

Climate Change and Greenhouse Gas Inventory - 101

The Carbon Trading-Green Building
Connection

March 6, 2008

Fairfax, Virginia

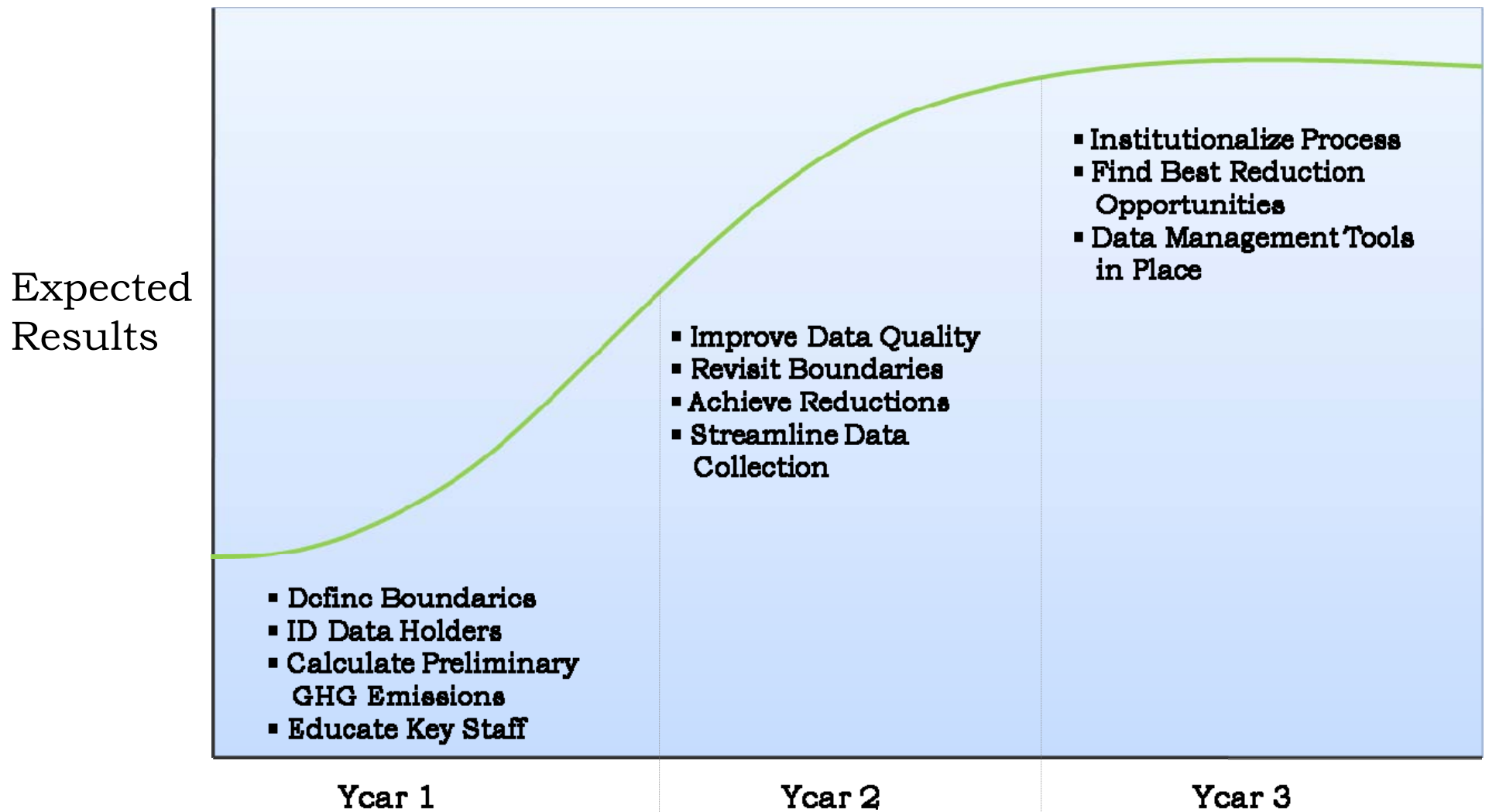
Goals

- Provide a common language
- Explain a proven step-by-step process
- Share tools and resources to help you start the footprinting process

Lesson Overview

- Getting Started – Terminology
- Two-Phased Approach
 - Define
 - Quantify
- Communicate Results
- Report Findings
- Data Management Strategy

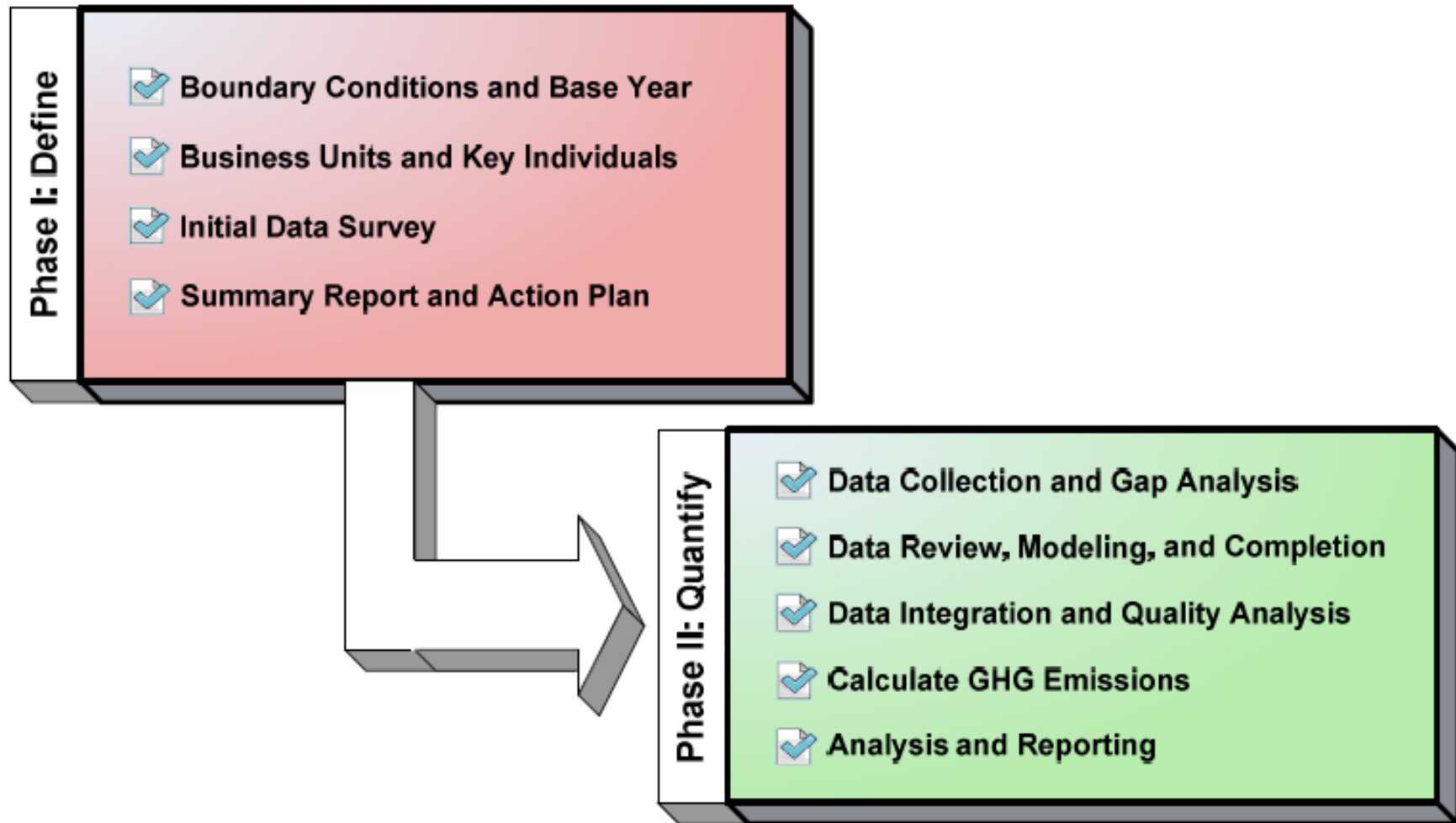
Getting Started – Expectations



Getting Started – Terminology

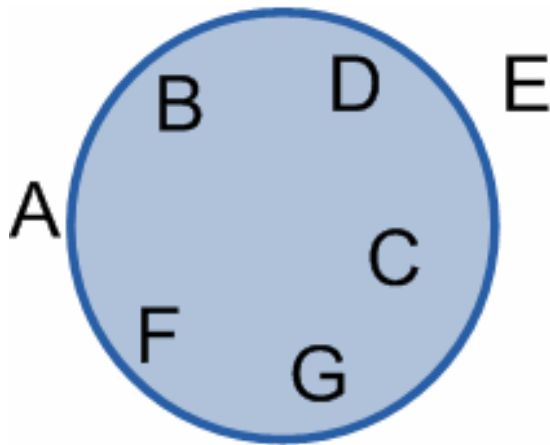
- Boundary Conditions → The breadth and depth of an inventory.
- Base Year → A year against which GHG emissions are tracked over time.
- Major Greenhouse Gas (GHG) Emissions → Carbon Dioxide (CO₂), Methane (CH₄), Nitrous Oxide (N₂O), Hydrofluorocarbons (HFC), Perfluorocarbons (PFC), Sulphur Hexafluoride (SF₆).
- Carbon Dioxide Equivalents (CO₂ eq) → Standard GHG emissions reporting metric.
- The GHG Protocol → A Corporate Accounting Standard developed by the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD).
- Direct Emissions (Scope 1) → GHG emissions that result from sources owned or controlled by the company.
- Indirect Emissions (Scope 2) → GHG emissions that result from the generation of purchased electricity.
- Other Indirect Emissions (Scope 3) → GHG emissions that result from sources not owned or controlled by the company but are a consequence of company activity. (optional)

Two-Phased Approach

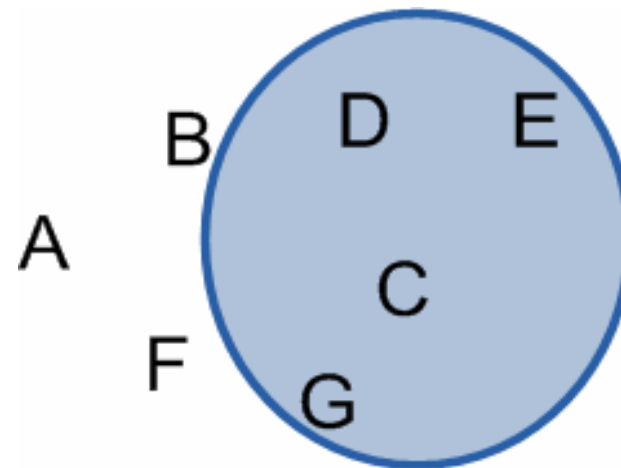


Organizational Boundaries

- Define “breadth” of inventory.
- Control Approach vs. Equity Approach
 - Control approach is most common.



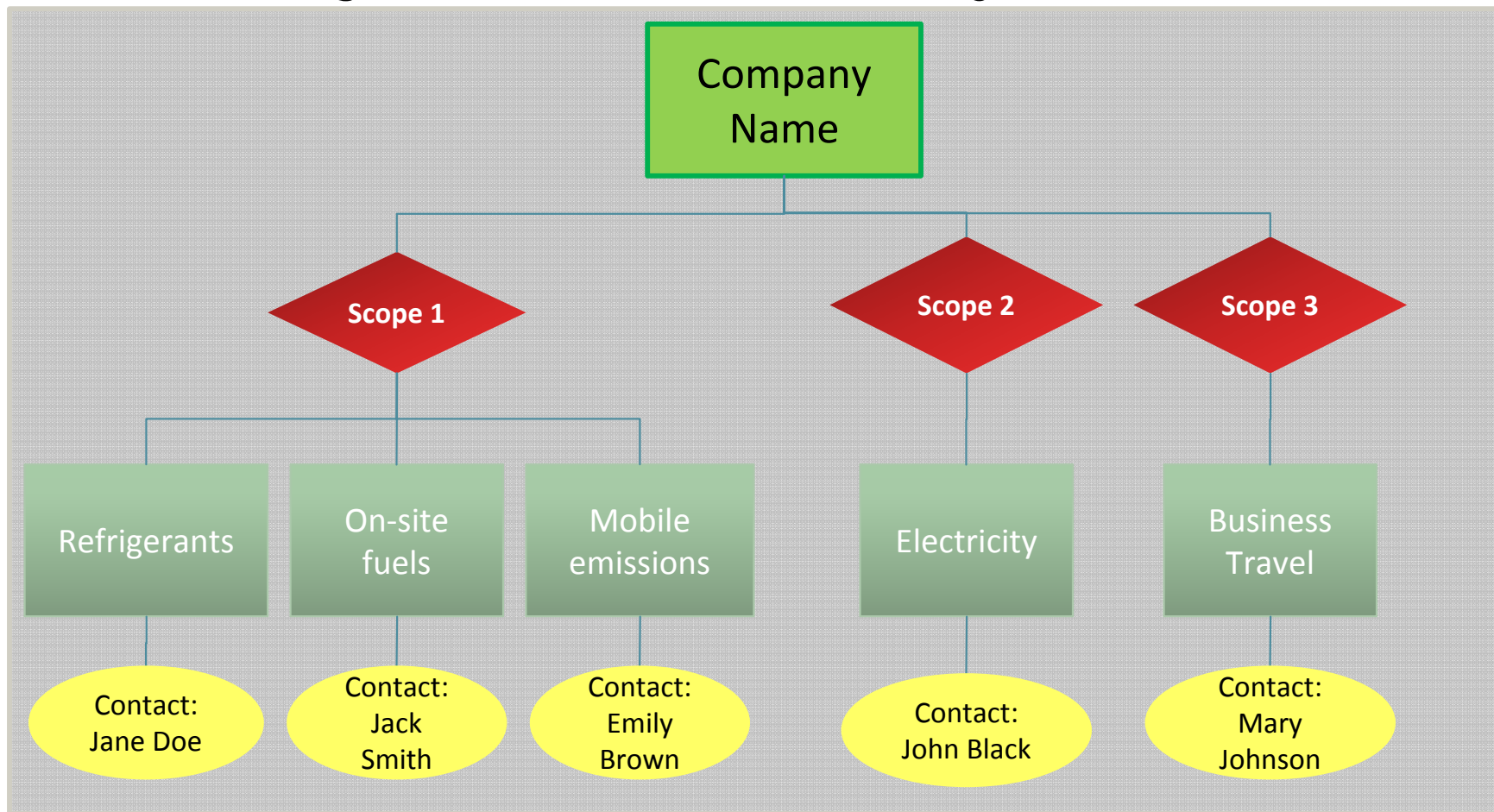
Option 1



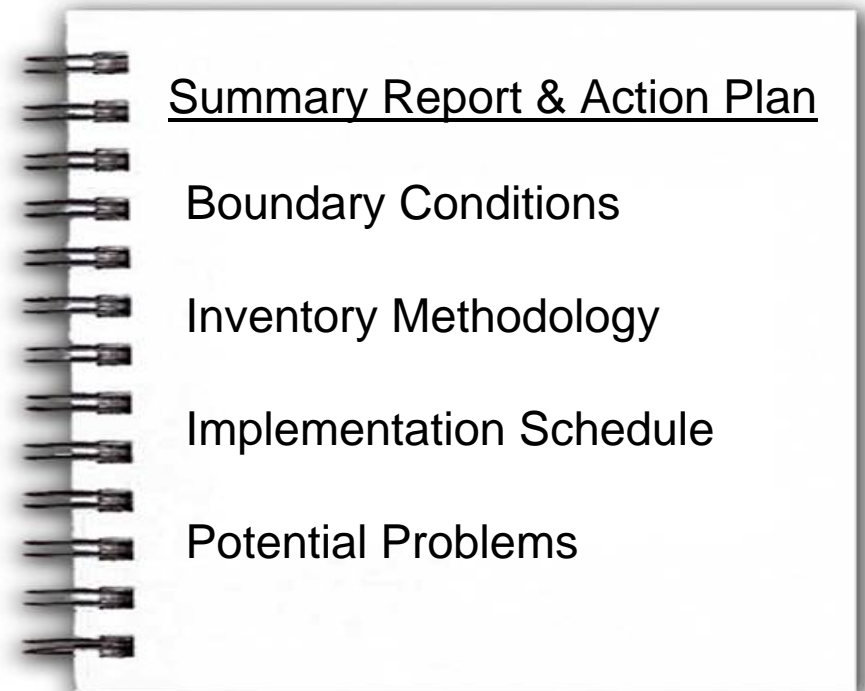
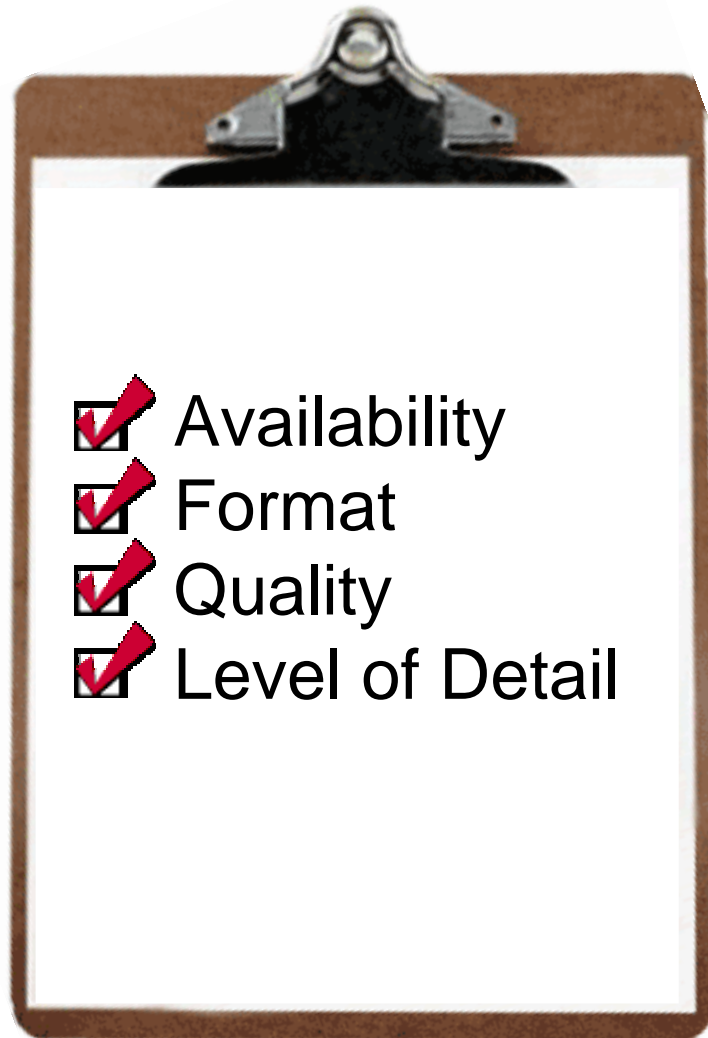
Option 2

Phase I – Define

- Determining Business Units and Key Individuals

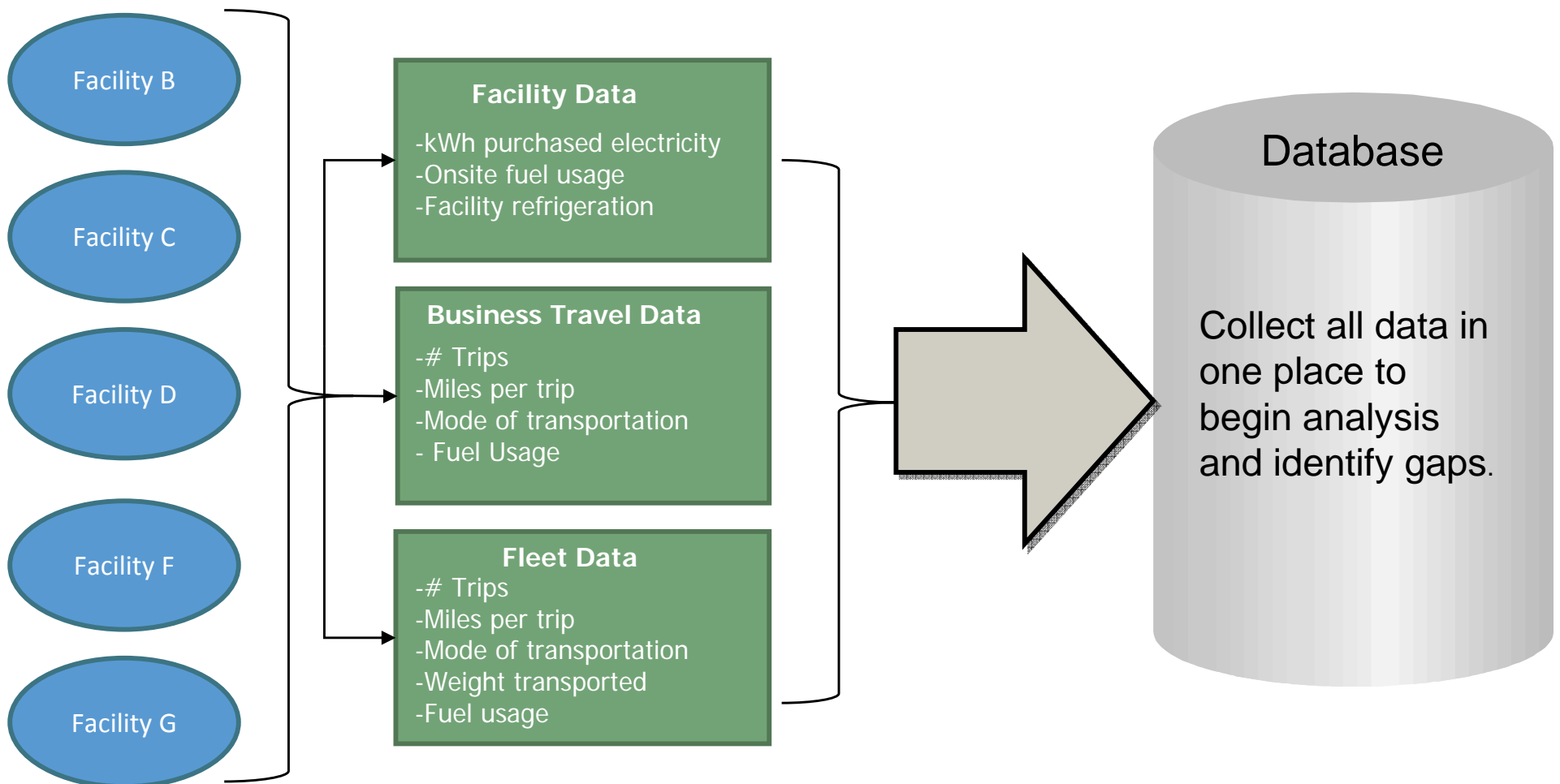


Phase I – Define



Phase II – Quantify

■ Data Collection



Phase II – Quantify

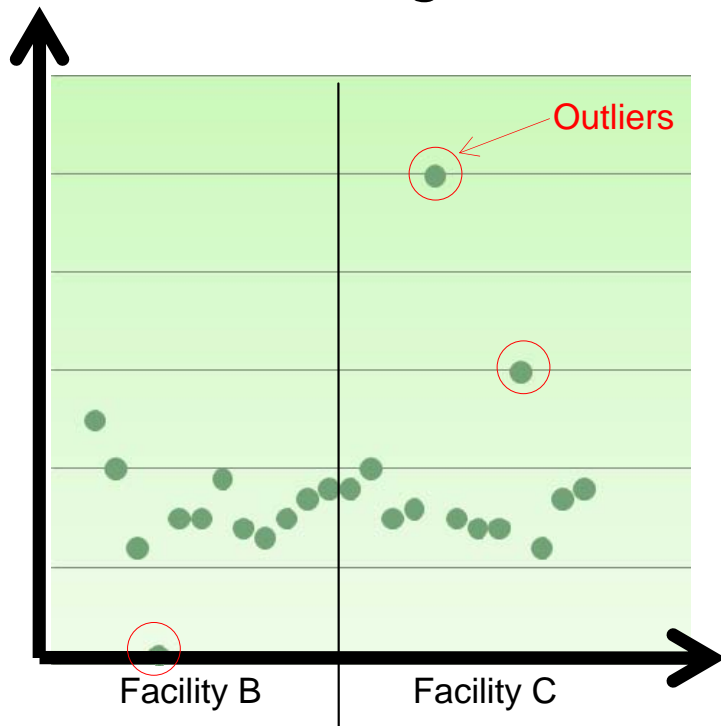
- Addressing Data Gaps

Emission Sources	Facility B	Facility C	Facility D	Facility F	Facility G
Electricity	Collected	Completed	Missing	Completed	Completed
On Site Fuel Combustion	Completed	Completed	Collected	Collected	Missing
Refrigerants	Collected	Missing	Completed	Completed	Missing
Mobile	Completed	Collected	Collected	Missing	Completed
Business Travel	Completed	Completed	Collected	Completed	Collected

- Identify the gaps in the data.
- Understand how these gaps may affect the outcome of the analysis and determine the best solution.
 - Estimate based on other received data.
 - Use default values as a last resort.

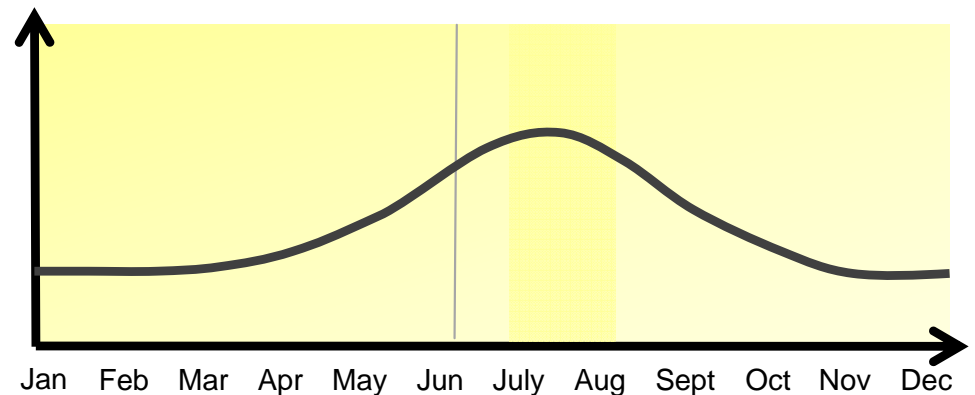
Phase II – Quantify

- Data review, modeling and completion
- Data integration and quality analysis



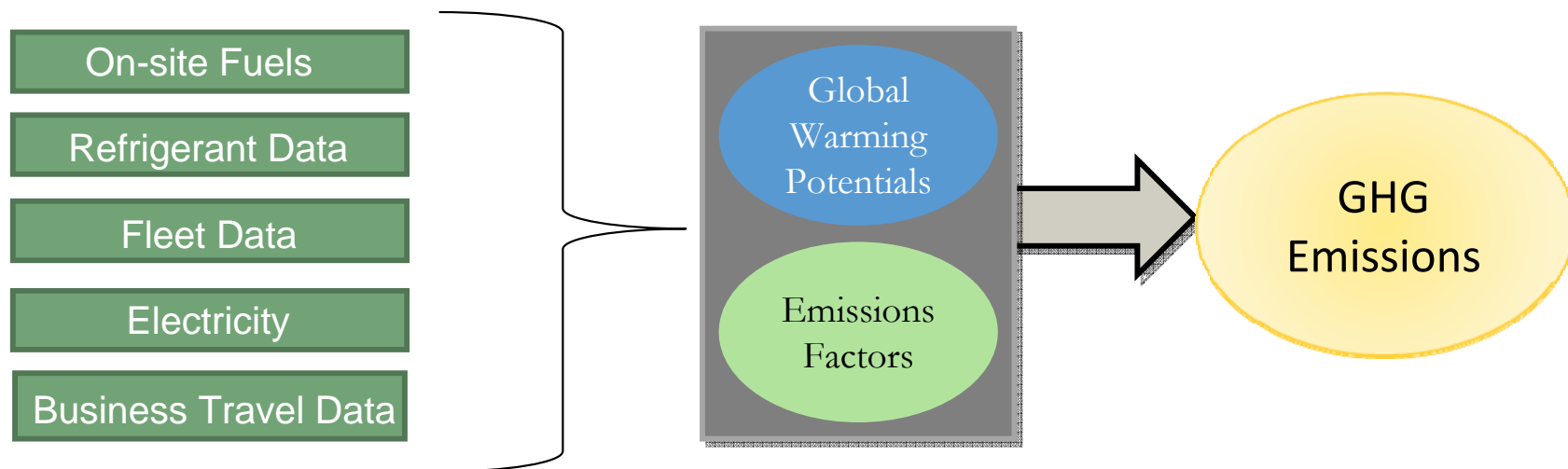
By comparing scatter plots of similar facilities you can visually see where outliers occur and find out why. Often times it may just be a mistake.

Facility energy usage usually follows a right of center bell curve along the x-axis of time. This is due to the high air conditioning demand during the warmer months. If a building is not following this trend it is good to double check the facility data.



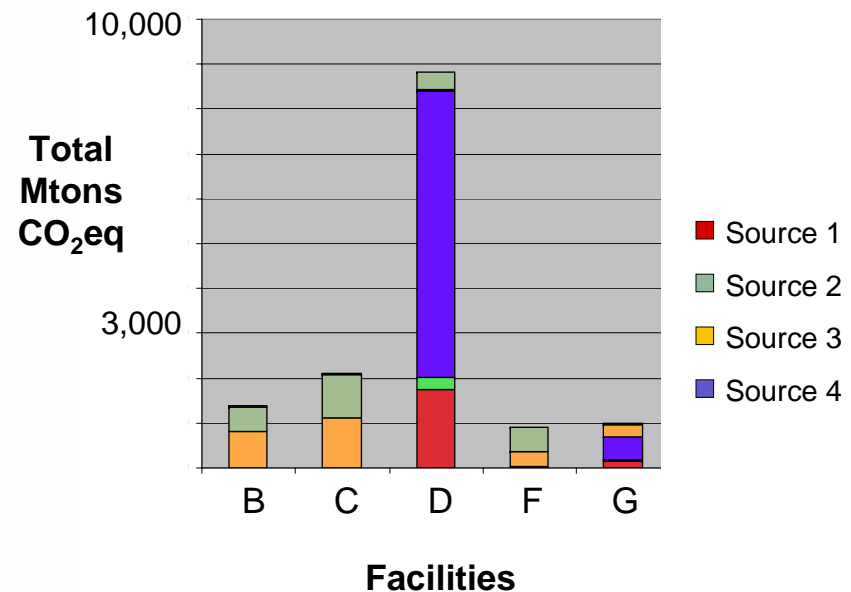
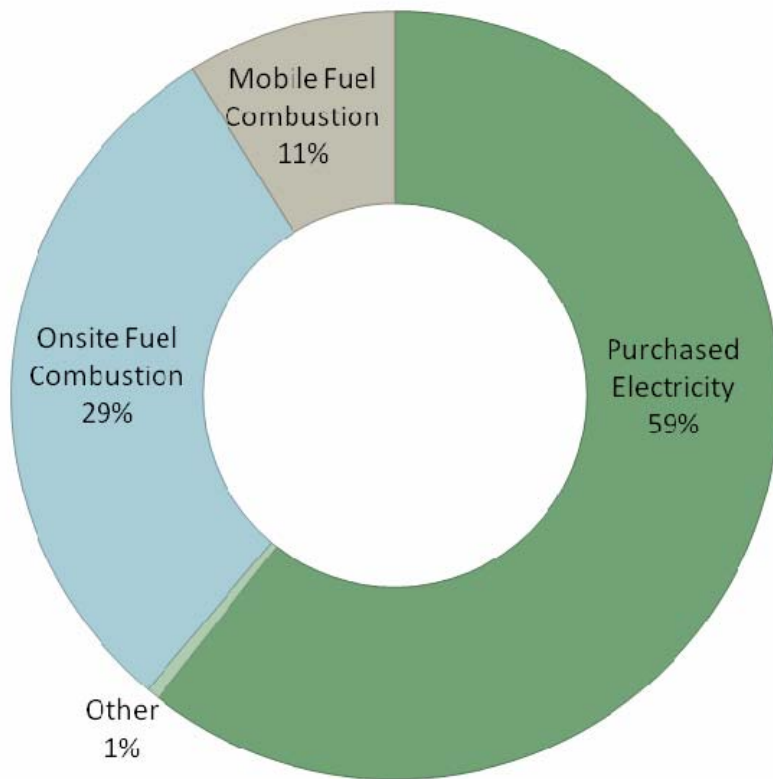
Phase II – Quantify

- Calculate GHG emissions
 - Once all the data has been collected, it needs to be manipulated to convert the energy use into GHG emissions. This is done using simple multiplication with global warming potentials and emission factors.



Phase II – Quantify

- Analysis and reporting
 - After all the calculations are completed the data must be categorized to understand what has the biggest impact.



Interpret Results

- What do the numbers mean?
- Identify opportunities to:
 - Improve data quality
 - Improve inventory process
 - Reduce emissions
- Implement GHG reduction action plan.

Communicate Results

CDP Reporting

- Flexible reporting provides opportunity to tell stories.
- Don't wait until your climate strategy is perfect.
- Credibility is gained through transparency.
- Strive to expand on submissions and achieving GHG reduction results over time.
- Information in CDP report is valuable for corporate sustainability reports, government voluntary program reporting, and award applications as well.

Communicate Results

- Report findings in easily understandable metrics and visuals



CO2eq	Approximately equal to...
20 Tons	1 US Household Annually
6 Tons	1 Car Annual Emissions
6 Tons	1 Cow Annual Emissions
1 ¼ Ton	1 Acre of Pine Forest Carbon Storage
1 Ton	38 Propane BBQ Cylinders
½ Ton	1 Barrel of Oil (approx. \$94 USD)
20 Lbs	1 Gallon of Gas
1 Lb	1 Day of an Office Computer



All numbers are approximate and rounded

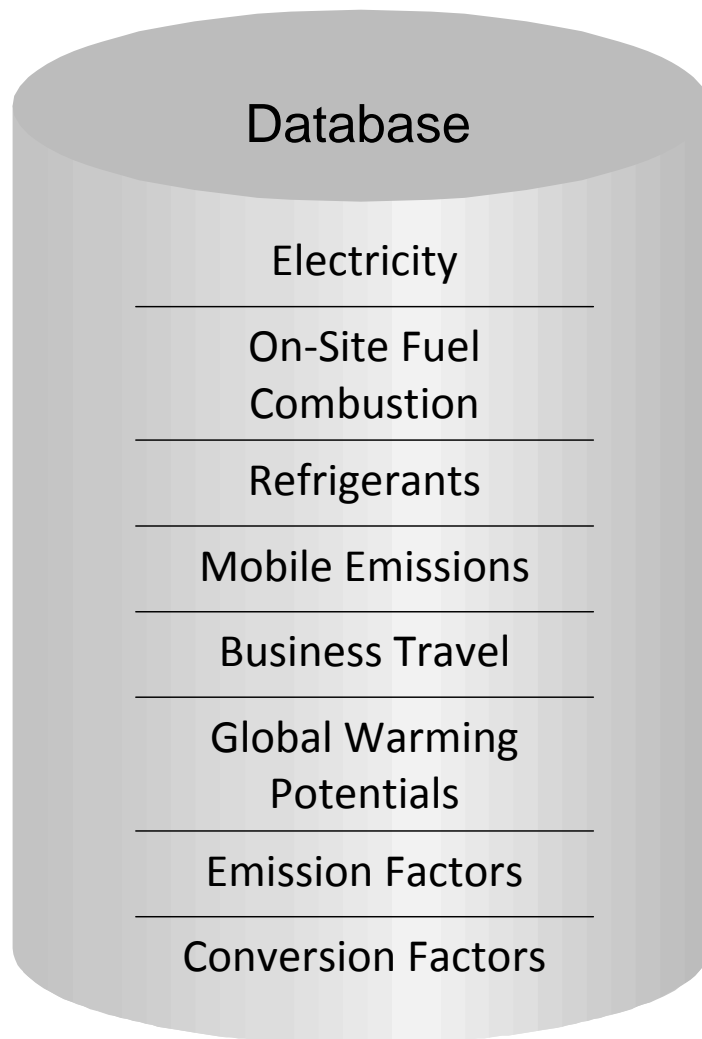
Data Management Strategy

Good Practice Principles

- Relevance → Ensure the GHG inventory reflects the company's GHG emissions and helps the goal audience.
- Completeness → Account for all GHG emission sources/activities within the boundary and justify any exclusions.
- Consistency → Use consistent methodologies overtime, and transparently document any changes.
- Transparency → Address all relevant issues in a factual and coherent manner. Disclose any relevant assumptions.
- Accuracy → Ensure that the quantification of GHG emissions is systematically neither over nor under actual emissions. Reduce uncertainties as far as practical.

Data Management Strategy

GHG Systems



Key Considerations

- Frequency of Updates
- Level of Detail
- Reporting Goals
- IT Standards
- Level of Analysis

Data Management Strategy

Business Dynamics

- Changes in business that drive adjustments in inventory
 - Mergers and acquisitions
 - Plant builds and closures
 - Out-sourcing and in-sourcing of activities
 - Expanding inventory boundaries

Data Management Strategy

Recommended Tools

- GHG Guidance
 - World Resources Institute (WRI)
 - EPA Climate Leaders
 - California Climate Action Registry
 - International Organization on Standardization (ISO)
- Calculation Tools and Emissions Factors
 - WRI
 - Climate Leaders
 - US Department of Energy 1605b Voluntary Reporting of Greenhouse Gases Program
 - Intergovernmental Panel on Climate Change (IPCC)

Key Decisions: Change Controls

- Accommodates corporate dynamics
- Modifications to base year
 - Divestitures
 - Acquisitions
 - Joint Ventures
- Changes to quantification methodology
 - Emissions factors change

Change Conditions	Baseline Adjustment Actions
Acquisition of a location that existed during the base year	Add the new facility's base-year emissions to overall entity base-year emissions
Acquisition of facility that DNE during the base year	No baseline adjustment
Divestiture of a facility that existed during the base year	Subtract the divested facility's emissions from overall entity base-year emissions
Transfer of ownership/control	Increased ownership/control : treated as a new acquisition, decreased ownership/control should be treated the same as a divestiture
Organic growth	No baseline adjustment
Organic decline	No baseline adjustment

Questions?
