Group 2 Presentation: Keepin' You Warm LLC

By: Max Alsoufiev, Leonard Cervantes, Joseph Del Rio, Jonathan Ili, Muhammad Khan, and Branden Soo

Keepin' You Warm LLC **Background**

Keepin' You Warm LLC **is a manufacturing company that operates coal-powered plants and company-owned vehicles and is evaluating its Scope 1 carbon emissions as part of its ESG reporting efforts.**

Focus:

- Sustainability
- Calculating ESG Metrics
- Greenhouse Protocol → 3 Scopes

Company Assets Overview:

- 3 Coal-Powered Plants.
- 2 Wind Turbines.
- 2 Cars.
- 3 Trucks.

ESG

ENVIRONMENTAL

Climate change strategy,
Biodiversity,
Water efficiency,
Energy efficiency,
Carbon intensity,
Enviromental
management system

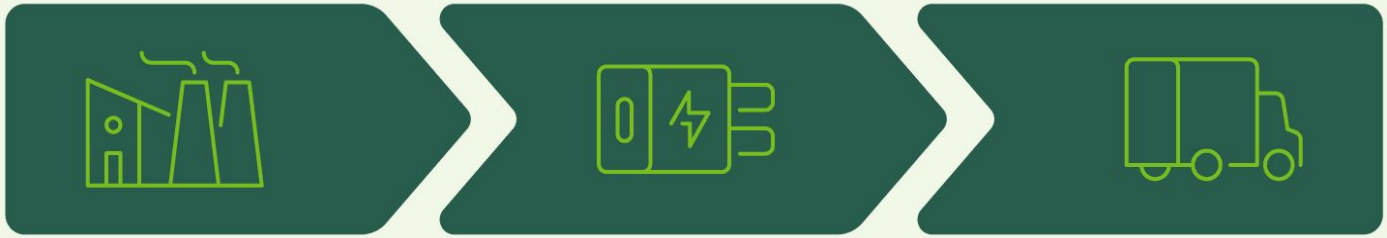
SOCIAL

Equal opportunities,
Freedom of association,
Health and safety,
Human rights,
Customer &
products resposibility,
Child labour

GOVERNANCE

Business ethics,
Compliance,
Board independence,
Executive compensation,
Shareholder democracy

How carbon emissions are categorized



Scope 1

Direct emissions

Scope 2

Indirect emissions

Scope 3

Value chain emissions

Primary Challenge

Lack of Standardization: There is no single required method for calculating ESG emissions, so companies may report them differently.

Data Reliability, Traceability, & Integrity: Emissions data can be hard to trace back to its source and verify for accuracy.

Scope Emissions Complexity: It is not always clear which activities belong in each emissions scope.

Subjectivity in Metrics: ESG metrics rely on assumptions that can change the results.

Business Relevance of ESG

Why ESG Matters for Keepin' You Warm LLC

Regulatory & compliance pressure:

- Manufacturing and transportation generate Scope 1 emissions subject to increasing regulation
- Accurate reporting reduces risk of penalties and future compliance costs

Investor and Stakeholder expectations:

- Investors, lenders, and customers expect transparent and reliable ESG reporting

Operational and cost impact

- Emissions data identifies high-emission assets, so this helps the management target efficiency improvements and cost savings

Reputation and Brand Value

- Accurately reporting ESG emissions demonstrates environmental responsibility.
- Strengthens trust with customers and business partners

Auditor’s Role in Evaluating ESG Data

Reliability of ESG information:

- Auditors provide assurance that ESG data is reasonable and supportable
- Enables stakeholders to rely on reported emissions

Recalculation & independent estimates:

- Recalculation: Confirms emissions using company inputs
- Independent estimate: Uses auditor trusted third party data (e.g., EPA - US Environmental Protection Agency) to assess reasonableness of data provided by the company

Evaluation of Assumptions:

Assess appropriateness of

- Emission factors
- Conversion factors
- Global Warming Potential

Why Audit procedures Are Necessary

Audit procedures are required to provide assurance over ESG data, because it involves estimates and management judgement (works like a financial statement)

It ensures data integrity, compliance, and helps build stakeholders trust

The auditors VERIFY AND TEST if management's estimates are reasonable and consistently applied; they **DO NOT** generate the numbers.

Role of Alteryx in this Case Study

Structures emissions data: Alteryx cleans, joins, and standardizes activity data, emission factors, and conversions for audit-ready analysis

Recalculates emissions using company inputs: Auditors can recompute emissions to verify management's calculations

Generates independent benchmark estimates: Auditor-selected assumptions and emission factors are applied to test the reasonableness of reported emissions.

Using Alteryx to Solve the Case Study

Input Tool – Imports Excel files for activity data, emission factors, GWPs, and unit conversions.

Select Tool – Cleans the data by renaming fields and removing unnecessary columns.

Filter Tool – Separates stationary and mobile combustion data into distinct calculation paths.

Join Tool – Matches activity data with the appropriate emission factors and conversion factors by fuel type and units.

Formula Tool – Calculates CO_2e emissions (Activity × EF × GWP × Conversion Factor).

Summarize Tool – Aggregates emissions by asset, fuel type, or total emissions.

Sort Tool – Ranks assets by emissions to identify material or high-risk sources.

Union Tool – Recombines stationary and mobile emissions into a single dataset.

Output Tool – Exports final results for audit documentation and review.

Alteryx’s Output Data Meaning

Recalculated results assess the reasonableness of the Company’s emissions calculations

Independent point estimates highlight variances between management’s data and auditor assumptions

Final results support audit conclusions but do not provide assurance on absolute accuracy

Excel Files Overview

Our Alteryx workflow is supported by **four Excel files**

Emissions Data.xlsx – contains asset-level fuel usage for stationary sources (plants/buildings) and mobile sources (vehicles)

Combustion Emission Factors.xlsx – provides CO_2 emission rates by fuel type

Unit Conversions.xlsx – converts outputs into metric tons

Global Warming Potential.xlsx – supplies GWP values (CO_2 = 1 in this case)

Key idea:
These files work together to calculate emissions using:

Activity × Emission Factor × Unit Conversion

How the Data Connects

We start with **Emissions Data.xlsx**, which includes fuel type, activity amount, and unit per asset (MT)

Fuel types are matched to **Combustion Emission Factors** to assign CO_2 rates (kg/unit)

Unit Conversions replaces Excel “divide by 1000” logic to convert kilograms into metric tons

GWPs confirms CO_2 has a multiplier of 1

Alteryx combines everything to calculate total emissions for each asset

The “Alteryx” tabs contain additional columns used for independent recalculation and validation

Excel Datasets, Formulas, and Structures

Key Formulas:

Emissions (MT CO_2e) = **Activity** X **Emission Factor** X **GWP** X **Conversion Factor**

This formula converts asset activity into carbon emissions by applying the appropriate emission factor, global warming potential, and unit conversion to calculate MT CO_2e (Metric Tons of Carbon Dioxide Equivalent).

Total Emissions =∑Emissions by Asset / Fuel Type

This formula aggregates individual asset emissions to determine total Scope 1 emissions for reporting and audit evaluation.

Key Data Structures:
Asset activity data: Asset ID, asset type (stationary or mobile), fuel type, activity amount, and unit of measure.

Emission factor table: Fuel type, emission factor value, and emission factor unit.

Global warming potential table: Gas type and GWP value (standardized to 1).

Unit conversion table: Source unit, target unit, and conversion factor.

Join structure: Fuel type links activity data to emission factors, and unit of measure links activity data to conversion factors.

Output structure: Emissions calculated per asset, emissions aggregated by fuel type, and total Scope 1 emissions.


Thanks for Listening!
Any Questions?

Appendix

Case Study Questions

Q1: Keepin' You Warm LLC is attempting to calculate its Scope 1 carbon emissions for ESG reporting purposes. What is the primary audit challenge associated with providing assurance over ESG emissions data, and why does this challenge differ from traditional financial statement auditing?

Q2: Why are Scope 1 carbon emissions particularly relevant to Keepin' You Warm LLC's business model as a manufacturing and transportation-focused company, and how could inaccurate reporting affect stakeholders?

Q3: In the case, management prepares emissions calculations while auditors perform recalculation procedures and independent point estimates. Why is it important that auditors do not generate ESG estimates for management, and how do these procedures provide assurance?

Case Study Questions Pt. 2

Q4: Assume the engagement team identifies differences between the company's reported emissions, the recalculated emissions using company inputs, and the independent point estimate. Which inputs are most likely to drive these variances, and why are they higher-risk from an audit perspective?

Q5: The company's materiality threshold for Scope 1 emissions is 250 metric tons of CO_2e. How should auditors assess whether identified differences are material and pervasive, and how would this affect audit conclusions?

Q6: Given that ESG emissions calculations rely on third-party data sources such as EPA emission factors and global warming potentials, how should auditors evaluate the reliability and appropriateness of these external sources when providing assurance?

Case Study Questions Answers

Q1: The main challenge is that ESG emissions rely on estimates, assumptions, and external data rather than hard transactions, which makes the audit more judgment-based than a typical financial audit.

Q2: Scope 1 emissions matter most because they come directly from the company's own plants and vehicles, so errors can mislead stakeholders about the company's true environmental impact and operational efficiency.

Q3: Auditors can't create ESG numbers for management, so they instead check whether management's math makes sense and compare it to a reasonable independent estimate without crossing independence lines.

Q4: Differences usually come from emission factors, unit conversions, or fuel assumptions, since small changes in these inputs can significantly change total emissions and involve a lot of judgment.

Q5: Auditors look at whether the differences exceed materiality or show a pattern across assets, because widespread or systematic errors raise bigger concerns than isolated ones.

Q6: Auditors assess whether third-party data sources are reputable and appropriate for the situation, focusing on reasonable use and consistent application rather than validating the science itself.

Alteryx Workflow Steps

Step 1: Input Excel Files
Load the four source files: Emissions Data, Emission Factors, Unit Conversions, and GWPs.

Step 2: Clean & Prepare Data
Use Select tools to standardize column names, remove unnecessary fields, and ensure consistent formatting before joining.

Step 3: Join Supporting Tables

- Join Emissions Data to Emission Factors by fuel type
- Join results to Unit Conversions to convert kilograms to metric tons
- Join results to GWPs to apply the CO_2 multiplier

Each join enriches the dataset with information needed for calculation.

Step 4: Calculate Emissions
Use a Formula tool to compute total emissions per asset using:
Activity × Emission Factor × Unit Conversion × GWP

Step 5: Summarize Results
Aggregate emissions to produce final totals and outputs.

Simple Alteryx Workflow Visualization