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U.S. DEPARTMENT OF **ENERGY** | Energy Efficiency & Renewable Energy



Federal Greenhouse Gas Accounting and Reporting

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Objectives


After completing this seminar, you will be able to:

1. explain common greenhouse gases and their effect on climate.
2. discuss federal sources of greenhouse gas emissions.
3. identify scope 1, 2, and 3 emissions and give examples.
4. access existing greenhouse gas accounting protocols.
5. describe a process for managing greenhouse gas emission reductions.
6. locate resources to assist you in greenhouse gas emissions accounting and reporting.

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Federal Greenhouse Gas Accounting and Reporting

Matt Gray
Department of Energy
Federal Energy Management Program

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What are greenhouse gases?

Greenhouse gases are defined in two categories:

- naturally occurring
- man made



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What Are Greenhouse Gases?

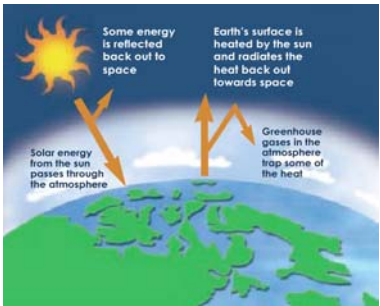
- Concentrations of naturally occurring GHGs have remained fairly steady for thousands of years.
- Since the industrial revolution, human activity has drastically increased the atmospheric concentrations of these gases.

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The Greenhouse Effect



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Key Greenhouse Gases

Greenhouse Gases	Common Sources/Uses	Global Warming Potential
Carbon Dioxide (CO ₂)	Mobile and stationary combustion	1
Methane (CH ₄)	Coal mining, fuel combustion	21
Nitrous Oxide (N ₂ O)	Fuel combustion, fertilizers	310
Hydrofluorocarbon group of gases (HFCs)	Refrigerants, fire suppressants, manufacturing processes	140-11,700
Perfluorocarbon group of gases (PFCs)	Electrical equipment, manufacturing processes, refrigerants, medicine	6,500 - 17,700
Sulfur hexafluoride (SF ₆)	Electrical equipment, manufacturing processes, tracer in air modeling, medicine	23,900

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Rising Temperatures in US

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US Climate Policy

- “...climate change poses a grave and growing danger to our people.”
(President Obama at Copenhagen COP, December 2009)
- "The science behind climate change is settled, and human activity is responsible for global warming."
(EPA Administrator Lisa Jackson at Senate Environment and Public Works Committee hearing, February 2010)

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Key E.O. 13514 Provisions

- Section 9a -c:** Recommendations for GHG Accounting and Reporting
- Section 13:** Recommendations for Vendor and Contractor Emissions
- Section 17-18:** Limitations and Exemption Authority

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Relationship of E.O. to other GHG Reporting Requirements

- E.O. 13514, Section 13, requires GSA to provide recommendations... in tracking and reducing Scope 3 GHG emissions related to the supply of products and services to the government
- Federal Statutory and E.O. Requirements reference: www.eere.energy.gov/femp/regulations/regulations.html
- Agencies may also need to refer to EPA's Mandatory Reporting of Greenhouse Gas Rule

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Relationship of E.O. to other GHG Reporting Requirements

- State and Regional Programs** – some agencies are subject to state level GHG reporting or reduction requirements
- International Reporting** – some agencies provide GHG information that is incorporated into the US Climate Action Report

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Requirements Milestones

Date	Task	Category
11/5/09	Designate Senior Sustainability Officer	Agency Requirements
1/4/10	Submit Scope 1 & 2 target goals for 2020	Agency Requirements
4/5/10	Submit to CEQ/OMB recommended GHG reporting guidance	FEMP-Specific Tasks
4/5/10	Issue guidance on Federal fleet management	FEMP-Specific Tasks
4/5/10	GSA submits recommendations on vendor and contractor GHG emissions and Federal local transportation logistics	FEMP-Specific Tasks
6/2/10	Submit Strategic Sustainability Performance Plan, in concert with 2012 budget submission	Agency Requirements
6/2/10	Submit Scope 3 target goals for 2020	Agency Requirements
10/5/10	Provide electronic GHG reporting capability	FEMP-Specific Tasks
10/5/10	Submit to CEQ input on agency adaptation actions	FEMP-Specific Tasks
Jan 11	Submit comprehensive FY 2008 and FY 2010 GHG inventory	Agency Requirements

Green: FEMP-Specific Tasks Black: Agency Requirements

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U.S. Public Sector Protocol

- Applies principles of the Corporate Standard to state, local, and Federal agencies
- Serves as a background for Section 9 Recommendations
- Designed to perform "entity-level" accounting of GHG emissions
- Stakeholder input and "road tested" by most Federal agencies
- www.ghgprotocol.org/psp

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Public Sector Protocol

The diagram shows a central box labeled "U.S. Public Sector Protocol". Five arrows point towards it from boxes representing other standards: "EPA Climate Leaders Guidance", "ISO 14054 Standards", "CCAR Reporting Protocol", "Climate Registry Protocol", and "The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard".

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GHG Accounting Hierarchy

Level	Description	Key Agencies
Public Sector GHG Protocol	Framework for consistent accounting approach	EPA, all agencies
Policies and Regulations	Establish GHG requirements (E.O. 13514)	CEQ, OMB
Federal Guidance	Implement regulation, provide assistance	CEQ, DOE, DOD, DOI, EPA, GSA, DOC
Agency Plans	Organizational approach	All agencies
Inventory	Agency / Facility level account	All agencies

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GHG Accounting Principles

- Completeness
- Consistency
- Transparency
- Accuracy
- Relevance

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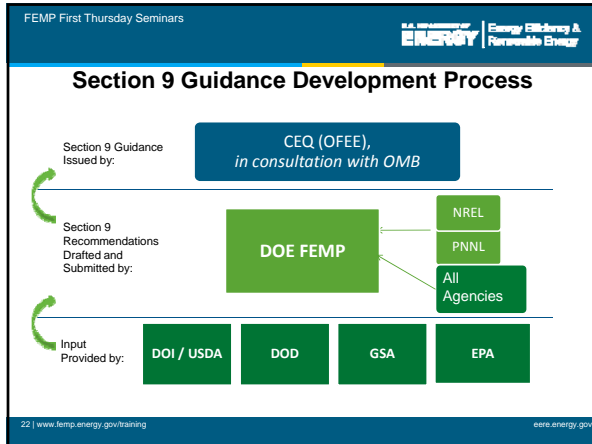
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Federal Greenhouse Gas Accounting and Reporting

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Overview of Recommendations

- Standardized procedures for reporting GHG emissions across the Federal Government
- Recommendations on Section 9 of E.O.13514 are under review
- The Council on Environmental Quality, in coordination with the Office of Management and Budget, will issue final Guidance

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Overview of Recommendations

- Both headquarters and facility levels considered
- Top-down or bottom-up
- Some flexibility in how facilities/subordinate organizations report their emissions for roll-up to agency wide inventory
- Final GHG inventories represent agency-level emissions

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GHG Inventory Topics

- Emissions sources to include in the comprehensive GHG inventory
- Treatment of land use, sequestration and agricultural emissions
- Use of renewable energy purchases, including RECs, and carbon offsets
- Reporting process, including procedure for inventory recalculations
- Validation and verification of emissions inventory

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Organizational Boundaries

Energy Bill – The activities related to the operation of the facilities for which they directly pay utility bills

Purchase Fuel – The operation of mobile sources for which the agency purchases fuel.

Other Activities – All other scope 1 and 2 activities over which the agency has operational control.

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GHG Reporting Portal
Energy Reporting data*
Fugitive Emissions data
Scope 3 data

GHG Inventory by:
Scope 1
Scope 2
Scope 3
Other

FAST data

GSA's Carbon Footprint tool

Other Bottom-Up Inventory Tools

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Scope 1 Emissions

Scope 1 Source	Description
Generation of electricity, heat, cooling, or steam	Emissions from combustion of fuels in stationary sources . This includes CH ₄ and N ₂ O emissions from biomass combusted for production of electricity, heat, cooling, or steam.
Mobile Sources	Emissions from the combustion of fuels in agency controlled mobile combustion sources . This includes CH ₄ and N ₂ O emissions from biofuel combustion.
Fugitive Emissions	Emissions from intentional or unintentional releases of GHGs from within the agency's organizational boundary
Process Emissions	Emissions from the manufacture or processing of chemicals and materials , and include on-site landfills, wastewater treatment plants, waste incinerators, and laboratory activities.

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Scope 2 Emissions

Indirect emissions associated with consumption of purchased or acquired electricity, steam, heating, or cooling.

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Scope 3 Emissions

- Because efforts to account for Scope 3 emissions are only recently emerging, a phased approach to developing Scope 3 inventories is recommended.
- Examples
 - Business travel (air, ground)
 - Employee Commuting
 - Contracted solid waste
 - Contracted wastewater treatment

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Verification and Validation

Verification provides confidence that reports of GHG emissions are complete, accurate, consistent, and without significant errors:

- Second party verification
- Third party verification
- Inventory management plan

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Summary – Key Topics Going Forward

- Reporting
- Scope 3 data collection
- Renewable energy
- Vendor and contractor emissions
- Organizational boundaries (including leased assets)
- Emissions and biological sequestration from land management techniques

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Bottom Up GHG Inventories at DOE Sites

Site	Electricity	Employee Commuting	Natural Gas	Business Travel	Fleet Vehicles	Fugitive Emissions	Solid Waste Disposal	Rental Cars
Hanford Site	39%	24%	17%	8%	11%	1%	1%	1%
National Renewable Energy Lab	76%	11%	6%	7%	0%	0%	0%	0%
Sandia National Lab	78%	8%	1%	1%	2%	0%	0%	0%
Pacific Northwest National Lab	53%	23%	13%	1%	1%	0%	0%	0%

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Example: Purchased Electricity

eGrid subregion SRVC with annual purchases of 30,000 MWh:

Step 1, Calculate Emissions for each GHG

CO ₂ Emissions	514.77 kg/MWh	30,000 MWh
N ₂ O Emissions	8.98 kg/MWh	30,000 MWh
CH ₄ Emissions	10.78 kg/GWh	30,000 MWh

Step 2, Calculate CO₂e for each GHG and sum overall emissions

CO ₂ e (CO ₂)	15,443.1 MT CO ₂	1
CO ₂ e(N ₂ O)	0.269 MT N ₂ O	310
CO ₂ e (CH ₄)	0.323 MT CH ₄	21

15,549.01 MT CO₂e

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Example: Mobile Combustion

Agency fleet with an annual fuel of 500,000 gallons of gasoline:

Step 1, Calculate emissions for each GHG

CO ₂ Emissions	8.78 kg/gal	500,000 gal
N ₂ O Emissions	2.54 x 10 ⁻⁴ kg/gal	500,000 gal
CH ₄ Emissions	2.4 x 10 ⁻⁴ kg/gal	500,000 gal

Step 2, Calculate CO₂e for each GHG and sum overall emissions

CO ₂ e (CO ₂)	4,390 MT CO ₂	1
CO ₂ e(N ₂ O)	1.27 x 10 ⁻¹ MT N ₂ O	310
CO ₂ e (CH ₄)	1.2 x 10 ⁻¹ MT CH ₄	21

4,431.89 MT CO₂e

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PNNL Case Study

1.1 billion business volume
4,600 staff
>2 millions sq. foot campus

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Contact Information

Matt Gray
 Federal Energy Management Program
 (202) 586-0067
Matthew.Gray@ee.doe.gov

www.eere.energy.gov/femp/programgreenhousegases.html

www.fedcenter.gov/programs/greenhouse/

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IN CONCLUSION

Reducing and reporting GHG pollution will ensure that the Federal Government leads by example in building the clean energy economy.

Actions taken under Executive Order 13514 will spur clean energy investments that create new private-sector jobs, drive long-term savings, build local market capacity, and foster innovation and entrepreneurship in clean energy industries.

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Seminar Evaluation and the Open Book Quiz

Almost done . . .

The link below will take you to the brief open-book Quiz and Evaluation.
 Earn a Certificate of Completion for your records!

<http://apps1.eere.energy.gov/femp/training/quiz/ghg.cfm>

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