Updated: 12/21/2017

VISTA METHANE INVENTORY

Vista-LA Data Information

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A. DATA INFORMATION, DISCLAMER, AND RELEASE

Vista-LA spatial datasets identify and classify potential methane source emitters in the South Coast Air Basin (SoCAB). SoCAB is the air shed for the greater Los Angeles urban extent, which includes urbanized parts of Los Angeles, Orange, Riverside, and San Bernardino Counties. Vista-LA spatial datasets were created utilizing an assortment of publically available data sources ranging from local, state, and federal agencies.

This document provides specific information and definitions for every data field found in each Vista-LA spatial layer. It also outlines the Vista-LA spatial datasets according to their designated Intergovernmental Panel on Climate Change (IPCC) sector and each layer is presented alphabetically within each IPCC sector. Vista-LA spatial datasets are organized using the IPCC categorization for Greenhouse Gas emissions. IPCC categories utilize a level system, levels 1 to 3, with level 1 relating to general categories ("CH_4 Sectors") and level 3 relating to specific emission sources ("CH_4 Sources").

The Vista-LA dataset features thirteen spatial layers totaling to 33,353 individual features comprised of geolocated and validated points, polylines, and polygons. This dataset contains three point layers, one polyline layer, and nine polygon layers. Vista-LA datasets have been significantly geoprocessed, edited, digitized, and standardized on the ArcGIS 10.4 platform. The standard data formats developed for the released version of the Vista-LA datasets are shapefiles (.shp; Esri vector data storage format) and KMZ files (.kmz; Keyhole Markup Language storage format optimized for Google Earth). The spatial domain for all these datasets have been geoprocessed to fit the SoCAB extent and are georeferenced to the WGS 1984 Datum and UTM Zone 11N Projection. Units for dimensions and activity data are kept consistent with the original data source.

Data Source & Contact Information

These datasets were collected as part of the NASA CCS Program. Additional information for use, disclaimer and release on Vista-LA datasets can be found by contacting the corresponding developers below.

Primary Contact Information:

Francesca Hopkins
Francesca.Hopkins@ucr.edu

Secondary Contact Information:

Valerie Carranza
vcarranz@ucla.edu

Talha Rafiq
Talha.Rafiq@jpl.nasa.gov

Citation

Carranza, V., Rafiq, T., Frausto-Vicencio, I., Hopkins, F., Verhulst, K.R., Rao, P., Duren, R.M., Miller, C.E., Vista-LA: Mapping Methane Emitting Infrastructure in the Los Angeles Megacity, submitted to *Earth System Science Data (ESSD)*.

Carranza, V., Rafiq, T., Frausto-Vicencio, I., Hopkins, F., Verhulst, K.R., Rao, P., Duren, R.M., Miller, C.E., Vista-LA Final Dataset, submitted to *Oak Ridge National Laboratory Distributed Active Archive Center for Biogeochemical Dynamics (ORNL DAAC)*, (https://doi.org/10.3334/ORNLDAAC/1525).

Fair-use Policy & Metadata Details

Vista-LA datasets are made freely available to the public and the scientific community in the belief that their wide dissemination will lead to greater understanding and new scientific and policy insights. Vista-LA contains datasets that have undergone significant quality assurance and quality control processes in accordance with strict guidelines. Every effort is made to produce the most accurate and precise data products possible at the time of their acquisition. However, we reserve the right to make future updates. If the data are obtained for potential use in a publication or presentation, we request that you please contact the authors at the onset of the work. If the Vista-LA data are essential to the work, or if an important result or conclusion depends on the data, it may be appropriate for those obtaining the data to consider co-authorship and/or to contact the co-authors to obtain more timely products as newer products may be available in the future. To discuss publication, presentation and collaboration, please contact the corresponding authors describing your plans for use.

This metadata document fulfills the NASA Base Metadata Requirements (https://wiki.earthdata.nasa.gov/display/NASAISO/NASA+Base+Metadata+Requirements) as outlined by the Earth Science Division and follows the International Organization for Standardization (ISO) Geographic Information – Metadata standard 19115 (https://earthdata.nasa.gov/standards/iso-19115).

B. VISTA-LA DATA CATEGORIZATION

IPCC LEVEL 1	IPCC LEVEL 2	IPCC LEVEL 3
1 Energy	1A Fuel Combustion Activities	1A1 Energy Industries
		1A2 Manufacturing Industries & Construction
		1A3 Transport
		1A4 Other Sources
		1A5 Non Specified
	1B Fugitive Emissions from Fuels	1B1 Solid Fuels
		1B2 Oil & Natural Gas
		1B3 Other Emissions from Energy Production
	1C Carbon Dioxide Transport & Storage	
2 Industrial Processes & Product Use*		
3 Agriculture, Forestry & Other Land Use	3A Livestock	3A1 Enteric Fermentation
		3A2 Manure Management
	3B Land	
	3C Aggregate Sources & Non-CO_2 Emissions	
	3D Other	
4 Waste	4A Solid Waste Disposal	4A1 Managed Waste Disposal Sites
		4A2 Unmanaged Waste Disposal Sites
		4A3 Uncategorized Waste Disposal Sites
	4B Biological Treatment of Solid Waste	
	4C Incineration & Open Burning of Waste	
	4D Wastewater Treatment & Discharge	4D1 Domestic Wastewater Treatment & Discharge
		4D2 Industrial Wastewater Treatment & Discharge
	4DE Other	
5 Other*		

Table 1: This chart describes the Intergovernmental Panel on Climate Change's (IPCC) National Greenhouse Gas Inventory source categorization from Level 1 to Level 3. The seven (7) highlighted Level 3 categories account for ~99% of California's inventoried statewide methane emissions in 2015; thus, only these seven Level 3 categories are included in Vista-LA. Level 2 categories marked with an asterisk indicates that there are more Level 3 categories under this level than are shown here. Omitted Level 3 categories do not contribute significantly to inventoried California methane emissions.

C. VISTA-LA DATA OVERVIEW

Table 2: Summary of Vista-LA layers. Vista-LA layers, representing CH_4 sources corresponding to IPCC Level 3, are shown organized by IPCC greenhouse gas emission reporting taxonomy. The source and year of the raw datasets, the maximum spatial coverage, number of features and format are also given for each Vista-LA layer.

CH_4 Sector	CH_4 Source Type	Vista-LA Layers (CH_4 Source)	Data Source (Year)	Raw Data Spatial Coverage (Data Source)	Vista-LA No. of Features	Vista-LA Data Format
IPCC Level 1	**IPCC Level 2**	**IPCC Level 3**				
1. Energy	**1A Fuel Combustion Activities**	**Energy Industries (IPCC - 1A1)**				
		Petroleum Refineries[a]	EIA (2016) SCAG (2005, 2012)	CONUS (EIA) California (SCAG 2005, SCAG 2012)	12	polygons / kmz
		Power Plants[a]	EIA (2016) SCAG (2005, 2012)	CONUS (EIA) California (SCAG 2005, SCAG 2012)	110	polygons / kmz
	1B Fugitive Emissions From Fuels	**Oil and Natural Gas (IPCC - 1B2)**				
		Compressed Natural Gas (CNG) Fueling Stations[b]	U.S. DOE AFDC (2017)	CONUS	109	polygons / kmz
		Liquefied Natural Gas (LNG) Fueling Stations[b]	U.S. DOE AFDC (2017)	CONUS	27	polygons / kmz
		Natural Gas Compressor Stations[c]	CEC (2011)[c] EPA FLIGHT Tool (2016)	California (CEC)[c] CONUS	25[c] 2	N/A polygons / kmz
		Natural Gas Pipelines[d]	CEC (2012)[d] EIA (2017)	California (CEC)[d] CONUS (EIA)	N/A 111	N/A polylines / kmz
		Natural Gas Processing Plants	EIA (2014)	CONUS	6	polygons / kmz
		Natural Gas Storage Fields	DOGGR (2016) EIA (2016)	California (DOGGR) CONUS (EIA)	3	polygons / kmz
		Oil and Gas Wells	DOGGR (2016)	California	32,537	points / kmz
3. Agriculture, Forestry & Other Land Use	**3A Livestock**	**Enteric Fermentation (IPCC - 3A1)**				
		Dairies	RWQCB (2015)	Chino, Ontario, Riverside Areas	110	points / kmz
		Manure Management (IPCC - 3A2)				
		Anaerobic Lagoons	NASA JPL-Caltech\RWQCB (2015)	Chino, Ontario, Riverside Areas	228	points / kmz
4. Waste	**4A Solid Waste Disposal**	**Managed Waste Disposal (IPCC - 4A1)**				
		Landfills	CARB (2014) CalRecycle (2015) SCAG (2005, 2012)	California (CARB) California (CalRecycle) California (SCAG 2005, SCAG 2012)	73	polygons / kmz
	4D Wastewater Treatment & Discharge	**Domestic and Industrial Water Treatment & Discharge (IPCC - 4D1 and 4D2)**				
		Wastewater Treatment Plants	CARB (2016) SCAG (2005, 2012)	California (CARB) California (SCAG 2005, SCAG 2012)	26	polygons / kmz

[a]Sources may also include fugitive emissions that fall under IPCC source type 1B
[b]Source not currently included in the California Air Resources Board's 2010-2015 GHG Inventory
[c]CEC compressor station data only available as a static representation in Figures 2 and 3.
[d]CEC pipeline data only available as a static representation in Figures 2 and 3.

NOTE:
CalRecycle = California Department of Resources Recycling and Recovery
CARB = California Air Resources Board
CEC = California Energy Commission
CONUS = Contiguous United States Region
DOE = U.S. Department of Energy
DOGGR = California Department of Conservation, Division of Oil, Gas, and Geothermal Resources
EIA = U.S. Energy Information Administration
EPA FRS = U.S. Environmental Protection Agency Facility Registry Service
NPMS = National Pipeline Mapping System
RWQCB = California EPA Regional Water Quality Control Board, Santa Ana Region
SCAG = Southern California Association of Governments

D. VISTA-LA METADATA DEFINITIONS

1. ENERGY (IPCC 1 LEVEL 3)

1.1 ENERGY INDUSTRIES (1A1)

1.1.1 PETROLEUM REFINERIES (IPCC - 1A1)

File Name: VistaLA_Petroleum_Refineries.shp / VistaLA_Petroleum_Refineries.kmz
Data Format: polygon shapefile / kmz file
Data Source: 2005 and 2012 Southern California Association of Governments (SCAG), 2015 Energy Information Administration (EIA)
Number of Data Elements: 12 polygons
Number of Data Fields: 27

Field	Description	Type
FID	Feature identification number	Object ID
Shape	Vector format identification	Geometry
COUNTYNAME	County where the petroleum refinery resides	Text
Shape_Leng	Perimeter length of the petroleum refinery (miles)	Long Integer
Shape_Area	Area of the petroleum refinery (square miles)	Long Integer
Company	Name of the company operating the petroleum refinery	Text
Corp	Corporation; Name of the corporation in charge of the petroleum refinery	Text
Site	City of the petroleum refinery	Text
ZIP	Zip code of the petroleum refinery	Long Integer
State	State of the petroleum refinery	Text
PADD	Petroleum Administration for Defense Districts; geographic aggregations of the 50 States and the District of Columbia into five districts	Long Integer
AD_Mbpd	Atmospheric Distillation; volume of crude oil processed by the atmospheric distillation chamber (thousands of barrels per day; Mb/d)	Long Integer
VDist_Mbpd	Vacuum Distillation; volume of crude oil processed by the vacuum distillation chamber (thousands of barrels per day; Mb/d)	Double
CaDis_Mbpd	Catalytic Disintegration; volume of crude oil processed by the catalytic disintegration chamber (thousands of barrels per day; Mb/d)	Long Integer
VRedu_Mbpd	Viscosity Reduction; volume of crude oil processed by the viscosity reduction chamber (thousands of barrels per day; Mb/d)	Long Integer
CaRef_Mbpd	Catalytic Reformation; volume of crude oil processed by the catalytic reformation chamber (thousands of barrels per day; Mb/d)	Long Integer
Isal_Mbpd	Alkylation and Isomerization; volume of crude oil processed by the alkylation and isomerization chambers (thousands of barrels per day; Mb/d)	Double
HDS_Mbpd	Hydroesulphurization; volume of crude oil processed by the hydroesulphurization chamber (thousands of barrels per day; Mb/d)	Double
Cokin_Mbpd	Coking; volume of crude oil processed by the coking chamber (thousands of barrels per day; Mb/d)	Long Integer
Asph_Mbpd	Asphalt Production; maximum production of asphalt products (thousands of barrels per day; Mb/d)	Long Integer
Source	Source Agency; source of the data	Text

Period	Date of last update	Long Integer
Latitude	y-coordinate in decimal degrees	Double
Longitude	x-coordinate in decimal degrees	Double
Notes	Vista validation notes	Text
Ver_Google	Y/N Flag to indicate verification with Google Earth aerial imagery	Text
VistaDate	Date of most recent update by the NASA JPL Vista Team	Date

1.1.2 POWER PLANTS (IPCC - 1A1)

File Name: VistaLA_Power_Plants.shp / VistaLA_Power_Plants.kmz
Data Format: polygon shapefile / kmz file
Data Source: U.S. Energy Information Administration (EIA) (2016), Southern California Association of Governments (SCAG) (2005, 2012)
Number of Data Elements: 110 polygons
Number of Data Fields: 36

<table>
<tr><th>Field</th><th>Description</th><th>Type</th></tr>
<tr><td>FID</td><td>Feature identification number</td><td>Object ID</td></tr>
<tr><td>Shape</td><td>Vector format identification</td><td>Geometry</td></tr>
<tr><td>Plant_Code</td><td>Office of Regulatory Information Systems (ORIS) in the Department of Energy (DOE) Code, unique identification number for each plant</td><td>Long Integer</td></tr>
<tr><td>Plant_Name</td><td>Name of the power plant</td><td>Text</td></tr>
<tr><td>Utility_Na</td><td>Utility Name; Name of the utility company that owns/operates the power plant</td><td>Text</td></tr>
<tr><td>Utility_ID</td><td>Identification number of the utility company that owns/operates the power plant</td><td>Long Integer</td></tr>
<tr><td>Sector_nam</td><td>Sector Name; Type of entity that owns the powerplant facilities to generate electric power for sale to utilities and end users

<table><tr><th>Category</th><th>Description</th></tr><tr><td>Commercial CHP</td><td>Commercial applications using combined heat and power (CHP) generation methods</td></tr><tr><td>Commercial Non-CHP</td><td>Commercial applications using Non-combined heat and power (Non-CHP) generation methods</td></tr><tr><td>Electric Utility</td><td>Utilities engaged in the generation, distribution and sale of electricity</td></tr><tr><td>Industrial CHP</td><td>Industrial applications using combined heat and power (CHP) methods</td></tr><tr><td>Industrial Non-CHP</td><td>Industrial applications using Non-combined heat and power (Non-CHP) methods</td></tr><tr><td>IPP CHP</td><td>Independent Power Producer (IPP) using combined heat and power (CHP) generation methods</td></tr><tr><td>IPP Non-CHP</td><td>Independent Power Producer (IPP) using Non-combined heat and power (Non-CHP) generation methods</td></tr></table></td><td>Text</td></tr>
<tr><td>City</td><td>City in which the power plant resides</td><td>Text</td></tr>
<tr><td>County</td><td>County in which the power plant resides</td><td>Text</td></tr>
<tr><td>StateName</td><td>State in which the power plant resides</td><td>Text</td></tr>
<tr><td>Zip</td><td>Zip code in which the power plant resides</td><td>Long Integer</td></tr>
<tr><td>Street_Add</td><td>Street address of the power plant</td><td>Text</td></tr>
</table>

<table>
<tr><td>PrimSource</td><td>Primary Source; Primary energy source of the power plant

<table><tr><th>Category</th><th>Description</th></tr><tr><td>Biomass</td><td>Electricity generated from the combustion of or gasification of organic materials</td></tr><tr><td>Natural Gas</td><td>Involves natural gas fired turbine, which runs a generator to produce electricity</td></tr><tr><td>Other</td><td>A plant using energy storage technologies, purchased steam, waste heat not directly attributed to a fuel source, and tire-derived fuels</td></tr><tr><td>Petroleum</td><td>A plant fueled by a broadly defined class of liquid hydrocarbon mixtures.</td></tr></table></td><td>Text</td></tr>
<tr><td>Total_MW</td><td>Total capacity; the total design capacity of the power plant (megawatts/hour; MW/hr)</td><td>Long Integer</td></tr>
<tr><td>Coal_MW</td><td>Design capacity of the power plant for energy derived from coal (megawatts/hour; MW/hr)</td><td>Long Integer</td></tr>
<tr><td>NG_MW</td><td>Design capacity of the power plant for energy derived from natural gas (megawatts/hour; MW/hr)</td><td>Long Integer</td></tr>
<tr><td>Crude_MW</td><td>Design capacity of the power plant for energy derived from crude oil and petroleum products (megawatts/hour; MW/hr)</td><td>Long Integer</td></tr>
<tr><td>Bio_MW</td><td>Design capacity of the power plant for energy derived from biomass (megawatts/hour; MW/hr)</td><td>Text</td></tr>
<tr><td>Hydro_MW</td><td>Hydroelectricity; Design capacity of the power plant for energy derived from hydroelectricity (megawatts/hour; MW/hr)</td><td>Long Integer</td></tr>
<tr><td>HydroPS_MW</td><td>Hydroelectricity Pumped Storage; Design capacity of the power plant for energy derived from pumped storage (megawatts/hour; MW/hr)</td><td>Long Integer</td></tr>
<tr><td>Nuclear_MW</td><td>Nuclear Power; Design capacity of the power plant for energy derived from nuclear (megawatts/hour; MW/hr)</td><td>Long Integer</td></tr>
<tr><td>Solar_MW</td><td>Solar Power; Design capacity of the power plant for energy derived from solar (megawatts/hour; MW/hr)</td><td>Long Integer</td></tr>
<tr><td>Wind_MW</td><td>Wind Power; Design capacity of the power plant for energy derived from wind (megawatts/hour; MW/hr)</td><td>Long Integer</td></tr>
<tr><td>Geo_MW</td><td>Geothermal; Design capacity of the power plant for energy derived from geothermal (megawatts/hour; MW/hr)</td><td>Text</td></tr>
<tr><td>Other_MW</td><td>Design capacity of the power plant for energy derived from other sources (megawatts/hour; MW/hr)</td><td>Text</td></tr>
<tr><td>Tech_desc</td><td>Description of the technology/methodology used to generate power</td><td>Text</td></tr>
<tr><td>Source</td><td>The designated Energy Information Administration (EIA) data collection forms where the power plant data was obtained from</td><td>Text</td></tr>
<tr><td>Period</td><td>Period the data was collected for (YYYYMM)</td><td>Long Integer</td></tr>
<tr><td>Latitude</td><td>y-coordinate in decimal degrees</td><td>Double</td></tr>
<tr><td>Longitude</td><td>x-coordinate in decimal degrees</td><td>Double</td></tr>
<tr><td>Ver_Google</td><td>Y/N Flag to indicate verification with Google Earth aerial imagery</td><td>Text</td></tr>
<tr><td>Ver_SCAG_0</td><td>Y/N Flag to indicate verification with SCAG 2005 land use data</td><td>Text</td></tr>
<tr><td>Ver_SCAG_1</td><td>Y/N Flag to indicate verification with SCAG 2012 land use data</td><td>Text</td></tr>
<tr><td>Notes</td><td>Vista validation notes</td><td>Text</td></tr>
<tr><td>Shape_Area</td><td>Area of the polygon (square miles)</td><td>Double</td></tr>
<tr><td>VistaDate</td><td>Date of most recent update by the NASA JPL Vista Team</td><td>Date</td></tr>
</table>

1.2 OIL AND NATURAL GAS (1B2)

1.2.1 COMPRESSED NATURAL GAS FUELING STATIONS (IPCC - 1B2)

File Name: VistaLA_CNG_Fueling_Stations.shp / VistaLA_CNG_Fueling_Stations.kmz
Data Format: polygon shapefile / kmz file
Data Source: U.S. Department of Energy Alternative Fuels Data Center (http://www.afdc.energy.gov/fuels/data_methods_stations.html)
Number of Data Elements: 109 polygons
Number of Data Fields: 29

Field	Description	Type
FID	Feature identification number	Object ID
Shape	Vector format identification	Geometry
Fuel_Type	CNG=Compressed Natural Gas	Text
Station_Na	Station Name; Name of the CNG fueling station	Text
Station_Add	Station Address; Address of the CNG fueling station	Text
City_1	City location of the CNG fueling station	Text
State	State location of the CNG fueling station	Text
ZIP	Zip Code of the CNG fueling station	Long Integer
Status_Cod	Status Code; The current status of the station given as a code; E=Open	Text
NG_Fill_Ty	The type of dispensing capability available at CNG stations Q = Quick Fill T = Timed Fill B = Both: quick fill and timed fill	Text
NG_PSI	Natural Gas operating pressure (pounds per square inch)	Text
Latitude	y-coordinate in decimal degrees	Double
Longitude	x-coordinate in decimal degrees	Double
ID_1	CNG fueling station identification number	Long Integer
Owner_Type	The type of organization that owns the fueling infrastructure P = Privately Owned T = Utility Owned FG = Federal Government Owned LG = Local Government Owned SG = State Government Owned J = Jointly owned (combination of owner type)	String
Federal_Ag	Federal Agency; A record for the federal agency that owns the CNG station is displayed if it is owned by one	Long Integer
Open_Date	Date when the CNG fueling station opened	Date

<table>
<tr><td>NG_Vehicle</td><td>Type of vehicles served at the CNG fueling station

<table><tr><th>Category</th><th>Description</th></tr><tr><td>HD</td><td>Heavy-duty vehicles</td></tr><tr><td>LD</td><td>Light-duty vehicles</td></tr><tr><td>MD</td><td>Medium-duty vehicles</td></tr></table></td><td>Text</td></tr>
<tr><td>Notes</td><td>Vista validation notes</td><td>Text</td></tr>
<tr><td>Ver_Google</td><td>Y/N Flag to indicate verification with Google Earth aerial imagery</td><td>Text</td></tr>
<tr><td>Vista_Date</td><td>Date of most recent update by the NASA JPL Vista Team</td><td>Date</td></tr>
</table>

1.2.2 LIQUEFIED NATURAL GAS FUELING STATIONS (IPCC - 1B2)

File Name: VistaLA_LNG_Fueling_Stations.shp / VistaLA_LNG_Fueling_Stations.kmz
Data Format: polygon shapefile / kmz file
Data Source: U.S. Department of Energy Alternative Fuels Data Center (http://www.afdc.energy.gov/fuels/data_methods_stations.html)
Number of Data Elements: 27 polygons
Number of Data Fields: 20

<table>
<tr><th>Field</th><th>Description</th><th>Type</th></tr>
<tr><td>FID</td><td>Feature identification number</td><td>Object ID</td></tr>
<tr><td>Shape</td><td>Vector format identification</td><td>Geometry</td></tr>
<tr><td>State</td><td>State</td><td>Text</td></tr>
<tr><td>StAddr</td><td>Street Address</td><td>Text</td></tr>
<tr><td>City</td><td>City</td><td>Text</td></tr>
<tr><td>Postal</td><td>Zip Code</td><td>Text</td></tr>
<tr><td>Fuel_Type</td><td>Fuel Type used at the fueling station; LNG= liquefied natural gas</td><td>Text</td></tr>
<tr><td>Station_1</td><td>Station Name; Name of the LNG fueling station</td><td>Text</td></tr>
<tr><td>Intersecti</td><td>Intersection; Location of the nearest intersection</td><td>Text</td></tr>
<tr><td>Station_Ph</td><td>Station Phone; Phone number of LNG fueling station (if available)</td><td>Text</td></tr>
<tr><td>Station_C_1</td><td>Station Code; The current status of the station given as a code; E=Open</td><td>Text</td></tr>
<tr><td>Latitude_1</td><td>Y-coordinate in decimal degrees</td><td>Double</td></tr>
<tr><td>Longitud_1</td><td>X-coordinate in decimal degrees</td><td>Double</td></tr>
<tr><td>ID_12</td><td>LNG fueling station identification number</td><td>Long Integer</td></tr>
<tr><td>Owner_Ty_1</td><td>The type of organization that owns the fueling infrastructure

<table><tr><th>Category</th><th>Description</th></tr><tr><td>P</td><td>Privately Owned</td></tr><tr><td>T</td><td>Utility Owned</td></tr><tr><td>FG</td><td>Federal Government Owned</td></tr><tr><td>LG</td><td>Local Government Owned</td></tr><tr><td>SG</td><td>State Government Owned</td></tr><tr><td>J</td><td>Jointly owned (combination of owner type)</td></tr></table></td><td>Text</td></tr>
<tr><td>Open_Date_1</td><td>Date when the LNG fueling station opened</td><td>Date</td></tr>
<tr><td>NG_Vehic_1</td><td>Type of vehicles served at the LNG fueling station

<table><tr><th>Category</th><th>Description</th></tr><tr><td>HD</td><td>Heavy-duty vehicles</td></tr><tr><td>LD</td><td>Light-duty vehicles</td></tr></table></td><td>Text</td></tr>
</table>

	MD: Medium-duty vehicles	
Notes	Vista validation notes	Text
Ver_Google	Y/N Flag to indicate verification with Google Earth aerial imagery	Text
VistaDate	Date of most recent update by the NASA JPL Vista Team	Date

1.2.3 NATURAL GAS COMPRESSOR STATIONS (IPCC - 1B2)

File Name: VistaLA_NG_Compressor_Stations.shp / VistaLA_NG_Compressor_Stations.kmz
Data Format: polygon shapefile / kmz file
Data Source: California Energy Commission (2011) and U.S. EPA FLIGHT Tool (2017)
Number of Data Elements: 25 polygons
Number of Data Fields: 13

Field	Description	Type
FID	Feature identification number	Object ID
Shape	Vector format identification	Geometry
Gas_Station	CEC alphanumeric identifier	Text
Name	Name of the natural gas compressor station	Text
Name_Source	Name of the operator in charge of the natural gas compressor station	Text
Station_Ty	Natural Gas Station Type: **Category** / **Description** COMP: Compressor Station COMP & STR: Compressor Station and Storage Station	Text
Owner	Operating company in charge of the compressor station	Text
Postal_City	City of the natural gas compressor station	Text
Zip_Code	Zipcode of the compressor station	Long Integer
County	County of the natural gas compressor station	Text
State	State of the natural gas compressor station	Text
Longitude	x-coordinate in decimal degrees	Double
Latitude	y-coordinate in decimal degrees	Double
Ver_Google	Y/N Flag to indicate verification with Google Earth aerial imagery	Text
VistaDate	Date of most recent update by the NASA JPL Vista Team	Date

1.2.4 NATURAL GAS PIPELINES (IPCC - 1B2)

File Name: VistaLA_NG_Pipelines.shp / VistaLA_NG_Pipelines.kmz
Data Format: polyline shapefile
Data Source: California Energy Commission (2012) and U.S. Energy Information Administration (EIA) (2017)
Number of Data Elements: 111 polylines
Number of Data Fields: 5

Field	Description	Type
FID	Feature identification number	Object ID
Shape	Vector format identification	Geometry
Typepipe	Pipeline extent type, intrastate=within a state, interstate=between states	Long Integer
Operator	Name of Operating Company	Text
Length	Length of pipeline line segment (miles)	Double

1.2.5 NATURAL GAS PROCESSING PLANTS (IPCC - 1B2)

File Name: VistaLA_NG_Processing_Plants.shp / VistaLA_NG_Processing_Plants.kmz
Data Format: polygon shapefile / kmz
Data Source: U.S. Energy Information Administration (EIA) (2014)
Number of Data Elements: 6 polygons
Number of Data Fields: 18

Field	Description	Type
FID	Feature identification number	Object ID
Shape	Vector format identification	Geometry
Facility	Facility name of the natural gas processing plant	Text
Owner	Name of the natural gas processing plant Owner	Text
Operator	Name of the natural gas processing plant Operator	Text
State	State of the natural gas processing plant	Text
County	County of the natural gas processing plant	Text
City	City of the natural gas processing plant	Text
ZipCode	Zip code of the natural gas processing plant	Long Integer
Plant_Flow	Plant flow (Million cubic feet per day)	Double
BTU_Conten	Energy Content (British thermal units)	Text
Dry_Stor	Dry Storage (Million cubic feet)	Text
NGL_Stor	Amount of liquefied natural gas stored at this processing plant (barrel)	Text
Latitude	y-coordinate in decimal degrees	Double
Longitude	x-coordinate in decimal degrees	Double
Capa_MMcfd	Processing capacity of the natural gas processing plant (Million cubic feet per day)	Double
Ver_Google	Y/N Flag to indicate verification with Google Earth aerial imagery	Text
VistaDate	Date of most recent update by the NASA JPL Vista Team	Date

1.2.6 NATURAL GAS STORAGE FIELDS (IPCC - 1B2)

File Name: VistaLA_NG_Storage_Fields.shp / VistaLA_NG_Storage_Fields.kmz
Data Format: polygon shapefile / kmz file
Data Source: California Department of Conservation Division of Oil, Gas, and Geothermal Resources (DOGGR) (2016), U.S. Energy Information Administration (2016)
Number of Data Elements: 3 polygons
Number of Data Fields: 24

Field	Description	Type
FID	Feature identification number	Object ID
Shape	Vector format identification	Geometry
NAME	Name of the natural gas storage field	Text
FIELD_CODE	DOGGR field boundary identifier	Text
AREA_SQ_MI	Area of the natural gas storage field (square miles)	Double
AREA_ACRE	Area of the natural gas storage field (acres)	Double
PERIMETER	Length of perimeter around the natural gas storage field (miles)	Double
District	DOGGR field boundary district number for the state of California (6 total districts)	Text
Statename	Name of the state of the natural gas storage field	Text
Reservoir	Name of the reservoir of the natural gas storage field	Text
Fld_type	Field Type; the type of field the natural gas sits in	Text
Company	Name of the operating company of the natural gas storage field	Text

County	Name of the county of the natural gas storage field	Text
Region	Name of the region of the natural gas storage field	Text
Status	Operational status of the natural gas storage field	Text
Base_gas	Volume of natural gas intended as permanent inventory in a storage reservoir to maintain adequate pressure and deliverability rates throughout the withdrawal season (million cubic feet)	Long Integer
Work_cap	Total gas storage capacity minus base gas (million cubic feet)	Long Integer
Fld_cap	Maximum volume of natural gas that can be stored in an underground storage facility in accordance with its design, which comprises the physical characteristics of the reservoir, installed equipment, and operating procedures particular to the site (million cubic feet)	Long Integer
Maxdeliv	Maximum amount of gas that can be delivered (withdrawn) from a storage facility on a daily basis (million cubic feet per day)	Long Integer
Source	Source of the U.S. EIA survey used to obtain data	Text
Period	Last updated by the U.S. EIA	Long Integer
Latitude	y-coordinate in decimal degrees	Double
Longitude	x-coordinate in decimal degrees	Double
VistaDate	Date of most recent update by the NASA JPL Vista Team	Date

1.2.7 OIL AND GAS WELLS (IPCC - 1B2)

File Name: VistaLA_Oil_Gas_Wells.shp / VistaLA_Oil_Gas_Wells.kmz
Data Format: points shapefile / kmz
Data Source: California Department of Conservation Division of Oil, Gas, and Geothermal Resources (DOGGR) (2016)
Number of Data Elements: 32,537 points
Number of Data Fields: 37

<table>
<tr><th>Field</th><th>Description</th><th>Type</th></tr>
<tr><td>FID</td><td>Feature identification number</td><td>Object ID</td></tr>
<tr><td>Shape</td><td>Vector format identification</td><td>Geometry</td></tr>
<tr><td>APINumber</td><td>Unique, permanent number assigned to each well as standardized by the American Petroleum Institute</td><td>Long Integer</td></tr>
<tr><td>WellNumber</td><td>Operator assigned designation for well</td><td>Text</td></tr>
<tr><td>WellStatus</td><td>Current status of the well
<table>
<tr><th>Category</th><th>Description</th></tr>
<tr><td>A</td><td>Active (well has been drilled and completed)</td></tr>
<tr><td>B</td><td>Buried (older well not abandoned to current standards; location of well is approximate)</td></tr>
<tr><td>I</td><td>Idle (well is idle, not producing, but capable of being reactivated)</td></tr>
<tr><td>N</td><td>New (recently permitted well; in the process of being drilled)</td></tr>
<tr><td>P</td><td>Plugged & Abandoned (Well has been plugged and abandoned to current standards)</td></tr>
<tr><td>U</td><td>Unknown (well status not known; mostly older, pre-1976 wells)</td></tr>
</table></td><td>Text</td></tr>
<tr><td>GISSymbol</td><td>Well status code that uses 2-digits to identify type of well
<table>
<tr><th>Category</th><th>Description</th></tr>
<tr><td>AI</td><td>Air Injector</td></tr>
<tr><td>DG</td><td>Dry Gas</td></tr>
<tr><td>GD</td><td>Gas Disposal</td></tr>
</table></td><td>Text</td></tr>
</table>

<table>
<tr><td></td><td><table>
<tr><td>DH</td><td>Dry Hole</td></tr>
<tr><td>GS</td><td>Gas Storage</td></tr>
<tr><td>LG</td><td>Liquid Gas</td></tr>
<tr><td>OB</td><td>Observation</td></tr>
<tr><td>OG</td><td>Oil & Gas</td></tr>
<tr><td>PM</td><td>Pressure Maintenance</td></tr>
<tr><td>SC</td><td>Cyclic Steam</td></tr>
<tr><td>SF</td><td>Steam Flood</td></tr>
<tr><td>WD</td><td>Water Disposal</td></tr>
<tr><td>WF</td><td>Water Flood</td></tr>
<tr><td>WS</td><td>Water Source</td></tr>
</table></td><td></td></tr>
<tr><td>OperatorCo</td><td>Operator Company; Unique, permanent number assigned to each operator</td><td>Text</td></tr>
<tr><td>OperatorNa</td><td>Operator Name; Name of individual or organization responsible for management of well</td><td>Text</td></tr>
<tr><td>LeaseName</td><td>Name of Oil & Gas lease in which well is located</td><td>Text</td></tr>
<tr><td>FieldName</td><td>Name of Oil & Gas field in which the well is located</td><td>Text</td></tr>
<tr><td>AreaName</td><td>Name of area in which well is located</td><td>Text</td></tr>
<tr><td>District</td><td>California Department of Conservation Division of Oil, Gas and Geothermal Resources (DOGGR) district with jurisdiction over the location in which well is located</td><td>Long Integer</td></tr>
<tr><td>County</td><td>County with jurisdiction over the location in which well is located</td><td>Text</td></tr>
<tr><td>Section_</td><td>Public Land Survey System section number in which well is located</td><td>Long Integer</td></tr>
<tr><td>Township</td><td>Public Land Survey System township in which well is located</td><td>Text</td></tr>
<tr><td>Range</td><td>Public Land Survey System range in which well is located</td><td>Text</td></tr>
<tr><td>Township_D</td><td>Single digit designator for Public Land Survey System township in which well is located</td><td>Double</td></tr>
<tr><td>Range_D</td><td>Single digit designator for Public Land Survey System range in which well is located</td><td>Double</td></tr>
<tr><td>BMeridian</td><td>Principle meridians required for all California surveys; defines Public Land Survey System base (Base Meridian); SB=San Bernardino</td><td>Text</td></tr>
<tr><td>Latitude</td><td>y-coordinate in decimal degrees</td><td>Double</td></tr>
<tr><td>Longitude</td><td>x-coordinate in decimal degrees</td><td>Double</td></tr>
<tr><td>Elevation</td><td>Surface elevation of the well (feet)</td><td>Text</td></tr>
<tr><td>TotalDepth</td><td>Total measured depth of well bore (feet)</td><td>Long Integer</td></tr>
<tr><td>RedrillFt</td><td>Total vertical depth of re-drill (feet) (Re-drill Footage)</td><td>Long Integer</td></tr>
<tr><td>RedCanFlag</td><td>Represents the number of re-drills for a well (Re-drill Cancel Flag)</td><td>Text</td></tr>
<tr><td>Location</td><td>Optional verbal description of well location</td><td>Text</td></tr>
<tr><td>Comments</td><td>Optional comments about the well</td><td>Text</td></tr>
<tr><td>GISSource</td><td>3-digit code describing the method by which the well location was established (Ranked from most accurate to least accurate)<table>
<tr><th>Category</th><th>Description</th></tr>
<tr><td>GPS</td><td>Global Positioning System</td></tr>
<tr><td>OPR</td><td>Operator</td></tr>
<tr><td>SUM</td><td>Well summary report</td></tr>
<tr><td>NOI</td><td>Notice of intent to drill</td></tr>
<tr><td>HUD</td><td>Heads up digitized</td></tr>
<tr><td>UNK</td><td>Unknown</td></tr>
</table></td><td>Text</td></tr>
<tr><td>DryHole</td><td>Y/N flag indicating if a well produced commercial quantities of hydrocarbons</td><td>Text</td></tr>
<tr><td>ConfWell</td><td>Confidential Well; Y/N flag indicating if subsurface information for well is held confidential for a period of two years pursuant to Public Resources Code 3234</td><td>Text</td></tr>
</table>

DirDrill	Directional Drilling; Indicator of whether well was directionally drilled (NULL for confidential wells)	Text
HydFrac	Hydraulic Fracturing; BLANK Y/N flag indicating whether a well received hydraulic stimulation treatment (hydraulic fractured)	Text
BLMWell	Y/N flag indicating whether the Bureau of Land Management (BLM) exercises jurisdiction of well	Text
EPAWell	Y/N flag indicating whether the Environmental Protection Agency (EPA) exercises jurisdiction of well	Text
SpudDate	Date on which well drilling commenced	Date
CompDate	Completion Date; Date on which wellhead oil & gas production equipment was installed	Date
AbdDate	Abandoned Date; Date on which well was plugged & abandoned to Division standards	Date
VistaDate	Date of most recent update by the NASA JPL Vista Team	Date

2. AGRICULTURE, FORESTRY, AND OTHER LAND USES (IPCC 3 LEVEL 3)

2.1 ENTERIC FERMENTATION (3A1)

2.1.1 DAIRIES (IPCC - 3A1)

File Name: VistaLA_Dairies.shp / VistaLA_Dairies.kmz
Data Format: points shapefile / kmz file
Data Source: California Regional Water Quality Control Board (RWQCB) Santa Ana Region (2015)
Number of Data Elements: 110 points
Number of Data Fields: 30

Field	Description	Type
FID	Feature identification number	Object ID
Shape	Vector format identification	Geometry
Site_Descr	Site Description; Name of the farm	Text
Facility_S	Address of the farm	Text
Basin	Basin location of the farm	Text
Place_ID	Unique dairy farm identifier	Long Integer
GPSLat_D	Latitude, y-coordinate in decimal degrees	Double
GPSLong_D	Longitude, x-coordinate in decimal degrees	Double
Report_Yea	Year the report was generated	Long Integer
No_Milking	Amount of milking cows on the farm	Long Integer
Report_Y_1	Amount of dry cows on the farm	Text
No_Heifers	Amount of young female cows that haven't borne a calf on the farm	Long Integer
No_Calves	Amount of young cows on the farm	Long Integer
No_Horses	Amount of horses on the farm	Long Integer
No_Pigs	Amount of pigs on the farm	Long Integer
Others	Amount of other animals on the farm	Long Integer
Annual_Man	Amount of manure produced (tons/year)	Long Integer
Manure_Hau	Amount of manure hauled (tons/year)	Long Integer
FacilityCr	Amount of crops at a facility (tons) (if available)	Long Integer
Crop	Types of crops grown on the farm (if applicable)	Text
WW	Amount of waste water generated (gallons/day)	Long Integer
ver_Google	Y/N Flag to indicate verification with Google Earth aerial imagery	Text
notes	Vista validation notes	Text
VistaDate	Date of most recent update by the NASA JPL Vista Team	Date

2.2 MANURE MANAGEMENT (3A2)

2.2.1 ANAEROBIC LAGOONS (IPCC - 3A2)

File Name: VistaLA_Anaerobic_Lagoons.shp / VistaLA_Anaerobic_Lagoons.kmz
Data Format: points shapefile / kmz file
Data Source: NASA/JPL-Caltech (2015)
Number of Data Elements: 228 points
Number of Data Fields: 5

Field	Description	Type
FID	Feature identification number	Object ID
Shape	Vector format identification	Geometry
Longitude	x-coordinate in decimal degrees	Double
Latitude	y-coordinate in decimal degrees	Double
VistaDate	Date of most recent update by the NASA JPL Vista Team	Date

3. WASTE (IPCC 4 LEVEL 3)

3.1 MANAGED WASTE DISPOSAL (4A1)

3.1.1 LANDFILLS (IPCC - 4A1)

File Name: VistaLA_Landfills.shp / VistaLA_Landfills.kmz
Data Format: polygon shapefile / kmz file
Data Source: California Air Resources Board (2014), California's Department of Resources Recycling and Recovery's Solid Waste Information System (2015), Southern California Association of Governments (2005, 2012)
Number of Data Elements: 73 polygons
Number of Data Fields: 25

Field	Description	Type
FID	Feature identification number	Object ID
Shape	Vector format identification	Geometry
SwisNo	SWIS Number; A unique identification number assigned to a specific facility, site or operation. It comprises eight characters and is divided into three parts having the form "XX-YY-ZZZZ". The first two characters are numbers that represent the County in which the facility is located. The second two are alpha characters and is a code used by a particular LEA or Board Program. The last four characters are numbers generated by the database.	Text
Sitename	Name of the Landfill site	Text
CountyID	County Identification number the landfill resides in	Long Integer
County	Name of the County the landfill resides in	Text
Operator	Operator name of the landfill	Text
Location	Address of the landfill	Text
Placename	Name of the City the landfill resides in	Text
Zip	Zip code the landfill resides in	Text
EnforAgent	Enforcement Agency; the entity responsible for enforcing solid waste handling laws and regulations in a particular jurisdiction in the state.	Text
Owner	Name of the Owner of the landfill	Text

<table>
<tr>
<td>Category</td>
<td>A set of waste management activities that are related through similar waste handling methods. Categories include: Transfer/Process, Composting, Transformation, Disposal, Waste Tire Site
<table>
<tr><th>Category</th><th>Description</th></tr>
<tr><td>Disposal</td><td>The final deposition of solid wastes onto land, into the atmosphere, or into the waters of the state.</td></tr>
</table>
</td>
<td>Text</td>
</tr>
<tr>
<td>Activity</td>
<td>A solid waste facility or site or operation may include one or more waste handling activities.
<table>
<tr><th>Category</th><th>Description</th></tr>
<tr><td>Solid Waste Disposal Site</td><td>"Disposal site" or "site" includes the place, location, tract of land, area, or premises in use, intended to be used, or which has been used for the landfill disposal of solid wastes.</td></tr>
<tr><td>Solid Waste Landfill</td><td>A disposal facility that currently accepts solid waste for land disposal, but does not include a facility which receives only wastes generated by the facility owner or operator in the extraction, beneficiation, or processing of ores and minerals, or a cemetery which disposes onsite only the grass clippings, floral wastes, or soil resulting from activities on the grounds of that cemetery.</td></tr>
</table>
</td>
<td>Text</td>
</tr>
<tr>
<td>RegStatus</td>
<td>Regulatory Status; The state of a particular waste handling facility, operation or site with respect to the requirements that the waste handling activities are to be conducted under the terms and conditions of a permit, closure plan, never been required to have a permit, or currently not required to have a permit.
<table>
<tr><th>Category</th><th>Description</th></tr>
<tr><td>Exempt</td><td>After a public hearing the enforcement agency may grant an exemption from the requirement that a solid waste facility obtain a permit.</td></tr>
<tr><td>Not Currently Required</td><td>Regulatory status is not currently required</td></tr>
<tr><td>Permitted</td><td>Indicates that a facility or site held a solid waste facility permit</td></tr>
<tr><td>Pre-regulations</td><td>Used for those disposal sites that ceased operations prior to August 15, 1977, when solid waste facility permits were required. Pre-regulation may also be used in the interim for those operations/facilities that may come under tiered requirements for permitting at a later date.</td></tr>
<tr><td>To Be Determined</td><td>There is presently not enough information to determine a Regulatory Status or Operational Status</td></tr>
<tr><td>Unpermitted</td><td>Indicates that the facility, operation or site never had or does not have a Solid Waste Facility Permit.</td></tr>
</table>
</td>
<td>Text</td>
</tr>
</table>

<table>
<tr><td>OpStatus</td><td>Operation Status of the landfill

<table><tr><th>Category</th><th>Description</th></tr><tr><td>Absorbed</td><td>Existing sites (permitted facilities) are being combined into a single facility under one of the existing permit numbers (SWIS Numbers) -or- combined under a separate new permit number (SWIS Number).</td></tr><tr><td>Active</td><td>A site that is currently accepting, handling, processing, or disposing waste.</td></tr><tr><td>Clean Closed</td><td>A site that has documentation of the removal of solid waste on file with the Board. When a site is clean closed, the site is considered to cease to exist as a solid waste disposal site, but records are kept to document the status of the site.</td></tr><tr><td>Closed</td><td>A site that has ceased accepting, handling, or disposing of waste (and is not inactive) and/or has documentation that closure was conducted in accordance with applicable statutes, regulations, and local ordinances in effect at the time</td></tr><tr><td>Closing</td><td>A site that has ceased accepting waste and is undergoing closure consistent with an approved final closure plan. Closing applies to landfills or disposal sites undergoing closure operations pursuant to closure plan development and implementation up to certification of closure.</td></tr><tr><td>Inactive</td><td>A permitted facility that was "Active" and has received the last shipment of waste as certified in writing by the LEA, but has not completed the closure plan submittal review and approval process. These sites will be moving toward "Closing" and "Closed" status and will not be returning to "Active" status. The term "Inactive" is used to differentiate these from sites that are actively receiving waste or will do so in the near future (within one year).</td></tr></table></td><td>Text</td></tr>
<tr><td>Latitude</td><td>y-coordinate in decimal degrees</td><td>Double</td></tr>
<tr><td>Longitude</td><td>x-coordinate in decimal degrees</td><td>Double</td></tr>
<tr><td>SiteID</td><td>Unique numeric identifier for the landfill site</td><td>Long Integer</td></tr>
<tr><td>UnitID</td><td>Unique numeric identifier for the landfill unit</td><td>Long Integer</td></tr>
<tr><td>Ver_Google</td><td>Y/N Flag to indicate verification with Google Earth aerial imagery</td><td>Text</td></tr>
<tr><td>Ver_SCAG_0</td><td>Y/N Flag to indicate verification with SCAG 2005 land use data</td><td>Text</td></tr>
<tr><td>Ver_SCAG_1</td><td>Y/N Flag to indicate verification with SCAG 2012 land use data</td><td>Text</td></tr>
<tr><td>Notes</td><td>Vista validation notes</td><td>Text</td></tr>
<tr><td>Shape_Area</td><td>Area of the polygon (square miles)</td><td>Double</td></tr>
<tr><td>VistaDate</td><td>Date of most recent update by the NASA JPL Vista Team</td><td>Date</td></tr>
<tr><td>Year_LFG_C</td><td>Year that landfill gas collection (LFG_C) began at the landfill facility</td><td>Double</td></tr>
<tr><td>Control_Ty</td><td>Control Type; Methods by which landfill gas movement is controlled through combustion or venting at the landfill facility</td><td>Text</td></tr>
</table>

3.2 DOMESTIC AND INDUSTRIAL WATER TREATMENT AND DISCHARGE (4D1 and 4D2)

3.2.1 WASTEWATER TREATMENT PLANTS (IPCC - 4D1 and 4D2)

File Name: VistaLA_Wastewater_Treatment_Plants.shp / VistaLA_Wastewater_Treatment_Plants.kmz
Data Format: polygon shapefile / kmz file
Data Source: California Air Resources Board (2016), Southern California Association of Governments (2012)
Number of Data Elements: 26 polygons
Number of Data Fields: 14

Field	Description	Type
FID	Feature identification number	Object ID
Shape	Vector format identification	Geometry
Shape_Area	Area of the polygon (square miles)	Double
Plant	Name of the wastewater treatment plant	Text
Location	Address of the wastewater treatment plant	Text
City	City of the wastewater treatment plant	Text
County	County of the wastewater treatment plant	Text
State	State of the wastewater treatment plant	Text
ZIP	Zip code of the wastewater treatment plant	Long Integer
Latitude	y-coordinate in decimal degrees	Double
Longitude	x-coordinate in decimal degrees	Double
DesignFlow	Amount of intake of wastewater in the treatment plant (million gallons/day)	Double
Notes	Vista validation notes	Text
Ver_Google	Y/N Flag to indicate verification with Google Earth aerial imagery	Text
VistaDate	Date of most recent update by the NASA JPL Vista Team	Date

E. REFERENCES

California Department of Conservation Division of Oil Gas and Geothermal Resources. GIS Mapping http://www.conservation.ca.gov/dog/maps/Pages/GISMapping2.aspx.

California Department of Resources Recycling and Recovery (CalRecycle). SWIS Facility/Site Search http://www.calrecycle.ca.gov/SWFacilities/Directory/Search.aspx.

CARB. *GHG Inventory Technical Documentation*; 2014.

CARB. *California Greenhouse Gas Inventory for 2000-2013 — by Sector and Activity Electricity Generation (In State) California Greenhouse Gas Inventory for 2000-2013 — by Sector and Activity*; 2015.

Hunsaker, L. *Larry Hunsaker of California Air Resources Board, Emission Inventory Branch, personal communication with Valerie Carranza*; 2016.

Kashak, E. Edward Kashak from California Regional Water Quality Board, Santa Ana Region personal communication with Francesca Hopkins. 2016.

Los Angeles County GIS Data Portal. Methane Producing Landfills http://egis3.lacounty.gov/dataportal/2014/01/06/methane-producing-landfills-2/.

Pipeline and Hazardous Materials Safety Administration; U.S. Department of Transportation. National Pipeline Mapping System https://www.npms.phmsa.dot.gov/.

Rose, T. *Terry Rose of California Energy Commission, GIS Unit, personal communication with Francesca Hopkins; 2016.*

Southern California Association of Governments. GIS and Data Services http://gisdata.scag.ca.gov/Pages/GIS-Library.aspx.

State Water Resources Control Board. Regulated Facility Report https://ciwqs.waterboards.ca.gov/ciwqs/readOnly/CiwqsReportServlet?inCommand=reset&reportName=RegulatedFacility.

State Water Resources Control Board. Searching for NPDES Wastewater Facilities http://www.swrcb.ca.gov/water_issues/programs/npdes/docs/wwtf_search.pdf.

U.S. Department of Energy. Alternative Fuels Data Center, 2017. http://www.afdc.energy.gov/.

U.S. Energy Information Administration. Maps: Layer Information for Interactive State Maps https://www.eia.gov/maps/layer_info-m.cfm.

U.S. Environmental Protection Agency. EPA Facility Level Information on Greenhouse Gases Tool (FLIGHT). 2017. https://ghgdata.epa.gov/ghgp/main.do#.

U.S. Environmental Protection Agency. EPA Facility Registry Service (FRS): Wastewater Treatment Plants https://catalog.data.gov/dataset/epa-facility-registry-service-frs-wastewater-treatment-plants.

U.S. Environmental Protection Agency. ICIS-NPDES Download Summary and Data Element Dictionary https://echo.epa.gov/tools/data-downloads/icis-npdes-download-summary.