San Diego County Greenhouse Gas Inventory

An Analysis of Regional Emissions and Strategies to Achieve AB 32 Targets

Other Fuels Report

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Acknowledgements

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For an electronic copy of this report and the full documentation of the San Diego Greenhouse Gas Inventory project, go to www.sandiego.edu/epic/ghginventory.

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1. Introduction

This report presents estimated greenhouse gas (GHG) emissions for all fuels combusted or used in San Diego County but not accounted for in other sections of the San Diego County Greenhouse Gas Inventory, including distillate (other than in power production), coal (other than in power production), kerosene, gasoline (other than in transportation sector), LPG, residual fuel oil (other than in power production), and wood. Emissions from other fuel use are divided into the categories used by the California Air Resources Board (CARB) statewide greenhouse gas (GHG) inventory: household, energy, manufacturing, transport, commercial, agriculture, non-specified, and associated fugitive emissions. GHG emissions from these other fuel sources account for 4% of the overall GHG emissions for San Diego County.

This report provides estimates of other fuel emissions from 1990 through 2006 and projects future emissions through 2020.[1] Primary data was not available at the county level for the other fuels included in the CARB statewide inventory, so the project team used statewide data and scaled it to San Diego County using appropriate economic activity or population data.

1.1. Key Findings

The key findings for the Other Fuels category include the following:

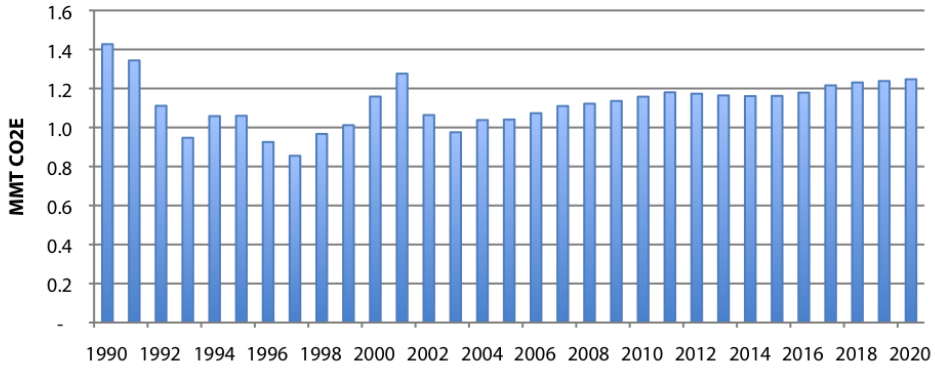
- In 2006, emissions from the Other Fuels category were estimated as 1.1 million metric tons carbon dioxide equivalent (MMT CO_2E), approximately 4% of overall regional GHG emissions, and about 24% less than the estimated 1990 level.
- The 1990 estimated baseline for the Other Fuels sector is 1.4 MMT CO_2E.
- The 2020 BAU forecast indicates a decreasing trend in this sector to 1.3 MMT CO_2E, or approximately 16% more than the 2006 levels, and 13% less than the 1990 levels.

2. Greenhouse Gas Emissions from Other Fuels

In 2006, GHG emissions from other fuel use in San Diego County were just over 1 MMT CO_2E, a 24% reduction below 1990 levels. Emissions in this category accounted for about 4% of total regional emissions in 2006. The business-as-usual projection for this category shows emissions increasing by 16% over 2006 levels by 2020, but remaining below 1990 levels (Figure 1).

Manufacturing is by far the dominant emissions source for this category, followed by residential, non-specified, commercial, and transportation (Figure 2).

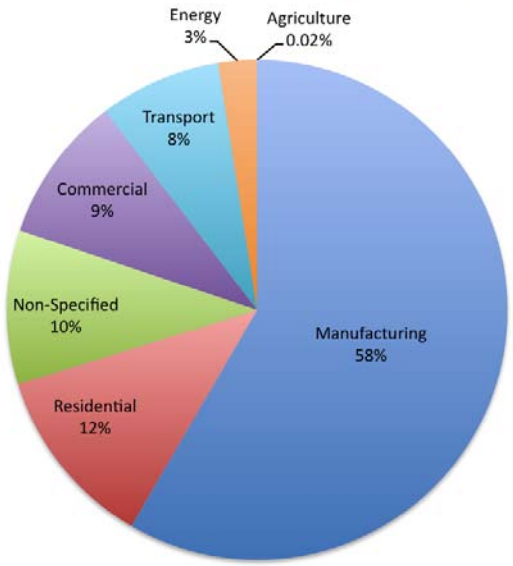
Figure 1. GHG Emissions from Other Fuels San Diego County



2.1. Emission Reduction Targets for the Other Fuels Category

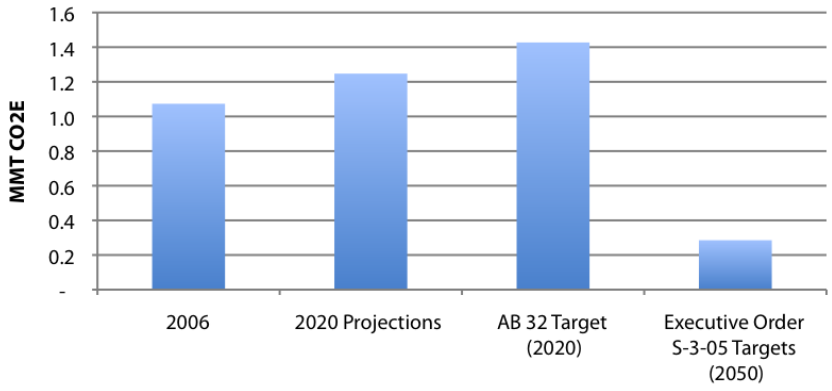
In 2006 Governor Arnold Schwarzenegger signed into law the Global Warming Solutions Act (AB 32), establishing statutory limits on greenhouse gas emissions in California. AB 32 seeks to reduce statewide greenhouse gas emissions to 1990 levels by the year 2020. Even though AB 32 does not specify reduction targets for specific sectors or jurisdictions, this study calculated theoretical reductions targets as if the statewide statutory emissions reductions targets were applied to San Diego County and to each emitting category. According to the estimates presented above, GHG emissions from Other Fuels will be below 1990 levels by 2020; therefore, no emissions reductions strategies are provided here.

Figure 2. GHG Emissions from Other Fuels by Source, San Diego County



In 2005, Governor Schwarzenegger signed Executive Order S-3-05, which establishes long-term targets for greenhouse gas emissions reductions. It seeks to reduce emissions levels 80% below 1990 levels by 2050. While this reduction target is not law, it is generally accepted as the long-term target to which California regulations are aiming. Similar to AB 32, Executive Order S-3-05 is intended to be a statewide target, but if applied hypothetically to San Diego County, total emissions from the Other Fuels sector would have to be reduced to 0.3 MMT CO_2E – a reduction of 0.96 MMT CO_2E (77%) below the 2020 business-as-usual forecast and 0.8 MMT CO_2E (73%) below 2006 levels. Figure 3 compares 2006 emissions levels, 2020 business-as-usual projections, AB 32 and Executive Order S-3-05 targets.

Figure 3. Hypothetical Emisisons Reduction Targets for Other Fuels, San Diego County



3. Other Fuels Methodology

The project team used data from the CARB statewide greenhouse gas inventory to derive regional emissions estimates. In general, statewide emissions values were scaled to San Diego County using data on relevant economic activity or population data.[2] The following categories are included in the Other Fuels emissions estimate: household use; energy - petroleum marketing; manufacturing for non-metallic minerals, oil and natural gas, construction, and non-specified; transportation for non-specified; commercial non-specified; agriculture energy use; and non-specified Industry. Emissions associated with rail are accounted for in a separate category and described in the Other Transportation Report.

3.1. IPCC Categories Not Included

Several categories were included in the CARB statewide inventory but not included in our estimate for San Diego County. Emissions from the following IPCC categories were set to zero because Economic Census data from 1997 and 2002 from the US Census Bureau indicated no economic activity in San Diego County:

- 1A1b - Petroleum Refining >
  - Associated gas > CH_4, CO_2, N_2O
  - Catalyst Coke > CH_4, CO_2, N_2O
  - Distillate > CH_4, CO_2, N_2O
  - LPG > CH_4, CO_2, N_2O
  - Petroleum Coke > CH_4, CO_2, N_2O
  - Refinery Gas > CH_4, CO_2, N_2O
  - Residual Fuel Oil > CH_4, CO_2, N_2O

- 1A1c - Manufacture of Solid Fuels and Other Energy Industries > Oil & Gas Extraction >
  - Associated gas > CH_4, CO_2, N_2O
  - Crude oil > CH_4, CO_2, N_2O
  - Distillate > CH_4, CO_2, N_2O
  - Residual Fuel Oil > CH_4, CO_2, N_2O

- 1B2 - Oil and Natural Gas > Manufacturing : Stone, Clay, Glass & Cement : Fugitives > Fugitive emissions > CH_4

- 1B2 - Oil and Natural Gas > Manufacturing : Construction : Fugitives > Fugitive emissions > CH_4

- 1B2 - Oil and Natural Gas > Manufacturing : Storage Tanks : Fugitives > Fugitive emissions > CH_4

- 1B2a – Oil > Petroleum Refining : Process Losses : Fugitives > Fugitive emissions > CH_4

- 1B2a – Oil > Petroleum Refining : Storage Tanks : Fugitives > Fugitive emissions > CH_4

- 1B3 - Other Emissions from Energy Production > In State Generation : Merchant Owned > Geothermal power - Geothermal > CO_2

- 1B3 - Other Emissions from Energy Production > In State Generation : Utility Owned > Geothermal power - Geothermal > CO_2

3.2. IPCC Categories Included

Emissions from the following category are taken from the California state inventory (CARB, 2007) and scaled to San Diego County using gross income from agriculture production for the years 1999 and 2000. The data for the state of California and San Diego County are from the California Energy Commission.[3]

- 1A4c - Agriculture/Forestry/Fishing/Fish Farms > Ag Energy Use
  - Distillate > CH_4, CO_2, N_2O
  - Kerosene > CH_4, CO_2, N_2O
  - Gasoline > CH_4, CO_2, N_2O
  - LPG > CH_4, CO_2, N_2O

These emissions are taken from the California state inventory (CARB, 2007) and scaled to San Diego County using population data. Annual population data is from the US Census Bureau.

- 1A4b – Residential > Household Use
  - Distillate > CH_4, CO_2, N_2O
  - Kerosene > CH_4, CO_2, N_2O
  - LPG > CH_4, CO2, N_2O
  - Wood (Wet) > CH_4, N_2O

The following emissions were calculated by scaling the California state inventory (CARB, 2007) data for each sector to the San Diego County level by using population data from the US Census Bureau (2002).

- 1A2f - Non-Metallic Minerals > Manufacturing : Stone, Clay, Glass & Cement : Cement >
  - Biomass Waste Fuel > CH_4, N_2O
  - Coal > CH_4, CO_2, N_2O
  - Distillate > CH_4, CO_2, N_2O
  - Fossil Waste Fuel > CH_4, CO_2, N_2O
  - Petroleum Coke > CH_4, CO_2, N_2O
  - Residual Fuel Oil > CH_4, CO_2, N_2O
  - Tires > CH_4, CO_2, N_2O

- 1A2m - Non-specified Industry > Manufacturing >
  - Coal > CH_4, CO_2, N_2O
  - Distillate > CH_4, CO_2, N_2O
  - Kerosene > CH_4, CO_2, N_2O
  - Gasoline > CH_4, CO_2, N_2O
  - LPG > CH_4, CO_2, N_2O
  - Natural Gas Liquids > CH_4, CO_2, N_2O
  - Residual Fuel Oil > CH_4, CO_2, N_2O

- 1A2m - Non-specified Industry > Not Specified Industrial - Wood (Wet) > CH_4, N_2O

- 1A2k – Construction > Manufacturing : Construction - Gasoline > CH_4, CO_2, N_2O

- 1A5 - Non-Specified > Not Specified Not Specified - LPG > CH_4, CO_2, N_2O

- 1B2 - Oil and Natural Gas > Manufacturing >
  - Electric & Electronic Equip. : Fugitives > Fugitive emissions > CH_4
  - Food Products : Fugitives > Fugitive emissions > CH_4
  - Plastics & Rubber : Fugitives > Fugitive emissions > CH_4
  - Primary Metals : Fugitives > Fugitive emissions > CH_4
  - Pulp & Paper : Fugitives > Fugitive emissions > CH_4
  - Stone, Clay, Glass & Cement : Fugitives > Fugitive emissions > CH_4
  - Chemicals & Allied Products : Fugitives > Fugitive emissions > CH_4
  - Primary Metals : Fugitives > Fugitive emissions > CH_4

The following emissions were calculated by scaling the statewide emissions (CARB, 2007) to the San Diego County level using economic data from the US Economic Census 2002 date for Retail Trade, Real Estate/ Rental Services, Arts/Entertainment, and Accommodations/Food.

- 1A4a - Commercial/Institutional > Not Specified Commercial
  - Distillate > CH_4, CO_2, N_2O
  - Coal > CH_4, CO_2, N_2O
  - Kerosene > CH_4, CO_2, N_2O
  - Gasoline > CH_4, CO_2, N_2O
  - LPG > CH_4, CO_2, N_2O
  - Residual Fuel Oil > CH_4, CO_2, N_2O
  - Wood (Wet) > CH_4, N_2O

Emissions in the following category were scaled from the statewide inventory (CARB, 2007) based on the total annual vehicle miles traveled in 1990, 1995, 2000, 2005, and 2006 as estimated by the California Department of Transportation.[4] Ratios in intervening years were linearly extrapolated.

- 21A3 – Transport > Not Specified Transportation >
  - Distillate > CH_4, CO_2, N_2O
  - LPG > CH_4, CO_2, N_2O
  - Residual Fuel Oil > CH_4, CO_2, N_2O

The following emissions were scaled from statewide levels using the ratio of the total On-Road emissions of San Diego County divided by California On Road emissions.

- 1B2 - Oil and Natural Gas > Petroleum Marketing : Process Losses : Fugitives > Fugitive emissions > CH_4
- 1B2 - Oil and Natural Gas > Petroleum Marketing : Storage Tanks : Fugitives > Fugitive emissions > CH_4

End Notes

1. This section includes only emissions from "other fuels." A small amount of emissions due to cogeneration are included in the main category of Other/Other Fuels. Information about cogeneration can be found in the Electricity Report.
2. Gross economic data for the agriculture sector is available at: http://www.energy.ca.gov/research/iaw/industry/agri.html. Economic Census data is available at: http://factfinder.census.gov/servlet/IBQTable?_bm=y&-geo_id=04000US06&-ds_name=EC0200A1&-_lang=en and http://factfinder.census.gov/servlet/IBQTable?_bm=y&-geo_id=31000US41740&-ds_name=EC0200A1&-_lang=en. Population data is available at: http://factfinder.census.gov/servlet/ACSSAFFPeople?_submenuId=people_1&_sse=on.
3. Go to: http://www.energy.ca.gov/research/iaw/industry/agri.html
4. Available at: http://www.dot.ca.gov/hq/tsip/smb/documents/mvstaff/mvstaff60.pdf