

The California Air Pollution Mapping Tool

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California Air Resources Board

Presented at the 2017 International Emissions Inventory Conference

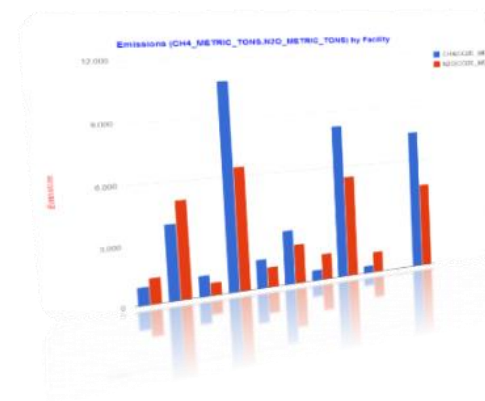
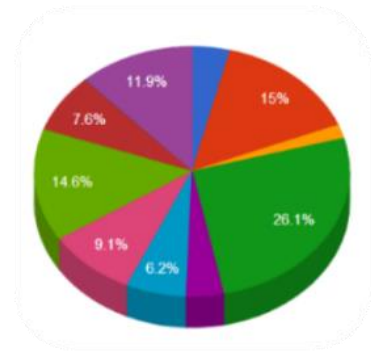
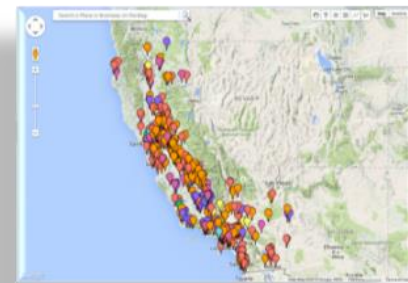
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Background

- ▶ Over the past 50 years, CARB has established emission inventory programs for criteria pollutants, toxic air contaminants and greenhouse gases
- ▶ Each program started in different years and had its own specific air quality goals, leading to different reporting frequencies, requirements, and mechanisms
- ▶ Separate databases have made it difficult to link criteria pollutants, toxic air contaminant and greenhouse gas emissions for a specific facility
- ▶ Historically, each type of emissions data has been made available to the public through separate web pages
- ▶ Pollution Mapping Tool is CARB's first step to integrate emissions inventories into one database system

Pollution Mapping Tool Overview

- ▶ Valuable data portal and analytical platform for emissions data collected under various programs
- ▶ Enables the public to query, view, and analyze emissions of GHG and criteria air pollutants from large facilities in California.
- ▶ Users can find facilities and associated emissions at the state, regional, local and community levels
- ▶ Allows comparison of GHG and criteria pollutant emission trends by facility
- ▶ Presents emissions data in maps, charts and tabular formats



Data Sources

- ▶ GHG emissions data are collected by CARB under the authority of the Mandatory Reporting Regulation for Greenhouse Gas Emissions and reported through the California Electronic Greenhouse Gas Reporting Tool (Cal-eGGRT)
- ▶ Criteria and toxic pollutant emissions are reported by 35 local air districts and uploaded into CARB's California Emission Inventory Development and Reporting System (CEIDARS)

System Design

- ▶ Mapping tool is an online application accessible through web browsers
- ▶ Back end is an Oracle database that includes data tables and views for facility information and emissions data, as well as auxiliary crosswalks between data systems
- ▶ The application uses a server-side PHP script to query the database and return the data to the client-side web browsers
- ▶ Data are processed with functions and procedures written in JavaScript, jQuery, and third party libraries
- ▶ Spatial and graphical analyses use Google Maps and Google Charts APIs

Front End GUI

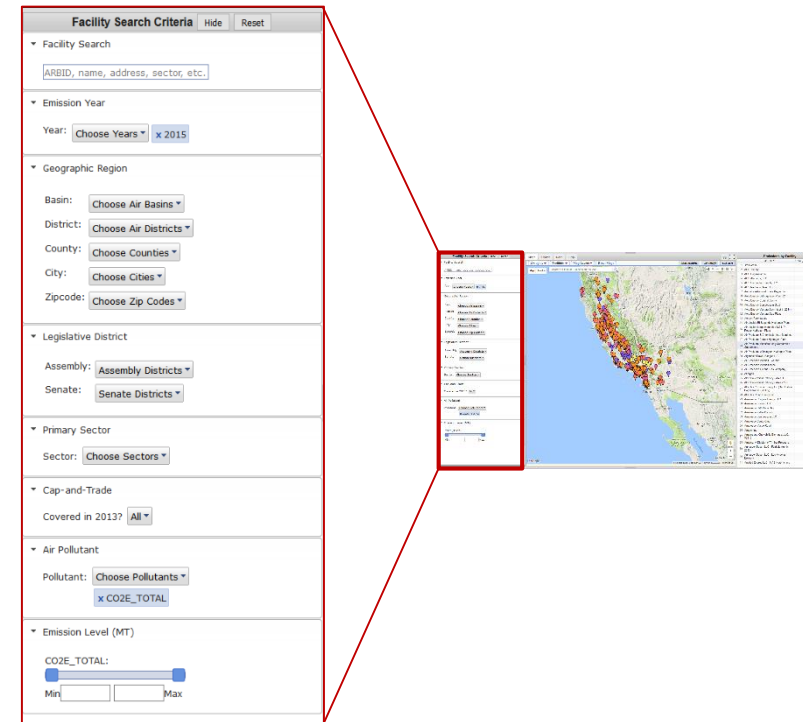
The screenshot displays the CARB Pollution Mapping Tool interface. At the top, there are logos for 'climate CHANGE', 'Scoping Plan Implementation', 'Cap-and-Trade', and the 'California Environmental Protection Agency AIR RESOURCES BOARD'. Navigation tabs for 'Maps', 'Charts', 'Data', and 'Help' are visible. The left sidebar contains 'Facility Search Criteria' with filters for 'Facility Search', 'Emission Year', 'Geographic Region', 'Legislative District', 'Primary Sector', 'Cap-and-Trade', and 'Air Pollutant'. The central map shows California with numerous colored markers representing facilities. The right sidebar, titled 'Emissions by Facility', contains a table with the following data:

FACILITY	CO2E_TOTAL (MT)
1 3M Corona	14,809
2 ABI Foundry	15,857
3 ACE Cogeneration	0
4 AES Alamitos, LLC	684,896
5 AES Huntington Beach, LLC	432,210
6 AES Redondo Beach LLC	318,370
7 Aemetis Advanced Fuels Keyes, Inc.	69,826
8 Aera Energy Belridge Gas Plant 32	33,441
9 Aera Energy Coastal Basins	231,065
10 Aera Energy San Joaquin Basin	3,342,461
11 Aera Energy Ventura Basin (opt-in 2014)	12,976
12 Aera Energy Ventura Gas Plant	4,923
13 Aerojet Rocketdyne	9,511
14 Air Liquide El Segundo Hydrogen Plant	552,487
15 Air Liquide Large Industries US L.P. - Rodeo Hydrogen Plant	819,886
16 Air Products & Chemicals, Inc., Martinez	196,728
17 Air Products Carson Hydrogen Plant	673,014
18 Air Products Manufacturing Corporation, Sacramento	44,205
19 Air Products Wilmington Hydrogen Plant	633,296
20 Algonquin Power Sanger, LLC	58,207
21 All American Asphalt - Corona	12,783
22 All American Asphalt Irvine	10,406
23 All American Oil and Gas Company	173,969
24 Allergan	9,080
25 Alon Bakersfield Refinery - Area 3	0
26 Alon Bakersfield Refinery - Areas 1&2	31,340
27 AltaGas Pomona Energy Inc (San Gabriel Cogeneration Facility)	53,742
28 AltaGas Ripon Energy Inc.	24,547
29 Ameresco Chiquita Energy LLC	33,279
30 Ameresco Forward LLC	16,644
31 Ameresco Half Moon Bay	45,483

At the bottom of the interface, it reads 'CARB Pollution Mapping Tool (ver 1.1) questions? contact us'.

Facility Search Panel

- ▶ Users can specify facility search criteria, such as facility name, geographical location, industrial sector, and participation in cap-and-trade
- ▶ Users can also specify pollutants, emission years, and emissions thresholds
- ▶ Search options allow high level of customization for emissions datasets, maps, and charts

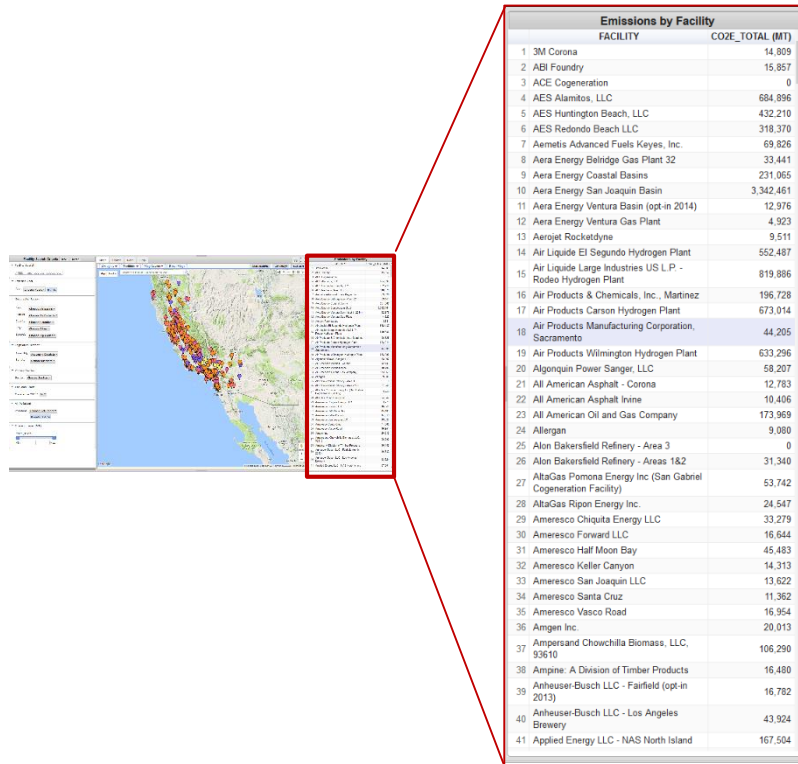


The image shows a screenshot of the 'Facility Search Criteria' panel on the left and a map view on the right. The panel is titled 'Facility Search Criteria' and has 'Hide' and 'Reset' buttons. It contains several sections for filtering search results:

- Facility Search:** A text input field with the placeholder 'ARBID, name, address, sector, etc.'
- Emission Year:** A 'Year:' label, a 'Choose Years' button, and a selected year '2015'.
- Geographic Region:** A series of dropdown menus for 'Basin', 'District', 'County', 'City', and 'Zipcode', each with a 'Choose' button.
- Legislative District:** 'Assembly:' and 'Senate:' dropdown menus with 'Choose' buttons.
- Primary Sector:** A 'Sector:' dropdown menu with a 'Choose' button.
- Cap-and-Trade:** A 'Covered in 2013?' dropdown menu with 'All' selected.
- Air Pollutant:** A 'Pollutant:' dropdown menu with a 'Choose' button and a selected pollutant 'CO2E_TOTAL'.
- Emission Level (MT):** A 'CO2E_TOTAL:' label, a slider bar, and 'Min' and 'Max' input fields.

The map view on the right shows a geographical map of California with various locations marked by colored dots. A red box highlights the map area, and a red line connects it to the search panel, indicating that the search results are displayed on the map.

Emissions Summary Panel



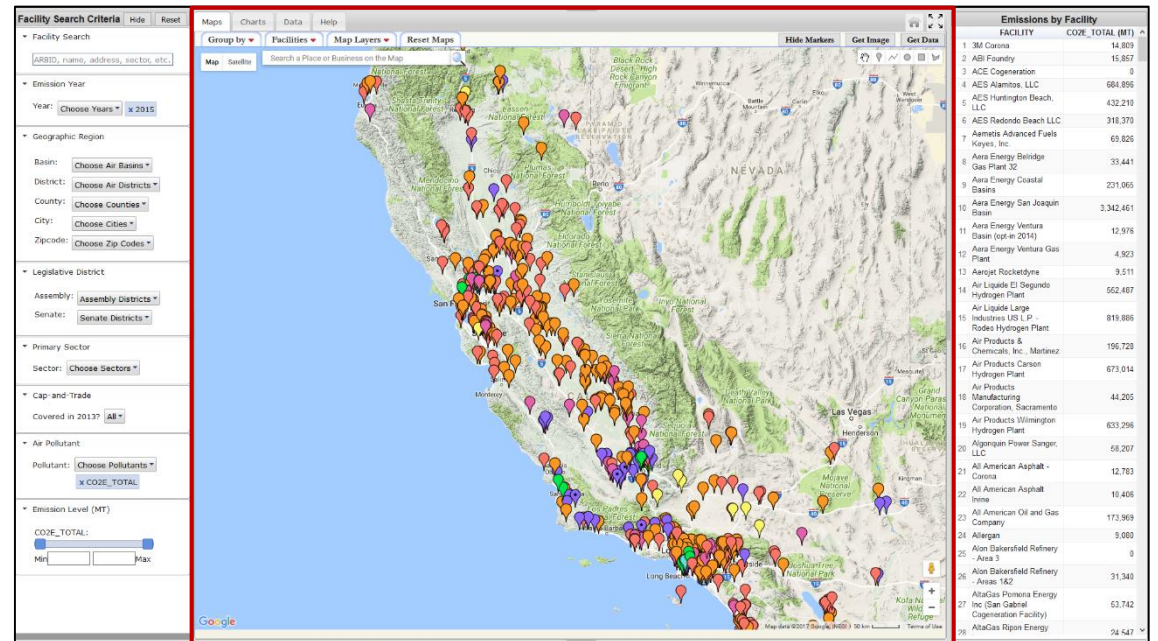
The screenshot displays the Emissions Summary Panel, which includes a map of California with facility locations marked by colored dots. A red box highlights the 'Emissions by Facility' table, which is shown in detail below.

Emissions by Facility	
FACILITY	CO2E_TOTAL (MT)
1 3M Corona	14,809
2 ABI Foundry	15,857
3 ACE Cogeneration	0
4 AES Alamitos, LLC	684,896
5 AES Huntington Beach, LLC	432,210
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29 Ameresco Chiquita Energy LLC	33,279
30 Ameresco Forward LLC	16,644
31 Ameresco Half Moon Bay	45,483
32 Ameresco Keller Canyon	14,313
33 Ameresco San Joaquin LLC	13,622
34 Ameresco Santa Cruz	11,362
35 Ameresco Vasco Road	16,954
36 Amgen Inc.	20,013
37 Ampersand Chowchilla Biomass, LLC, 93610	106,280
38 Ampine - A Division of Timber Products	16,480
39 Anheuser-Busch LLC - Fairfield (opt-in 2013)	16,762
40 Anheuser-Busch LLC - Los Angeles Brewery	43,924
41 Applied Energy LLC - NAS North Island	167,504

- ▶ Displays list of facilities and associated emissions selected in Facility Search panel
- ▶ List can be sorted by facility name or by emissions

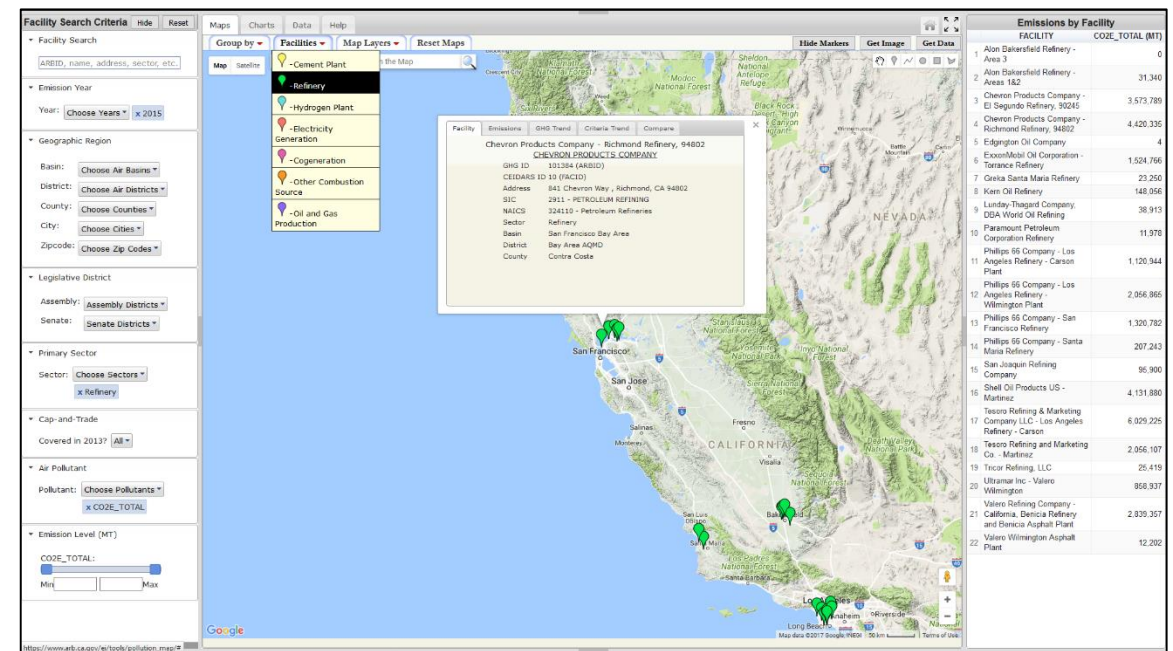
Center Display Panel

- ▶ Displays data in mapping, graphic, or tabular formats
- ▶ Allows visualization of facility physical location and graphical analyses of facility emissions data



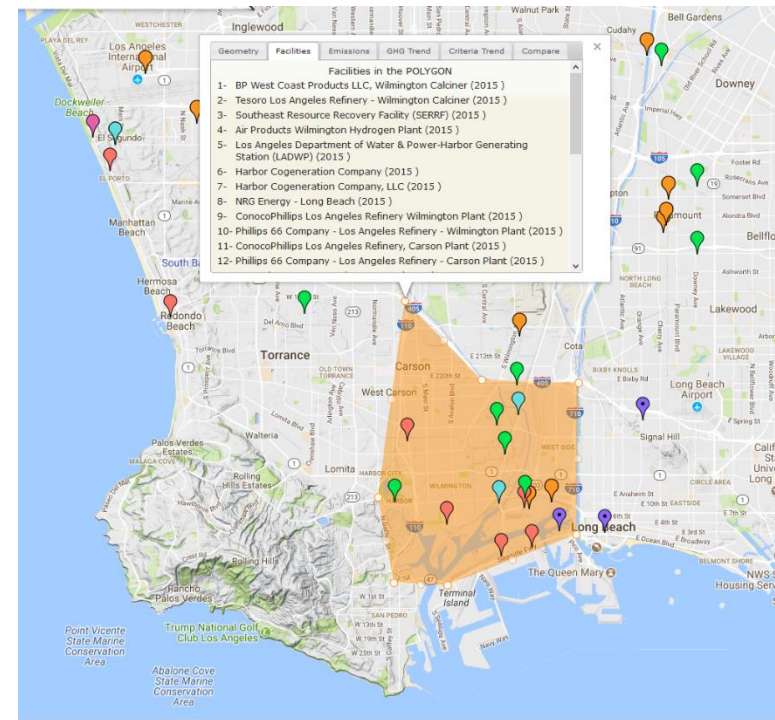
Maps View

- ▶ Facilities are displayed by color-coded markers by industrial sector
- ▶ Clicking on a facility marker opens an information window with tabs for facility information, emissions data, GHG and criteria pollutant trends, and comparison of pollutant trends.
- ▶ A 'Notes' tab is included if there is any additional information that may be helpful to explain the emissions changes over time.



User-Defined Views

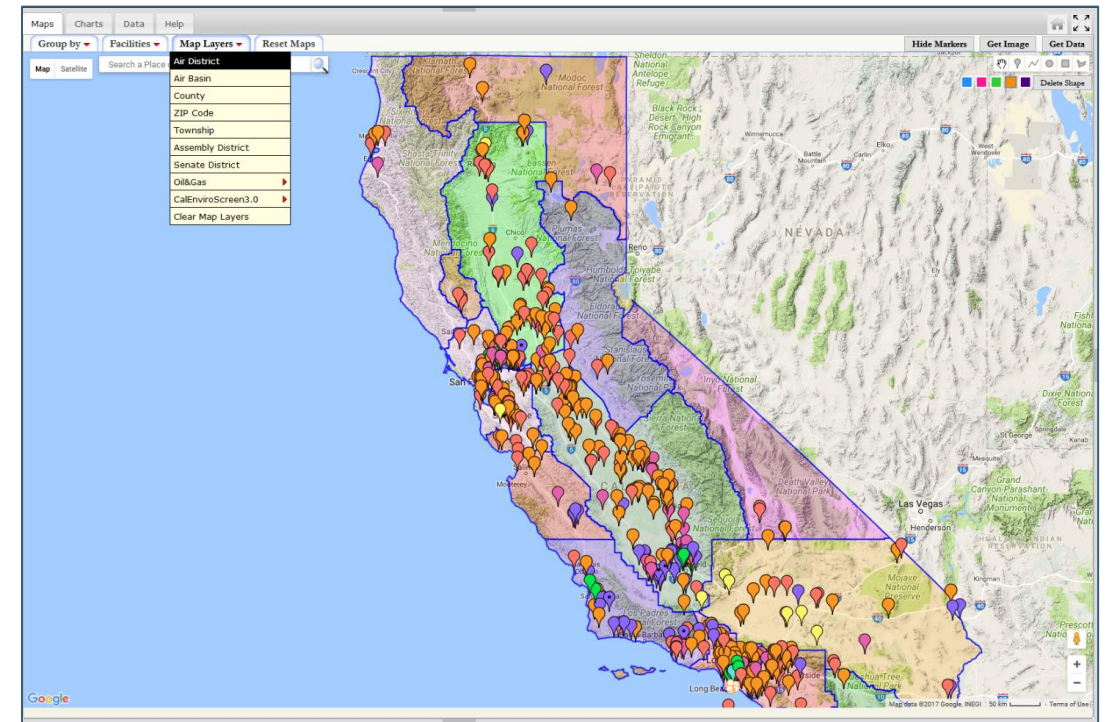
- ▶ The tool offers spatial calculators to quantify emissions from facilities in user-defined areas using circles, rectangles and polygons
- ▶ The information window includes coordinates and geometry parameters for the shape, and a list of facilities within the perimeter and their aggregated emissions



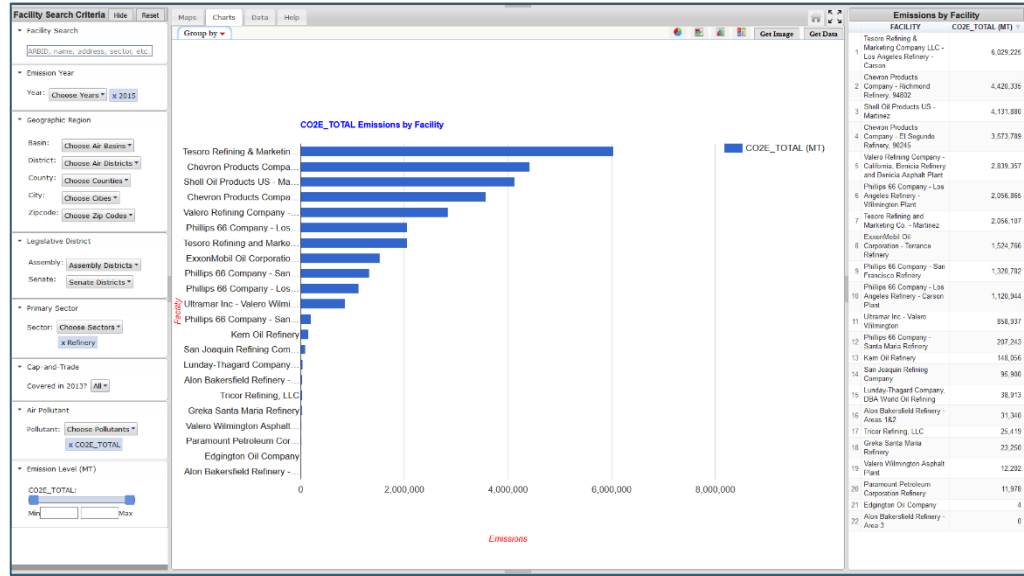
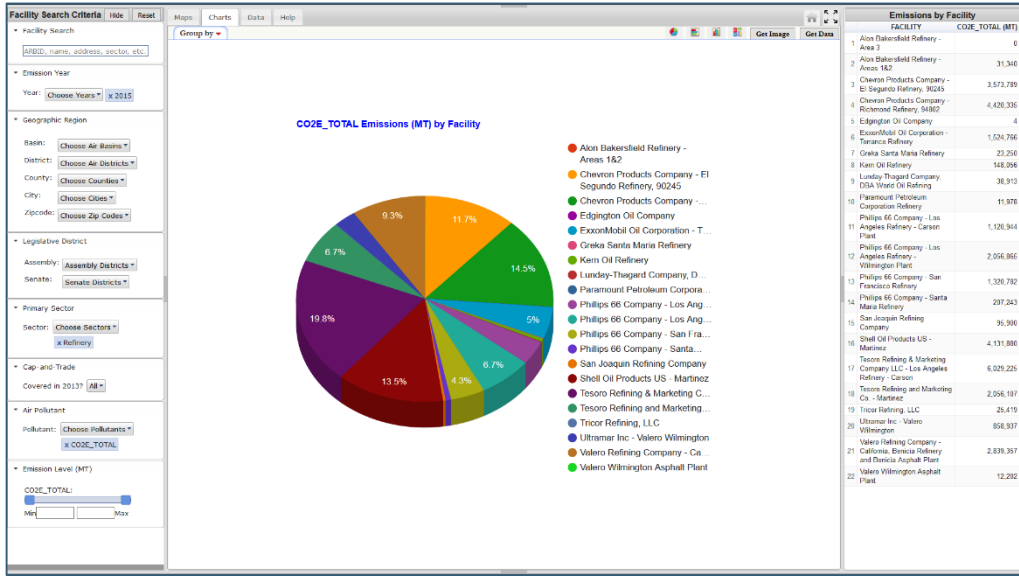
Map Layers

Map layers available to assist with the spatial analysis of emissions include:

- ▶ Air Basins
- ▶ Air Districts
- ▶ Counties
- ▶ Zip Codes
- ▶ Townships
- ▶ Legislative Districts
- ▶ CalEnviroScreen 3.0
- ▶ Oil and Gas Fields and Geological Basins



Graphical Data Views



Data View

- ▶ Data view offers detailed facility information along with emissions in tabular format
- ▶ Data can be sorted by any column
- ▶ 'Get Data' button allows downloading of data as a csv file
- ▶ Facility Search panel dictates data view content

Facility Search Criteria													Maps	Charts	Data	Help	rows/page	No paging	Get Data
YEAR	ARBID	FACID	FACILITY	PRIMARY_SECTOR	ADDRESS	CITY	STATE	ZIP_CODE	COUNTY	DISTRICT	BASIN	CAP_AND_TRADE	CO2E_TOTAL	CO2E_NOX_BIOMASS	CO2E_BIOMASS	CO2E	CH4		
1	2015	100001	50001051 ACE Cogeneration	Cogeneration	12001 Mariposa Street, Trona, CA 93562	Trona	California	93562	San Bernardino	Mojave Desert AQMD	Mojave Desert	Yes	0	0	0	0			
2	2015	100002	174591 Tesoro Los Angeles Refinery Wilmington Calciner	Other Combustion Source	1175 Carack Avenue, Wilmington, CA 90744	Wilmington	California	90744	Los Angeles	South Coast AQMD	South Coast	Yes	193,154	193,154	0	192,698	5		
3	2015	100011	900002 Searles Valley Minerals Inc.	Other Combustion Source	13200 Main Street, Trona, CA 93562	Trona	California	93562	San Bernardino	Mojave Desert AQMD	Mojave Desert	Yes	1,503,410	1,503,410	0	1,492,902	159		
4	2015	100013	1200003 CalPortland Company Oro Grande Plant	Cement Plant	19409 National Trails Highway, Oro Grande, CA 92768	Oro Grande	California	92768	San Bernardino	Mojave Desert AQMD	Mojave Desert	Yes	930,160	930,160	0	927,143	45		
5	2015	100018	51 Bumeys Forest Products	Cogeneration	35056 B Hwy 299 East, Bumeys, CA 96013	Bumeys	California	96013	Shasta	Shasta County AQMD	Sacramento Valley	No	362,083	16,067	346,015	354,792	118		
6	2015	100025	285 Dinuba Energy	Electricity Generation	6329 Ave 430, Reedley, CA 93654	Reedley	California	93654	Tulare	San Joaquin Valley Unified APCD	San Joaquin Valley	No	78,121	1,670	76,452	76,573	25		
7	2015	100026	96 DG Fairhaven Power LLC	Electricity Generation	97 Bay Street, Samoa, CA 95564	Samoa	California	95564	Humboldt	North Coast Unified AQMD	North Coast	No	191,541	7,129	184,412	187,657	62		
8	2015	100029	15 HL Power Company	Electricity Generation	732-025 Wendel Road, Wendel, CA 96136	Wendel	California	96136	Lassen	Lassen County APCD	North Coast	No	268,408	6,730	261,678	262,927	88		
9	2015	100035	825 Coanta - Mendota	Electricity Generation	400 Guillen Parkway, Mendota, CA 93649	Mendota	California	93640	Fresno	San Joaquin Valley Unified APCD	San Joaquin Valley	No	8,560	345	8,215	8,388	2		
10	2015	100036	96387 Miramar - MM and Miramar Energy	Electricity Generation	5344 Conroy Street, San Diego, CA 92111	San Diego	California	92111	San Diego	San Diego County APCD	San Diego	No	51,136	297	50,839	50,880	3		
11	2015	100040	970 Scotia Sawmill Cogen	Cogeneration	169 Main St, Scotia, CA 95565	Scotia	California	95565	Humboldt	North Coast Unified AQMD	North Coast	No							
12	2015	100041	38 Coanta - Pacific Oroville Power Inc	Electricity Generation	3060 South 5th Ave, Oroville, CA 95965	Oroville	California	95965	Butte	Butte County AQMD	Sacramento Valley	No	8	0	0	0			
13	2015	100043	18 Sierra Pacific Industries (SPI) - Bumeys	Other Combustion Source	36336 Highway 299 East, Bumeys, CA 96013	Bumeys	California	96013	Shasta	Shasta County AQMD	Sacramento Valley	No	219,217	4,546	214,671	214,700	73		

Applications for Mapping Tool

- ▶ Streamlined querying, visualization, and analysis of criteria pollutant and GHG data on one platform
- ▶ QA/QC tool for emission inventory (facility geocoordinates, data completeness, emissions outliers, crosschecks between criteria pollutant and GHG trends)
- ▶ Community-level assessment of emission sources in support of environmental justice efforts
- ▶ Identification of areas suitable for community-oriented air monitoring

Next Steps

- ▶ Incorporate toxic pollutant emissions data by the end of 2017
- ▶ Develop expanded visualization tools to improve public engagement
- ▶ Create an integrated inventory database system for all pollutants
- ▶ Enhance the efficiency of the emission inventory database and data reporting

Contact Information

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