. Figure 3-5 shows fleet yards within two miles of existing fueling stations.

- Public agency diesel fleets not near existing fueling stations should consider developing their own fueling facility, or joint-use facilities in partnership with other nearby fleets. Shared use may be particularly beneficial to small or dispersed fleets that cannot justify investing in infrastructure exclusively for their own use, such as County fleets or those of smaller municipalities. Examples of where the joint-use approach may be feasible include Chula Vista, National City, Kearny Mesa, Santee, Encinitas, and San Marcos, as illustrated in Figure 3-6.

- Consider developing fleet-oriented fueling stations at tourist destinations. Biodiesel is an appropriate fuel for school buses and tour buses. Often these fleets “return to base” after following their normal route, in which case fueling facilities could be installed at the fleet yard. However, these buses would benefit from being able to refuel when taking longer trips, such as field trips or extended tourist-oriented trips. Fueling facilities could be developed at popular field trip and tourist destinations such as the San Diego Zoo, Sea World, Old Town, and the Wild Animal Park, as illustrated in Figure 3-7.

- Monitor the supply of locally-produced biodiesel and encourage the development of new processing facilities as appropriate.

- Monitor the results of CEC full life-cycle GHG analysis of biodiesel, which will include land cover change, and modify regional strategies accordingly.
NATURAL GAS

Natural gas can be used as a transportation fuel in either CNG or LNG forms. In many respects, natural gas is preferable to petroleum-based fuels, and its use in the region is likely to expand over the coming years.

Vehicle Applications

Natural gas is used in engines and vehicles designed specifically for the fuel, rather than in gasoline or diesel engines. Only one natural gas light-duty passenger vehicle, the Honda Civic GX NGV, is currently for sale in California, and from all indications, automakers are focused more on developing hybrids, plug-in hybrids, and fuel-cell vehicles than on expanding the offering of natural gas passenger vehicles. However, natural gas engine retrofits are available for many light-duty vehicles, including the Ford Crown Victoria, the Lincoln Town Car, and a variety of passenger and cargo vans, all of which are commonly used in taxi and shuttle fleets.

Natural gas also is used in medium- and heavy-duty applications, and in this respect, the fuel is similar to biodiesel. Both natural gas and biodiesel can be used in buses, refuse haulers, and other heavy-duty diesel fleets, and fleet managers face a decision between these two viable fuels. Diesel fleets must be retrofitted with natural gas engines to utilize CNG, however, and even as this is considered, biodiesel can be viewed as an interim alternative.

LNG is predominately used in the region in refuse haulers, but in Southern California, it is increasingly used in tractor-trailers.

Benefits and Opportunities

Benefits and opportunities associated with natural gas fuels include:

- **GHG Emissions.** Natural gas transportation fuels produced domestically can reduce life-cycle GHG emissions by approximately 30 percent compared to California gasoline. Emissions can be reduced further by capturing biomethane from landfills, wastewater treatment plants, and livestock operations, and processing the gas into transportation-grade fuels.

- **Petroleum Independence.** Natural gas production processes consume very little petroleum. A large majority of the natural gas used in transportation fuels is extracted in the United States and is transported by pipeline, mitigating the need for petroleum inputs. Natural gas imported as LNG is anticipated to grow as an LNG facility becomes operational in Northern Baja Mexico and diesel fuel is consumed in shipping the fuel to that facility from overseas. Nevertheless, both processes represent a life-cycle reduction in petroleum use of over 95 percent.

- **Existing Distribution Infrastructure.** Natural gas pipelines already serve the region.

- **Available Natural Gas Vehicles.** Natural gas vehicles and engine retrofits are available, but the fuel cannot be used in existing diesel vehicles.
Costs and Challenges

Costs and challenges associated with natural gas fuels include:

- **Natural Gas Demand.** Demand for natural gas is increasing due to climate change considerations. It is the lowest-emitting fossil fuel choice for electricity generation and California requires that all fossil-fuel based power plants in the state run on natural gas. Widespread use of natural gas in transportation applications would increase demand further, potentially leading to higher electricity costs and more rapid depletion of domestic natural gas reserves.

- **LNG Dependence.** While natural gas production does not consume petroleum, many of the reasons for promoting petroleum independence also apply to natural gas. As demand for domestic natural gas increases, a larger share of domestic consumption will be met through imports. Starting in 2008, the San Diego region will receive natural gas from the only LNG regasification terminal on the West Coast. The economic, environmental, and national security issues associated with many oil-producing regions also are present in many natural gas-producing regions, partly because the two fossil fuels often are extracted from the same fields.

- **New Fueling Infrastructure.** A separate fueling infrastructure of compressors and pumps is required. Costly high-pressure “fast-fill” facilities are needed to serve any vehicles not in return-to-base fleets.

- **GHG Emissions.** While domestic natural gas and recycled biogas are an improvement over gasoline in terms of GHG, imported LNG represents less of an improvement.

Recommendations

Natural gas can contribute to energy security and climate change goals, particularly when sourced domestically. It should be considered for both light-duty and heavy-duty applications. In terms of cost and sustainability, biodiesel produced locally from waste oil is preferable to natural gas for medium-duty and heavy-duty vehicles. However, capacity to produce this type of biodiesel is limited, and natural gas is a suitable alternative to imported virgin biodiesel. Natural gas also is an attractive option for fleet managers who are averse to using biodiesel for technical reasons and for tractor trailers engaged in goods movement in the region. Specific recommendations include:

- If natural gas fueling infrastructure is developed to serve private fleet yards, companies should consider installing a fast-fill (high-pressure) pump for shared use with the public or other passenger vehicle fleets.

- Public agencies should consider replacing passenger vehicles and medium or heavy-duty diesel vehicles with natural gas vehicles if fleet yards are proximate to accessible existing fueling infrastructure. Figure 3-5 shows fleet yards within two miles of existing fueling stations.

- Public agencies committed to incorporating natural gas vehicles into their fleets should consider developing joint-use facilities in partnership with other nearby fleets. Shared use may be particularly beneficial to small or dispersed fleets that cannot justify investing in infrastructure
exclusively for their own use, such as County fleets or those of smaller municipalities. Examples of where the joint-use approach may be feasible include Chula Vista, National City, Kearny Mesa, Santee, Encinitas, and San Marcos, as illustrated in Figure 3-6.

- Consider developing fleet-oriented fueling stations at tourist destinations. Natural gas is an appropriate fuel for school buses and tour buses. Often, these fleets “return to base” after following their normal route, in which case fueling facilities could be installed at the fleet yard. However, these buses would benefit from being able to refuel when taking longer trips, such as field trips or extended tourist-oriented trips. Fueling facilities could be developed at popular field trip and tourist destinations such as the San Diego Zoo, Sea World, Old Town, and the Wild Animal Park, as illustrated in Figure 3-7.

- Develop LNG fueling stations in major goods movement corridors, as illustrated in Figure 3-8.

- Currently, not all biogas captured at regional landfills is reused for electricity generation. Monitor the need for a local refinery to process excess biogas captured from local facilities into transportation fuel-grade methane.

**HYDROGEN**

Hydrogen is widely-recognized as a desirable long-term alternative fuel. However, many barriers must be overcome to transition to a hydrogen future, and efforts will be required over the course of decades to make hydrogen a commonly-used transportation fuel.

**Vehicle Applications**

Hydrogen is used in fuel-cell vehicles to produce electricity for electric drive propulsion. Fuel cells generate electricity through electrochemical processes, as opposed to the conventional mechanical process of turning turbines. It is anticipated that many vehicle classes will be suitable for hydrogen fuel cells, and a variety of prototype fuel-cell vehicles currently are being road-tested under normal driving conditions, including passenger vehicles and transit buses. While no fuel-cell vehicles are operating in the San Diego region, Honda is offering a three-year lease of its FCX fuel-cell vehicles to a limited number of customers in the Los Angeles region, starting in summer 2008. Fuel cells also are being tested in transit bus fleets across the country, including Alameda County (AC) Transit in the Bay Area-East Bay. Buses are well-suited for current fuel-cell technologies due to their reduced weight and packaging requirements relative to passenger vehicles.

**Benefits and Opportunities**

Hydrogen offers many potential benefits and opportunities, including:

- **GHG Emissions.** Hydrogen produced from biomass feedstocks can reduce full fuel-cycle GHG emissions by more than 90 percent compared to California gasoline. The more GHG-intensive process of deriving hydrogen from natural gas represents a reduction of approximately 55 percent.
- **Petroleum Independence.** Virtually no petroleum is consumed in the hydrogen fuel-cell process.

- **Air Quality.** Water vapor is the only tailpipe emission associated with hydrogen fuel cells, resulting in a significant reduction in criteria pollutants and air toxics. Emissions from facilities that produce hydrogen are also relatively low, but more test data is needed to draw definitive conclusions about these stationary emissions.

### Costs and Challenges

Considerable challenges remain to commercializing hydrogen fuel-cell vehicles and developing the necessary infrastructure to serve them. These challenges include:

- **Vehicle Technology.** On-board hydrogen storage poses technical challenges that have yet to be solved. Advances must be made to reduce the pressure at which the gas is stored, to ensure that the fuel does not pose a safety hazard in an accidental impact, and to extend the range of vehicles between refuelings.

- **Cost.** By most estimates, the cost of the fuel-cell and hydrogen storage system must be reduced by at least one order of magnitude to approach commercial viability.

- **Production Infrastructure.** Hydrogen can be produced from water in an electrolyzer or from methane in a methane reformer. These facilities do not exist and would need to be developed on a broad scale.

- **Distribution Infrastructure.** Hydrogen could be produced on either a centralized or a decentralized basis. Unless hydrogen is produced at the point of use (i.e., the fueling station), a new distribution infrastructure will be required.

- **Fueling Infrastructure.** Hydrogen fueling infrastructure does not exist and would need to be developed on a broad scale.

### Recommendations

The challenges cited above will only be solved through considerable investment over the course of decades. The most optimistic scenarios for fuel-cell adoption in the State Alternative Fuels Plan foresee a transition to hydrogen beginning in the 2020 to 2025 timeframe, while other scenarios acknowledge that affordable fuel-cell vehicles and infrastructure may never materialize. Nevertheless, ongoing testing and demonstration of fuel-cell vehicles and hydrogen infrastructure is valuable, and the region can facilitate advances in these technologies through the following measures:

- Identify opportunities to charge battery electric vehicles (and plug-in hybrid electric vehicles as they become available) with electricity generated from stationary fuel cells that operate at buildings and serve building loads. This strategy could prove effective at corporate campuses, universities, and other locations identified in the electricity section of this document.
- Encourage operators of heavy-duty fleets to consider participating in a hydrogen fuel-cell demonstration project.

- Evaluate the feasibility of developing a demonstration methane reforming and fueling facility for light-duty passenger vehicles. The Los Angeles region is being targeted by both automakers and policymakers for an initial roll-out of fuel-cell passenger vehicles, starting in summer 2008. Installation of a fueling facility in the San Diego region would contribute to this initiative by allowing for an extended range. A demonstration fueling station would optimally be sited at an Interstate 5 interchange between San Diego and Oceanside.
Figure 3-2: Public Agency Fleet Yards - Central/South County
April 2008
- Cities
- County
- Caltrans
- SANDAG

0 2 4 6 Miles
0 2 4 6 Kilometers

SANDAG
Figure 3-4: OPPORTUNITY ZONES
High Traffic Volume Roads
(Average Daily Traffic Volume)
April 2008

- Yellow: Less than 50,000
- Orange: 50,001 - 100,000
- Brown: Over 100,000

Legend:
- 0 to 3 Miles: 0 to 5 Kilometers
- 3 to 6 Miles: 5 to 9 Kilometers
- 6 to 9 Miles: 9 Kilometers

Locations:
- Camp Pendleton
- Oceanside
- Encinitas
- Solana Beach
- Del Mar
- San Marcos
- Escondido
- Poway
- County of San Diego
- San Diego
- La Mesa
- Santee
- Lemon Grove
- Chula Vista
- Imperial Beach
- Tijuana
- United States
- Mexico

City:
- National City
- Vista
- Chula Vista
- Solana Beach
- Del Mar
- Encinitas
Figure 3-5: OPPORTUNITY ZONES Public Agency Fleets Near Existing Fueling Facilities
April 2008
- Public Agency Fleet
- Biodiesel
- CNG
- E85
- Hydrogen

0 3 6 9 Kilometers
0 7 Miles

SANDAG
Oceanside
Encinitas
Solana Beach
Del Mar
City of San Diego
SDUSD
County
City
Caltrans
SANDAG
City
San Marcos
Escondido
Poway
La Mesa
Santee
City
Citrus Cove
City
La Mesa
El Cajon
Lemon Grove
City
Vista
National City
City
Coronado
National City
City
Imperial Beach
Tijuana
Mexico
UNITED STATES

58
Figure 3-8: OPPORTUNITY ZONES Goods Movement Corridors
April 2008

Goods Movement Corridor

0 3 6 9 Kilometers
0 7 Miles

SANDAG
SUBCOMMITTEE UPDATE: LARGE-SCALE UTILITY-OWNED
PHOTOVOLTAIC PROGRAM File Number 3003000

On March 27, 2008, Southern California Edison filed a rate-setting application with CPUC (Proceeding A.08.03.015). The application proposed a ratepayer-funded photovoltaic (PV) program in which Edison would develop 250 MW of PV capacity in 1 to 2 MW projects on existing commercial and industrial rooftops. At the April EWG meeting, Laura Hunter (Environmental Health Coalition) suggested that the EWG draft a letter to the CPUC supporting the Edison application and requesting that the agency engage SDG&E in establishing a similar program.

Discussion of this question was the sole agenda item at the May EWG Subcommittee meeting. Presentations were delivered by Mike Evans (San Diego Chamber of Commerce) and Bill Powers (Sierra Club). The meeting ended before Mr. Powers completed his presentation. He is scheduled to deliver the remainder of the presentation at the June EWG Subcommittee meeting followed by closing comments by Mr. Evans.

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