

## **Section XX: Fuel Combustion—Services and Commercial**

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### **EMISSION INVENTORY SOURCE CATEGORY**

Services and Commercial

### **EMISSION INVENTORY CODES (CES CODES) AND DESCRIPTION**

060-995-0110-0000 (47167) - Commercial Natural Gas Combustion - Other

### **METHOD SUMMARY**

The commercial natural gas combustion categories—space heating (EIC 060-020-0110-0000, CES 58735) and water heating (EIC 060-030-0110-0000, CES 58743)—are consolidated under commercial natural gas combustion (unspecified) (EIC 060-995-0110-000, CES 47167). CES 47167 accounts for all commercial natural gas usage including space heating and cooling, cooking, water heating, refrigeration and other commercial processes.

California Energy Commission, Andrea Gough, (916) 654-4928 ([agough@energy.state.ca.us](mailto:agough@energy.state.ca.us)), provided 2000 PG&E natural gas deliveries and number of accounts in Sacramento County by SIC code. The natural gas deliveries are categorized as Industrial or Commercial based on the SIC code. The following tables are used to classify SIC usage as commercial or industrial:

#### Commercial Building Classifications

<b>Building Type</b>	<b>SIC Codes Included</b>
Office-Small <30,000 Square Feet	074, 076, 078, 60-61, 62-67, 73
Restaurants	58
Retail Stores	52, 53, 55-57 (554), 59 (592)*
Food/Liquor Stores	54, 592
Warehouses	42 (4222), 50, 51 (514)
Refrigerated Warehouses	4222, 514
Schools	821, 835
Colleges/Trades	822, 824, 829
Health Care	805-809, 836
Hotel/Motel	70 (703)
Miscellaneous	554, 72, 75, 78, 79, 823, 84, 92
Office-Larger >=30,000 Square Feet	801-804, 81, 91, 93-96, 972

\*Excluded industry subgroups in parentheses.

(Source: 1998 Baseline Energy Outlook, CEC Staff Report)

#### Industrial Sector Definitions By SIC Code

<b>SIC</b>	<b>Process Industries</b>
15	Construction
203	Canned, Frozen, Preserved Fruits, Vegetables, and Food Specialites
206	Sugar and Confectionery Products

24	Lumber and Wood Products
261	Pulp Mills
262-3	Paper and Paperboard Mills
29	Petroleum Refining and Related Industries
321-3	Glass and Glassware
324	Cement
<b>SIC</b>	<b>Resource Extraction Industries</b>
10	Metal Mining
13	Oil and Gas Extraction
14	Mining and Quarrying of Non-Metallic Minerals
<b>SIC</b>	<b>Assembly Industries</b>
20x	Food and Kindred Products (Except 203 and 206)
22	Textile Mill Products
23	Apparel and Other Textile Products
25	Furniture and Fixtures
26x	Paper and Allied Products (Except Pulp, Paper and Paperboard Mill 261-263)
27	Printing and Publishing
28	Chemicals and Allied Products
308	Plastics Products
30x	Rubber Products
31	Leather and Leather Products
32x	Stone and Clay Products
33	Primary Metal Industries
34	Fabricated Metal Products
357	Computers and Office Equipment
35x	Industrial Machinery and Equipment (Except 357)
366	Communications Equipment
367	Electronic Components and Accessories
36x	Electronic and Other Electric Equipment (Except 366, 367)
37	Transportation Equipment
38	Instruments and Related Products
39	Miscellaneous Manufacturing

(Source: 1998 Baseline Energy Outlook, CEC Staff Report)

The total unreconciled commercial natural gas usage is 9307 mmcf/yr. Natural gas usage by the 3 large power plants, UCD Medical cogeneration, and oil and gas extraction industry is not included in the PG&E data. However, since this area source category does not reconcile with these emission sources, the total unreconciled commercial natural gas usage need not include consumption data from these sources. Whereas, natural gas usage by PG&E Brannan Island natural gas compressor station (a point source), which is accounted as internal use by PG&E and not included in the PG&E data, must be added, because it is a point source that is reconciled with this area source category. The amount of natural gas consumed by commercial point sources (800 mmcf/yr) is identified using the Reconciliation Report output from CEIDARS and quantified using process data from CEIDARS.

It is assumed that if the average natural gas consumption (mmcf/account\_year) for a given SIC category is less than 5 mmcf/account\_year, then the combustion units under that SIC code are probably small and uncontrolled (i.e., cooking, office hot water heaters/furnace, etc.). Using this assumption, 5685 mmcf/yr from the commercial category is uncontrolled (94 lbs of NOx/mmcf) and exempted from district NOx limit.

The natural gas usage under SIC categories for warehouse-nondurable goods, refrigerated warehouse, and electric, gas and sanitary services is assumed to be combusted in internal combustion engines and gas turbines. This amount totals to about 3% of the commercial natural gas usage and is allocated equally to engines and turbines. Subtracting out the point source engine (PG&E, F#110, 108 mmcf/yr), the remaining natural gas usage is assumed uncontrolled, 2700 lbs of NOx/mmcf for engine and 320 lbs of NOx/mmcf for turbine.

The difference between the total commercial natural gas and the exempt usage (5685 mmcf/y) and engine/turbine usage (280 mmcf/yr) is 3342 mmcf/yr. It is assumed to be the amount of natural gas associated with boiler units that are subject to district NOx limit. By subtracting consumption from permitted boilers units from 3342 mmcf/yr, the amount of natural gas combustion associated with unpermitted non-exempt boilers is estimated to be 891 mmcf/yr. This amount of natural gas consumption is assumed to be uncontrolled (100 lbs of NOx/mmcf). The total natural gas consumption and emissions (2451 mmcf/yr, 68.3 tpy) from permitted commercial boilers are compiled from the Feecalc database. By subtracting the point source commercial boilers out, the amount of natural gas usage and emissions associated with permitted boilers not in CEIDARS point source inventory are determined.

The total unreconciled emissions for this inventory category is the sum of emissions from all commercial point sources, permitted commercial units not identified in point source inventory, unpermitted non-exempt commercial units, and exempt commercial units.

Type	Usage (mmcf/yr)	NOx EF (lbs/mmcf)	NOx (tpy)
IC Engine (not permitted not in CEIDARS, assumed 50% of 3% of Comm is ICE, minus 108 from PG&E PS)	32	2700	42.67
Gas Turbine (not permitted not in CEIDARS, assumed 50% of 3% of Comm is gas turbine)	140	320	22.34
Unpermitted Non-Exempt Boilers	891	100	44.57
Permitted Boilers Not in CEIDARS PS	1759	58	51.31
Exempt Commercial Natural Gas (cooking, small heaters/furnaces)	5685	94	267.20
CEIDARS Boilers	692	49	16.99
CEIDARS ICE	108	156	8.42
<b>Total Unreconciled Commercial Natural Gas</b>	<b>9307</b>	<b>97</b>	<b>453.49</b>

ACTIVITY DATA SOURCE:

California Energy Commission.

EMISSION FACTOR SOURCE: AP-42, Permit Evaluation.  
TEMPORAL INFORMATION: Daily Activity: 24 hours/day  
Weekly Activity: 7 days/week  
Monthly Activity: 365 days/year  
MOST RECENT UPDATE: May 1, 2002  
GROWTH PARAMETER: Commercial Employment

EMISSION SUMMARY (2000-ANNUAL TONS/YEAR) UNRECONCILED

<b>CES#</b>	<b>TOG</b>	<b>ROG</b>	<b>CO</b>	<b>NOX</b>	<b>SOX</b>	<b>PM</b>	<b>PM10</b>
47167	155.12	32.65	286.33	453.49	2.79	37.69	37.69

NEEDED CLARIFICATIONS/CORRECTIONS TO CURRENT METHOD

None.

FUTURE PLANS FOR METHOD UPDATE/REVISION

None.