

San Diego County Regional Airport Authority Air Quality Management Plan



FINAL DRAFT



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Acronym List

ACI-NA	Airports Council International—North America
ACRP	Air Cooperative Research Program
ADO	Airport District Office
AERC	Aviation Environment Research Center
AFV	Alternative Fuel Vehicle
AIP	Airport Improvement Program
ANOMS	Airport Noise and Operations Monitoring System
AOPA	Aircraft Owners and Pilots Association
APCD	Air Pollution Control District
APU	Auxiliary Power Unit
AQMP	Air Quality Management Plan
ASDi	Aircraft Situational Display
ASPM	Aviation System Performance Metrics
ASTM	American Society for Testing and Materials
ATA	Air Transport Association
AVI	Automatic Vehicle Identification
BTS	Bureau of Transportation Statistics
Caltrans	California Department of Transportation
CARB	California Air Resources Board
CEC	California Energy Commission
CH ₄	Methane
CNG	Compressed Natural Gas
CO	Carbon Monoxide
CO ₂	Carbon Dioxide
CO _{2,e}	CO2 Equivalents
CONRAC	Consolidated Rental Car Facility
DOE	Department of Energy
EA	Environmental Assessment
EDMS	Emissions and Dispersion Modeling System
EER	Energy Economy Ratio
EIR	Environmental Impact Report
EMFAC	Emission Factors model
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FDD	Facilities Development Department



FEIR	Final Environmental Impact Report
GAV	Ground Access Vehicle
GHG	Greenhouse Gas
GRI	Global Reporting Initiative
GSE	Ground Support Equipment
GWP	Global Warming Potential
HFCs	Hydrofluorocarbons
HOV	High-occupancy Vehicle
ICAT	Innovative Clean Air Technologies
IPCC	Intergovernmental Panel on Climate Change
ITC	Intermodal Transit Center
LCA	Life Cycle Analysis
LCFS	Low Carbon Fuel Standard
LEED	Leadership in Energy and Environmental Design
LFG	Landfill Gas
LTO	Landing/Take-off Cycle
MOU	Memorandum of Understanding
MT	Metric Ton
MTS	Metropolitan Transit System
MW	Megawatt
N ₂ O	Nitrous Oxides
NAAQS	National Ambient Air Quality Standards
NCDC	National Climate Data Center
NO _x	Nitrous Oxides
NTC	Naval Training Center
O ₃	Ozone
OPSNET	Operations Network
OVT	Office of Vehicle Technologies
Pb	Lead
PCA	Preconditioned Air
PFC	Passenger Facility Charge
PFCs	Perfluorocarbons
PHEV	Plug-in Hybrid Electric Vehicles
PM	Particulate Matter
PM _{10/2.5}	Particulate Matter of 10 and 2.5 Microns
RON	Remain Overnight
SAGE	System for Assessing Global Emissions



SAN/SDIA	San Diego International Airport
SANDAG	San Diego Association of Governments
SDAPCD	San Diego Air Pollution Control District
SDCRAA	San Diego County Regional Airport Authority
SF ₆	Sulfur Hexafluoride
SIP	State Implementation Plan
SO ₂	Sulfur Dioxide
SO _x	Sulfur Oxides
TAF	Terminal Area Forecasts
TDP	Terminal Development Plan
TRB	Transportation Research Board
ULSD	Ultra-low Sulfur Diesel
USGBC	US Green Build Council
USO	United Services Organization
VALE	Voluntary Airport Low Emission
VMT	Vehicle Miles Traveled
VOCs	Volatile Organic Compounds
WARM	Waste Reduction Model
WCI	Western Climate Initiative
WRI	World Resources Institute



Section 1—Purpose, Background, and AQMP Guiding Principles

I. Introduction and Purpose

The San Diego County Regional Airport Authority (Airport Authority) has voluntarily embarked on preparing an Air Quality Management Plan (AQMP) for San Diego International Airport (SAN) (see Figure 1). The objectives of the AQMP are to:

The Air Quality Management Plan is a voluntary action.

1. Quantify both “criteria” pollutant¹ and greenhouse gas (GHG)² emissions from airport-related sources³ under “baseline” (i.e., 2010) conditions;
2. Identify emissions reduction opportunities and funding sources that the Airport Authority, airport tenants and stakeholders can implement and use;
3. Address the requirements of the Memorandum of Understanding (MOU) with the Attorney General of the State of California; and
4. Support the Airport Authority’s on-going Environmental Sustainability Program.

Figure 1: Aerial Photograph of San Diego International Airport



¹ The criteria pollutants comprise the U.S. EPA criteria pollutants and/or their precursors and include: carbon monoxide (CO), lead, nitrogen oxides (NO_x), particulate matter (PM), sulfur oxides (SO_x), and volatile organic compounds (VOCs).

² Greenhouse gases are those that trap heat in the earth’s atmosphere. Both naturally occurring and anthropogenic (man-made) greenhouse gases include water vapor (H₂O), carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), and ozone (O₃).

³ These emission sources include aircraft operations; ground support equipment (GSE); auxiliary power units (APUs); ground access vehicles (GAV) including passenger vehicles, taxis and limos, rental cars, shuttle vans and buses); stationary sources; fuel facilities; and electrical consumption.



As part of the AQMP five separate reports were completed that directly addressed specific portions of the plan. These reports, which are included as appendices, are detailed in Table 1.

Table 1: Air Quality Management Plan Reports

Report Name	Report Content
Criteria Pollutant and Greenhouse Gases Baseline Emissions Inventory (see Appendix A)	Report describes the technical approach, methodology, and data sources as well as estimates the emissions associated with operations at SAN.
Analysis of Potential Air Emission Reduction Measures (see Appendix B)	Report addressed identifying emission reduction opportunities at the airport. The report focused on sources that can be reduced through the construction of infrastructure, development of incentive programs, and planning activities by the Airport Authority.
Analysis of Ground-Based Aircraft Movement Greenhouse Gases (see Appendix C)	Report was prepared to directly address <i>Specific Measure 1f. (Aircraft Movements)</i> which calls for a goal of 20 percent reduction of 2010 (i.e., baseline) GHG emissions attributable to aircraft engine on-the-ground movements by 2015.
Addressing the Memorandum of Understanding (see Appendix D)	Report was prepared to directly address each of the specific measures outlined in the Memorandum of Understanding.
Shuttle Incentive Program (see Appendix E)	The report was prepared to directly address <i>Specific Measure 2b.</i> of the MOU in developing an incentive program to convert shuttles that operate at the airport to alternative fuels.

The Draft Final AQMP report has been prepared to summarize the finding of those reports listed above and will address the following in each section:

- Section 1—provides background information on the AQMP
- Section 2—summarizes existing air quality conditions at SAN
- Section 3—discusses emission reduction opportunities associated with aircraft movements at SAN
- Section 4—discusses emission reduction opportunities associated with airport operations
- Section 5—addresses the Memorandum of Understanding
- Section 6—provides future recommendations on AQMP implementation
- Section 7—discusses coordination efforts



The AQMP is a living document that will be continually modified as the Airport Authority implements emission reduction opportunities, new technologies become available, and regulatory requirements are promulgated. In its first draft, this document focuses on addressing the requirements of the 2008 Memorandum of Understanding with the Attorney General of the State of California (herein referred to as the MOU).

II. Attorney General's Office Memorandum of Understanding

A Memorandum of Understanding has been agreed to with the Attorney General of the State of California to address the reduction of energy use and greenhouse gas emissions at SAN. The MOU can be found in Appendix G. The MOU outlines specific measures that the Airport Authority has committed to implement to limit the greenhouse gas emissions associated with the airport. The MOU specific measures are listed in Table 2.

Table 2: Memorandum of Understanding Specific Measures

Specific Measure	Requirements
Reduction in aircraft on-the-ground energy usage	Provide landside power and preconditioned air (PCA) at all new and upgraded gates. Provide landside power at all new and upgraded cargo facilities and hangers. Prepare GHG emissions inventory attributed to movement of aircraft (on ground) at airport. Set GHG emission reduction goals and implement GHG emissions reduction plan pursuant to AB 32 requirements.
Reduction of landside energy usage	Replace all existing ground support equipment (GSE) with electric or alternative fuel powered equipment. Replace all existing shuttle vehicles with electric or alternative fuel powered vehicles through incentive-based programs or impose replacement requirements on operators. Make good faith to assist operators in obtaining grant funding for equipment replacement.
Use of green materials and sustainable design	Incorporate use of cool roofs or solar panels on all new buildings and construct cool pavements for all new or rebuilt paved areas. Construct all new facilities to meet LEED⁴ certification of silver or better.

⁴ Leadership in Energy and Environmental Design (LEED) Green Building Rating System, was developed by the U.S. Green Building Council to rate environmentally sustainable development. Four ratings are given to projects based on the number of points achieved, with the lowest (certified) and the highest (platinum).



Use of green construction methods and equipment	Require contractors to use construction equipment that runs on alternative fuels or employs Air Board-certified particle traps.
Coordination and encouragement of tenants to address GHG	Expand existing recycling programs to include all tenants, businesses, and concessions operating at the airport. Encourage existing general aviation operator to offer sale of unleaded Avgas for planes; require all new operators to offer unleaded Avgas. In implementing sustainability policy, work with all tenants, businesses and concessions operating at the airport to reduce their carbon footprint.

Source: C&S Companies, October 2009.

However, if it is found that the measure violates federal law, disrupts operations at the airport, compromises the safety of air travelers, or does not result in a meaningful net reduction in GHG emissions, the Airport Authority “shall notify the attorney general and both parties” shall confer in good faith. Section 4—Addressing the MOU, identifies each MOU specific measure and provides the recommended approach and obstacles to implementation for each of them.

III. Airport Authority Environmental Initiatives

In addition to the AQMP and its commitment to implement the MOU specific measures, the Airport Authority currently has additional environmental initiatives planned or in place at SAN, following the guiding principles and policies explained below.

A. Airports Council International North America (ACI-NA) Sustainability Initiative



The San Diego County Regional Airport Authority is member of the Airports Council International North America (ACI-NA) a trade group that advocates policies and provides services that strengthen the ability of commercial airports to serve their passengers, customers, and communities. In February 2009, the ACI-NA board of directors adopted a series of environmental goals and encouraged its member airports to move toward those goals. As part of the AQMP the Airport Authority has begun exploring ways to meet these goals, which include the following air quality goals:

1. **Low Emission Airport Vehicles and Ground Support Equipment:** ACI-NA member airports will strive to convert airport-owned and operated ground vehicles and ground support equipment (GSE) to low-emission vehicles with an industry-wide average goal of 50% of vehicle conversion by 2019.



2. **Low Emission Access Vehicles:** By 2010, every ACI-NA member airport will strive to implement an incentive program to encourage taxi, shuttle, limo, and rental car companies to use low emission vehicles.
3. **Low Emission Vehicle Infrastructure:** Half of ACI-NA member airports will strive to provide low emission vehicle support infrastructure by 2019.
4. **Energy Conservation:** By 2014, every ACI-NA member airport will strive to implement an energy conservation program that includes adoption of an airport-specific goal to reduce non-renewable energy consumption.
5. **Loading Bridges Equipped with Pre-conditioned Air and Power:** Every ACI-NA member airports will strive to have at least 25% of their loading bridges equipped with PCA and 400 hertz (Hz) electrification by 2019.
6. **Reduced Fee and/or Parking Incentives for Low Emission Passenger Vehicles:** Half of ACI-NA member airports will strive to provide incentives and/or reduced fee parking for low emission passenger vehicles by 2011.
7. **Greenhouse Gas Emissions Inventories:** Half of ACI-NA member airports will strive to conduct greenhouse gas emissions inventories by 2015.

The Airport Authority is also represented on the ACI-NA Airport Sustainability Integration Steering Team, a committee that identifies, implements, and educates in furthering sustainable development and operations at airports.

B. San Diego County Regional Airport Authority Sustainability Policy

In support of its active role in setting a sustainability agenda for airports nationwide, the Airport Authority has authored its own sustainability policy statement with the overarching goal of “[operating] San Diego’s air transportation gateways in a manner that pro-

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motes the region’s prosperity and protects its quality of life.” The framework of the policy is based upon four key elements: economic viability, operational excellence, natural resource conservation and social responsibility. Based on this framework, the Airport Authority has committed to a number of measures including striving for environmental compliance and pollution prevention; fostering sustainability partnerships in the area; conducting life cycle cost and environmental analyses to inform decision making; considering Leadership in Energy and Environmental Design (LEED) criteria in tenancy renewals and requiring all tenants to contractually agree to the sustainability policy. According to the US Green Build Council (USGBC), “The LEED Green Building

Rating System is the nationally accepted benchmark for the design, construction, and operation of high performance green buildings.”



In addition to its internal sustainability goals, as well as those through ACI-NA, the Airport Authority is a member of the Global Reporting Initiative (GRI). The GRI is a network-based organization that provides the world's most widely-used sustainability reporting framework.

C. Other Environmental Initiatives

Other air quality or energy-related initiatives that are also in place at SAN include the following:

1. The SAN-based airlines' history and ongoing commitment to use landside power and PCA and the conversion to alternative fueled GSE which have reduced greenhouse gas emissions by approximately 4,100 and 1,000 metric tons, respectively.
2. Approximately 30 percent of the Airport Authority fleet vehicles and over 50 percent of the Red/Blue Shuttle buses are fueled by alternative fuels, as of 2009.
3. As part of the Airport Authority's "The Green Build Program" the Terminal 2 West expansion will achieve LEED Silver certification.
4. The Airport Authority's award-winning waste recycling program that diverts a large percentage of airport recyclable wastes from county landfills. Moreover, the airport provides foreign object debris receptacles on the airside to prevent large waste materials from entering storm-water catchments or other sensitive areas. (Winners of the City of San Diego Waste Recycling award in 2007, 2008, and 2009.)
5. Finally, the Airport Authority just completed remediation of a closed municipal solid waste disposal facility located at SAN, which includes excavation and proper disposal of all stored waste, replacement with clean soils, and implementing a community health and safety plan intended to safeguard surrounding communities.



IV. State and Regional Environmental Initiatives

The development of the AQMP has also been influenced by both state and regional initiatives that have been created to reduce GHG emissions. Those initiatives are summarized below.

A. California Assembly Bill 32

In September 2006, Governor Schwarzenegger and the California Legislature signed AB32, the California Global Warming Solutions Act. Most importantly; this law set a greenhouse gas emissions reduction goal into law—requiring a cap on emissions, such that emissions in 2020 do not exceed 1990 levels. It directed the California Air Resources Board (CARB) to develop early actions to reduce



greenhouse gases while also preparing a scoping plan to identify how best to reach the 2020 limit. This scoping plan was approved in 2008.

AB32 required that by January 2008, CARB was to establish a mandatory emissions reporting rule for significant emissions. Emissions reporting is to be facility-specific for specific business activities; relative to an airport, reporting is required if the airport generates electricity greater than 1 megawatt (MW) or 2,500 tons of carbon dioxide equivalents (CO₂e) or if the airport's stationary sources emit more than 25,000 tons CO₂e per year. The first reports were due June 1, 2009 for emissions occurring in 2008 and reports are made directly to CARB. Currently, stationary sources owned and operated by the Airport Authority do not meet the criteria for the mandatory reporting rule.

B. Western Climate Initiative

On February 26, 2007, the Western Regional Climate Action Initiative (known as the Western Climate Initiative or WCI) was signed by the governors of Washington, Oregon, Arizona, New Mexico, and California. Since then, Montana and Utah have joined as well as the Canadian provinces of British Columbia, Manitoba, Ontario, and Quebec. In addition to the 11 WCI partners there are 13 WCI observers, including Alaska, Colorado, Idaho, Kansas, Nevada, Wyoming, and six Mexican states and one additional Canadian province.

This agreement represents the collaborative commitment of these states (WCI partners or observers) to identify, evaluate, and implement ways of reducing greenhouse gas emissions through a regional, market-based approach. The goal is to reduce greenhouse gas emissions 15 percent below 2005 levels by 2020. The WCI protocols include the six GHG Kyoto pollutants: carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆).

The WCI rules govern 32 different source activities. Those most applicable to an airport operator would include: general stationary fuel combustion, nonroad equipment at facilities, cogeneration, electricity generation, and any supplier that distributes transportation fuels in quantities that when combusted, would emit 10,000 metric tons CO₂e per year or more in any calendar year starting in 2010.⁵ Under the WCI, entities with emissions greater than 10,000 metric tons are required to report their emissions, and those with emissions greater than 25,000 tons are subject to a regional cap and trade program.

⁵ Final, Essential Requirements of Mandatory Reporting, WCI, July 15, 2009. <http://www.westernclimate-initiative.org/component/remository/func-startdown/118/>



V. California Coastal Commission

On August 14, 2009 the California Coastal Commission approved Coastal Development Permit No. 6-09-015 (see Appendix H) for the expansion of Terminal 2 West and associated projects. As part of the issuance of the permit, the Airport Authority has agreed to the following conditions regarding greenhouse gas emission reductions:

1. Submit Greenhouse Gas Emission Reduction Plan prior to commencement of construction that quantifies the type and amounts of Scope 1, 2 and 3 GHG emissions associated with planned development. Emission goals will be consistent with the MOU, AB-32, the Western Climate Initiative, and Coastal Act.
2. Submit construction-related GHG emissions report within 60 days of completing construction that calculates net construction-related GHG emissions resulting from the project and measures implemented to reduce net emissions to less than 7,000 metric tons per year.
3. Submit operation-related GHG emissions report no later than June 30th of each year that calculates GHG emissions associated with project operations and measures implemented to reduce net emissions to less than 7,000 metric tons per year.



Section 2—Baseline Emissions Inventory

Per the requirements of the MOU with the Attorney General of the State of California, the baseline emissions inventory represents expected conditions during calendar year 2010. The following sections identify: the overall approach to the inventory; sources of emissions; and the criteria and greenhouse gas emissions inventory. The report, *Criteria Pollutant & Greenhouse Gases Baseline Emissions Inventory*, dated October 20, 2009 is provided in Appendix A of the AQMP.

I. Overall Approach

The baseline emissions inventory for SAN was prepared following four fundamentals:

1. It is representative of emission sources and conditions that are characteristic of the airport.
2. It uses the most up-to-date information and data currently available.
3. It is consistent with the most appropriate guidelines for quantifying airport related emissions.
4. It aids the Airport Authority with its development of the AQMP.

The emissions inventory includes both the criteria pollutants (and their precursors) as well as greenhouse gases associated with the development and operation of the airport. For the purposes of this assessment, the year 2010 represents the baseline conditions.

Much of the information and data used to prepare the emissions inventory was obtained from Airport Authority records, Federal Aviation Administration (FAA) and other databases and/or derived from the SAN master plan Environmental Impact Report (EIR). This information includes aircraft operational and fleet mix data, GSE data, auxiliary power units (APU), motor vehicle traffic, and stationary source information. In some cases, the operational data (for 2008) was adjusted through extrapolation to 2010 conditions, based on forecasted operations

For the criteria pollutants, the analysis was accomplished following guidelines for preparing airport-related emissions inventories issued by the FAA such as the *Airport Air Quality Assessment Guidelines*. In the case of GHG's, the emissions inventory followed recommendations recently issued by the Transportation Research Board (TRB) Airport Cooperative Research Program (ACRP); specifically, the *Guidebook on Preparing Airport Greenhouse Gas Emission Inventories (ACRP Report 11)*. The modeling of the majority of sources was accomplished using the latest version of the FAA's Emissions and Dispersion Modeling System (EDMS 5.1) and other federal and California-approved models.



II. Sources of Emissions

In general, the primary sources of emissions associated with activity at SAN are typical of most commercial airports of its size and function. The primary emission sources include aircraft; GSE, airport fleet vehicles, and APUs; a small assortment of stationary sources; and motor vehicles operating on the internal roadways, parking facilities, and off-airport roadways. Additionally, emissions associated with the consumption of electricity at the airport (but generated elsewhere by burning coal, oil, and natural gas) are also included in the greenhouse gas inventory.

The primary emission sources include aircraft; GSE, airport fleet vehicles, and APUs; a small assortment of stationary sources; and motor vehicles operating on the internal roadways, parking facilities, and off-airport roadways.

For the most part, the emissions from these sources arise from the combustion of fossil fuels (e.g., jet fuel, avgas, diesel, gasoline, natural gas, etc.) and are by-products contained in the engine exhausts and constitute the majority of those included in the baseline emissions inventory for SAN.

Greenhouse gas emissions from recycling of solid wastes associated with SAN are also included.

Construction activities also represent sources of air emissions at SAN but they are short-term and intermittent; nevertheless, construction emissions are included.

III. Emissions Inventory Results

Because the criteria pollutant portion of the baseline emissions inventory for SAN varies somewhat in the way it was computed relative to the greenhouse gas inventory, and the categories/groupings for how emissions are reported differ, the results are also reported separately.

A. Criteria Pollutant Emissions

The results of the SAN criteria pollutant emissions inventory are summarized in Table 3. Following standard convention for reporting airport-related emissions inventories, the results are expressed in units of short tons per year (tpy) for each pollutant and emission source.



Table 3: 2010 Criteria Pollutant Emissions Inventory (short tons/year)

Source	Pollutant					
	CO	VOC	NO _x	SO _x	PM ₁₀	PM _{2.5}
Aircraft	760.0	134.0	813.0	86.9	12.1	12.1
Ground Support Equipment	117.0	7.3	44.4	0.0	1.1	1.0
Auxiliary Power Units	24.2	1.9	22.8	3.2	3.0	3.0
Motor Vehicles						
Parking Facilities	20.6	1.4	2.1	0.0	0.4	0.3
On-Airport Roadways	21.4	0.8	2.4	0.0	0.3	0.2
Off-Airport Roadways	221.0	8.8	55.4	0.3	3.6	2.3
Stationary Sources	3.8	6.5	12.4	4.0	0.6	0.6
Construction Activities	19.6	4.7	36.6	0.0	12.3	7.7
Totals	1,187.6	165.4	989.1	94.5	33.3	27.2

Source: KB Environmental Sciences, Inc. 2009.

Notes:

- Tons = short ton = 2,000 lbs.
- CO—carbon monoxide, NO_x—nitrogen oxides, VOC—volatile organic compounds, SO_x—sulfur oxides, PM_{10/2.5}—particulate matter equal to, or less than, 10 and 2.5 microns in diameter, respectively.
- Within the Landing/Take-off (LTO) cycle.
- Airport-related motor vehicles on the off-airport roadway network and on-airport parking facilities.
- Stationary Sources include fuel facilities, steam boilers and emergency generators.
- Lead emissions from avgas usage within the LTO cycle amount to 22.4 pounds per year.

B. Greenhouse Gas Emissions

The results of the greenhouse gas emissions inventory are expressed in units of metric tons per year for each emission source (e.g., aircraft, GSE, etc.). In accordance with the Airport Cooperative Research Program Report 11, the emissions are further subdivided by category referred to as Category 1 (sources owned or controlled by the airport operator), Category 2 (sources owned or controlled by an airport tenant), and Category 3 (sources owned or controlled by the public accessing the airport).

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The World Resource Institute (WRI) inventory boundaries, Scope 1, Scope 2, and Scope 3 designations are also given. For greenhouse gases that are not carbon dioxide, those pollutant results have been converted to CO₂e values using the Global Warming Potential values. Table 4 provides the baseline greenhouse gas emissions inventory results for SAN.



Table 4: 2010 GHG Emissions Inventory (metric tons/year)

Emission Source	WRI Scope	CO ₂ e	Percent of Category	Percent of Total
Category 1: Airport Owned/Controlled				
Purchased Electricity	2	14,055	59.8	0.87
Stationary Sources				
- Central Plant	1	1,443	6.14	0.09
- Emergency Generators	1	139	0.59	0.01
Ground Service Vehicles	1	423	1.80	0.03
Ground Access Vehicles—On-airport Roadways				
- Employee Auto/Trucks	3	23	0.10	0.00
- Public Auto/Trucks	3	1,771	7.54	0.11
- Taxis/Limos	3	700	2.98	0.04
- Vans/Shuttles/Buses	3	3,521	15.0	0.22
Ground Access Vehicles—Parking Facilities	3	525	2.24	0.03
Ground Access Vehicles—Off-airport Roadways				
- Employee Auto/Trucks	3	819	3.49	0.05
- Vans/Shuttles/Buses	3	79	0.34	0.00
Subtotal-Airport Owned/Controlled		23,498	100	1.45
Category 2: Airline, Aircraft Operator, or Tenant Owned/Controlled				
Aircraft				
- Ground	3	79,133	5.29	4.88
- Ground to 3,000 feet	3	121,439	8.12	7.49
- Above 3,000 feet	3	1,269,066	84.8	78.3
Aircraft Total		1,469,638	98.2	90.6
Aircraft Engine Startup	3	1,267	0.08	0.08
Auxiliary Power Units	3	8,965	0.60	0.55
Ground Support Equipment	3	3,725	0.25	0.23
Ground Access Vehicles—On-airport Roadways				
- Employee Auto/Trucks	3	310	0.02	0.02
- Vans/Shuttles/Buses	3	212	0.01	0.01
Ground Access Vehicles—Off-airport Roadways				
- Employee Auto/Trucks	3	11,266	0.75	0.69
- Vans/Shuttles/Buses	3	1,083	0.07	0.07
Subtotal-Tenant Owned/Controlled		1,496,465	100	92.3



Category 3: Public Owned/Controlled				
Ground Access Vehicles—Off-airport Roadways				
- Public Auto/Trucks	3	65,949	66.8	4.07
- Taxis/Limos	3	10,087	10.2	0.62
- Vans/Shuttles/Buses	3	22,658	23.0	1.40
Subtotal-Public Owned/Controlled		98,695	100	6.09
Construction Activities		3,558		0.22
Waste Management		(837)		-0.05
Grand Total		1,621,378	100	100

Source: KB Environmental Sciences, Inc. 2009.

Notes: Metric Tons = 1.1 short tons = 2,200 lbs. CO₂e = carbon dioxide equivalents.

As shown, aircraft represent the largest source of greenhouse gas emissions associated with SAN comprising over 90 percent (1,469,638 metric tons) of the estimated total (1,621,378 metric tons). The Airport Authority owned or controlled emission sources comprise only 1.5 percent (23,498 metric tons) of the estimated total, while tenant-owned and controlled and public emission sources comprise 92.4 and 6.1 percent of the estimated total, respectively.



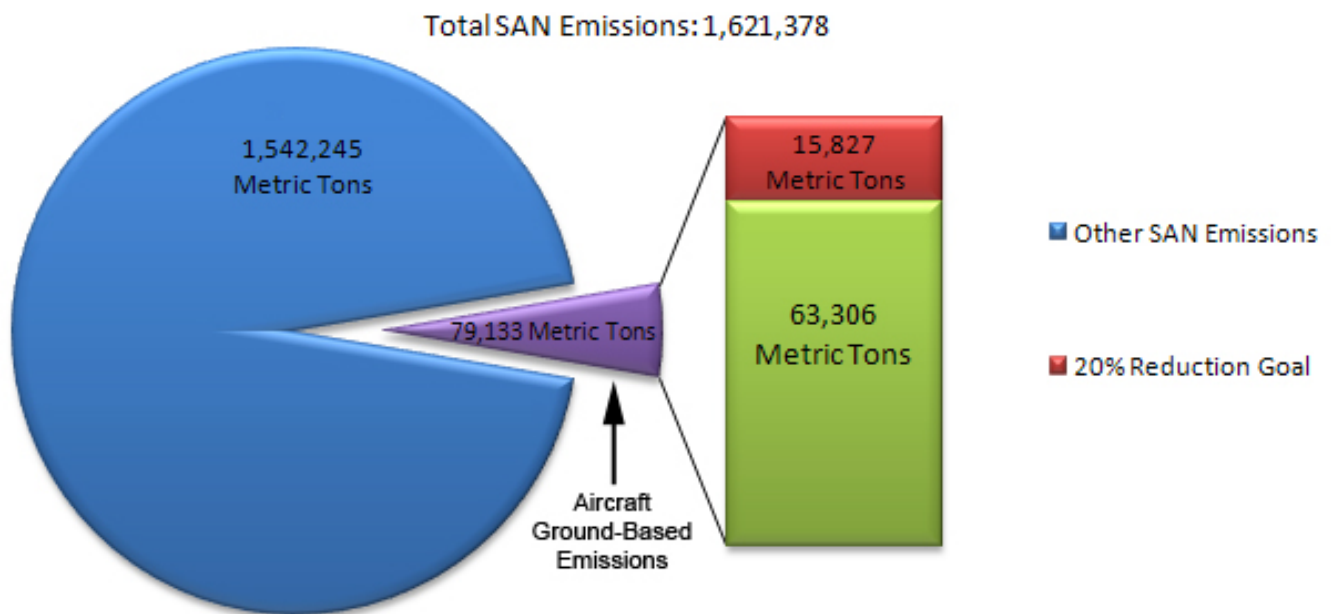
Section 3—Aircraft Movement Measures

MOU Specific Measure 1f (Aircraft Movements) calls out a goal and timeframe for a 20 percent reduction of 2010 (i.e., Baseline) greenhouse gas emissions attributable to aircraft engine on-the-ground movements by 2015. The outcome of the 2010 baseline emissions inventory (see Appendix A) for SAN reveals that on-the-ground aircraft movements represent 79,133 metric tons of GHG. From this, the MOU goal to reduce these emissions by 20 percent corresponds to reducing these emissions by 15,827 metric tons (as follows):

79,133 metric tons (Aircraft On-the-Ground Emissions) $\times$ 0.20 = 15,827 metric tons (Reduction Goal)

For ease of comprehension, Figure 2 illustrates these findings.

Figure 2: Airport Total and Aircraft Ground Movement GHG Emissions



Source: KB Environmental Sciences Inc., October, 2009.

Eighteen (18) potential emission reduction measures were identified that have been undertaken or are presently being considered by other airports, airlines or regulators to reduce aircraft engine fuel burn. These measures were assessed considering technical, economic, environmental, and safety factors associated with implementation at the San



Diego International Airport. Based on the assessment, four are considered to have “good” potential at SAN. These include the following:

- **Airfield and Terminal Area Improvements**—Resolves “bottle-necks” and other airfield conflicts or delays with added runways, taxiways, turn-outs, etc. The SAN Airport Master Plan contains recommended improvements to airfield and terminal areas. By way of example, airfield and terminal area improvements that would reduce the average aircraft taxi-in, taxi-out, and/or delay times would result in the following reductions in ground-based greenhouse gas emissions:

- 15-seconds = 1,125 metric tons CO₂e
- 30-seconds = 2,250 metric tons CO₂e
- 1-minute = 4,500 metric tons CO₂e

These reductions in ground-based aircraft emissions represent approximately 7 to 28 percent of the 15,827 metric ton goal set by the MOU.

- **Gate-hold Procedures**—Would involve controlling the time and frequency of aircraft departures thus avoiding or minimizing delays during taxi-out. Subject to FAA air and ground traffic control at SAN, reductions in aircraft engine emissions associated with this measure could be similar to those associated with Airfield and Terminal Area Improvements, described above. In other words, a 1 minute delay in engine start-up at the gate that would correspond to a similar reduction in taxi time resulting in a 4,500 metric ton savings of CO₂e.
- **Reduce APU Usage**—Install landside power and PCA provide a means of reducing the use of APUs and the associated jet fuel burn. For gates not equipped with 400-Hz, ground-start units could be employed to start aircraft engines rather than relying on APU. Again, by way of example, the theoretical reductions in APU usage associated with this measure are estimated to result in the following reductions in ground-based GHG emissions:
 - PCA and landside power at 10 new gates = 1,030 metric ton CO₂e
 - PCA and landside power at all remaining gates = 4,210 metric ton CO₂e
 - Eliminate APU usage during taxi-in and taxi-out operations = 3,700 metric ton CO₂e

As shown, these reductions represent approximately 7 to 27 percent of the 15,827 metric ton goal set by the MOU.

- **Single Engine Taxiing**—In general terms, the concept involves aircraft using less than all its engines to taxi-in and taxi-out between the runway ends and the terminal areas. As the practice of single engine taxiing would directly be the responsibility of aircraft operators, input was expressly solicited from the airlines and air cargo operators at SAN on the feasibility of this measure. From this input, it is apparent that passenger safety and aircraft engine operational considerations make a mandatory policy for single engine taxiing at SAN impracticable.



Moreover, the relatively short taxi times at SAN significantly reduce the overall benefits of this measure in reducing ground-based aircraft engine greenhouse gas emissions. However, on a voluntary basis and during certain periods (e.g., taxi-in operations and taxi-out operations when the taxi times exceed five minutes) single engine taxiing has the potential to reduce ground-based aircraft engines at SAN.

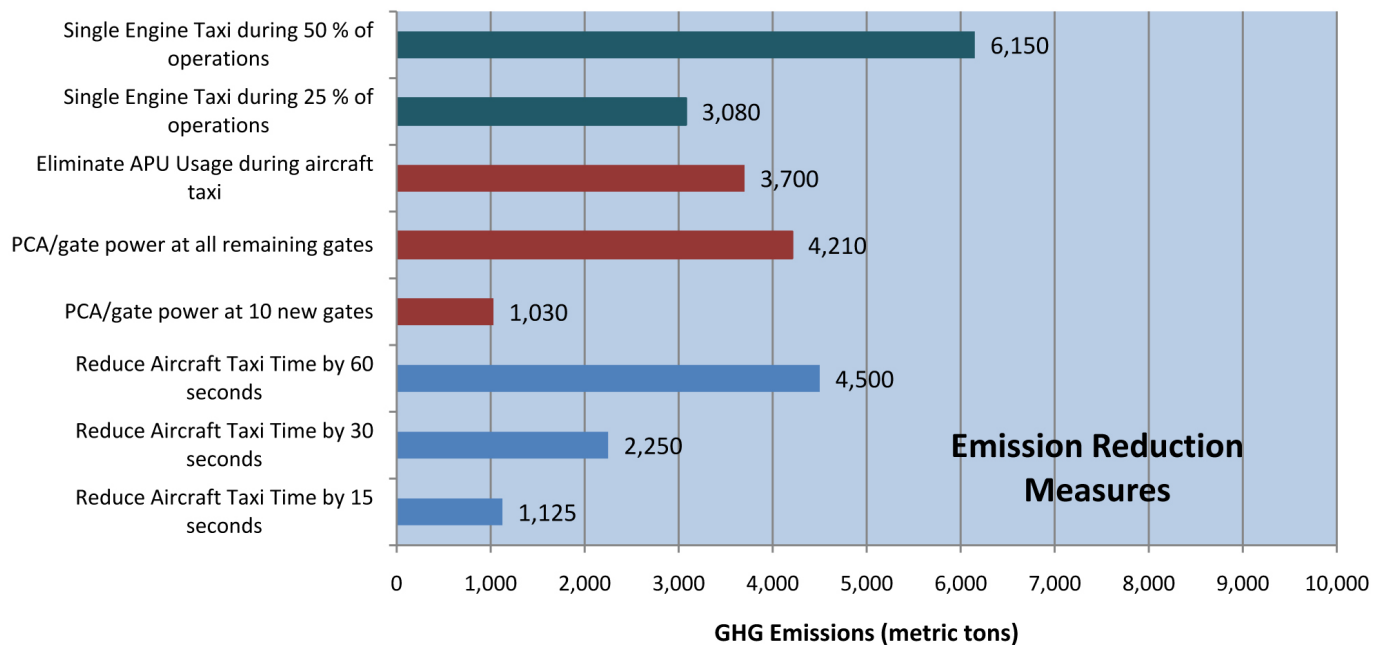
The following theoretical single engine taxi conditions at SAN reveal the potential greenhouse gas emission reduction benefits at SAN:

- Single engine taxi for 50 percent of the taxi out (~7 minutes) and 25 percent of the taxi in (~1 minute) during 25 percent of all SAN operations = 3,080 metric tons CO₂e
- Single engine taxi for 50 percent of the taxi out (~7 minutes) and 25 percent of the taxi in (~1 minute) during 50 percent of all SAN operations = 6,150 metric tons CO₂e

As shown, these reductions in ground-based aircraft emissions represent approximately 20 to 40 percent of the 15,827 metric ton goal set by the MOU.

For ease of comprehension, Figure 3 illustrates these findings.

Figure 3: Aircraft Emission Reduction Measures



Source: KB Environmental Sciences Inc., October, 2009.

Appendix C contains a full copy of the *Analysis of Ground-Based Aircraft Movement Greenhouse Gases* for SAN.



Section 4—Analysis Of Potential Air Emission Reduction Opportunities

The draft report, entitled *Analysis of Potential Air Emission Reduction Opportunities* (see Appendix B) identifies emission reduction opportunities at San Diego International Airport. The report focuses on sources that can be reduced through the construction of infrastructure, development of incentive programs, and planning activities by the Airport Authority, but does not address emission reductions associated with aircraft and its movements, which is the largest source of emissions at the airport. The *Analysis of Aircraft Movement Greenhouse Gases* (see Appendix C) summarizes current emissions associated with aircraft “on the ground” movement and evaluates specific aircraft ground movement emission reduction measures based on safety, technological, economic, and environmental considerations.

Projects were evaluated based on regulatory requirements, alternative fuel availability, amount of emission reductions achieved, capital costs, limitations and constraints, and future considerations.

Potential projects to reduce emissions of criteria pollutants and GHG were identified in the AQMP. They were evaluated based on regulatory requirements, alternative fuel availability, amount of emission reductions achieved, capital costs, limitations and constraints, and future considerations. These opportunities include actions that could affect activities of both the airside and landside operations. The majority of the emission reduction opportunities would involve the conversion of equipment or vehicles to electricity or an alternative fuel to reduce the combustion of conventional fuels, such as gasoline or diesel. For the purpose of the draft AQMP, the definition of an “alternative fuel vehicle” is based on the definition included in the MOU and means a vehicle that runs on an energy source, fuel or blend of fuels that achieves a reduction of at least 10 percent carbon intensity relative to petroleum fuel, as contained in Governor Schwarzenegger’s Executive Order S-01-07.⁶

Airside emission reduction projects could include the installation of landside power and PCA for use by aircraft to reduce APU usage, development of infrastructure to support electric recharging and/or alternative fuel refueling, as well as working with airlines to promote the conversion of GSE to electric or alternative fuels. The Airport Authority has made the commitment to install landside power and preconditioned air on all new and refurbished gates. As part of the expansion of the Green Build, the Airport Authority has committed to these improvements at the ten new gates. Following construction, 23 of the 51 gates or 45 percent of the gates would have landside power or PCA. These improvements at ten new gates would potentially reduce greenhouse gas emissions at the airport by 1,030 metric tons per year, while an eventual conversion of all gates to landside power and PCA would reduce GHG emissions by approximately 4,210 metric tons per year.

⁶ This Executive Order, signed by Governor Schwarzenegger in January 2007, established the goal of developing a Low Carbon Fuel Standard (LCFS) to reduce the carbon intensity of transportation fuels by at least 10 percent by 2020.



To promote the conversion of GSE to electric or alternative fuels, the Airport Authority would need to evaluate and construct the necessary infrastructure needed to support full conversion of airport vehicles and GSE. The airport currently has a compressed natural gas (CNG) station and electric charging stations available. However, conversion of the majority of GSE would require additional capacity.

Airlines have already initiated programs to convert their GSE to electric and reduce associated emissions. For example, Southwest Airlines has spent over \$3.7 million to date at SAN for the following conversions:

1. Installation of 11 electric charging stations.
2. Purchase of 20 electric tractors, 12 electric belt loaders, 8 electric pushpacks.
3. Installation of landside power and PCA at 11 gates..
4. Monitoring of run time on ground power units and airstarts.

Landside emissions associated with SAN include emissions from airport service vehicles, shuttles, taxis, and employee transportation. In an effort to reduce emissions, the Airport Authority should promote the use of alternative fuels. The ground service vehicles/fleet vehicles owned by the Airport Authority include cars, vans, and pickup trucks. Of the 53 ground service vehicles, six are electric, seven operate on CNG, three are bio-diesel, while the remainder are conventional fuel vehicles. It is recommended that the remaining conventional fueled vehicles be replaced with an alternative fuel at the end of their useful life. According to the draft report, *Criteria Pollutant and Greenhouse Gases Baseline Emission Inventory* (see Appendix A), ground service vehicles/fleet vehicles operating at SAN account for 423 metric tons of CO₂e emissions annually, or approximately 1.8 percent of the total GHG emissions owned and controlled by the airport. Although tailpipe emissions may not decrease through conversion to CNG, the conversion would reduce the life cycle greenhouse gases emissions by approximately 30 percent. If technically feasible, the conversion to electric vehicles would eliminate tailpipe emissions of criteria pollutants completely and greatly reduce GHG emissions.

The MOU requires the airport to develop a vehicle conversion incentive program by January 1, 2010, to induce every shuttle operator to replace existing vehicles with electric or alternative fueled shuttle vehicles at the end of their useful life. Shuttle operators include rental car facilities, hotels, door-to-door operators, and off-airport parking facilities. As an alternative to an incentive-based program, the MOU allows the Airport Authority to impose a mandated requirement on shuttle service providers that existing vehicles within their fleets be replaced by electric or alternative fueled vehicles according to set provisions. Shuttle operators prefer an incentive based program.



The *Shuttle Incentive Program* (see Appendix E) outlines several options to induce shuttle operators to convert to alternative fuels, including age requirements, annual surcharge fees, trip fees for “new non-alternative fueled vehicles”, and consolidation programs. A “new non-alternative fuel vehicle” would be defined as any shuttle vehicle that does not meet the requirements of an “alternative fuel vehicle” specified in the MOU and was not registered to operate at the airport in 2009. A non-alternative fuel vehicle registered to operate at the airport in 2009 would not be surcharged for as long as it is not older than the specified replacement period and continues to be registered with the Airport Authority. If the shuttle is not registered or does not operate at the airport during a calendar year, it would be considered a “new non-alternative fuel vehicle” upon registration and be subject to the set program.



In addition to the incentive program, the Airport Authority plans to construct a consolidated rental car (CONRAC) facility and alternative fuel station. This development would reduce the number of rental car shuttles operating at the airport as well as allow shuttles to travel between the terminals and CONRAC without accessing the general purpose lanes on Pacific Highway and North Harbor Drive. This would alleviate traffic along Harbor Drive, reducing automotive emissions.

The Airport Authority promotes the use of public transport by its employees by offering 50 percent discounts on the commuter rail system. It is estimated that 18 percent of the employees use public transportation on a regular basis. By increasing use of public transportation by employees to 60 percent, greenhouse gas tailpipe emissions from this activity would be reduced by approximately 410 metric tons of CO₂e annually.

There are a number of projects which could reduce criteria pollutant and GHG emissions at the airport. Tables 5 and 6 provide a summary of potential projects, including general cost estimates, emission reductions, and action items. It should be noted that the costs are for equipment or vehicles only and does not include the infrastructure modifications that may be necessary to support the improvements.



Table 5—Summary Of Potential Airside Emission Reduction Opportunities

Emission Reduction Measure	Tailpipe GHG Reduction (metric tons of CO ₂ e)	Life Cycle GHG Reductions (metric tons of CO ₂ e)	Estimated Capital Costs	Action Items	Year
1) Landside Power/ Preconditioned Air					
Ten gates as part of Terminal 2 West Expansion	1,030		\$1,500,000	Improvements will be included in Terminal 2 expansion	2015
Remaining 29 gates at airport	4,210		\$4,350,000	Install at gates as gates are refurbished	Continual
2) Construction of Electric Recharging Stations			\$40,000/ station (avg)	Evaluate electrical infrastructure to support conversion	2011
25% Conversion of conventional GSE to electric	934		(1)	Coordinate with air-lines to convert GSE to electric	Continual
50% Conversion of conventional GSE to electric	1,868		(1)		
75% Conversion of conventional GSE to electric	2,801		(1)		
100% Conversion of conventional GSE to electric	3,725		(1)		
3) Natural Gas Fueling Station				Evaluate need to improve existing station	2011
Natural gas conversion dependent on equipment and electric GSE conversion		5,857 (2)	(1)	Coordinate with air-lines to convert GSE to natural gas when electric conversion is unfeasible	Continual
4) Aircraft Movement					
Based on MOU 20% reduction in aircraft movement	15,827		NA	Refer to Analysis of Ground Based Aircraft Movement	2015

Source: C&S Companies, October, 2009

(1) Capital costs based on type of GSE converted

(2) Based on life cycle analysis, not tailpipe emission reductions occurring at the airport



Table 6—Summary Of Potential Landside Emission Reduction Opportunities

Emission Reduction Measure	Tailpipe GHG Reduction (metric tons of CO ₂ e)	Life Cycle GHG Reductions (metric tons of CO ₂ e)	Estimated Capital Costs	Action Items	Year
5) Conversion of Airport GAV				Convert vehicles to electric or alternative fuel at replacement	2019
100% conversion to electric	423				
100% conversion to natural gas		317 (2)	30% - 50% Increase in vehicle costs	Work to develop second natural gas station near airport	2012
6) Conversion Program for Shuttles			\$450,000	Construct CNG fueling station with CONRAC	2015
100% Conversion to Electric or Alternative Fuel		7,846 (2)		Coordinate with shuttle operators	2016
7) Conversion Program for Taxis					
100% Conversion to Electric or Alternative Fuel		970 (2)	No capital cost for airport	Coordinate with taxi operators to convert to alternative fuels	2019
8) Employee Transportation					
Increase public transportation by authority personnel from 20% to 60%	410		Authority cost for incentives will triple	Promote use of public transportation and ride sharing	2019

Source: C&S Companies, October, 2009

(1) Capital costs based on type of GSE converted

(2) Based on life cycle analysis, not tailpipe emission reductions occurring at the airport



Section 5—Addressing The Memorandum of Understanding

The Airport Authority agreed to a Memorandum of Understanding (MOU) with the Attorney General of the State of California to address the reduction of greenhouse gas emissions at the San Diego International Airport. The MOU outlines specific measures that the Airport Authority has committed to implement to limit and reduce greenhouse gas emissions generated by the operations of SAN. The following section describes the Airport Authority's commitment to the various specific measures of the MOU and provides the recommended approach and obstacles to implementation for each measure. For additional discussion on the MOU see Appendix D.

MOU Measure 1a-e—Reduction in Aircraft On-the-Ground Energy Usage

The Airport Authority has committed to implementing measures to provide landside power and PCA during the installation and/or refurbishment of aircraft gates. According to the 2010 GHG Emissions Inventory (see Table 4) annual emissions from APU's are estimated at 8,965 metric tons of CO₂e. By providing landside power and PCA at all existing gates the Airport Authority could reduce their annual emissions by 4,210 metric tons of CO₂e. The following provides the recommended actions for this task.

Recommended Task	Implementation
Meet with airlines and cargo operators regarding the MOU and plans to implement landside power and PCA.	Task Completed, July 22 and August 24, 2009
Design landside power and PCA, if applicable, into all improvements at terminals, cargo facilities, and general aviation facilities.	On-Going
Incorporate landside power and PCA into the design of the Terminal 2 West expansion.	On-Going
Lease agreements, other enforceable agreements, and the airports operations manual should include statements that the landside power and PCA shall be utilized as soon as possible upon arrival at the gate, unless there are safety considerations.	July 1, 2010
Engineering staff will be updated on any recondition or refurbishing project that would require the incorporation of landside power and PCA.	Semi-Annual Meetings
Track and quantify greenhouse gas emission reductions associated with landside power and PCA.	Annual Emissions Inventory

Obstacles to Implementation

- The use of APUs for aircraft parked at a gate is still at the pilot's discretion.
- Due to the warm climate in San Diego, cabin comfort is important to the carrier. Airlines have indicated that there may be instances where the PCA units may not satisfactorily control temperature.
- There are currently no aircraft gates or hangars associated with air cargo operations at SAN.



MOU Measure 1f—Aircraft Movements

Annual emissions from aircraft movements are estimated at 79,133 metric tons of CO₂e. The *Analysis of Aircraft Movement Greenhouse Gases* (see Appendix C) describes in detail possible emission reduction actions. The following provides the recommended actions for this task.

Recommended Task	Implementation
Coordinate with Air Transport Associations (ATA), airlines, and FAA regarding practical measures that can be implemented to reduce greenhouse gas emissions associated with aircraft movement.	Task Completed, July 22 and August 24, 2009
Select alternatives to reduce aircraft movement emissions by 20% by 2015.	January 1, 2010
Prepare report for the public identifying and evaluating greenhouse gas emissions associated with aircraft movement at SAN by January 1, 2010.	January 1, 2010
Implement recommended actions addressed in report.	On-going through January 1, 2015
Continue to track and quantify greenhouse gas emission reductions associated with aircraft movement and submit in annual report.	Annual Emissions Inventory

Obstacles to Implementation

- Emission reductions from aircraft on-the-ground movements are not under the direct control of the Airport Authority. Air carriers must agree to implement any emission reduction procedures.

MOU Measure 2a—Replacement of Existing Tow Vehicles with Electric or Alternative Fuel Aircraft Pushback Tractors

The Airport Authority does not own tow vehicles or aircraft pushback tractors. Any tow vehicles or aircraft pushbacks operating at the airport are owned and operated by the airlines or their contractors. According to the 2010 GHG Emissions Inventory (see Appendix A), annual emissions from tow vehicles or aircraft pushback tractors are estimated at 600 metric tons of CO₂e. Conversion of these vehicles to electric could reduce those emissions to zero. The following provides the recommended actions and potential obstacles.

Recommended Task	Implementation
Meet with ATA, airlines, and FAA regarding aircraft pushback tractors and conversion to electric or alternative fuels.	Task Completed, July 22 and August 24, 2009
Conduct annual GSE surveys to determine the number of vehicles that are reaching the end of their useful lives and to make sure that each vehicle is properly permitted.	Part of Annual Emissions Inventory.
Work with airlines and ATA to research the commercial availability and safety of electric and alternative fuel pushback tractors as well as the necessary operations associated with such procedures.	On-going



Airlines and ATA will submit written requests or concerns regarding the conversion of pushback tractors to the Airport Authority.	Task Completed, September 1, 2009.
Determine viability of electric or alternative fuel pushback tractors for use at SAN.	On-going
Work with Federal, state, and local agencies to take advantage of funding programs that can be used to offset the cost to install electric recharging and alternative fuel fueling stations.	On-going
If electric or alternative fuel pushback tractors are not viable or a reasonable alternative is not available, the Airport Authority shall confer with the Attorney General's office for a deferral of this MOU Specific Measure.	No action needed at this time.

Obstacles to Implementation

- Lack of available alternative fuel fueling or electric recharging stations.
- Electric or alternative fueled vehicles do not typically have the horsepower to relocate larger aircraft longer distances.
- Concerns that the towing of aircraft could potentially result in damage to the aircraft landing gear.

MOU Measure 2b—Replacement of Shuttles with Electric or Alternative Fuel Vehicles

The actions associated with this specific measure are described in Section 4 of this report. According to the 2010 GHG Emissions Inventory (see Table 4) annual emissions from tow vehicles or aircraft pushback tractors are currently estimated at 25,864 metric tons of CO₂e. The *Shuttle Incentive Program* (see Appendix E) describes in detail possible emission reduction actions. The following provides the recommended actions for this task.

Recommended Task	Implementation
Develop incentive program regarding conversion of airport shuttles.	January 1, 2010
Meet with shuttle operators regarding the conversion of alternative fuels and incentive programs.	Task Completed, September 22, 2009
Shuttle operators will submit written requests or concerns regarding the incentive program to the Airport Authority.	Coordination on-going
Work with SANDAG, Clean Energy, SDAPCD, and other stakeholders to develop necessary infrastructure to support alternative fuels.	On-going
Track and quantify GHG emission reductions associated with shuttle conversion to alternative fuels.	Annual Emissions Inventory

Obstacles to Implementation

- Replacement of off-airport shuttle vehicles is not under the direct control of the Airport Authority.



MOU Measure 3a and b—Use of Green Materials and Sustainable Design

The Airport Authority has committed to using green materials and sustainable design on new construction projects at the airport. According to the 2010 GHG Emissions Inventory (see Table 4) annual emissions from purchased electricity is estimated at 14,055 metric tons of CO₂e. Those emissions are generated at an off-site power plant. A 10 percent reduction in energy usage will save approximately 1,400 metric tons of CO₂e per year by the utility associated with providing the electricity to the airport. The following provides the recommended actions for this task.

Recommended Task	Implementation
Meet with planning and engineering staff to detail that these requirements are being met by SAN.	Semi-Annually
Incorporate sustainable technologies into capital projects.	On-going
Track and quantify greenhouse gas emission reductions associated with use of green materials and sustainable design.	Annual Emissions Inventory

Obstacles to Implementation

- Sustainable technologies such as landside power, pre-conditioned air, conversion to electric GSE, and public transportation, will reduce the overall greenhouse gas emissions associated with the facility, but these improvements may also increase the electrical usage at SAN.

MOU Measure 4—Use of Green Construction Methods and Equipment

The Airport Authority has committed to using green construction methods and equipment on projects at the airport. According to the 2010 GHG Emissions Inventory (see Table 4) annual emissions from the use of construction equipment is estimated at 3,558 metric tons of CO₂e. The following are recommended steps to implement this task.

Recommended Task	Implementation
Meet with planning and engineering staff to reaffirm use of green construction methods and equipment.	Semi-Annually
Develop specifications for construction methods and equipment.	January 1, 2011
Enforce any non-compliance with the construction specifications.	On-Going
Document CO ₂ e being reduced for each project by use of green construction methods compared to traditional means.	Annual Emissions Inventory

Obstacles to Implementation

- The increased cost to operate alternative fueled construction equipment, compared to conventional fuels, may require additional funding.
- Dependent upon the construction project, some equipment types may not be able to operate on alternative fuels due to power requirements.



MOU Measure 5a,b, and c—Coordination and Encouragement of Tenants

The Airport Authority plans to educate and work with tenants to expand its recycling program and reduce its carbon footprint. The following are actions items for this task.

Recommendations	Implementation
Meet with planning and engineering staff on a semi-annual basis to discuss the recycling program and ways to increase the recycling efforts.	Semi-Annually
Develop on educational program for recycling at the airport.	January 1, 2011
Meet with tenants and other stakeholders to promote recycling at the airport.	January 1, 2011
Meet with general aviation operators to evaluate alternatives to leaded avgas and the potential number of aircraft that can utilize unleaded avgas.	January 1, 2011
Document recycling efforts, type and quantity of recycled materials, and amount carbon dioxide equivalents being reduced compared to baseline scenario in which waste was land-filled.	Annual Emissions Inventory

Obstacles to Implementation

- The operation of piston driven aircraft is dependent upon the availability of 100LL avgas. The Aircraft Owners and Pilots Association (AOPA) has continued to argue that there are currently no adequate affordable fuel alternatives that have been developed to replace Avgas without compromising the safety of flight.



Section 6—Implementation and Funding Opportunities

I. Implementation

Implementation of elements of the AQMP, including the MOU Specific Measures, have already commenced at SAN. The AQMP was initiated in early January, 2009 with the formulation of the AQMP Team and extensive coordination with airport stakeholders occurring between May and November, 2009. The publication of the Final AQMP Report (expected in December, 2009) further signifies the Airport Authority's continued commitment to reduce the "carbon footprint" and overall environmental impact of SAN.

Table 7 contains summary information on the recommended actions that the Airport Authority should take to continue to meet the goals outlined in the AQMP.

Table 7: Implementation Program

Recommended Task	Implementation Date
Evaluate and document infrastructure upgrades needed to support conversion of GSE to electricity and/or alternative fuels.	July 1, 2010
Develop standard construction specifications for the implementation of green construction methods and equipment.	July 1, 2010
Develop and promote a pilot awareness program to incorporate emission reduction measures when feasible.	January 1, 2011
Develop incentive program for taxis to convert to alternative fuels.	January 1, 2011
Work with airlines to develop program to convert GSE to electric and alternative fuels, where feasible.	January 1, 2011
While currently under applicable AB-32 thresholds, document the greenhouse gas emissions in comparison to 1990 levels.	January 1, 2011
The Terminal 2 West expansion project will be LEED Silver or better and incorporate landside power and PCA.	January 1, 2013
Construct a consolidated rental car facility incorporating an alternative fuel station.	January 1, 2015
If technically feasible, all ground service vehicles owned and operated by the Airport Authority will be electric or alternative fuels.	January 1, 2016
If feasible, all of the shuttles and taxis operating at the airport will be electric or alternative fuels.	January 1, 2019



Importantly, because the development and implementation of the AQMP is a dynamic and long-term process, the documents will be reviewed and updated annually by the Airport Authority—reporting on the progress of the plan and making any necessary adjustments to ensure its continued success.

The following outline semi-annual and annual activities, respectively, that are recommended to continue planning, implementing, and tracking emission reductions at the airport:

Semi-Annual Activities

- Coordinate meetings with ATA, airlines, and FAA regarding practical measures that can be implemented to reduce greenhouse gas emissions associated with aircraft movement.
- Coordinate meeting with shuttle operators and taxis regarding the conversion of alternative fuels and incentive programs.
- Meet with SANDAG, San Diego APCD and other applicable agencies regarding regional transportation initiatives around the airport and funding opportunities.
- Coordinate meetings between planning and engineering staff to discuss projects, sustainable design, green construction methods and other emission reduction opportunities at the airport.
- Research and document potential funding opportunities to assist in the capital expenditure of reducing emissions for the Airport Authority, tenants and other stakeholders.

Annual Activities

- Document the conversion of ground support equipment, ground service vehicles, shuttles and taxis to electricity and alternative fuel.
- Investigate new technology and opportunities to reduce greenhouse gas emissions associated with aircraft movement.
- Meet with tenants and other stakeholders to promote recycling at the airport.
- Update greenhouse gas inventory associated with the airport.
- Evaluate the effectiveness of incentive programs for shuttles and taxis and modify incentive program accordingly.



II. Funding Programs

Various funding programs were investigated to determine eligibility, requirements, funding amounts, and submittal dates and deadlines. The draft report *Analysis of Potential Air Emission Reduction Measures* (see Appendix B), describes the details of the funding programs investigated. The most promising funding programs for the Airport Authority and tenants are described below:

Carl Moyer Program

Under the Carl Moyer Memorial Air Quality Standards Attainment program, CARB provides funding for projects that have cleaner than required engines and equipment, and if the project has early or extra emission reductions. The program is administered by the San Diego Air Pollution Control District (APCD). It is believed that this program can be used by the Airport Authority, airlines, and shuttle operators to assist in securing funds for equipment not mandated by Federal, state, or local regulations. However, equipment subject to the Off-Road Diesel Rule, On-Road Heavy Duty Diesel Rule, Large Spark Ignition Rule, or other applicable regulations will not be eligible for such funding.

Voluntary Airport Low Emission (VALE) Program

The FAA provides VALE grants to commercial airports located in non-attainment or maintenance areas to fund voluntary emission reduction projects. To obtain VALE funding, a Letter of Assurance to grant airport emissions reduction credits would be required from CARB and/or the San Diego APCD. Emission reduction projects associated directly with the airport would be eligible for funding through VALE as long as there is no regulatory requirement for implementation, the emissions are surplus, and a Letter of Assurance from the applicable regulatory agency is received. The FAA could provide grants up to 75 percent of the project cost for San Diego International Airport.

California Energy Commission (CEC)—Clean Cities Program

The CEC administers the Alternative and Renewable Fuel and Vehicle Technology Program of Clean Cities Program. It supplies funding for the installation or acquisition of infrastructure necessary to directly support alternative fueled vehicles. Clean Cities can also supply funding for the direct purchase of alternative fueled vehicles. The typical funding amount is between \$5,000,000 and \$15,000,000.



Section 7—Coordination Efforts

Throughout the AQMP process the Airport Authority has coordinated with various airport stakeholders and tenants whose operations could be potentially impacted by proposed emission reduction measures. The following gives a brief description of those coordination efforts. Presentations and additional meeting materials are located in Appendix F.

July 22, 2009—Meeting with Air Carriers

A meeting was held with passenger and air cargo carriers to discuss the AQMP and MOU. Several of the specific measures outlined in the MOU are under the direct influence of air carriers and require their participation if those measures are to be successfully implemented. The meeting began with a presentation on the AQMP and the floor was then opened to address questions. Those in attendance included representatives from the air carriers, Airport Transportation Association, and Airport Authority staff.

August 25, 2009—Follow-up Meeting with Air Carriers

A second meeting was held with passenger and air cargo carriers to discuss potential emission reduction measures and to solicit feedback on measures that the air carriers may already have in place. The meeting focused on efforts to meet MOU specific measure 1f—Aircraft Movements, which requires the Airport Authority to develop a plan to reduce aircraft on-the-ground emissions by 20 percent by 2015. The meeting began with a brief review of the MOU and the *Analysis of Aircraft Movement Greenhouse Gases* (see Appendix C) report. As part of that report specific emission reduction measures were analyzed to determine their applicability to achieving the 20 percent reduction. After the brief review, each of the emission reduction measures was then discussed in detail to determine their plausibility. Those in attendance included representatives from the air carriers and Airport Authority staff.

September 22, 2009—Landside Shuttle Operators

A meeting was held with landside shuttle operators to discuss the AQMP and the MOU. Specific measures outlined in the MOU are under the direct influence of shuttle operators and require their participation if those measures are to be met. The focus of the meeting centered on MOU Specific Measure 2.b—which requires the Airport Authority to develop and implement an incentive or mandated program to induce shuttle operators to replace existing conventional fueled vehicles with electric or alternative fuels. The meeting began with a presentation and the floor was then opened to address questions. Those in attendance included representatives from area hotels, off-airport parking facilities, rental car companies, door-to-door shuttle operators, Clean Energy, and Airport Authority staff. A follow up meeting is planned for November, 2009.