AAPA Climate Change Workshop
GHG Emission Inventories at Ports

Presented by: Jette Findsen
November 12, 2008
Presentation Overview

• Introduction
• GHG Protocols
• What to report and how?
• Organizational boundaries and tenant emissions
• Accounting for direct and indirect emissions
  – Stationary combustion
Our Consulting Work in Climate Change Policy

**Vision:** Policy consulting supports efficiency and engineering projects for large commercial, industrial, and government clients

- **Energy Modeling and Analysis**
  - Forecast energy and allowance prices
  - Understand local market conditions

- **Emissions Accounting and Forecasting**
  - Inventory corporate emissions
  - Forecast emissions
  - Seek offset project opportunities

- **Emission Abatement Cost Curves and Plans**
  - Seek short-term project opportunities
  - Seek capital opportunities
  - Integrate allowance prices into curve

- **Energy Efficiency and Engineering Projects**

- **Emission Offset Procurement and Auctions**
  - Serve both large scale buyers and sellers
  - Position for multibillion dollar federal auction

**GHG Reporting Protocols**
- California Climate Action Registry
- The Climate Registry
- DOE 1605(b) Program
- EPA Climate Leaders
- Western Governors Association

**GHG Inventories**
- Port of Long Beach
- Nebraska Public Power District
- ConocoPhillips
- Oklahoma Gas & Electric
- Chicago Transit Authority
- Defense Logistics Agency
- Sunrise Assisted Living
- NASA
### Emerging GHG Protocols

#### Where to Report GHG Emissions from Ports?

<table>
<thead>
<tr>
<th>Organization</th>
<th>Coverage</th>
<th>Status</th>
</tr>
</thead>
</table>
| Enhanced 1605(b) Voluntary GHG Reporting Program  
DOE Energy Information Administration | - United States  
- Reporters can register emission reductions against 2002 baseline starting 2003 | - Reporting expected to begin by March 2009 |
| Climate Leaders  
Environmental Protection Agency | - United States  
- Partners agree to GHG target | - Ongoing |
| Mandatory GHG Reporting Rule  
Environmental Protection Agency | - United States  
- Mandatory for large emitters | - Scheduled Sep. 08 draft delayed. OMB reviewing rule  
- Final rule scheduled for Spring 2009 |
| The Climate Registry (TCR)  
Thirty-nine U.S. states, the District of Columbia, nine Canadian provinces, six Mexican states, and several North American Indian tribes | - Canada, Mexico, and the United States  
- Voluntary; supports mandatory reporting in 18 states | - 2008 data must be reported by June 2009 and verified by December 2009  
- Historical third-party verified data can be submitted now  
- Transitional reporting allowed for 2 years. |
| The California Climate Action Registry (CCAR)  
California | California and the United States | - Accepts inventory data through 2009 reporting year  
- In 2010 all reports will be transferred to The Climate Registry |
| GHG Protocol  
WRI/WBCSD | Worldwide | - No official reporting program |
What GHGs to Report?

- **Greenhouse Gases**
  - Carbon Dioxide (CO₂)
    - Stationary/mobile combustion, industrial processes, fugitive emissions, etc.
  - Methane (CH₄)
    - Stationary/mobile combustion, industrial processes, fugitive emissions, landfills, agriculture, etc.
  - Nitrous Oxide (N₂O)
    - Stationary/mobile combustion, industrial processes
  - Hydrofluorocarbons (HFCs)
    - Industrial processes, refrigeration
  - Perfluorocarbons (PFCs)
    - Industrial processes, refrigeration
  - Sulfur Hexafluoride (SF₆)
    - Electricity T&D systems

- **Typical Sources at Ports**
  - Buildings
    - Electricity, heating, and cooling
    - Fugitive emissions from cooling and air conditioning
  - Fleet vehicles
  - Commercial marine vessels
  - Cargo handling equipment
  - Landfills
  - Attracted travel
  - Employee commuting
What to Sources to Include, and How?
Two Options for Organizational Boundaries

1. Equity share
   • Report all sources that are wholly or partially owned by your organization

2. Management/operational control
   • Report all sources that are under your control
   • Two approaches:
     • **Financial control**
       • Authority to direct the financial policies of the operation with an interest in gaining economic benefit
     • **Operational control**
       • Authority to introduce and implement operating policies
Reporting of Tenant Emissions
Depends on Organizational Approach

The Climate Registry: Decision Tree for a Leased Asset

What type of lease do you have?

Finance or Capital Lease
Operating Lease

You may need to report emissions from the asset (as Scope 2 or 3 emissions)

Equity Share or Financial Control

Operational Control

What consolidation method are you using?

You may opt to report emissions from the asset (as Scope 3 emissions)
Example: Port and Tenant Emissions at Port Authority of New York & New Jersey

Port Commerce Department GHG Emissions by Facility and Scope (metric tons CO$_2$e), 2006

<table>
<thead>
<tr>
<th>Facility/Source</th>
<th>Scope 1</th>
<th>Scope 2</th>
<th>Scope 3</th>
<th>Facility Emission Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Port Authority Ports</td>
<td>-</td>
<td>-</td>
<td>146,735</td>
<td>146,735</td>
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<tr>
<td>Commercial Marine Vessels</td>
<td>-</td>
<td>-</td>
<td>146,735</td>
<td>146,735</td>
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<tr>
<td>Port Newark/Elizabeth Terminal</td>
<td>189</td>
<td>-</td>
<td>710,143</td>
<td>710,332</td>
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<tr>
<td>Cargo Handling Equipment</td>
<td>-</td>
<td>-</td>
<td>219,955</td>
<td>219,955</td>
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<tr>
<td>Attracted Travel</td>
<td>-</td>
<td>-</td>
<td>299,029</td>
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<tr>
<td>Buildings</td>
<td>-</td>
<td>-</td>
<td>44,424</td>
<td>44,424</td>
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<tr>
<td>Fleet Vehicle</td>
<td>189</td>
<td>-</td>
<td>-</td>
<td>189</td>
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<tr>
<td>Direct Fugitive Emissions</td>
<td>18</td>
<td>-</td>
<td>-</td>
<td>18</td>
</tr>
<tr>
<td>Howland Hook Marine Terminal/Port Ivory</td>
<td>9</td>
<td>-</td>
<td>78,911</td>
<td>78,920</td>
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<tr>
<td>Cargo Handling Equipment</td>
<td>-</td>
<td>-</td>
<td>31,445</td>
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<tr>
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<td>-</td>
<td>47,015</td>
<td>47,015</td>
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<tr>
<td>Buildings</td>
<td>-</td>
<td>-</td>
<td>451</td>
<td>451</td>
</tr>
<tr>
<td>Fleet Vehicle</td>
<td>9</td>
<td>-</td>
<td>-</td>
<td>9</td>
</tr>
<tr>
<td>Red Hook Container Terminal and Brooklyn PA Marine Terminal (Brooklyn Piers)</td>
<td>66</td>
<td>-</td>
<td>1,894</td>
<td>1,960</td>
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<tr>
<td>Cargo Handling Equipment</td>
<td>-</td>
<td>-</td>
<td>Included in Howland Hook</td>
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<tr>
<td>Attracted Travel</td>
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<td>1,443</td>
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<tr>
<td>Fleet Vehicle</td>
<td>66</td>
<td>-</td>
<td>-</td>
<td>66</td>
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<tr>
<td>Auto Marine Terminal and Greenville Yard</td>
<td>-</td>
<td>-</td>
<td>3,687</td>
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<tr>
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<td>-</td>
<td>150</td>
<td>150</td>
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<tr>
<td>Attracted Travel</td>
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<td>-</td>
<td>Included in Red Hook</td>
<td></td>
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<tr>
<td>Buildings</td>
<td>-</td>
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<td>3,537</td>
<td>3,537</td>
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<tr>
<td>Elizabeth Landfill</td>
<td>4,073</td>
<td>-</td>
<td>941,370</td>
<td>945,707</td>
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<tr>
<td>PORT COMMERCE DEPARTMENT</td>
<td>4,337</td>
<td>-</td>
<td>941,370</td>
<td>945,707</td>
</tr>
</tbody>
</table>

Mobile sources represent the largest share of emissions and the biggest opportunity for reductions.

Scope 3 (optional sources) represents the largest source of emissions by far.
### Example Accounting Methodologies

**Stationary Sources: Direct and Indirect**

<table>
<thead>
<tr>
<th>Source</th>
<th>Method</th>
<th>References</th>
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<tbody>
<tr>
<td><strong>Scope 1 Direct</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stationary combustion</td>
<td>Fuel consumption x emission factor</td>
<td>Use established emission factors from protocols</td>
</tr>
<tr>
<td>Fugitive Emissions</td>
<td>Based on leak rates</td>
<td></td>
</tr>
<tr>
<td><strong>Scope 2 Indirect</strong></td>
<td></td>
<td></td>
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<tr>
<td>Imported electricity</td>
<td>KWh x emission factor</td>
<td>Utility-specific emission factors</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Power pool emission factors from EPA’s eGRID database</td>
</tr>
<tr>
<td><strong>Scope 3 Indirect</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electricity in tenant buildings</td>
<td>KWh x emission factor</td>
<td>Utility-specific emission factors</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EPA’s eGRID database</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Estimates of per square foot energy use of similar buildings using EIA Commercial Buildings Energy Consumption Survey (CBECS)</td>
</tr>
</tbody>
</table>
For SAIC’s Climate Change Services, please contact:

**Jette Findsen**
Ph: 202-488-6624
Email: [jette.findsen@saic.com](mailto:jette.findsen@saic.com)

For SAIC’s work with ports, please contact:

**Scott Weaver**
Ph: 626-440-8347
Email: [michael.s.weaver@saic.com](mailto:michael.s.weaver@saic.com)