



**FINAL DRAFT**

# San Diego International Airport Air Quality Management Plan

## **Criteria Pollutant & Greenhouse Gases Baseline Emissions Inventory**

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Prepared for the:  
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## Executive Summary

This Baseline Air Emissions Inventory for San Diego International airport (SAN) was prepared on behalf, and with the assistance, of the San Diego County Regional Airport Authority (SDCRAA or Airport Authority). The purpose of the document is as follows:

### **Purpose of the Baseline Emissions Inventory**

This document contains the results and describes the technical approach, methodology, and data sources developed in support of the Criteria Pollutant and Greenhouse Gas (GHG) Baseline Emissions Inventory for SAN. The results will be used in support of the SAN *Air Quality Management Plan* (AQMP).

The overall approach to preparing the emissions inventory is based on the following four fundamentals: a.) representative of emission sources and conditions that are characteristic of SAN; b.) uses the most up-to-date information and data currently available; c.) is consistent with the most appropriate guidelines for quantifying airport-related emissions; and d.) aids the Airport Authority with its development plans in a transparent fashion.

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

Specific GHG types that were included comprise that comprise carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and nitrous oxide (N<sub>2</sub>O). The results are then converted to CO<sub>2</sub> equivalent (CO<sub>2</sub>e) values using appropriate Global Warming Potential (GWP) values.

Much of the information and data used to prepare the emissions inventory was obtained from Airport Authority records, Federal Aviation Administration (FAA) databases and/or derived from the SAN Master Plan *Environmental Impact Report* (EIR). This information includes aircraft operational and fleet mix data, ground support equipment (GSE) data, motor vehicle traffic, and stationary source information. In some cases, these operational data (for 2008) were adjusted through extrapolation to 2010 conditions.

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*



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*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 (EDMS5.1) and other federal and California-approved models.



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## I. BACKGROUND INFORMATION & PURPOSE OF THE BASELINE EMISSIONS INVENTORY

The San Diego County Regional Airport Authority (SDCRAA or Airport Authority) is preparing an Air Quality Management Plan (AQMP) for San Diego International Airport (SAN, also known as Lindbergh Field) located in San Diego, California.<sup>1</sup> The AQMP is a multi-faceted program to aid the Airport Authority in the reduction and management of air emissions associated with SAN. In particular, the AQMP is specifically designed to accomplish the following:

- Identify the sources and quantify the amounts of air emissions (e.g., criteria pollutants<sup>2</sup> and greenhouse gases - GHG<sup>3</sup>) associated with the development and operation of the airport;
- Address the energy and GHG emission reduction measures called for in the Attorney General Memorandum of Understanding (MOU)<sup>4</sup>; and
- Support the Airport Authority's on-going Environmental Sustainability Program.<sup>5</sup>

This document, referred to as the *Baseline Emissions Inventory*, contains the results and describes the overall technical approach, methodology, and data sources that were developed in support of this effort. For the purposes of this assessment, the year 2010 represents the Baseline conditions at SAN.

### **Purpose of the Baseline Emissions Inventory**

This document contains the results and describes the technical approach, methodology, and data sources developed in support of the Criteria Pollutant and Greenhouse Gas (GHG) Baseline Emissions Inventory for SAN. The results will be used in support of the SAN *Air Quality Management Plan* (AQMP) being prepared by the San Diego Airport Authority.

<sup>1</sup> The Airport Authority is a public entity created by state law to operate SAN and plan for the region's future air transportation needs. For more information on SAN, SDCRAA or the *Airport Master Plan* go to: <http://www.san.org/>

<sup>2</sup> For this assessment the criteria pollutants comprise the U.S. EPA criteria pollutants and/or their precursors and include: carbon monoxide (CO), lead, nitrogen oxides (NO<sub>x</sub>), particulate matter (PM), sulfur oxides (SO<sub>x</sub>), and volatile organic compounds (VOCs).

<sup>3</sup> For this assessment greenhouse gases comprise the following: carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>) and nitrous oxides (N<sub>2</sub>O) expressed as "CO<sub>2</sub> equivalents" (CO<sub>2e</sub>).

<sup>4</sup> *Memorandum of Understanding Between the Attorney General of the State of California and the San Diego County Regional Airport Authority Regarding the San Diego International Airport Master Plan*, May 5, 2008. [www.san.org/documents/airport\\_authority/MOU\\_SDCRAA\\_AG\\_Master\\_Plan\\_2008.pdf](http://www.san.org/documents/airport_authority/MOU_SDCRAA_AG_Master_Plan_2008.pdf)

<sup>5</sup> For more information on the SDCRAA's Environmental Sustainability Program go to: [http://www.san.org/airport\\_authority/environmental\\_affairs/index.asp](http://www.san.org/airport_authority/environmental_affairs/index.asp)



## II. OVERALL APPROACH

The overall approach to the preparation of the SAN Baseline criteria pollutant and GHG emissions inventory was based principally on the following four fundamentals: a.) representative of emission sources and conditions that are characteristic of SAN; b.) uses the most up-to-date information and data currently available; c.) consistent with the most appropriate guidelines for quantifying airport-related emissions; and d.) aids the Airport Authority with its current and future development plans in a transparent fashion.

For the criteria pollutant emissions inventory, these guidelines included the following publication issued by the Federal Aviation Administration (FAA):

- *Air Quality Procedures for Civilian Airports and Air Force Bases (and Addendum)* – Referred to as the *Airport Air Quality Handbook*, provides specific methodologies for computing emissions from airport-related sources including aircraft, auxiliary power units (APUs), ground support equipment (GSE), fuel facilities, stationary sources, and motor vehicle.<sup>6</sup>

In the case of GHG's, the SAN Baseline emissions inventory also followed recommendations recently issued by the Transportation Research Board (TRB) Airport Cooperative Research Program (ACRP):

- *Guidebook for Preparing Airport-Related Greenhouse Gas (GHG) Emissions Inventories* – Referred to as ACRP Report 11, provides recommended instructions to airport operators on how to prepare an airport-specific GHG emissions inventory.<sup>7</sup>
- California Climate Action Registry General Reporting Protocol – Provides principles, approach, methodology and procedures to support GHG emissions inventory for participation in the California Registry.<sup>8</sup>



In addition, the majority of the technical analysis for many of the sources was accomplished using the latest version of the FAA's Emissions and Dispersion Modeling System (EDMS) (Version 5.1) and other federal and state-approved models (see Section V).

Importantly, the process of assessing and reporting airport criteria pollutants is fairly well established. By comparison, the assessment and reporting of airport GHGs is relatively new and still evolving. In this case, the overall approach to preparing both the criteria

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<sup>6</sup> *Air Quality Procedures for Civilian Airports and Air Force Bases – and Addendum*, Federal Aviation Administration, 1997 and 2004.

<sup>7</sup> *Guidebook for Preparing Airport-Related Greenhouse Gas Emissions Inventories*, prepared for the Airport Cooperative Research Program, Transportation Research Board, April 2009.  
[http://onlinepubs.trb.org/onlinepubs/acrp/acrp\\_rpt\\_011.pdf](http://onlinepubs.trb.org/onlinepubs/acrp/acrp_rpt_011.pdf)

<sup>8</sup> *California Climate Action Registry General Reporting Protocol Version 3.1*, January 2009,  
[http://www.climateregistry.org/resources/docs/protocols/grp/GRP\\_3.1\\_January2009.pdf](http://www.climateregistry.org/resources/docs/protocols/grp/GRP_3.1_January2009.pdf)



pollutant and GHG emissions inventories is to help meet the immediate and long-term needs of the Airport Authority as they advance the AQMP, implement the MOU requirements<sup>9</sup>, and address other federal, state and local air quality or initiatives.

### III. TERMS AND CONCEPTS

There are a number of terms and concepts that are considered standard, but unique, to the preparation of airport-related emissions inventories. Some of the more important ones used in this assessment include the following:

- Baseline Conditions – These are the conditions for which the criteria pollutant and GHG emissions inventories are computed and compared. The year 2010 represents these baseline conditions, as called for in the MOU.
- Criteria Pollutants - The U.S. EPA has established National Ambient Air Quality Standards (NAAQS) for six criteria pollutants including: carbon monoxide (CO), lead (Pb), nitrogen oxides (NO<sub>x</sub>), sulfur dioxide (SO<sub>2</sub>), ozone (O<sub>3</sub>) and particulate matter of 10 and 2.5 microns (PM<sub>10/2.5</sub>). Because O<sub>3</sub> cannot be calculated directly, the “precursors” of NO<sub>x</sub> and volatile organic compounds (VOCs) are used.
- Atmospheric Mixing Height – The altitude above which aircraft emissions are not expected to have significant ground level impacts. Forms the upper boundary of the criteria pollutant emissions inventory for the landing/take-off (LTO) cycle.
- Greenhouse Gases - The six Kyoto GHGs pollutants are: CO<sub>2</sub>, CH<sub>4</sub>, nitrous oxides (N<sub>2</sub>O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulfur hexafluoride (SF<sub>6</sub>). Notably, CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O are the predominant GHGs associated with airports. The other GHGs occur - but to a far lesser extent.
- CO<sub>2</sub> equivalents - This is the universal unit of measurement used to indicate the global warming potential for different GHG. Represented by the symbol *CO<sub>2</sub>e*, these values range from “1” for CO<sub>2</sub> to “25” for CH<sub>4</sub> to “298” for N<sub>2</sub>O.<sup>10,11</sup>
- Greenhouse Gas Ownership and Control Boundaries – These boundaries of a GHG emissions inventory reflect the sources based on ownership or control, as suggested by the ACRP Report 11. From this, three general categories are identified and characterized by degrees of control that an airport operator may have as follows:
  - Category 1 – GHG emissions from sources that are owned and controlled by the reporting entity (e.g., Airport Authority). These sources typically represent all

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<sup>9</sup> In particular, this analysis will provide a means of assessing aircraft ground-based movement emissions and evaluating emission reduction measures called for in the MOU.

<sup>10</sup> Based on these CO<sub>2</sub> equivalents factors (CO<sub>2</sub>e), 1 ton of CH<sub>4</sub> is 25 times more “potent” than 1 ton of CO<sub>2</sub>.

<sup>11</sup> *Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, Cambridge University Press, 2001.



- Scope 1 and 2 sources, and Scope 3 sources which are not owned by the entity, but over which the entity can exert control. At SAN, these sources include airport-owned and controlled stationary sources (e.g., boilers, generators, etc.), some GSE, fleet vehicles, and purchased electricity. On-airport ground transportation emissions are also included if they are controlled by the airport.
- Category 2 – This category comprises Scope 3 emissions associated with sources owned and controlled by airlines and airport tenants. These sources can include aircraft (on-ground, within the LTO, in the cruise/residual modes), APU, most GSE, electrical consumption, and other stationing sources.
  - Category 3 – This category generally comprises GHG emissions associated with other sources associated with the airport. These include public automobiles, taxis, limousines, buses, shuttle vans, etc. operating on the off-airport roadway network.
- Greenhouse Gas Operational Boundaries –Once the ownership boundaries are determined, the operational boundaries are also set; reflecting the Scope and reflecting the ownership of the emission source. Three Scopes are identified and characterized as follows:
- Scope 1 / Direct – GHG emissions from sources that are owned and controlled by the reporting entity. In the case of SAN, these include on-airport owned and controlled stationary sources (e.g., boilers, emergency generators, etc.) and airport-owned GSE and fleet motor vehicles.
  - Scope 2 / Indirect – GHG emissions associated with the generation of electricity consumed by the reporting entity; in this case, SAN.
  - Scope 3 / Indirect and Optional – GHG emissions that are associated with the activities of the reporting entity, but are associated with sources that are owned and controlled by others. These include aircraft-related emissions, emissions from airport tenant’s activities, as well as ground transportation to and from the airport.

#### IV. SOURCES OF EMISSIONS

In general, the primary sources of emissions associated with SAN are typical of most commercial airports of its size and function. As shown in **Table 1**, the primary emission sources include aircraft; GSE and APUs; a small assortment of stationary sources; and motor vehicles operating on the internal roadways, parking facilities, and off-airport roadways. For GHG’s, emissions associated with the consumption of electricity at the airport (but generated elsewhere by burning coal, oil, and natural gas) are also included.



**Table 1: Sources of Airport Criteria Pollutant and GHG Emissions**

Sources	Characteristics of Emissions
Aircraft	Exhaust products of fuel combustion that vary depending on aircraft engine type (i.e., turbo-jet, turbo-prop, etc.), fuel type (Jet-A, avgas), number of engines, power setting and time-in-mode (i.e., taxi/idle, take-off, cruise), and amount of fuel burned.
Ground Support Equipment / Auxiliary Power Units (GSE/APUs)	Exhaust products of fuel combustion from aircraft service trucks, tow tugs, belt loaders, and other portable equipment. Emissions are also emitted by auxiliary power units used to furnish power to some aircraft when the main engines are off.
Ground Access Vehicles (GAV)	Exhaust products of fuel combustion from airport authority, passengers, employee and cargo motor vehicles approaching, departing, and moving about the airport site. These include automobiles, vans, trucks, and buses. Emissions vary depending on vehicle and fuel type (i.e., gasoline, diesel, etc.) and the amount of fuel consumed.
Stationary sources and fuel facilities	Exhaust products of fossil fuel combustion in boilers for space heating and emergency generator units. Evaporative emissions from fuel storage and transfer facilities and fugitive emissions of refrigerant and cooling system gases are also included.
Electrical Consumption	Emissions associated with the production of electricity at off-site utilities that use coal, oil or natural gas.

Source: KB Environmental Sciences, Inc. 2009.

For the most part, the emissions from these sources arise from the combustion of fossil fuels (i.e., 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.

GHG emissions from recycling of solid wastes are associated with SAN are also included. Construction activities also represent sources of air emissions at SAN but they are short-term and intermittent. Nevertheless, they will be addressed later in the AQMP as an element of the MOU GHG emissions reduction initiatives.

## V. INFORMATION, DATA AND ASSUMPTIONS

Most of the information and data used to prepare the Baseline emissions inventory for SAN was obtained from Airport Authority records, FAA databases and/or derived from the SAN Master Plan Environmental Impact Report (EIR).<sup>12</sup> This includes aircraft

<sup>12</sup> *San Diego International Airport Master Plan Environmental Impact Report*; Lead Agency – San Diego County Regional Airport Authority, 2007.



operational and fleet mix data, GSE data, motor vehicle traffic, and stationary source information. In some cases, these data were adjusted through extrapolation to 2010 conditions.

Aircraft emission factors and other emission source performance characteristics are inherent to the EDMS database. For GSE and motor vehicle emissions, California-specific data from the California Air Resources Board (CARB) EMFAC2007 and OFFROAD2007 emission models were used.

These sources of information, data and other assumptions used to prepare the emissions inventory are listed and generally described in **Table 2**, by emission source category (i.e., aircraft, GSE, etc.) and parameter (i.e., emission factors, operational data, etc.).

**Table 2: Input Data and Information Summary**

<b>Emission Source</b>	<b>Parameter - Source of Data and Information</b>
Aircraft	Criteria pollutant emission factors – EDMS5.1 Operations and fleet mix –SAN Airport Noise and Operations Monitoring System (ANOMS) and Destination Lindbergh. Aircraft/engine combinations –JP Airline Fleets International and EDMS5.1 default values. Times-in-mode – EDMS5.1 default, FAA Aviation System Performance Metrics (ASPM) and Bureau of Transportation Statistics for SAN Mixing Height – Local mixing height data from NCDC (criteria pollutants) or 3,000 feet (GHG emissions). GHG emission factors – 2006 IPCC guidelines and ARCP Airport GHG Guidebook Fuel throughput – Airport Authority records
GSE/APU	Emission factors – EDMS5.1, CARB OFFROAD2007, 2006 IPCC guidelines, and ARCP Airport GHG Guidebook GSE fleet mix and operating times – EDMS5.1 default data and observed during GSE field survey conducted by the Airport Authority. APU types and operating times – EDMS5.1 default data and standard assumptions based on preconditioned air and gate power availability and SAN-specific turnaround times
Ground Access Vehicles	Emission factors – CARB EMFAC2007 Traffic volumes and fleet mix – SAN Master Plan EIR and SAN AVI Roadway operating speeds – SAN Master Plan EIR



Emission Source	Parameter - Source of Data and Information
Stationary sources and fuel facilities	Emission factors – EDMS5.1, San Diego Air Quality Compliance Guide, 2006 IPCC guidelines, and ARCP Airport GHG Guidebook Source and fuel/material types – SAN Master Plan EIR and Airport Authority records Fuel/material throughput volumes – Airport Authority records and San Diego Air Quality Compliance Guide
Electrical Consumption	Electrical Consumption – Airport Authority records Emission Factors – Energy Information Administration

Source: KB Environmental Sciences, Inc. 2009.

GHG emissions from the use of refrigeration and fire extinguishers can be associated with airport activities, but are not considered to be significant at SAN and are not included in this analysis. GHG emissions associated with the recycling of solid wastes are also not considered to be significant at SAN but were included in this analysis.

## VI. RESULTS

Because the criteria pollutant and GHG components of the Baseline emissions inventory for SAN vary somewhat in the way they are computed and the categories of emissions differ, the results are also reported separately.

### A. Criteria Pollutant Emissions

Following standard convention for reporting airport-related emissions inventories, the criteria pollutant results are expressed in units of short tons per year (tpy) for each pollutant and emission source. In this way, the results can be used in support of the SAN AQMP and compared directly to the applicable State Implementation Plan (SIP) and the Master Plan EIR/EA. **Table 3** provides a summary listing of these data.



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

Source	Pollutant					
	CO	VOC	NO <sub>x</sub>	SO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
Aircraft	760	134	813	86.9	12.1	12.1
Ground Support Equipment (GSE)	117	7.3	44.4	0.0	1.1	1.0
Auxiliary Power Units (APU)	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	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
<b>Totals</b>	<b>1,189</b>	<b>166</b>	<b>989</b>	<b>94.5</b>	<b>33.3</b>	<b>27.2</b>

Source: KB Environmental Sciences, Inc. 2009.

Tons = short ton = 2,000 lbs.

<sup>a</sup> CO – carbon monoxide, NO<sub>x</sub> – nitrogen oxides, VOC – volatile organic compounds, SO<sub>x</sub> – sulfur oxides, PM<sub>10/2.5</sub> – particulate matter equal to, or less than, 10 and 2.5 microns in diameter, respectively.

<sup>b</sup> Within the Landing/Take-off (LTO) cycle.

<sup>c</sup> Airport-related motor vehicles on the off-airport roadway network and on-airport parking facilities.

<sup>d</sup> Stationary Sources include fuel facilities, steam boilers and emergency generators.

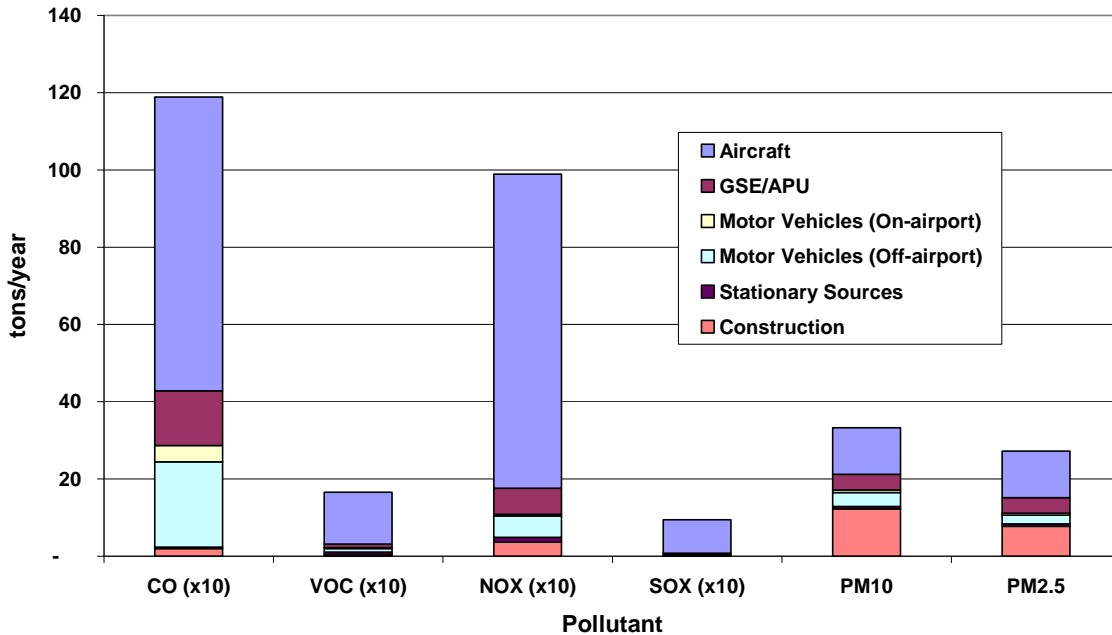
Lead emissions from avgas usage within the LTO cycle amount to 23.3 pounds per year.

As shown, aircraft is the largest emission source for all the criteria pollutants, generally followed by off- and on-airport related motor vehicles, GSE, APU, and construction activities.

For illustration purposes and for ease of comparison, the criteria pollutant emissions inventory results are also be presented graphically as shown in **Figure 1**.



Figure 1. 2010 Criteria Pollutant Emissions Inventory



Additional details are provided in the *Emissions Inventory Appendix* that show further breakdown of the criteria pollutant emissions by source owner (e.g., airline, GSE provider, etc.), facility (e.g., airside, landside, roadway, parking), and location (e.g., on-airport versus off-airport).

### B. Greenhouse Gas Emissions

The results of the GHG emissions inventory are expressed in units of metric tons per year for each emission source (e.g., aircraft, GSE, etc.) and Category (1, II, III). These results have been converted to CO<sub>2</sub> equivalent values using the Global Warming Potential values<sup>13</sup>. **Table 4** provides the Baseline GHG emissions inventory results for SAN.

<sup>13</sup> The universal unit of measurement to indicate the global warming potential for different GHG. Represented by the symbol CO<sub>2</sub>e, these values range from “1” for CO<sub>2</sub> to “25” for CH<sub>4</sub> to “298” for N<sub>2</sub>O based on the IPCC’s Fourth Assessment Report. The emission amounts are expressed as metric tons (MT).



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

Emission Source	Scope	CO <sub>2e</sub>	Percent of Category	Percent of Total
<b>Category 1: Airport Owned/Controlled</b>				
Purchased Electricity	2	14,055	59.8	0.87
Stationary Sources	1	1,443	6.14	0.09
- Central Plant	1	139	0.59	0.01
- Emergency Generators				
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
<b>Subtotal-Airport Owned/Controlled</b>		<b>23,498</b>	<b>100</b>	<b>1.45</b>
<b>Category 2: Airline, Aircraft Operator, or Tenant Owned/Controlled</b>				
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
<b>Aircraft Total</b>		<b>1,469,638</b>	<b>98.2</b>	<b>90.6</b>
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
<b>Subtotal-Tenant Owned/Controlled</b>		<b>1,496,465</b>	<b>100</b>	<b>92.3</b>
<b>Category 3: Public Owned/Controlled</b>				
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
<b>Subtotal-Public Owned/Controlled</b>		<b>98,695</b>	<b>100</b>	<b>6.09</b>
Construction Activities		3,558		0.22
Waste Management		(837)		-0.05
<b>Grand Total</b>		<b>1,621,378</b>	<b>100</b>	<b>100</b>



As shown, aircraft represent the largest source of GHG emissions associated with SAN comprising over 90 percent (1,469,638 MT) of the estimated total (1,621,378 MT). SAN-owned or controlled emission source comprise only 1.5 percent (23,498 MT) 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.

Again, for illustration purposes and for ease of comparison, the GHG emissions inventory results are also presented graphically in **Figure 2**, by Category. Figure 1 presents graphically, the emissions within Category 1; which represent the emissions owned or controlled by the Airport. The GHG emissions inventory results are also presented graphically in **Figure 4**, by Scope.

**Figure 2. 2010 Greenhouse Gas Emissions Inventory, By Category**

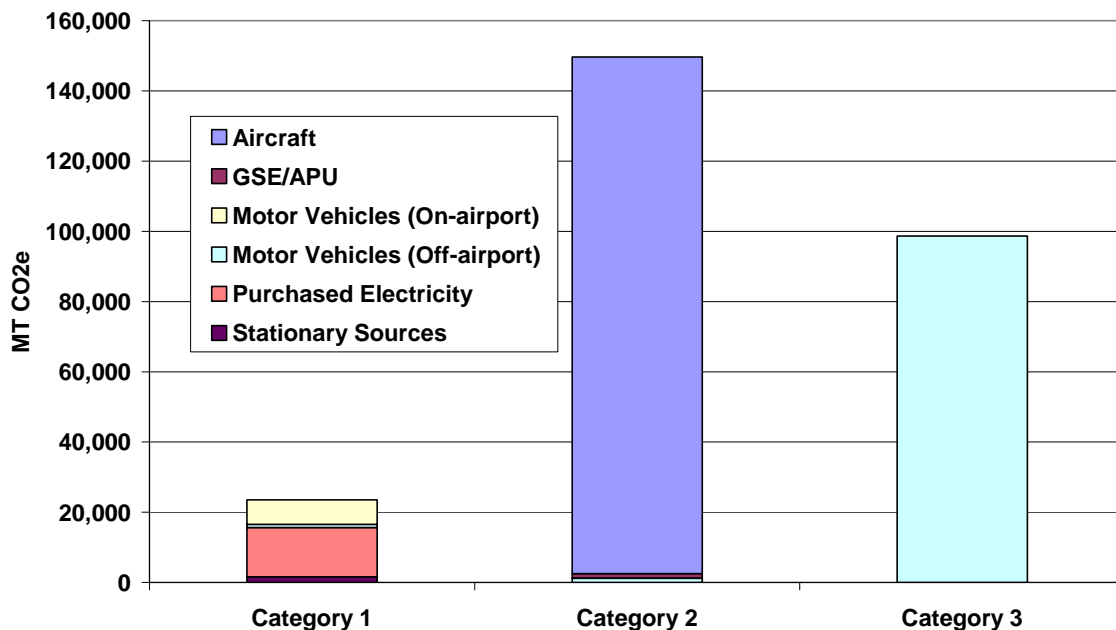




Figure 3: 2010 Greenhouse Gas Emissions Inventory, Category 1

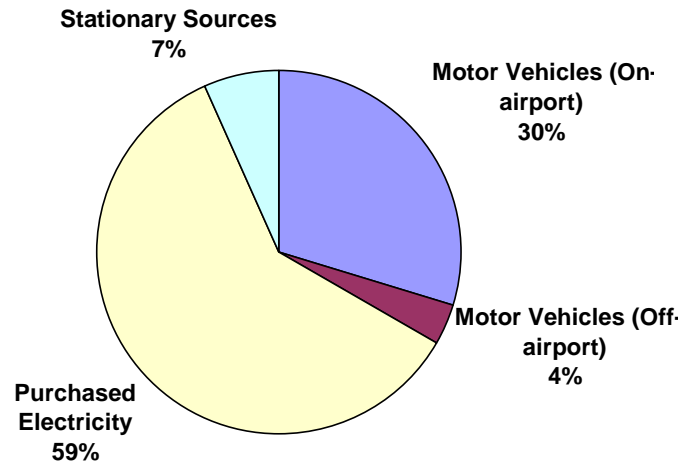




Figure 4. 2010 Greenhouse Gas Emissions Inventory, by Scope

