

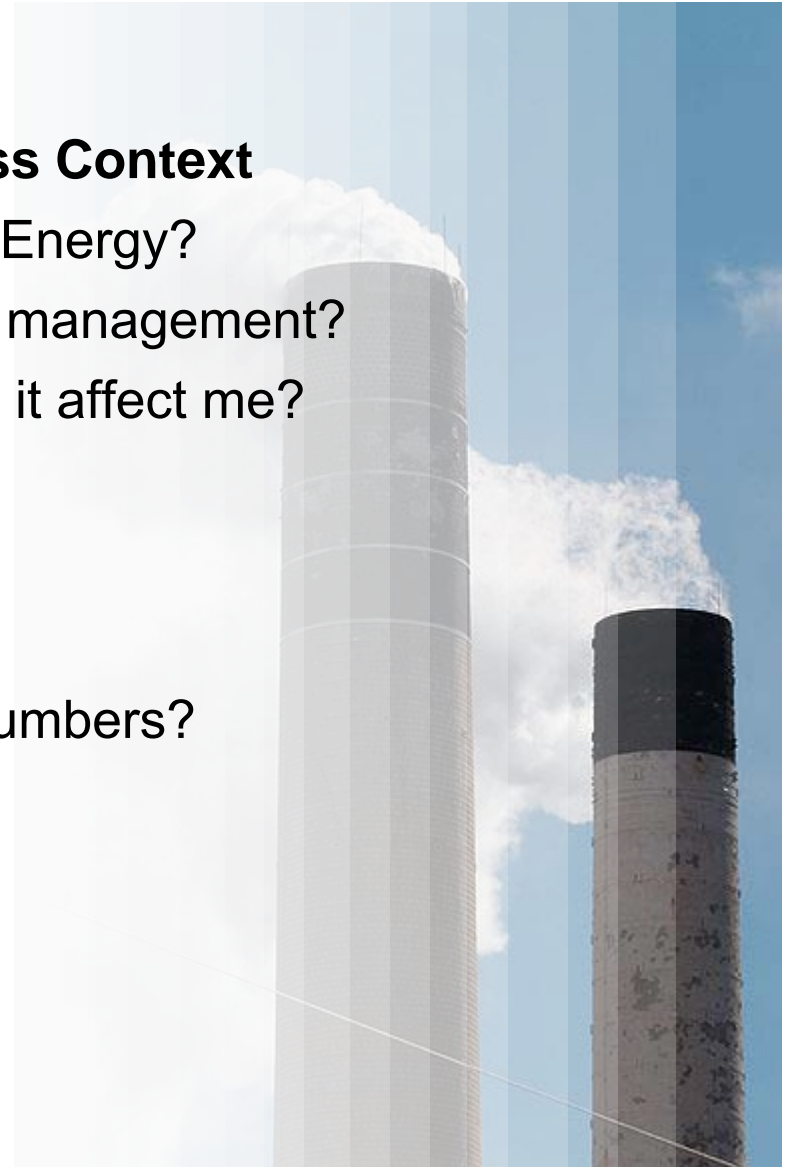
PowerLogic EEM Greenhouse Gas (GHG) Reporting Module



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Oct 23, 2009

Agenda

- **Greenhouse Gas Policy and Business Context**
 - How are GHG Emissions related to Energy?
 - What's the global direction on GHG management?
 - What is Canada doing, and how will it affect me?
- **GHG Calculation Complexities**
 - What difficulties do people run into?
 - How do we actually come up with numbers?
 - How do we manage all of this?
- **GHG Reports for Your Business**
 - What are the business drivers?
 - How will EEM help me specifically?



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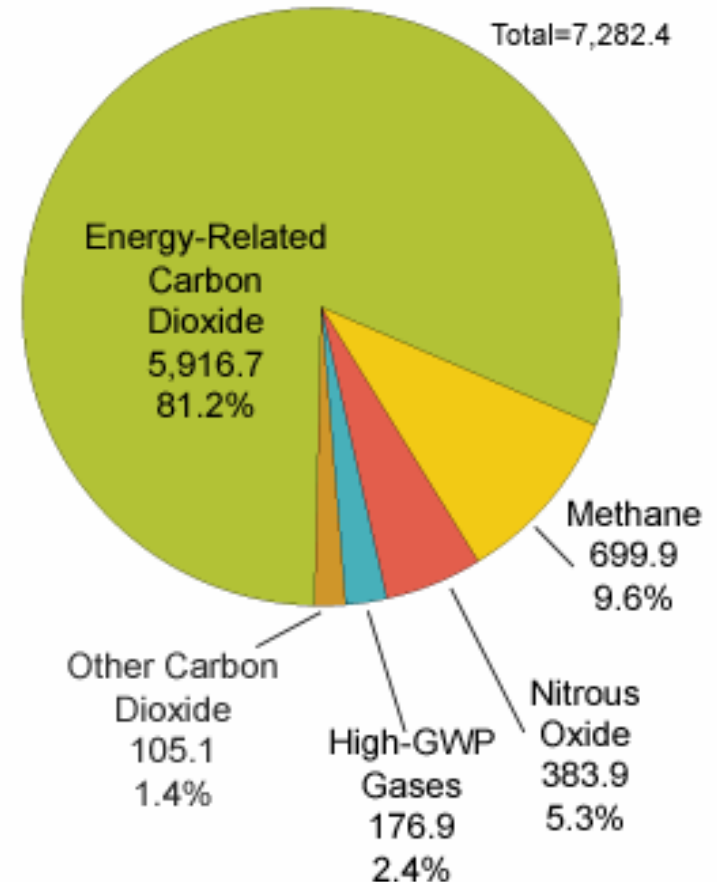
Greenhouse Gas Reporting Module



Greenhouse Gases and Energy Consumption

- Energy use is the dominant contributor to GHG emissions in North America
- Canada and the US report that 81% of CO₂ emissions are directly related to energy use
- EEM is designed to be your tool for collecting the full spectrum of energy data within your organization

U.S. Greenhouse Gas Emissions by Gas, 2007 (Million Metric Tons Carbon Dioxide Equivalent)



Source: EIA estimates, published in *Emissions of Greenhouse Gases in the United States 2007* (December 2008).

Global Policy Direction

- GHG regulation is evolving rapidly throughout the world
- Regulation approaches typically fall into one of two categories:
 - **Cap-and-trade**, a transferable, cost-mitigating approach
 - **Carbon taxes or fees**, a non-transferable, fixed cost approach
- International NGOs have established standardized GHG reporting frameworks
 - The **Greenhouse Gas Protocol Initiative** is the leading international standards group



The Greenhouse Gas Protocol Initiative

The foundation for sound and sustainable climate strategies

Greenhouse Gas (GHG) Protocol Initiative

- Partnership between:
 - World Resources Institute (WRI)
 - World Business Council for Sustainable Development (WBCSD)
- A widely used international reporting standard for government and business leaders
- The foundation for many GHG standards and programs
 - ISO 14064 “... Quantification and Reporting of Greenhouse Gas Emissions and Removals”
 - The Climate Registry
 - The California Climate Action Registry
- **EEM’s GHG Reporting Module is based on the GHG Protocol**

Canadian GHG Policies



Summary: GHG Policy and Business Context

- Energy use is the primary contributor to GHG emissions
- The Canadian government continues to tighten the regulations on GHG emissions in Canada
- The EEM GHG Module is designed in accordance with recognized international GHG accounting standards
- PowerLogic EEM with the GHG module will:
 - manage corporate-level energy consumption data
 - convert your energy data into GHG emissions information
 - deliver GHG reports appropriate for all levels of your organization

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Greenhouse Gas Reporting Module

GHG Calculation Complexities

$$K_{11} = k_{11}^{(1)} = \frac{9}{16}$$
$$K_{12} = k_{12}^{(1)} = \frac{3\sqrt{3}}{16}$$
$$K_{33} = k_{33}^{(1)} + k_{11}^{(2)} = \frac{9}{16} + \frac{5}{2} = 3.0625$$
$$K_{34} = k_{34}^{(1)} + k_{12}^{(2)} = \frac{3\sqrt{3}}{16} + \left(-\frac{5}{2}\right) = -2.175$$
$$K_{43} = K_{34} = k_{43}^{(1)} + k_{21}^{(2)} = k_{34}^{(1)} + k_{12}^{(2)} = -2.$$
$$K_{44} = k_{44}^{(1)} + k_{22}^{(2)} = \frac{3}{16} + \frac{5}{2} = 2.6875$$

The diagram illustrates a process of emergence. At the bottom, 'Simple Self-Organized Local Relationships' are shown as a network of interconnected nodes. This network is influenced by 'Info In' and 'Info Out' flows. As the system evolves, it moves through a phase of 'Emergence' (indicated by a large upward arrow) to 'Complex Adaptive Behavior' at the top. This transition is also influenced by 'Info Out' and 'Info In' flows. The entire process is framed by 'Changing External Environment' at the top and bottom. On the left side, a vertical arrow labeled 'Positive Feedback (Amplification)' points upwards, and on the right side, a vertical arrow labeled 'Damping' points downwards.

GHG Reporting Complexities

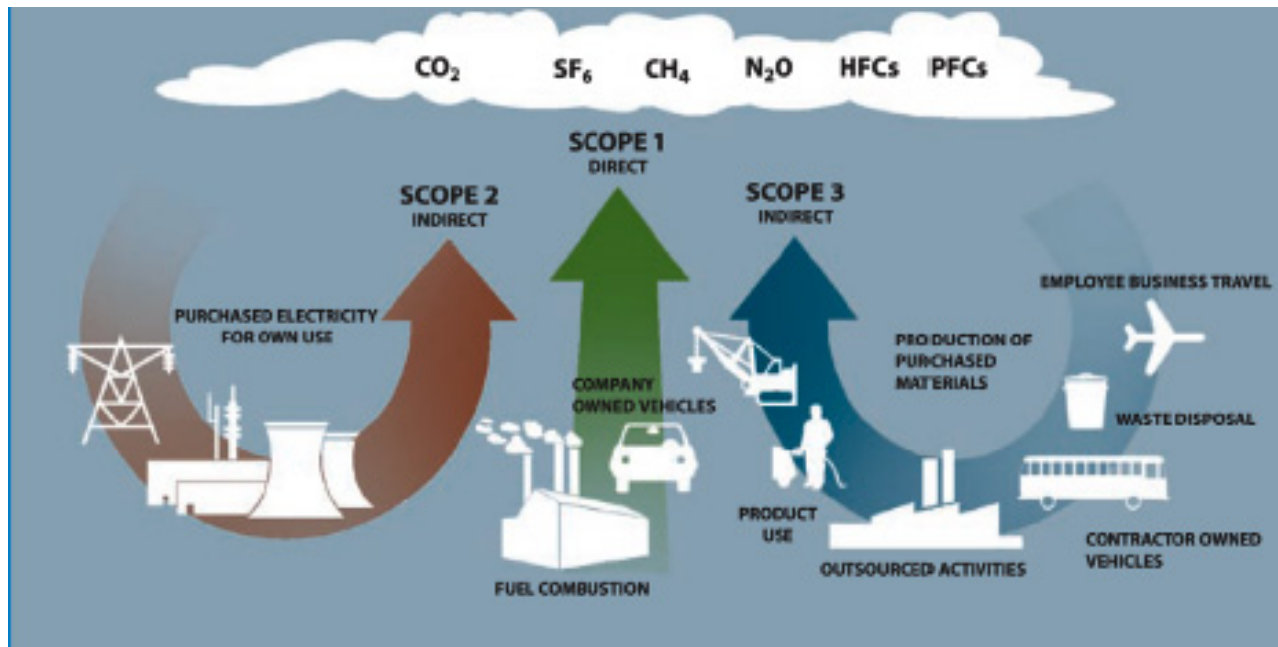
GHG Reporting is made difficult by a number of factors:

- Difficult to pin down the relationship between “point of emission” and “person responsible”
 - Example: Utilities generate power, but demand side customers are responsible for the emissions.
- Determining the emissions for various energy sources requires some knowledge of the generation method
- Keeping track of the source of energy for each of the metered points downstream requires a dedicated information management system

Assigning Emissions Responsibilities

GHG Protocol Initiative reporting categories:

- Scope 1 (Direct): Fuel combustion, physical/chemical processing, company owned mobile sources, & fugitive emissions
- Scope 2 (Indirect): Purchased electricity and steam
- Scope 3 (Indirect): All other emissions



Calculating Greenhouse Gases in EEM

The Kyoto Protocol splits Greenhouse Gases into two types:

- **Derived gases**

- May be calculated from energy consumption.
- Carbon Dioxide (CO₂), Methane (CH₄) and Nitrous Oxide (N₂O)
- Out of the box support in EEM's GHG Module

- **Directly Measured gases**

- Require specific measurement by dedicated instrumentation or engineering estimation
- These gases fall into the 19% of GHGs that are not related to energy consumptions (industrial process, HFC usage, etc)
- Supported in EEM with appropriate system configuration

Calculating Greenhouse Gases in EEM

The basic calculation:



Energy Consumption

- The total energy consumed

Emission Factor

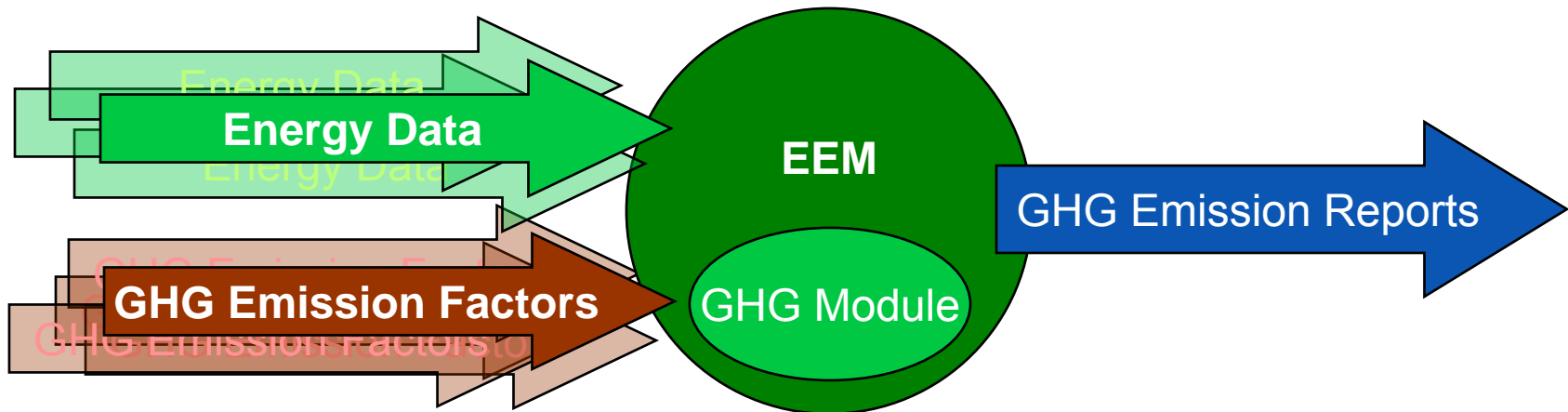
- A conversion factor that includes both the severity of the gases emitted, as well as the intensity of gases emitted
 - Emission Factors are available for all Scope 1 fuels, and from your Utility for Scope 2 emissions

Emissions in CO2e

- International standards use a “CO2-equivalent” unit of measure.

GHG Module in EEM

- The GHG Module in EEM provides tools specifically designed to support the GHG emissions calculation process for the enterprise
 - Links all energy consumption points to an energy source
 - Defines Emission Factors for each energy source
 - Handles Emission Factor changes over time
 - Performs CO₂e conversions



Summary: GHG Calculation Complexities

- Emissions are sorted into three “Scopes” for reporting
- Calculations for Energy-dependant gases use Emission Factors to generate CO2e output
- To calculate emissions, you must have a system that will link the energy consumption at your facilities to appropriate energy sources
- PowerLogic EEM with the GHG module will:
 - manage corporate-level energy consumption data
 - convert your energy data into GHG emissions information
 - deliver GHG reports appropriate for all levels of your organization

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Greenhouse Gas Reporting Module



Business Drivers for GHG Reporting

Why invest in Greenhouse Gas accounting and reporting tools?

- Participation in mandatory reporting programs
 - 50kt CO₂e GHG emission threshold in Canada
- Managing GHG risks and identifying reduction opportunities
 - Identify risks associated with GHG constraints in the future
 - Identify cost effective reduction opportunities
- Public reporting and participation in voluntary GHG programs
 - Eco-labeling and GHG certification
 - Regulatory concessions or “baseline protection”

GHG Report Capabilities in EEM

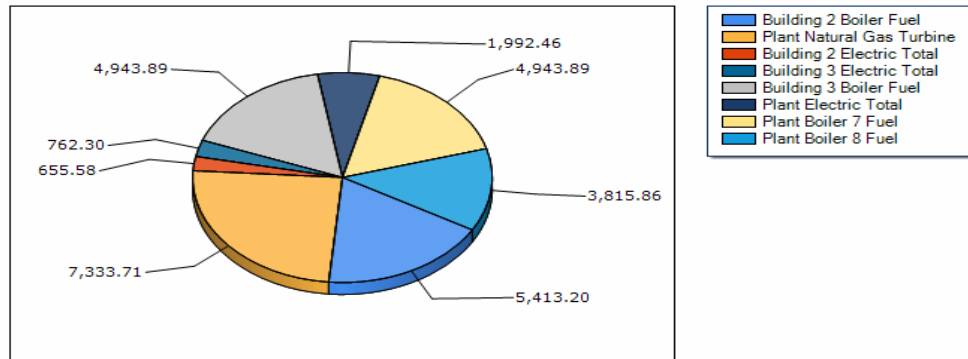
- The Greenhouse Gas Module reporting capabilities include:
 - Total emission summaries, broken down by:
 - Energy consumption source; or,
 - Energy type (commodity)
 - Base year comparisons, enabling progress measures
 - Year-to-year improvement targets
- Both the Base Year and Year-to-Year target features are configurable for each consumption source in the system

Default Report – Emissions by Source

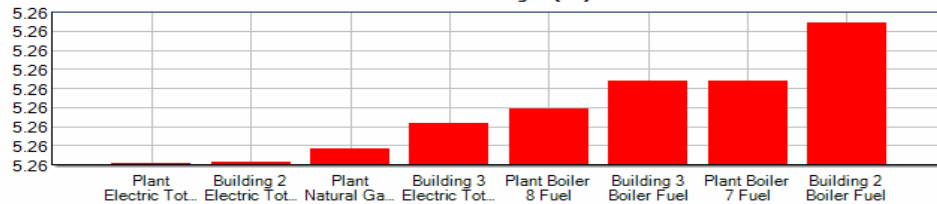
Emissions Comparison & Variance Report

Monday, January 01, 2007 - Sunday, April 01, 2007

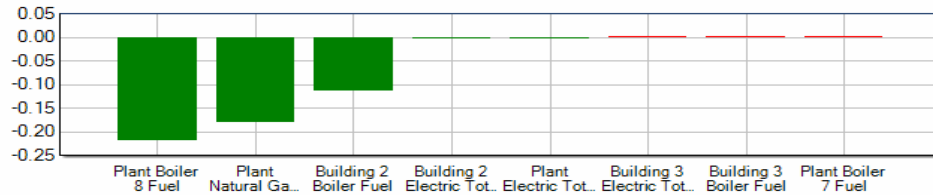
Total Emissions by Source (tCO2e)



Variance from Target (%)



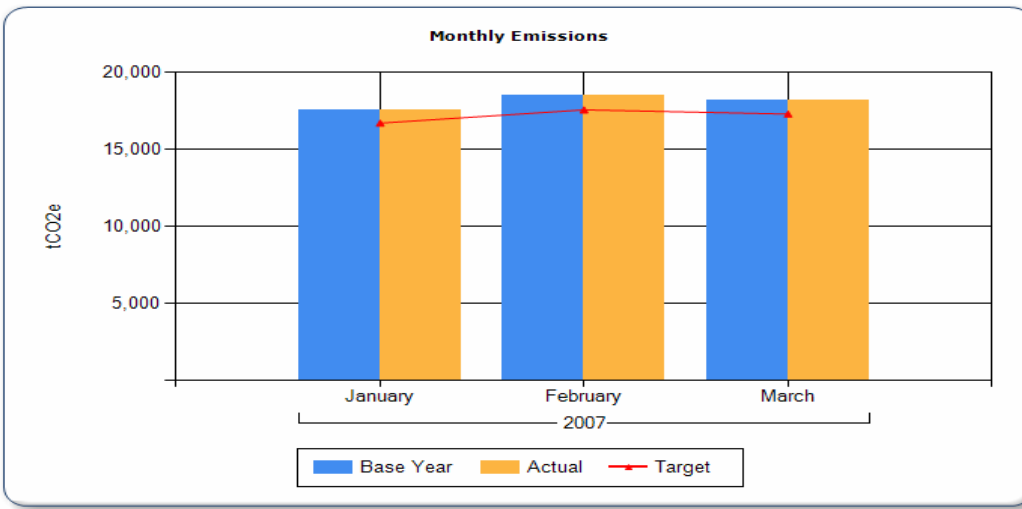
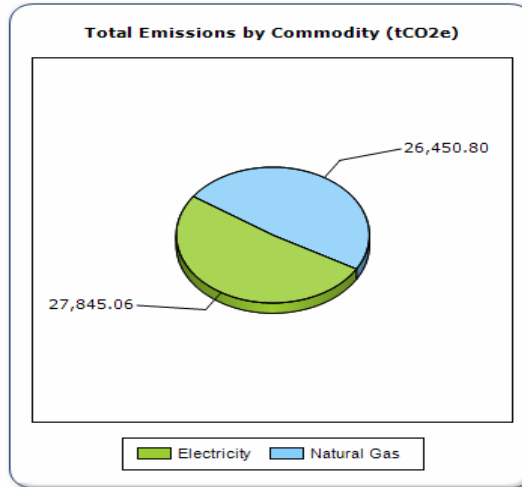
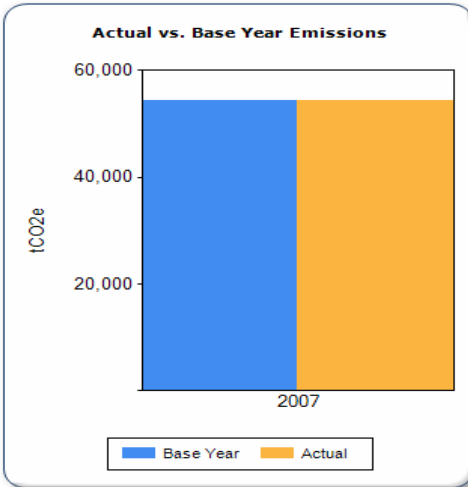
Variance from Base Year (%)



Default Report – Emissions by Energy Type

Total Emissions Report

Monday, January 01, 2007 - Sunday, April 01, 2007



Summary: GHG Reports for Your Business

- EEM and the Greenhouse Gas Module will help you:
 - Understand your existing emissions and root causes
 - Identify efficient reduction opportunities
 - Measure progress against targets and base years
 - Communicate overall results to stakeholders

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Greenhouse Gas (GHG) Reporting Module

Thanks for coming!

Questions?

