



## 2006 Area Source Emissions Inventory Methodology

### 099 - RESOURCE RECOVERY

#### I. Purpose

This document describes the Area Source Methodology used to estimate emissions of carbon monoxide (CO), nitrogen oxides (NO<sub>x</sub>), fine particulate matter less than 10 microns (PM<sub>10</sub>), volatile organic compounds (VOC), and sulfur oxides (SO<sub>x</sub>) from sources that convert municipal wastes, agricultural wastes, forest wastes, landfill gas, or digesters gas to energy in the San Joaquin Valley Air Basin. An area source is a collection of similar emissions units within a geographic area (ie., a County). Area sources collectively represent individual sources that are small and numerous, and that may not have been inventoried as specific point, mobile, or biogenic sources. The California Air Resources Board (CARB) has grouped these individual sources with other like sources into area source categories. These source categories are grouped in such a way that they can be estimated collectively using one methodology.

#### II. Applicability

The emission calculations from this Area Source Methodology apply to facilities that are identified by the following Category of Emission Source (CES) code and Reconciliation Emission Inventory Code (REIC):

**Table 1. Emission inventory codes**

CES	REIC	Description
83055	99-080-0012-0000	Resource Recovery

#### III. Point Source Reconciliation

Emissions from the area source inventory and point source inventory are reconciled against each other to prevent double counting. This is done using relationships created by the California Air Resources Board (ARB) between the area source REIC and the point sources' Standard Industry Classification (SIC) code and emissions process Source Category Code (SCC) combinations. The area sources in this methodology reconcile against processes in our point source inventory with the following SIC/SCC combinations:

**Table 2. Point source reconciliation relationships for REIC 099-080-0012-0000.**

EIC	SIC	SCC	Point Source Type
099-080-0012-0000	4959, 9199	20100802	Reciprocating Internal Combustion Engines - Electric Generation - Landfill Gas

#### IV. Methodology Description

Resource recovery is generally defined as the extraction of useful materials (paper, glass, metals, etc) or energy from solid waste. For purposes of this methodology we use the more narrow definition found in § 39050.5 of the California Health and Safety Code. Here resource recovery is defined as “a project which converts municipal wastes, agricultural wastes, forest wastes, landfill gas, or digester gas in a manner so as to produce energy as a byproduct in the air basin in which they are produced”. The District permits all waste to energy projects, so all emissions for this source category are reported annually through our point source inventory. The area source emissions for this source category are set to zero.

#### V. Activity Data

The activity data for each facility associated with this source category is reported through the District’s point source inventory.

#### VI. Emission Factors

The emission factors for processes associated with this source category are reported through the District’s point source inventory and are derived from continuous emission monitor (CEMS) equipment, source tests, or approved emission factors.

#### VII. Emissions Calculations

##### Assumptions

All resource recovery facilities within the District are permitted, and data for each facility is collected annually by the District.

##### Sample Calculations

Not applicable.

#### VIII. Temporal Variation

The temporal data for each facility associated with this source category is reported through the District’s point sources inventory.

## IX. Spatial Variation

The spatial data for each facility associated with this source category is reported through the District's point sources inventory.

## X. Growth Factor

Growth factors are developed by either the District's Planning Department or CARB for each EIC. These factors are used to estimate emissions in future years. The growth factors associated with this emissions category may be obtained from the Air Quality Analysis Section of the District's Planning Department.

## XI. Control Level

Emission units within this area source category may be subject to the following District Rules:

**Table 3. District rules and control levels applicable to REIC 099-080-0012-0000.**

Rule No.	Rule Description
4701	Internal Combustion Engines – Phase 1
4702	Internal Combustion Engines – Phase 2

Control levels associated with this emissions category may be obtained from the Air Quality Analysis Section of the District's Planning Department.

## XII. ARB Chemical Speciation

CARB has developed organic gas profiles in order to calculate reactive organic gasses (ROG), volatile organic compounds (VOC) or total organic gas (TOG) given any one of the three values. For each speciation profile, the fraction of TOG that is ROG and VOC is given. The organic gas profile codes can also be used to lookup associated toxics. CARB's speciation profiles for printing operations are presented in Table 4. Organic gas profile #600 is applied to REICs 099-080-0012-0000.

**Table 4. CARB chemical speciation profiles.**

Profile Description	ARB Organic Gas Profile#	Fractions	
		ROG	VOC
Species unknown – all categories composite	600	0.699	0.699

CARB has developed particulate matter speciation profiles in order to calculate particulate matter (PM), particulate matter with a diameter less than or equal to 10 microns (PM<sub>10</sub>) or particulate matter with a diameter less than or equal to 2.5 microns (PM<sub>2.5</sub>) given any one of the three values. For each speciation profile, the fraction of PM that is PM<sub>10</sub> and PM<sub>2.5</sub> is given. The particulate matter profile codes can also be used to lookup associated toxics. CARB's speciation profile for resource recovery is presented in Table 5.

**Table 5. CARB chemical speciation profiles for unspecified combustion sources.**

Profile Description	ARB PM Profile#	Fractions	
		PM <sub>10</sub>	PM <sub>2.5</sub>
Unspecified	900	0.7	0.42

### XIII. Assessment Of Methodology

Since all resource recovery operations in the San Joaquin Valley Air Basin are permitted, there are no area source emissions in this category. All resource recovery emissions are reported through the District's point source inventory.

### XIV. Emissions

Following is the 2006 area source emissions inventory for REIC 099-080-0012-0000 estimated by this methodology. Emissions are reported for each county in the District.

**Table 6. Area source emissions for REIC 099-080-0012-0000 (2006).**

County	Emissions (tons/year)					
	NOx	CO	SOx	VOC <sup>(1)</sup>	PM <sub>10</sub>	PM <sub>2.5</sub> <sup>(2)</sup>
Fresno	0.0	0.0	0.0	0.0	0.0	N/A
Kern	0.0	0.0	0.0	0.0	0.0	N/A
Kings	0.0	0.0	0.0	0.0	0.0	N/A
Madera	0.0	0.0	0.0	0.0	0.0	N/A
Merced	0.0	0.0	0.0	0.0	0.0	N/A
San Joaquin	0.0	0.0	0.0	0.0	0.0	N/A
Stanislaus	0.0	0.0	0.0	0.0	0.0	N/A
Tulare	0.0	0.0	0.0	0.0	0.0	N/A
<b>TOTAL</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>N/A</b>

(1) The District only reports ROG to ARB. As noted in Section XII, ROG is the same as VOC.

(2) At this time, the District does not calculate PM2.5 emissions. PM2.5 emissions can be estimated using the speciation profiles found in Section XII.

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Following is the 2006 point source emissions inventory for REIC 099-080-0012-0000 as reported to the District by our permit holders. Emissions are reported for each county in the District.

**Table 7. Point source emissions for REIC 099-080-0012-0000 (2006).**

County	Emissions (tons/year)					
	NOx	CO	SOx	VOC <sup>(1)</sup>	PM <sub>10</sub>	PM <sub>2.5</sub> <sup>(2)</sup>
Fresno	0.0	0.0	0.0	0.0	0.0	N/A
Kern	0.0	0.0	0.0	0.0	0.0	N/A
Kings	0.0	0.0	0.0	0.0	0.0	N/A
Madera	0.0	0.0	0.0	0.0	0.0	N/A
Merced	0.0	0.0	0.0	0.0	0.0	N/A
San Joaquin	1.7	25.4	0.3	0.4	0.7	N/A
Stanislaus	0.0	0.0	0.0	0.0	0.0	N/A
Tulare	17.0	34.8	9.5	0.1	1.4	N/A
<b>TOTAL</b>	<b>18.7</b>	<b>60.2</b>	<b>9.8</b>	<b>0.5</b>	<b>2.1</b>	<b>N/A</b>

(1) The District only reports ROG to ARB. As noted in Section XII, ROG is the same as VOC.

(2) At this time, the District does not calculate PM2.5 emissions. PM2.5 emissions can be estimated using the speciation profiles found in Section XII.

Following is the 2006 total unreconciled (point source plus area source) emissions inventory for REIC 099-080-0012-0000. Emissions are reported for each county in the District.

**Table 8. Total emissions for REIC 099-080-0012-0000 (2006).**

County	Emissions (tons/year)					
	NOx	CO	SOx	VOC <sup>(1)</sup>	PM <sub>10</sub>	PM <sub>2.5</sub> <sup>(2)</sup>
Fresno	0.0	0.0	0.0	0.0	0.0	N/A
Kern	0.0	0.0	0.0	0.0	0.0	N/A
Kings	0.0	0.0	0.0	0.0	0.0	N/A
Madera	0.0	0.0	0.0	0.0	0.0	N/A
Merced	0.0	0.0	0.0	0.0	0.0	N/A
San Joaquin	1.7	25.4	0.3	0.4	0.7	N/A
Stanislaus	0.0	0.0	0.0	0.0	0.0	N/A
Tulare	17.0	34.8	9.5	0.1	1.4	N/A
<b>TOTAL</b>	<b>18.7</b>	<b>60.2</b>	<b>9.8</b>	<b>0.5</b>	<b>2.1</b>	<b>N/A</b>

(1) The District only reports ROG to ARB. As noted in Section XII, ROG is the same as VOC.

(2) At this time, the District does not calculate PM2.5 emissions. PM2.5 emissions can be estimated using the speciation profiles found in Section XII.

Following is the net change in total unreconciled emissions between this update (2007 inventory year) and the previous inventory year (2006 inventory year) for REIC 099-080-0012-0000. The change in emissions are reported for each county in the District.

**Table 9. Net emissions change for REIC 099-080-0012-0000 (2005-2006).**

County	Emissions (tons/year)					
	NOx	CO	SOx	VOC <sup>(1)</sup>	PM <sub>10</sub>	PM <sub>2.5</sub> <sup>(2)</sup>
Fresno	0.0	0.0	0.0	0.0	0.0	N/A
Kern	0.0	0.0	0.0	0.0	0.0	N/A
Kings	0.0	0.0	0.0	0.0	0.0	N/A
Madera	0.0	0.0	0.0	0.0	0.0	N/A
Merced	0.0	0.0	0.0	0.0	0.0	N/A
San Joaquin	1.7	25.4	0.3	0.4	0.7	N/A
Stanislaus	0.0	0.0	0.0	0.0	0.0	N/A
Tulare	17.0	34.8	9.5	0.1	1.4	N/A
<b>TOTAL</b>	<b>18.7</b>	<b>60.2</b>	<b>9.8</b>	<b>0.5</b>	<b>2.1</b>	<b>N/A</b>

(1) The District only reports ROG to ARB. As noted in Section XII, ROG is the same as VOC.

(2) At this time, the District does not calculate PM2.5 emissions. PM2.5 emissions can be estimated using the speciation profiles found in Section XII.

## XV. Revision History

2006. This is a new District methodology. Landfill gas-fired engines that produce electricity were recoded in the point source inventory so the emissions would reconcile to the Resource Recovery source category.

## XVI. Update Schedule

In an effort to provide inventory information to ARB and other District programs and maximize limited resources, the District has developed an update cycle based on emissions within the source category as shown in Table 6.

**Table 10. Area source update frequency criteria.**

Total Emissions (tons/day)	Update Cycle (years)
<1	4
>1 and <= 2.5	3
>2.5 and <=5	2
>5	1

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Since emissions from this source category are less than 1 ton per day, it will be updated every four years.

**Table 11. Resource Recovery Area Source Methodology Update Frequency**

EIC	Frequency (years)	Source of Emissions (Point Source Inventory / Data Gathering)
099-080-0012-0000	4	Point Source Inventory

## XVII. References

1. State of California. 1985. § 39050.5. Resource Recovery Project. Health and Safety Code, Division 26, Air Resources.