



## APPENDIX A

# 2010 GHG Emissions Inventory Update Assumptions and Methodology

### 1.1 San Jose's Organizational Boundary

Setting an organizational boundary for a GHG inventory involves identifying the facilities and operations that are to be included. National and international GHG accounting standards<sup>1</sup> define the organizational boundary as the boundary that determines the operations owned or controlled by the reporting entity. The City of San Jose's municipal operations inventory encompasses the GHG emissions resulting from actions governed directly by the local government, such as municipal buildings, fleet, and streetlights.

### 1.2 Emissions Sources in San Jose

The 2010 municipal operations inventory includes emissions from the following sectors:

- **Buildings/Facilities:** This sector comprises direct stationary emissions from natural gas combustion (Scope 1) and indirect emissions from purchased electricity (Scope 2) for City buildings and facilities;
- **Streetlights:** The sector includes purchased electricity (Scope 2) for City streetlights and traffic signals;
- **Water:** The sector comprises indirect emissions from electricity used to convey water and wastewater within the City (Scope 2);
- **Airport:** This sector includes purchased electricity (Scope 2) for airport operations;
- **Stationary Sources:** This sector is comprised of diesel fuel combustions in City-operated generators;
- **Vehicle Fleet:** This sector includes direct emissions from fuel combustion in fleet vehicles (Scope 1); and

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<sup>1</sup>The Greenhouse Gas Protocol (GHG Protocol) from WRI/WBCSD (2008) forms the basis for most GHG accounting protocols, available at: <http://www.ghgprotocol.org/>



- **Wastewater Treatment Plant:** This sector includes emissions resulting from the operation of energy (electricity and fuel) consumed by unit processes (Scopes 1 and 2), and indirect process and fugitive emissions from wastewater treatment process, and associated emissions sources (Scope 3).
- **Solid Waste:** This sector comprises solid waste sent to landfill from government-owned and/or operated facilities (Scope 3);
- **Employee Commute:** This sector includes emissions from the fuel combustion in municipal government employee vehicles travelling to and from work (Scope 3).

### 1.3 Emissions Quantification Methodology

The San Jose municipal operations 2010 inventory was developed by DNV-KEMA, following methodology as described by the Local Government Operations Protocol (LGOP) 1.1.<sup>2</sup> The LGOP was developed in partnership and adopted by the California Air Resources Board, the California Climate Action Registry, ICLEI – Local Governments for Sustainability, and the Climate Registry. The associated municipal operations 2005 inventory was also developed by DNV-KEMA. It includes the data sources provided to the City by Joint Venture: Silicon Valley (buildings/facilities; streetlights; water; airport; and solid waste), and is the first 2005 municipal operations inventory developed for San Jose.<sup>3</sup> The 2005 inventory follows the same methodology as that of the 2010 inventory for the included sectors.

### 1.4 Municipal Operations Inventory

#### 1.4.1 Buildings and Facilities

Buildings and facilities emissions were calculated from activity data (metered electricity and natural gas in the buildings and facilities operated by the City of San Jose), which were obtained for electricity and natural gas. Account-level consumption data were provided by PG&E, and individual account business activity descriptors were utilized to assign accounts to this sector.

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<sup>2</sup> LGOP version 1.1, published May 2010, available at: <http://www.theclimateregistry.org/resources/protocols/local-government-operations-protocol/>

<sup>3</sup> Joint Venture: Silicon Valley is available at <http://www.jointventure.org/>



## 1.4.2 Streetlights

This sector includes electricity consumption from City-operated streetlights, traffic lights, and other outdoor lighting. Account-level consumption data was provided by PG&E, and rate schedule data was utilized to assign accounts to this sector (Rate Schedules LS2, TC1, & LS2).

## 1.4.3 Water

This sector comprises electricity consumption of water delivery equipment operated by the City. Account-level consumption data was provided by PG&E, and individual account business activity descriptors were utilized to assign accounts to this sector.

## 1.4.4 Airport

This sector includes purchased electricity (Scope 2) for the operations of San Jose International Airport. Account-level consumption data was provided by PG&E, and the provided Customer Name designations were utilized to assign accounts to this sector (i.e. Customer Name: 'City of San Jose International Airport').

## 1.4.5 Vehicle Fleet

This sector includes emissions from on-road and off-road fuel consumption from vehicles operated by the City of San Jose, including the City vehicle fleet. Fuel quantity data--as well as vehicle year, make, and model data--for all biodiesel, gasoline, diesel, electric, hybrid, LGP, and methanol vehicles, were provided by the city.

## 1.4.6 Solid Waste

This sector includes government-generated solid waste sent to landfill. Municipal solid waste and recycling volume data, as well as frequency of pickup, were provided by each city facility. Tons disposed (landfilled) were input into EPA's LandGEM software<sup>4</sup>, to calculate methane (CH<sub>4</sub>) emissions from solid waste, using the following assumptions:

- 100-year timeframe for waste decomposition;

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<sup>4</sup> EPA's Landfill Gas Emissions Model (LandGEM version 3.02, released May 12, 2005) is available at <http://www.epa.gov/lmop/publications-tools/>



- Landfill gas capture rate = 75%;
- LandGEM parameters:
  - Methane generation rate (k) = 0.05;
  - Potential methane generation capacity (Lo) = 170;
  - NMOC concentration = 4000;
  - Methane content = 50%

### **1.4.7 Wastewater Treatment Plant**

This sector incorporates all emissions as described in the San Jose/Santa Clara Water Pollution Control Plant Master Plan. Sources of emissions include the operation of energy (electricity and fuel) consumed by the unit processes, onsite general stationary combustion units, nitrification and denitrification processes, discharged effluent, the production and transport of wastewater chemicals, and biosolids treatment, transport, and disposal.

### **1.4.8 Employee Commute**

This sector comprises emissions from fuel consumption from City government employee vehicle travel. The City conducted survey of rideshare and travel mode of city employees in 2011, which serves as a proxy for commute patterns in 2010. Mileage travelled, destination, and vehicle type, model, make, and year were provided.