



# Overview of Greenhouse Gases

## What Are Greenhouse Gases?

Gases that trap heat in the atmosphere are often called greenhouse gases. Some greenhouse gases such as carbon dioxide occur naturally and are emitted to the atmosphere both through natural processes and human activities. Other greenhouse gases (e.g., fluorinated gases) are created and emitted solely through human activities. The principal greenhouse gases that enter the atmosphere because of human activities are:

### *Carbon Dioxide (CO<sub>2</sub>)*

Carbon dioxide enters the atmosphere through the burning of fossil fuels (oil, natural gas, and coal), solid waste, trees and wood products, and also as a result of other chemical reactions (e.g., manufacture of cement). Carbon dioxide is also removed from the atmosphere (or "sequestered") when it is absorbed by plants as part of the biological carbon cycle. About 75% of all greenhouse gases emitted globally are CO<sub>2</sub>.

### *Methane (CH<sub>4</sub>)*

Methane is emitted during the production and transport of coal, natural gas, and oil. Methane emissions also result from livestock and other agricultural practices and the decay of organic waste in municipal solid waste landfills.

### *Nitrous Oxide (N<sub>2</sub>O)*

Nitrous oxide is emitted during agricultural and industrial activities as well as during combustion of fossil fuels and solid waste.

### *Fluorinated Gases*

Hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride are synthetic, powerful greenhouse gases that are emitted from a variety of industrial processes. Fluorinated gases are sometimes used as substitutes for ozone-depleting substances (i.e., CFCs, HCFCs, and halons). These gases are typically emitted in smaller quantities, but because they are potent greenhouse gases, they are sometimes referred to as High Global Warming Potential gases ("High GWP gases").

## What Is a Carbon Dioxide Equivalent (CO<sub>2</sub>e)?

A carbon dioxide equivalent is the common metric used to compare various greenhouse gas emissions based on their global warming potential (GWP). GWP values allow for a comparison of the impacts of emissions and reductions of different gases. For example, the global warming potential for methane is 21. This means that emissions of one million metric tons of methane are equivalent to emissions of 21 million metric tons of carbon dioxide. Other greenhouse gases may be converted to CO<sub>2</sub>e based on their global warming potential. <sup>1</sup>

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<sup>1</sup> Source: U.S. Environmental Protection Agency

## Why Should My Business or Organization Care?

Reasons why businesses and organizations care about climate change include:

- **Cost savings.** Taking action to reduce greenhouse gas emissions has many co-benefits including reducing costs through energy and process efficiency, conserving resources, and reducing waste.
- **Consumer concern.** About 70% of American consumers feel that climate change and global warming are severe or very severe problems (Yankelovich-Going Green Prospective, July 2007). By advertising initiatives to reduce greenhouse gas emissions, companies can improve consumer perception, improve marketing, and create a competitive advantage.
- **Increased revenues and markets.** New markets for low-carbon products and services are expanding. Certain organizations will benefit by aligning their products and services to satisfy consumer and investor concerns about climate change.
- **Employee recruitment and retention.** According to MonsterTRAK (an arm of online employment finder Monster Worldwide), 80% of recent graduates want a job with a positive impact on the environment, and according to Harris Interactive Survey on behalf of Adecco USA, 30% of American workers would prefer to work for an environmentally responsible company. Quantifying and reducing greenhouse gas emissions can help recruit and retain employees.
- **Getting a step ahead.** Quantifying and reducing greenhouse gas emissions now can help prepare for future federal reporting or cap and trade regulations without any time restrictions and plenty of time to begin making reductions and receive credit for them. Businesses can also begin building goodwill with oversight agencies by being among the first to inventory emissions and assess risks.
- **Energy security.** A finite amount of resources such as oil are available and future prices of such resources remain unpredictable; therefore, utilizing alternative energy sources and reducing energy consumption can limit the vulnerability of a business and reduce the volatility of overhead costs.