Air Emissions Data Management at the Goddard Space Flight Center

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The Mission of GSFC to expand knowledge of the earth and its environment, the solar system and the universe through observations from space.
Goddard Space Flight Center (GSFC)

- Located in Greenbelt, Maryland
  - Non-attainment Area for Ground-Level Ozone
- Major Source for NOx
- Area Source for HAPs
- Major Source for GHGs(?)
- Title V Air Permit
  - Annual Compliance Certification
  - Annual Emissions Certification
GSFC’s Permitted Sources

- Five 49.5 MM/Btu-hr Boilers
  - Landfill gas, natural gas and #2 Fuel Oil
- Backup Diesel Generators providing up to 14.75 MW
- Semi-Conductor Facility
- Aerospace Coating Shop
- Electrochemical Plating Shop
Greenhouse Gas Sources

From NASA’s 2010 Strategic Sustainability Performance Plan
GSFC’s Initial GHG Inventory

- GSFC received MDE’s request for CY2007 GHG Inventory information on January 2008
  - Submitted as part of the Annual Emissions Certification
- Limited to Title V Registered pieces of equipment, partial Scope 1 GHG Inventory
  - MDE does not consider LFG a biogenic fuel
  - EPA hasn’t made up their minds if LFG is biogenic
Environmental Management System and GHG Inventory

- EMS Core Team designated a completed GHG Inventory a high priority aspect in August 2008
- Environmental Management Plan
  - Calendar Year 2008
  - Completed Scope 1, 2, and 3
  - Tracking pending regulations
- Take advantage of existing committees to share information with Center Management
  - Educated Management/Decision Makers
  - Positioning the Center to respond to pending requirements
Inventory Development

- Identify scope and data needs –
  - Read the protocol, regulations & define requirements!
- Protocols – *Concurrently Calculated*
  - World Resources Institute / World Business Council For Sustainable Development (WRI/WBCSD)
  - Federal Energy Management Program (FEMP), Energy Management Data Report
- Boundaries
  - NASA GFSC directly controlled facilities, civil servant activities, etc. – *mirrors activities monitored under relevant Executive Orders*
- Identify existing Agency data collection and management systems
- Determine if data outputs are relevant, reliable, comparable, available, and maintainable year-to-year
Define Requirements

- Three different Inventories required annually
  - EPA Mandatory Reporting Rule
  - EO 13514 - *Federal Leadership in Environmental, Energy, and Economic Performance*
  - Maryland Department of the Environment (MDE)
  - Data must be verified and auditable
Mandatory Reporting Rule

- Covered Gases:
  - CO₂, CH₄, N₂O, HFCs, PFCs, SF₆, and NF₃
- Threshold for reporting:
  - Scope 1 emissions
  - 25,000 metric tons of CO₂ equivalent (MTCO₂e)
  - Begins January 1, 2010
  - Reporting on a Calendar Year by each facility
  - Under the Mandatory Reporting Rule, LFG is biogenic (emissions not counted)
Executive Order 13514

- Signed on October 5, 2009
- Covered Gases: CO$_2$, CH$_4$, N$_2$O, HFCs, PFCs, and SF$_6$
- Applicable to all federal agencies
- Scope 1, 2, and 3 GHG Inventory
- Based on Fiscal Year emissions
- Absolute reductions
- 2008 baseline/2020 target date of reduction
MDE Inventory Request

- GSFC received MDE’s request for this GHG Inventory information on January 2008
  - Calendar Year 2007
  - Part of the Annual Emissions Certification
- Limited to Title V Registered pieces of equipment, partial Scope 1 GHG Inventory for MDE
  - MDE does not consider landfill gas a biogenic fuel
Inventory Development

- Identify existing Agency and Facility data collection and management systems
- Determine if data outputs are relevant, reliable, comparable, available, and maintainable year-to-year
Data Sources

• Past Executive Orders mandated collection of energy and transportation data you need!
• Determine appropriateness and availability of data in existing reporting systems
• Engage local “keepers” of the data early on
• Select and incorporate data inputs
  • NETS / Center utilities data
  • Title V Air Emissions Certification Calculations
  • GSA vehicle fuel and / or mileage data
  • HVAC refrigerant recharge data
Scope 1 Inventory

- Scope 1 for CY09 MRR is 10,547 MTCO2e
  - Landfill Gas (LFG) is **not** included in GHG Emissions
- MDE Limited Scope 1 – 28,700 MTCO2e
  - Landfill Gas (LFG) **is** included in GHG Emissions

Title V PSD Boilers ONLY

- PTE (assuming LFG not biogenic) – 58,720 tons per year CO2e (53,270 MTCO2e)
  - LFG Composition – 51% CH4, 38% CO2
- PTE (assuming no LFG, 100% NG) – 44,120 tons per year CO2e (40,020 MTCO2e)
GHG Limited Scope 1 Inventory

- PTE for Sources Other than Power Plant Boilers
  - Emergency Generators – 110 MTCO2e (1% of total)
  - Space heaters – 460 MTCO2e (4% of total)
  - Mobile Sources – 27 MTCO2e (0% of total)
  - No SF6, HFCs, and PFCs, and NF3 in measurable amount
  - Fugitive Emissions – not required, but rough data shows much less than 1% of total
Data Collection and Maintenance

- Document each Calendar/Fiscal Year (record keeping, record keeping, record keeping)
- Validate the data
- Manage your resources
  - 1st Year – must have detailed data across the board
  - Thereafter – don’t spend half your time on a source that doesn’t affect the bottom line
- Need a good HazMat Management/Tracking system to ensure that SF6, HFCs, and PFCs, and NF3 usage remains insignificant
Annual GHG Inventories

- Three different Inventories required annually
  - MDE, EPA MRR, and EO 13514
  - Data must be verified and auditable
- Maryland Department of the Environment
  - Calendar Year
  - Limited Scope 1
  - GHG Gases: CO₂, CH₄, N₂O, HFC, PFC, and SF₆
  - Landfill gas is not considered a biogenic fuel
- EPA’s Mandatory Reporting Rule
  - Calendar Year
  - Scope 1 (Source Categories)
  - GHG Gases: CO₂, CH₄, N₂O, HFC, PFC, SF₆, and Fluorinated Gases
- EO 13514
  - Fiscal Year
  - Scope 1, 2, and 3
  - GHG Gases: CO₂, CH₄, N₂O, HFC, PFC, and SF₆
  - Plus need verification/validation of data
Air Quality Management Planning and Impact Analysis

GHG Emissions and Climate Change inclusion in NEPA

- Federal Action
  - Projects
  - Policy Changes
  - Upstream/Downstream impacts
  - Scope 1, 2, and 3
- GHG Gases: CO₂, CH₄, N₂O, HFC, PFC, and SF₆
- Reference Point of 25,000 MTCO₂ e
- Impacts of/on Proposed Action
- Mitigation and Adaptation Analysis
## Resource Impacts

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GSFC’s Lessons Learned

- EMS provided the opportunity to educate Center Management on the impacts of GHG regulations
- State and federal regulations will drive GHG Inventory approaches
- Flexible and transparent data collection and management is even more important for rapid adaptation, modification, recalculation and validation
- Electronic Data Management
- Determine if data outputs are relevant, reliable, comparable, available, and maintainable year-to-year
GSFC’s Lessons Learned

- Assess the data source’s continued viability and sustainability for long-term use
- Leverage existing Agency data collection and management systems (don’t reinvent the wheel!!)
  - Past EOs mandated collection of energy and transportation data
  - Using existing system should have some data quality and verification
- Engage local “keepers” of the data early on
- Part of larger effort, not an independent effort (sustainability)
Questions???