Scope 3 Greenhouse Gases

February 18, 2010
Today’s Webinar

1. Quick Review: GHGs
2. Scope 3 Emissions
3. Scope 3 Reductions
4. Executive Order 13514
5. Guidance Document
6. Calculator Tool
7. Additional Resources
INTRODUCTION

- GYCC and NREL
- About NREL
  - The DOE’s national laboratory dedicated to integrating energy efficiency and renewable energy technologies
- About the presenter: John Nangle
The Greenhouse effect

1. Solar radiation passes through the clear atmosphere.
   - Incoming solar radiation: 343 Watt per m²

2. Net incoming solar radiation: 240 Watt per m²

3. Some solar radiation is reflected by the atmosphere and earth's surface.
   - Outgoing solar radiation: 103 Watt per m²

4. Solar energy is absorbed by the earth’s surface and warms it.
   - 168 Watt per m²

5. Some of the infrared radiation is absorbed and re-emitted by the greenhouse gas molecules. The direct effect is the warming of the earth’s surface and the troposphere.

6. Some of the infrared radiation passes through the atmosphere and is lost in space.
   - Net outgoing infrared radiation: 240 Watt per m²

Surface gains more heat and infrared radiation is emitted again...

... and is converted into heat causing the emission of longwave (infrared) radiation back to the atmosphere.

Sources: Okanagan university college in Canada, Department of geography, University of Oxford, school of geography; United States Environmental Protection Agency (EPA), Washington; Climate change 1995, The science of climate change, contribution of working group 1 to the second assessment report of the intergovernmental panel on climate change, UNEP and WMO, Cambridge university press, 1996.
## Kyoto Greenhouse Gases +1

<table>
<thead>
<tr>
<th>Greenhouse Gas</th>
<th>Pre-1750 Concentration</th>
<th>Current Concentration</th>
<th>Global Warming Potential*</th>
<th>Atmospheric Lifetime (yrs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon Dioxide (CO(_2))</td>
<td>280 ppm</td>
<td>384 ppm</td>
<td>1</td>
<td>50-200+</td>
</tr>
<tr>
<td>Methane (CH(_4))</td>
<td>700 ppb</td>
<td>1735–1857 ppb</td>
<td>25</td>
<td>12</td>
</tr>
<tr>
<td>Nitrous Oxide (N(_2)O)</td>
<td>270 ppb</td>
<td>320-321 ppb</td>
<td>298</td>
<td>114</td>
</tr>
<tr>
<td>Sulfur Hexafluoride (SF(_6))</td>
<td>0</td>
<td>6.03-6.40 ppt</td>
<td>22,800</td>
<td>3,200</td>
</tr>
<tr>
<td>Hydrofluorocarbons (HFCs)</td>
<td>0</td>
<td>3.2-197 ppt</td>
<td>124–14,800</td>
<td>&lt; 15</td>
</tr>
<tr>
<td>Perfluorocarbons (PFCs)</td>
<td>0</td>
<td>77-246 ppt</td>
<td>7,390-12,200</td>
<td>50,000</td>
</tr>
<tr>
<td>Nitrogen Trifluoride (NF(_3))**</td>
<td>0</td>
<td>.454 ppt</td>
<td>6,800</td>
<td>550</td>
</tr>
</tbody>
</table>

*100 year time horizon

**Not a Kyoto GHG, but regulated in Waxman-Markey
## GHG Emission Sources

<table>
<thead>
<tr>
<th>Greenhouse Gas</th>
<th>Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon Dioxide</td>
<td>Fossil fuel combustion, deforestation, land use change</td>
</tr>
<tr>
<td>Methane</td>
<td>Landfills, wastewater treatment, biomass combustion, natural gas production, coal production</td>
</tr>
<tr>
<td>Nitrous Oxide</td>
<td>Agriculture, wastewater treatment, manure management, composting, waste incineration</td>
</tr>
</tbody>
</table>
EO 13514 Reduction Goals

- Reduction Goal for 2020, based on FY08 baseline
- Reported to CEQ Chair and OMB Director
Federal GHG Inventory Guidance
Executive Order 13514

“Excluded vehicles and equipment” means any vehicle, vessel, aircraft, or non-road equipment owned or operated by an agency of the Federal Government that is used in:

- Combat support, combat service support, tactical or relief operations, or training for such operations;
- Federal law enforcement (including protective service and investigation);
- Emergency response (including fire and rescue); or
- Spaceflight vehicles (including ground-support equipment)
Common Sources of Federal Greenhouse Gas Emissions

SCOPE 1:
Greenhouse gas emissions from sources that are owned or controlled by a Federal agency.

SCOPE 2:
Greenhouse gas emissions resulting from the generation of electricity, heat, or steam purchased by a Federal agency.

SCOPE 3:
Greenhouse gas emissions from sources not owned or directly controlled by a Federal agency but related to agency activities, such as vendor supply chains, delivery services, and employee travel and commuting.
**Scope 3 Emissions**

**Scope 3**: Other Indirect Emissions

- Emissions from sources not owned or directly controlled by an agency, but related to agency activities.

- Scope 3 emissions methodologies are not well defined at this point.

- However, there are efforts underway to standardize Scope 3 accounting.
## Scope 3: Value Chain

<table>
<thead>
<tr>
<th>Value Chain Position</th>
<th>Upstream</th>
<th>Own Operations</th>
<th>Downstream</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Emissions</strong>&lt;br&gt;Associated with the entity:</td>
<td><strong>Purchases or services provided</strong></td>
<td><strong>Owns or Controls</strong></td>
<td><strong>Sales or services provided</strong></td>
</tr>
<tr>
<td><strong>Scope 1</strong>&lt;br&gt;Emissions of:</td>
<td>Goods and service Providers</td>
<td>Reporting Entity</td>
<td>Customers and Visitors</td>
</tr>
<tr>
<td><strong>Accounted by the reporting entity as:</strong></td>
<td>Scopes 2 &amp; 3</td>
<td>Scope 1</td>
<td>Scope 3</td>
</tr>
</tbody>
</table>

Source: GHG Protocol Scope 3 Accounting and Reporting Standard- November 2009 Draft
Scope 3 Upstream Emissions

Emissions that occur in the life cycle of inputs up to receipt by the reporting entity.

Examples:

- Direct Supplier purchased goods and services
- Transportation and distribution (includes utilities)
- Leased assets (reported by lessee)
- Business travel (air, ground, hotel, etc.)
- Contract waste disposal
Scope 3 Downstream Emissions

Emissions that occur in the life-cycle of outputs subsequent to sale or disposal by the reporting entity.

Examples:
- Waste production (solid waste, recycling, wastewater)
- Transportation and distribution of sold products
- Use of sold products
- Leased assets (reported by lessor)
Scope 3 Other Emissions

Other Scope 3:
Employee commuting

Examples:
- Employee owned vehicles
- Public transportation
- Telecommuting
Scope 3: The Federal Sector

Specific categories for Federal sector still undecided

- Commonly occurring categories
  - Business air and ground travel
  - Assets leased from GSA
  - Employee commuting
  - Purchased energy T&D Losses

- Others for consideration
  - Waste management
  - Concessionaires
  - Park visitors
Reduction Strategies

- Travel and Commuting – short term
  - Telecommuting
  - Alternative work schedules
  - Video conferencing (saves a lot of time, too)
- Longer term strategies
  - Emissions part of contracts with vendors/concessionaires
  - Biogas from landfills and wastewater treatment
  - Composting
- Others....
Leased Space

- Leased space Scope 3 accounting methodologies are still under discussion for Federal Guidance.
- Two proposed (not official) methodologies:
  - **Method 1: Energy Intensity Factor**
    \[ E_{\text{Tenant}} = A_{\text{Tenant}} \cdot EI_{\text{Building}} \]
  - **Method 2: Total Building Energy Use**
    \[ E_{\text{Tenant}} = E_{\text{Building}} \cdot A_{\text{Tenant}} \div A_{\text{Building}} \div OR_{\text{Building}} \]

*The Climate Registry’s General Reporting Protocol*
# Calculator Tool

## Scope 3 Data Collection Summary

<table>
<thead>
<tr>
<th>Contact Information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Name</strong></td>
</tr>
<tr>
<td><strong>Phone Number</strong></td>
</tr>
<tr>
<td><strong>Email</strong></td>
</tr>
<tr>
<td><strong>Title</strong></td>
</tr>
<tr>
<td><strong>Unit</strong></td>
</tr>
</tbody>
</table>

## Deployment Scope 3 Summary

<table>
<thead>
<tr>
<th>Category</th>
<th>MT CO2e</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commuting</td>
<td>235658.39</td>
</tr>
<tr>
<td>Business Travel</td>
<td>18770.87</td>
</tr>
<tr>
<td>Waste Disposal</td>
<td>13528453.82</td>
</tr>
<tr>
<td>Contractor/Vendor</td>
<td>0.00</td>
</tr>
<tr>
<td>T&amp;D Losses</td>
<td>234.72</td>
</tr>
</tbody>
</table>

**Key**

- Input Field
- Calculated Field
- Factor Field
Further Resources:

- FEMP GHG Program website
  - [http://www1.eere.energy.gov/femp/program/greenhousegases.html](http://www1.eere.energy.gov/femp/program/greenhousegases.html)
- GHG Protocol Scope 3 Accounting and Reporting Standard
- The Climate Registry General Reporting Protocol
- National Renewable Energy Laboratory
  - [http://www.nrel.gov](http://www.nrel.gov)
Some Dates to Remember

- **GYA Facilities Webinars** - Eliza Hotchkiss, NREL:
  - February 25\textsuperscript{th}, 10–11 AM (Basics, energy intensity, outliers, priorities)
  - March 25\textsuperscript{th}, 10–11 AM (Data preparation, calculations and Q&A)

- **GYA Scope 3 Emissions Webinars** - John Nangle, NREL:
  - March 19th, 10-11 AM (Data preparation, calculations and Q&A)

- **GYA Fleet Webinars** - Kristin Day, NREL:
  - March 30, 2-3 PM (Workshop preparation and new technology)

- **Greater Yellowstone Interagency Climate Action Plan Working Session**:
  - April 19\textsuperscript{th}-22\textsuperscript{nd}, Bozeman, MT
Questions and Follow-Up

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