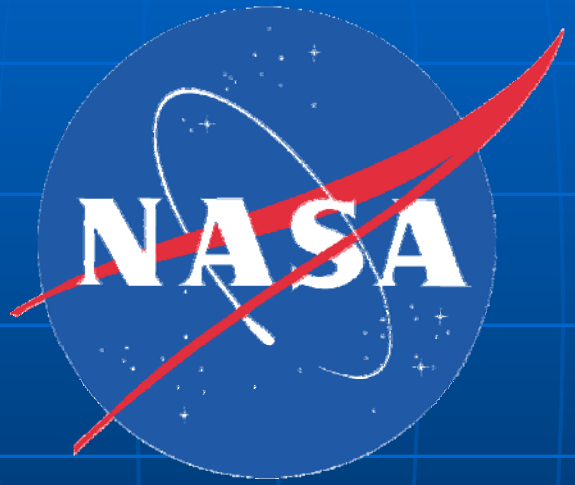
Case Study: Using Existing Agency Tools to Develop a GHG Inventory

Climate Leaders Workshop



January 15, 2008

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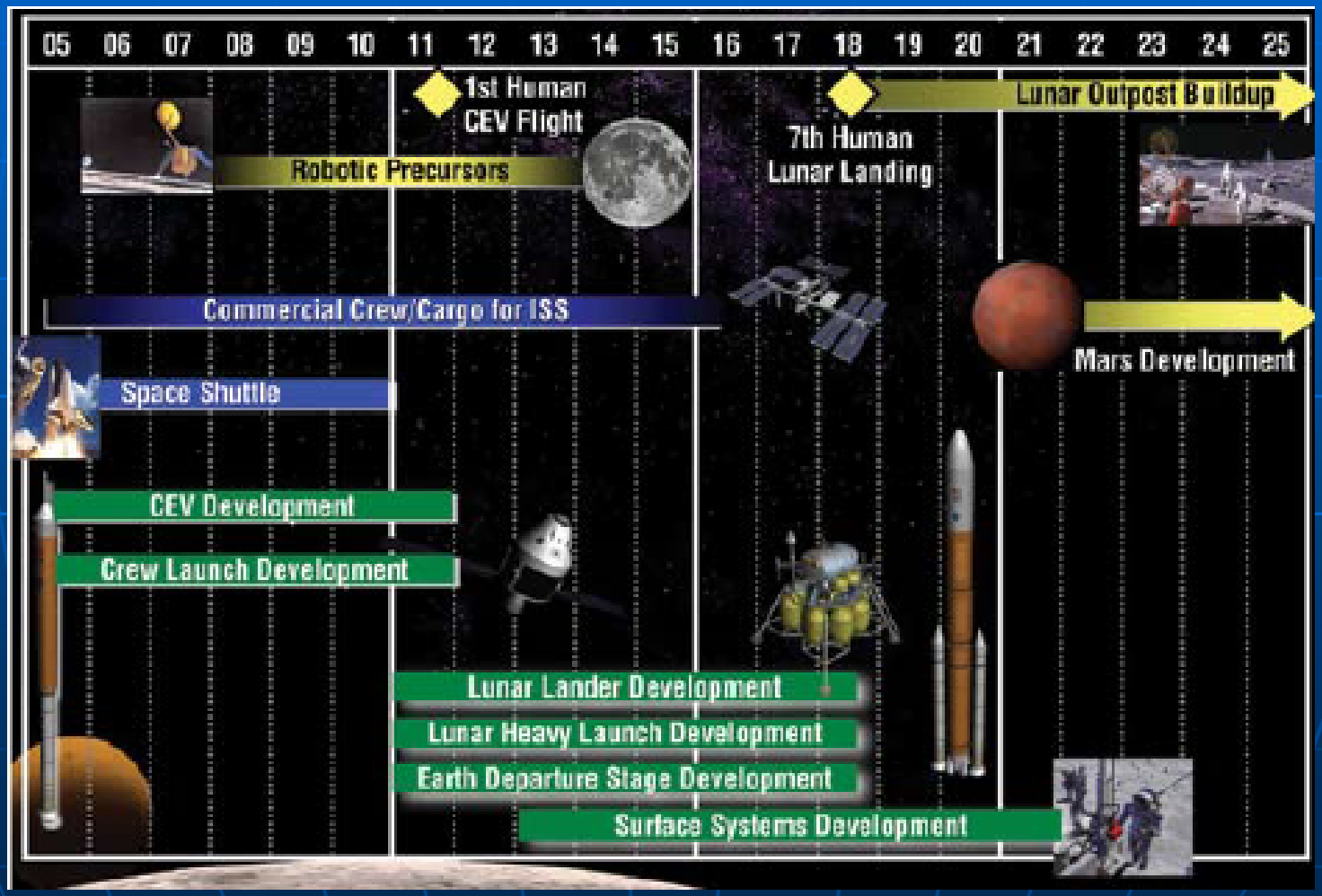
Presentation Nuts & Bolts

- GHG Inventory Initial Efforts, Protocols, Scope, and Boundaries
- Data Collection & Leveraging Existing Systems
- NASA's Initial Approach and Customization Process
- Quality Assurance in Design and Process
- Lessons Learned
- Next Steps

NASA's Mission:

"To pioneer the future in space exploration, scientific discovery, and aeronautics research."



*The President's Vision For U.S. Space Exploration, National Security Directive 31 (2004)

*U.S. Space Transportation Policy – Access to Space, National Security Directive 40 (2005)

Vision for Space Exploration:
"A Safe, Accelerated, Affordable, and Sustainable Approach"

Douglas R. Cooke, NASA's Exploration Architecture, 12/8/05, NASA Risk Management Conference 2005

Graphics Credit: NASA/John Frassanito and Associates

- **Complete International Space Station**
- **Safely fly Space Shuttle until 2010**
- **Develop and fly Crew Exploration Vehicle before 2015**
- **Return to the Moon before 2020**
- **Promote international and commercial participation**
- **Develop supporting innovative technologies, knowledge, and infrastructures**
- **Implement sustained and affordable human and robotic program**

Why Prepare a GHG Inventory Now?

- Reasons
  - Massachusetts v. EPA - U.S. Supreme Court – air pollutants include GHG (2007)
  - President supports voluntary “cutting our nation’s Greenhouse Gas intensity” (June 11, 2002)
  - EPA “Climate Leaders” Program - voluntary reduction of greenhouse gases
  - California Climate Action Registry (CCAR) – JPL is a new member
  - DOE 1605(b) Voluntary Reporting of Greenhouse Gases [EPAct 1992; 10 CFR Part 300]
- Executive Order 13423
  - Specifically references reduction in greenhouse gas emissions
  - Toxic and Hazardous Chemical Plan due by 24 January 2008
  - Greenhouse gas theme underlies several areas of Executive Order 13423 (e.g., energy intensity, new construction & major renovation of buildings, agency vehicle fleet, and pollution prevention)

NASA's Initial GHG Inventory Efforts

- Developed Internal Ecological Footprint: CO_2

  resource consumption *inventory* for sustainability indicator

- Adapted Greenhouse Gas Inventory: $CO_{2\ eq.}$

  risk management "GHG rough order of magnitude" (including ODSs)

- Explored Greenhouse Gas Accounting: $CO_{2\ eq.}$
  - *WRI / WBCSD GHGs Protocol*
  - *EPA "Climate Leaders" Program (excludes ODSs)*
  - *DOE 1605(b) Program (optional to include ODSs)*
  - *ISO 14064 & 14065 – Greenhouse Gas (internal audits & projects)*

Putting NASA's Draft GHG Inventory Into Context

- *If it isn't measured, it isn't managed!*
- Greenhouse Gases theme underlies emphasized areas of Executive Order (EO) 13423
- GHG Inventory provides basis for looking at baseline and process moving forward with more feedback and customization at facility level
- Leverage results and tools to aid decision-making for energy projects and GHG emission control

Initial GHG Inventory Effort – Protocols, Scope, & Boundaries

- Protocols – *Concurrently Calculated*
  - World Resources Institute / World Business Council For Sustainable Development (WRI/WBCSD)
  - Federal Energy Management Program (FEMP), Energy Management Data Report
- Scope
  - Scope 1: Direct Emissions (stationary, mobile, etc.)
  - Scope 2: Indirect Emissions (electric, steam, etc.)
- Boundaries
  - NASA direct controlled Centers & facilities, civil servant activities, etc. – *mirrors activities monitored under relevant Executive Orders*

Data Collection – Systematic and Pragmatic

- Identify scope activity data needs –
  - Read the manual & define requirements!
- Identify existing Agency data collection and management systems
- Determine if data outputs are relevant, reliable, comparable, available, and maintainable year-to-year
- Assess source's continued viability and sustainability for long-term use

Leveraging NASA's Existing Data

- Past Executive Orders mandated collection of energy and transportation data you need!
- Determine appropriateness and availability of data in existing reporting systems
- Engage "keepers" of the data early on
- Select and incorporate data inputs
  - NASA Environmental Tracking System (NETS) data resources
  - Federal Federal Automotive Statistical Tool, Annual Report Data, See https://fastweb.inel.gov/

NASA's Initial Approach and Customization Process

- WRI/WBCSD Protocol has good calculation tool modules in MS Excel but time / labor intensive for ~20 facilities at a time
- Used NASA data inputs to define calculation data streams and WRI/WBCSD modules needed
- Developed, customized, and integrated NASA GHG Inventory Template for facility level runs
- Used standardized template outputs and nested structure to rollup Agency inventory results
- Provided low-cost and modular GHG inventory with ability for quick updates and customization

Quality Assurance in Design and Process

- Designed tool to:
  - Maintain input component data streams
  - Use single data input / dual protocol calculations with comparisons for ball park side-by-side QA
  - Generic template with facility specific look up tables for customization and consistency
- QA for facility and rollup components
  - On-going during preparation process
  - After calculations are completed
- Design & planning for future 3rd party audit

Programs, Organizations, and ISO Standards to Reference

- Useful resources for developing robust GHG inventory process and program
  - WRI/WBCSD Protocol Guidance
  - U.S. EPA Climate Leaders Program Guidance
  - California Climate Action Registry Guidance
  - ISO 14064-1 – *Design and development of organizational GHG Inventories*
  - ISO 14064-2 – *Design and development of GHG Projects*

Lessons Learned (1)

- Involve your Agency's energy and transportation leads early on
- Maximize data "borrowing"
- Minimize new data collection and maintenance where possible
- Use modular and consistent data management process
- Take baby steps!

Lessons Learned (2)

- Flexible and transparent architecture is key for rapid improvement, modification, and recalculation
- Integrate accessible, consistent, and authoritative data and conversions
- Good start but still on-going development process

On-Going and Future Efforts

- Continue data stream gap analysis
  - HFCs, PFCs, & SF6 used at facilities?
- Use initial numbers and products to engage NASA decision-makers
- Utilize existing data and tool to plan future policy and goals
- Continue coordination with U.S. EPA Climate Leaders Program

Means To An End

"If ***scientists*** supply accurate and reliable information,

policy makers can make intelligent and responsible decisions

to preserve an acceptable quality of life for our ***children and grandchildren***."

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B. Cramer (2001) "New Millennium Program's First Earth Observing Mission (EO-1)" January 11, 2001; Technology Workshop USGS Auditorium / Reston, Virginia http://eo1.gsfc.nasa.gov/miscPages/Tech1.html

Useful Supplementary Resources:

- J. Lash & F. Wellington (March 2007) “Competitive Advantage on a Warming Planet,” Harvard Business Review.
- Meridian Institute (July 2002) “Forum on a GHG Accounting System: Taking Stock and Prioritizing Action,” See http://www.merid.org/GHGaccounting/index.php.
- J.D. Garbrecht & T.C. Priechota (eds.) (2006) Climate Variations, Climate Change, and Water Resources Engineering, American Society of Civil Engineers.
- Florence Daviet (June 2006) The Greenhouse Gas Protocol: Designing a Customized Greenhouse Gas Calculation Tool. World Resources Institute.
- Michael Gillenwater (July 2005) WRI/WBCSD GHG Protocol Stationary Combustion Guidance, Version 3.0, World Resources Institute (WRI) and World Business Council for Sustainable Development (WBCSD), See http://www.ghgprotocol.org/calculation-tools.
- U.S. EPA (October 2004) Climate Leaders Greenhouse Gas Inventory Protocol Core Module Guidance: Indirect Emissions from Purchases/Sales of Electricity and Steam.