

# Should I Do a Carbon Inventory – When, Why & How?

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# Why?

- AB 32 California Global Warming Solutions Act (2006)
  - Mandatory reporting of greenhouse gas emissions from:
    - Cement plants
    - Petroleum refineries (emit  $\geq 25,000$  metric tonnes CO<sub>2</sub> per year)
    - Hydrogen plants (emit  $\geq 25,000$  metric tonnes CO<sub>2</sub> per year)
    - Electricity generating facilities (capacity  $\geq 1$  MW and emit  $\geq 2,500$  metric tonnes of CO<sub>2</sub> per year from electricity generating activities)
    - Retail providers and marketers of electricity
    - Cogeneration facilities (capacity  $\geq 1$  MW and emit  $\geq 2,500$  metric tonnes of CO<sub>2</sub> per year from electricity generating activities)
    - Other facilities (emit  $\geq 25,000$  metric tonnes CO<sub>2</sub> per year from stationary combustion sources)

# Why?

- AB 32 California Global Warming Solutions Act (2006)
  - State can request that a facility demonstrate that it does not meet any of the above criteria (20 days to respond)
- Money
  - Rising energy prices vs. cost of alternative sources
  - Emission cap and trade programs
- Public Relations
- May Be Required for Permitting New Projects
- No Variances Allowed for Greenhouse Regulations

# When?

- AB 32 Reporting Deadlines
  - April 1 or June 1 annually starting 2009 (existing facilities)
  - Submit initial report based on first full calendar year of operation (new facilities after January 1, 2008)
- AB 32 Phased in Requirements
  - CY 2008 reports can use best available data and methods
  - CY 2009 reports and after must meet all requirements
- AB 32 Report Verification Deadlines
  - Annually or triennially starting in 2010

# How?

- AB 32 Mandatory Rpt. Final Review Draft (9/18/08)
  - Greenhouse gases are:
    - carbon dioxide (CO<sub>2</sub>)
    - methane (CH<sub>4</sub>)
    - nitrous oxide (N<sub>2</sub>O)
    - sulfur hexafluoride (SF<sub>6</sub>)
    - hydrofluorocarbons (HFCs) & perfluorocarbons (PFCs)
  - Carbon dioxide equivalent (CO<sub>2</sub>e, MTCO<sub>2</sub>e)
    - Compares CO<sub>2</sub> with other GHGs
    - Gas quantity multiplied by its global warming potential (GWP) factor
    - Commonly expressed as metric tonnes of CO<sub>2</sub> equivalents
    - Metric tonne = 2,204.6 pounds or 1.1 short tons

# How?

- AB 32 Mandatory Rpt. Final Review Draft (9/18/08)
  - Identify all stationary sources of the six GHGs
    - combustion
    - processes
    - fugitive sources
  - Reporting mobile sources is voluntary
  - Exclude any exempt equipment
    - Nuclear, hydroelectric, wind, or solar electricity generators
    - Portable equipment
    - Permitted backup or emergency generators
    - Hospitals, primary and secondary schools (NAICS 62, 611110)
  - Identify all fuel types used by the remaining equipment
    - Natural gas, gasoline, diesel, etc.

# How?

- AB 32 Mandatory Rpt. Final Review Draft (9/18/08)
  - Review appropriate calculation methods
    - Section 95110 Cement Plants
    - Section 95111 Electricity Generating, Retail Providers, Marketers
    - Section 95112 Cogeneration Facilities
    - Section 95113 Petroleum Refineries
    - Section 95114 Hydrogen Plants
    - Section 95115 General Stationary Combustion Facilities
    - Section 95125 Methods Applicable to Multiple Facilities

# How?

- AB 32 Mandatory Rpt. Final Review Draft (9/18/08)
  - Section 95115 General Stationary Combustion Facilities
    - Stationary combustion emissions
      - Total CO<sub>2</sub> emissions
        - CO<sub>2</sub> emissions from biomass-derived fuels
      - Total CH<sub>4</sub> emissions
      - Total N<sub>2</sub>O emissions
    - Fuel information
      - By fuel type
      - Average annual carbon content (if measured or provided by supplier)
      - Average annual high heat value (if measured or provided by supplier)
    - Indirect energy usage (electricity, steam, heat, cooling)

# How?

- AB 32 Mandatory Rpt. Final Review Draft (9/18/08)
  - Collect data for the calendar reporting year
    - direct measurement of GHG emissions (e.g. CEMS, source test)
    - Material Safety Data Sheets (MSDSs)
    - purchased/acquired electricity, heat, cooling, or steam
    - utility bills
    - on-site fuel meters
    - quantify fuel use to within +/- 5% accuracy
    - maintenance & calibration records support the +/- 5% accuracy

# How?

- AB 32 Mandatory Rpt. Final Review Draft (9/18/08)
  - Natural Gas Example (per Section 95115)
    - Fuel usage = 350 million standard cubic feet (SDG&E bill)
    - Heat content = 1,027 MMBtu/MMscf (default)
    - $\text{CO}_2 = 53.02 \text{ kg / MMBtu}$
    - $\text{CH}_4 = 0.0009 \text{ kg / MMBtu}$
    - $\text{N}_2\text{O} = 0.0001 \text{ kg / MMBtu}$
    - $\text{CO}_2 = \text{Fuel} * \text{HHV} * \text{EF}_{\text{CO}_2} * 0.001$
    - $\text{CO}_2 = (350 \text{ MMscf/yr}) * (1,027 \text{ MMBtu/MMscf}) * (53.02 \text{ kg/MMBtu}) * (0.001 \text{ MT/kg})$
    - $\text{CO}_2 = 19,058 \text{ MT}; \text{CH}_4 = 0.324 \text{ MT}; \text{N}_2\text{O} = 0.036 \text{ MT}$

# More Information?

- California Air Resources Board (ARB)
  - [www.arb.ca.gov/cc/cc.htm](http://www.arb.ca.gov/cc/cc.htm)
- Contact Information
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