BACKGROUND INFORMATION

Over the past century, human activities have released large amounts of carbon dioxide and other greenhouse gases into the atmosphere. The majority of greenhouse gases come from burning fossil fuels to produce energy, although deforestation, industrial processes, and some agricultural practices also emit gases into the atmosphere.

Greenhouse gases act like a blanket around Earth, trapping energy in the atmosphere and causing it to warm. This phenomenon is called the greenhouse effect and is natural and necessary to support life on Earth. However, the buildup of greenhouse gases can change Earth's climate and result in dangerous effects to human health and welfare and to ecosystems. A warming climate will bring changes that can affect our water supplies, agriculture, power and transportation systems, the natural environment, and even our own health and safety.

TYPES OF GREENHOUSE GASES

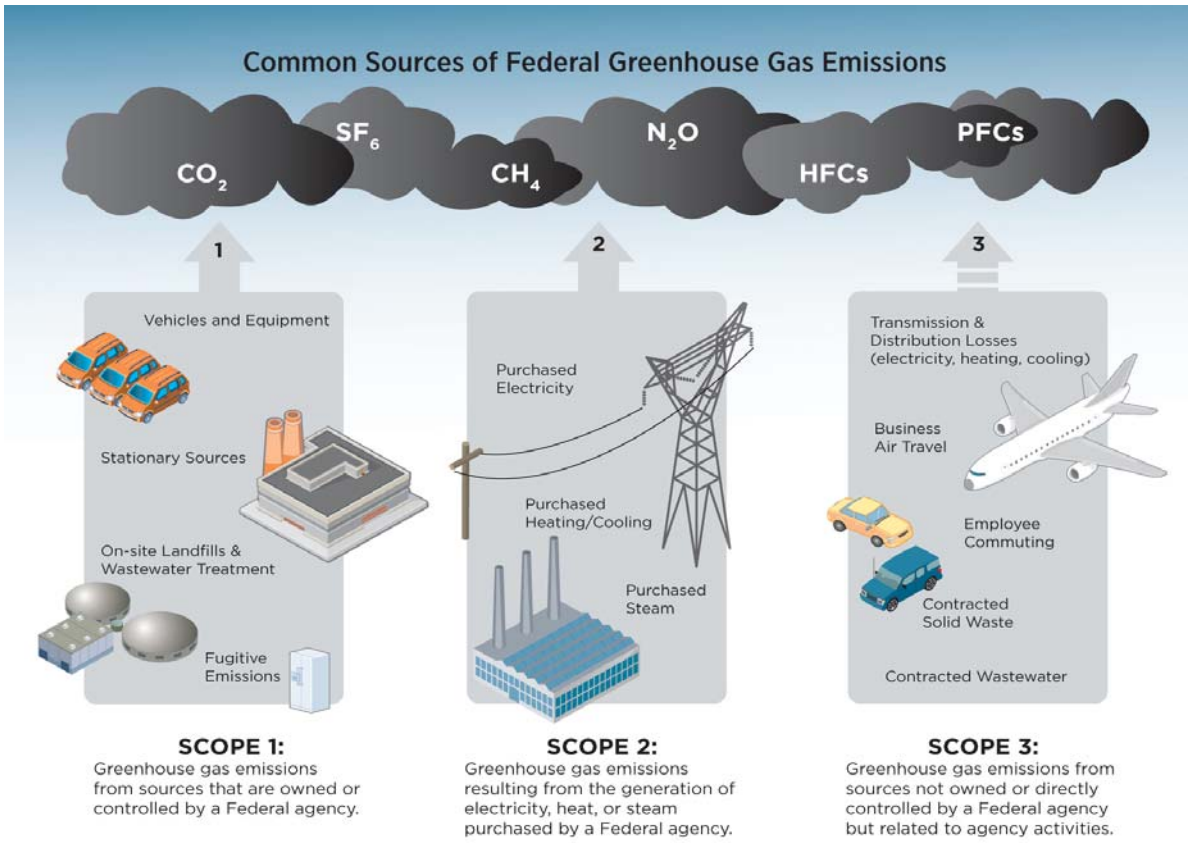
Greenhouse gases are defined as gases which trap heat in the atmosphere and adversely affect climate change. Human activities are responsible for nearly all of the increases in greenhouse gases in the atmosphere in the past 150 years, according to the EPA. There are four such gases:

- **Carbon Dioxide (CO2):** Released through the burning of fossil fuels (coal, natural gas and oil), solid waste, trees and wood products.
- **Methane (CH4):** Most commonly results from the decay of organic waste in solid waste landfills.
- **Nitrous Oxide (N2O):** Emitted during agricultural and industrial activities, and 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, and are typically used in building HVAC systems.

SOURCES OF GREENHOUSE GASES

Greenhouse gas emissions originate from multiple sources. For the purposes of Federal Agencies, these are classified into three distinct categories, or “Scopes.”

- **Scope 1:** Direct emissions from onsite sources - i.e., natural gas combustion in boilers, combustion of fuel in fleet, refrigerant equipment leaks
- **Scope 2:** Indirect emissions associated with the consumption of purchased electricity
- **Scope 3:** All other indirect emissions not included in Scope 2 – i.e., Federal employee commuting, business travel



EXECUTIVE ORDER 13514

Executive Order (EO) 13514, "Federal Leadership in Environmental, Energy, and Economic Performance," was signed by President Obama on October 5, 2009. This EO expands upon the energy reduction and environmental stewardship requirements established by EO 13423, which was signed by President Bush on January 24, 2007.

EO 13514 requires Federal Agencies to “measure, report and reduce their greenhouse gas emissions from direct and indirect activities.” The Department of Commerce abides by this requirement by conducting the annual greenhouse gas inventory Department-wide and by coordinating efforts with Bureaus to reduce energy use, reduce facility footprints, reduce vehicle fleet sizes, reduce solid waste, and encourage the use of mass transit or telework by employees.

GREENHOUSE GAS REDUCTION STRATEGIES

Reducing Scope 1&2 greenhouse gas emissions requires broad adjustments in the ways in which the Department obtains and consumes energy. This includes exploring alternative energy sources such as wind, solar, and geothermal. It also requires a simultaneous effort to consolidate facilities and eliminate or upgrade old, inefficient, and outdated building stock in the Department's portfolio. In FY11, **68% of the Department's Scope 1&2 emissions were attributed to purchased electricity**, meaning energy conservation is the soundest strategy to reduce these emissions.

Scope 1&2 reduction strategies work best when enacted at the individual employee level. Each Department employee should strive to be a responsible environmental and energy steward by doing things such as:

- Using natural light if possible
- Keeping windows shut when HVAC is in use, but employing natural ventilation when possible
- Unplugging TVs, AV equipment, and phone chargers when not in use
- Turning off the lights and computer when leaving the office
- Recycling and/or reusing as many waste materials as possible

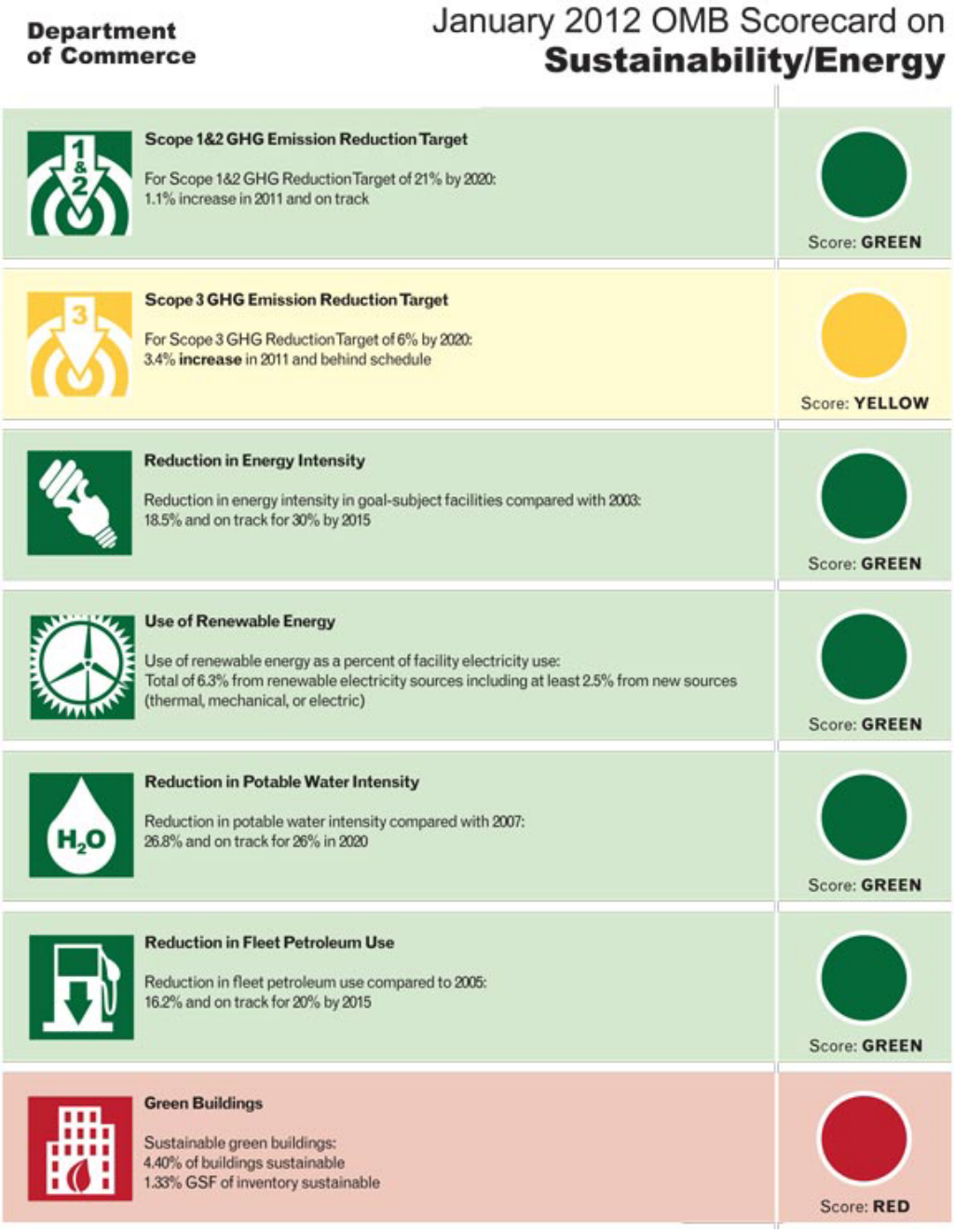
Scope 3 emissions are nearly entirely made up of employee commuting emissions. Of the Department's Scope 3 emissions in FY11, **72% was attributed to employee commuting.** As the Department grows, reducing these emissions becomes more and more difficult, but the Department has seen success by encouraging employees to use the following strategies:

- Telework and alternative work schedules
- Driving an alternative fueled or hybrid vehicle
- Participating in rideshare, carpool or vanpool programs
- Using public transit such as buses, Metro, and commuter rail
- Participating in the "guaranteed ride home" program
- Biking or walking to work if possible

Telework is a significant part of the Department's strategy to reduce greenhouse gas emissions. Not only does telework reduce commuting emissions and directly affect Scope 3 emissions, but it indirectly affects Scope 1&2 emissions, as well. As more employees elect to telework, less energy is required to power an office. Additionally, large amounts of teleworking employees may allow an office to reduce their facility size.

HOW IS THE DEPARTMENT DOING?

The current goal for the Department is to reduce Scope 1&2 emissions by 21% by 2020, as compared to a 2008 baseline, and to reduce Scope 3 emissions by 6% over the same period. While these goals are challenging to meet, the Department is showing progress on both fronts, and this was reflected in the strong Sustainability/Energy Scorecard we received from the Office of Management and Budget following FY11, which awarded the Department "green" in five of the seven sustainability status categories outlined by EO 13514:



While the Department's greenhouse gas emissions remain slightly above their 2008 baselines, we achieved significant year-to-year reductions from FY10 to FY11 across all three Scopes, and are on track to achieve reductions from the 2008 baselines by the 2020 target years. The continued success of these efforts will require a unified effort across all Departmental offices and Bureaus.

THE WAY FORWARD

Continuing the Department's trend of greenhouse gas reductions over the following years will require an "all of the above" strategy, with responsibilities shared by Bureau leadership and employees. Crucial components of such a strategy should include, but should not be limited to:

- Reduction in energy use (electricity, natural gas, etc.)
- Reduction in real property portfolio through the demolition of antiquated, unnecessary buildings and the consolidation of similar functions
- Renovation of outdated, inefficient facilities
- Assessment of existing facilities to identity energy conservation measures and savings opportunities
- Elimination of independent leases
- Increased use of alternative energy sources though the use of power purchase agreements for renewable energy

Such an ambitious strategy will not be easy to implement, nor will its success be quickly recognized. However, reductions in greenhouse gas emissions lead to environmental and economic benefits for the Federal government and for the nation. The Department and its Bureaus should strive to set the bar high for all Federal agencies and show the environmental and economic communities that their respective standards for excellence need not be mutually exclusive.