

The background of the slide is a photograph showing several people, likely in Southeast Asia, sorting through large, tangled green fishing nets. One person in a red shirt and a traditional conical hat is visible in the upper right, and another in a yellow shirt and similar hat is in the lower left. The scene is outdoors, and the nets are spread out on the ground.

# Introduction to GHG Measurement

July 14, 2020

Higg Co



# Introduction to GHG Measurement

July 14, 2020

# Higg Co

Attendees are all muted.  
Please type your questions  
into the Q&A box in the  
bottom of the screen.

# Team Introduction

## English

Tuesday, July 14

8:00 to 9:00 AM PST (EMEA)

8:00 to 9:00 PM PST (APAC)



**Cashion East**  
Director, Data Analytics



**Sally Smaili**  
Director, Customer Success



# ≡ **Agenda**

1. GHG Introduction
2. Higg FEM GHG Parameters and Calculation
3. Higg FEM GHG Report
4. Higg FEM CSV GHG Data
5. Guidance & Support
6. Platform Demo
7. Q&A



## By the end of this training you will have learned:

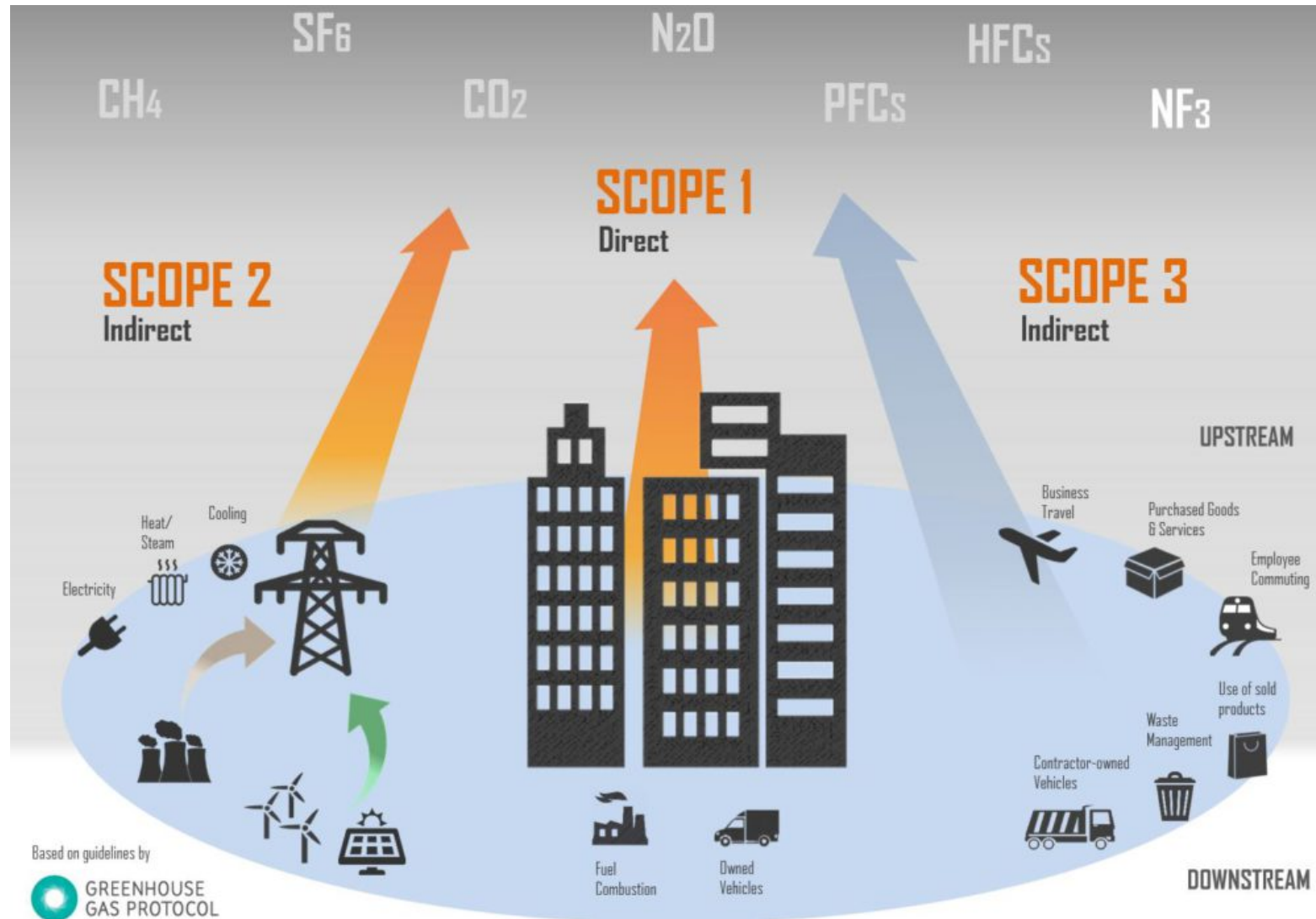
- What is GHG emission scope?
- What is the methodological framework in Higg FEM?
- What are the GHG parameters and calculation in Higg FEM?
- How to understand the GHG report in Higg FEM?



# GHG Introduction

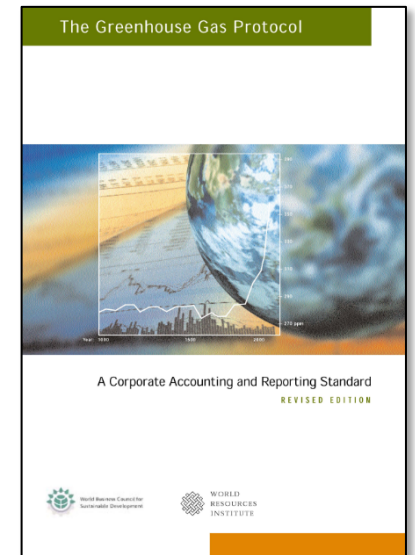


# GHG Emissions and Scope 1, 2, 3 Categories



# GHG in Higg FEM- Methodological Framework

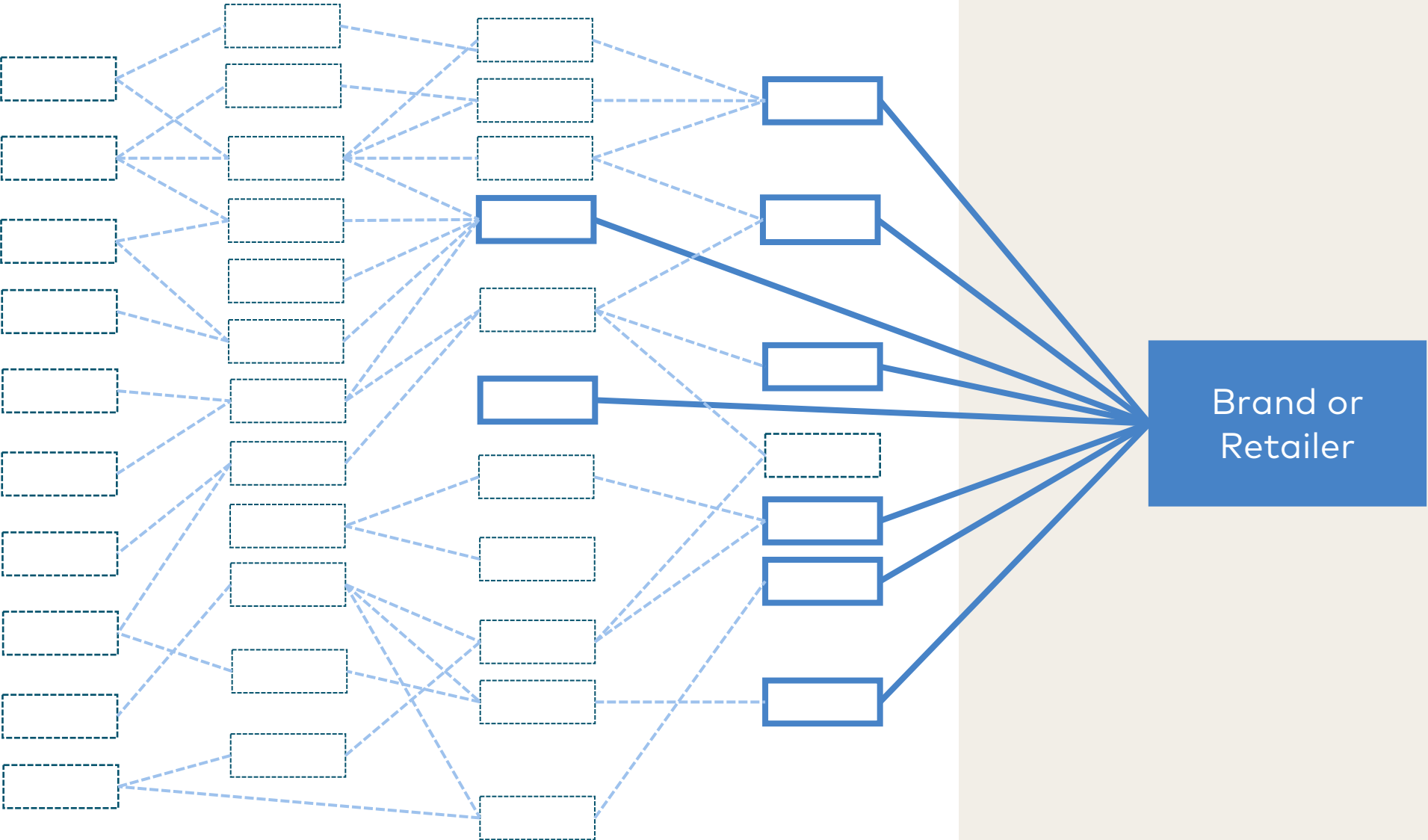
- Alignment with GHG Protocol, the leading global GHG accounting standard
- Inclusion of non-Carbon GHGs- including CH<sub>4</sub>, N<sub>2</sub>O, SF<sub>6</sub>, others
- Emissions calculated based on Energy use, Refrigerant use reported in FEM
- Potential data gaps- process-specific emissions, wastewater emissions
- General calculation and source data alignment with MSI, PM, and BRM



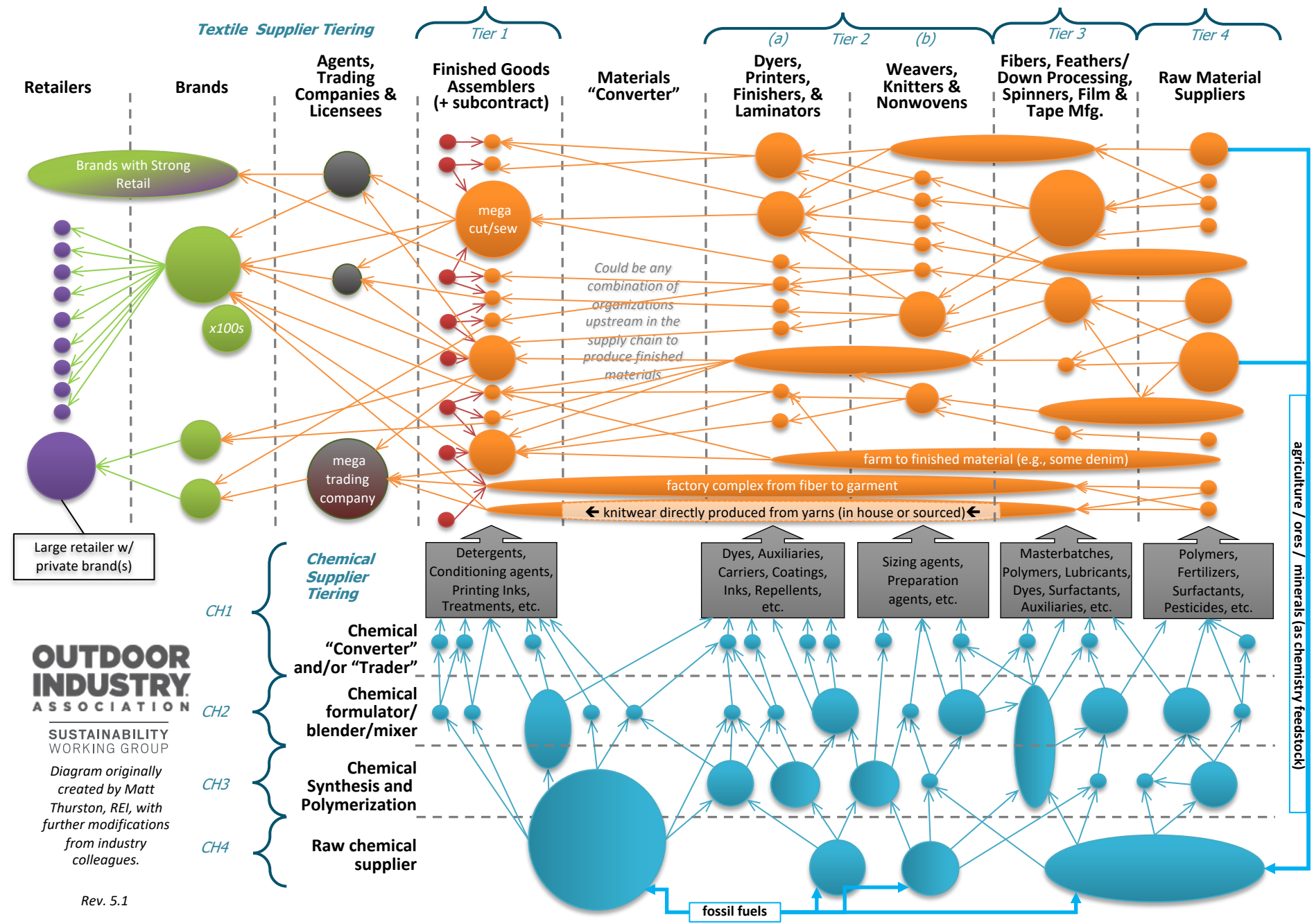


# Supply Chain and Facility Nodes

# Connections to Brands and Retailers



# The Textile & Textile Chemistry Supply "Network"



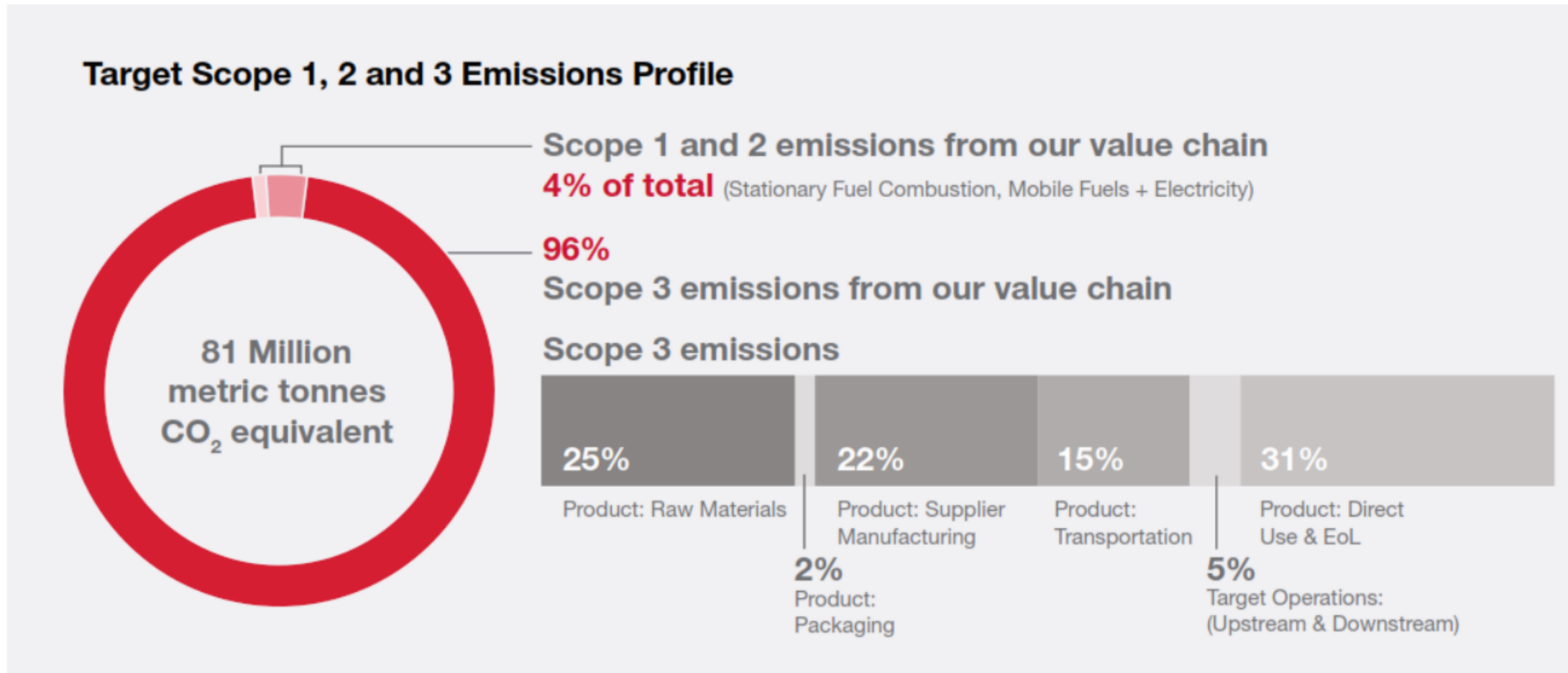
**OUTDOOR  
INDUSTRY  
ASSOCIATION**

SUSTAINABILITY  
WORKING GROUP

Diagram originally  
created by Matt  
Thurston, REI, with  
further modifications  
from industry  
colleagues.



# Importance of Scope 3



Source: 2019 Target Sustainability Report

[https://corporate.target.com/\\_media/TargetCorp/csr/pdf/2019\\_corporate\\_responsibility\\_report.pdf](https://corporate.target.com/_media/TargetCorp/csr/pdf/2019_corporate_responsibility_report.pdf)

**Building a robust Higg FEM sharing network provides a scalable approach to building robust Scope 3 measurements.**





# Examples of Use Cases

- A **Brand** uses Higg FEM data to identify low carbon intensity suppliers for a particular material or process
- A **Facility** uses Higg FEM data to set emissions targets and move towards low carbon fuels
- A **Retailer** uses Higg FEM data to calculate a portion of their Scope 3 emissions





# Higg FEM GHG Parameters and Calculation





# Higg FEM GHG Parameters

## Updates on the Higg FEM GHG reporting

- Updated and Consolidated Emission Factors
  - Updated background sources, expanded country-level electricity mixes
- Addition of Refrigerant GHG Emissions
  - Emission factors for all relevant refrigerants in Higg FEM
- Separate Reporting of Non-renewable/Renewable Sources

# Emissions Sources in Higg FEM

Emission Source	Description	Examples	Source Data
Stationary Combustion Sources (Energy section)	On-site emissions resulting from direct combustion of emissions	Coal burned in on-site boilers; natural gas for heating & thermal energy	EPA 2018; IPCC AR5
Fugitive Refrigerant Emissions (Air Section)	Loss of refrigerants (HFC, CFC, etc) to air, typically resulting from leaks or damage to cooling systems	Loss of R404 due to a leaking refrigerant system	IPCC AR5
Purchased Electricity (Energy Section)	Emissions resulting from purchasing electricity- based on the fuel mix (country level)	Electricity purchased from a utility	GaBi, IEA





## Technical Parameters

- All greenhouse gases, including carbon dioxide ( $\text{CO}_2$ ), methane ( $\text{CH}_4$ ), nitrous oxide ( $\text{N}_2\text{O}$ ), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulphur hexafluoride ( $\text{SF}_6$ ), and nitrogen trifluoride ( $\text{NF}_3$ ) are counted in the GHG inventory.
- Some individual country-level electricity emission factors may not include some non-carbon emissions due to limited data availability.
- Emissions are calculated using the 100-year Global Warming Potential (GWP) factors for each GHG in the IPCC 5<sup>th</sup> assessment report, including non-carbon GHGs.



# Calculation Examples

- **Absolute GHG Emissions**

- **Total emissions from a facility over a reporting year (non-renewable)**
- Emission source \* conversion to MJ (if applicable) \* Emission factor per MJ= Absolute Emissions
- *Example: 5400 kg Coal- SBA\*20.077 MJ/kg \* 0.09004 kgCO<sub>2</sub>e/MJ=9262 kg GHG*

- **Normalized GHG Emissions**

- **Emissions per unit of production over a reporting year (non-renewable)**
- Absolute emissions/production volume (reported units)= Emissions per reported unit
- *Example: 9262 kg GHG/49,356 kgs annual production= 0.188 kg CO<sub>2</sub>E per kg of production*

\*Higg FEM GHG calculations are based on total reported energy and air emissions data in any individual FEM. In order to accurately calculate Scope 3 emissions, Brands/Retailers must claim their portion of emissions based on the volume of their purchases from an individual facility.



## Renewable and Non-renewable Emissions

- Emissions totals include only non-renewable sources
- Renewable emissions (biomass) are calculated separately, but not included in Total Absolute or Total Normalized emissions
- Other direct use renewable sources (solar, wind, hydro) are considered “zero production” emissions, and have emission factors of zero
- Purchased renewables can only be reported if the facility has contractual proof that the energy they are purchasing is from renewable sources. [See GHG protocol for additional guidance](#)





# Higg FEM GHG Report



# Higg FEM GHG Report

Sally plus testing account

My Account

2019

Overview

Available Actions

Purchase vFEM

Share Assessment

Submit/Post Assessment

Assessment Status

Assessment Initiated (ASI)

Self-Assessment - Not posted

96 %

Verified - Not posted

--

Assessment ID

femsurvey:0358e5f0-59a0-4d89-8c73-acbad6f822fa

Verifying Body

--

Verifier Contact

--

View

Download Assessment

View/Edit FEM

CSV v2 / v1

Excel

Facility Information

Name

Sally plus testing account

Country

China

Contact

sally@apparelcoalition.org

Higg ID

133601

Activity History

Mar 27, 2020

Updated status: Assessment Initiated (ASI)

sally@apparelcoalition.org

Nov 6, 2019

Allocated self-assessment

sally@apparelcoalition.org

Scores

Overall scores

46.6%

--

Total for self-assessment

Total for verified assessment

View Details

Greenhouse Gas Emissions

9.0m CO2e

1.276e+0 CO2e/unit

Total Absolute

Total Normalized

View Details

Flagged Questions

Questions flagged by verifiers for not being in line with legal requirements.

This report is not available

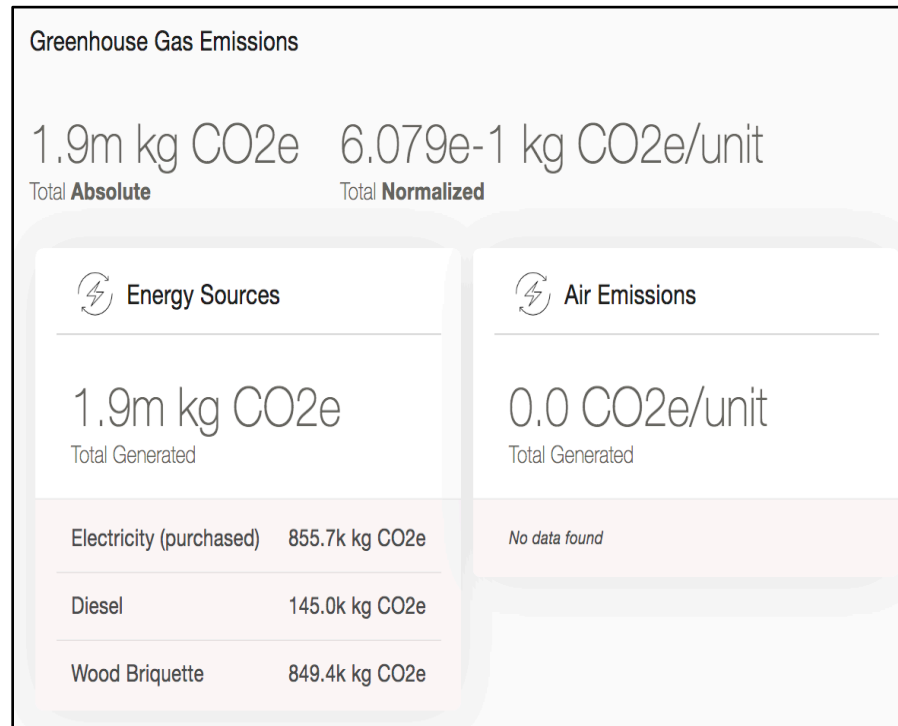
Verifier Notification

Questions marked as Inaccurate or No Response by Verifier

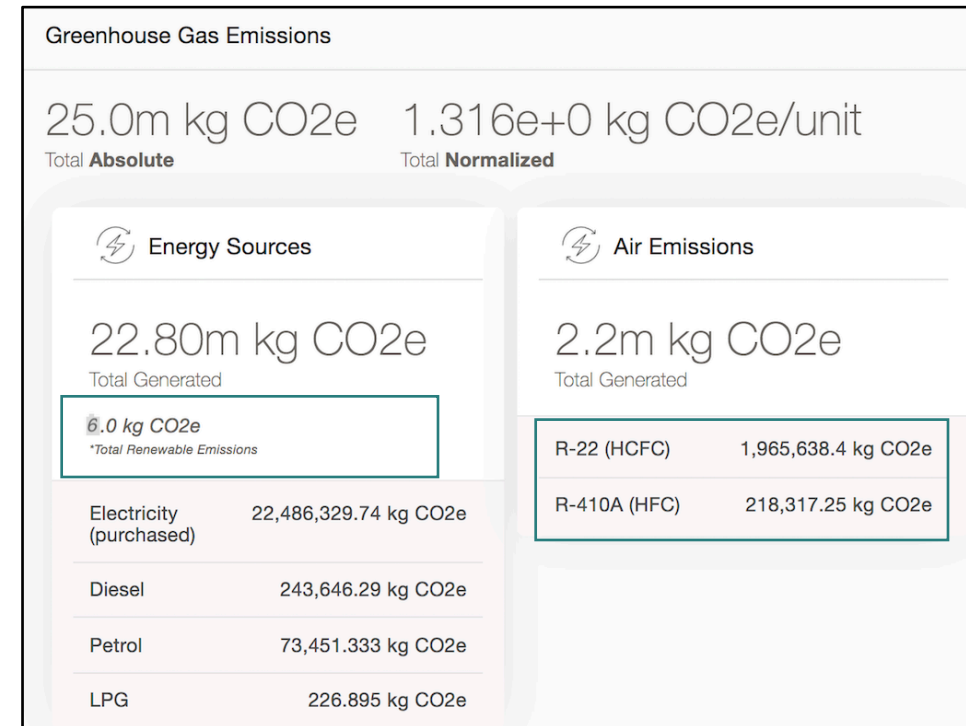
This report is not available

# Higg FEM GHG Report

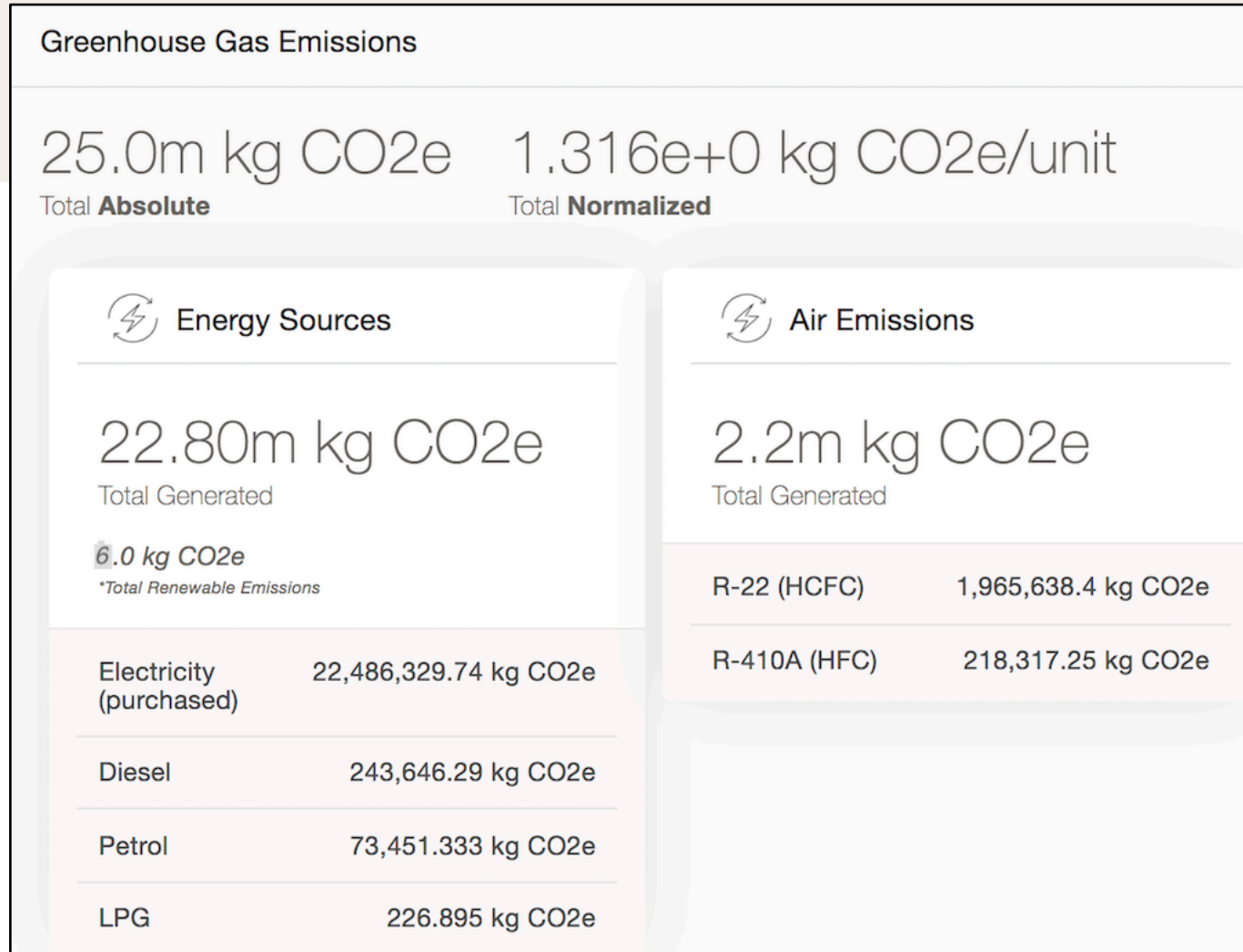
## Old Version



## New Version



# Higg FEM GHG Report



## Total GHG

- Absolute
- Normalized

## Energy Sources GHG

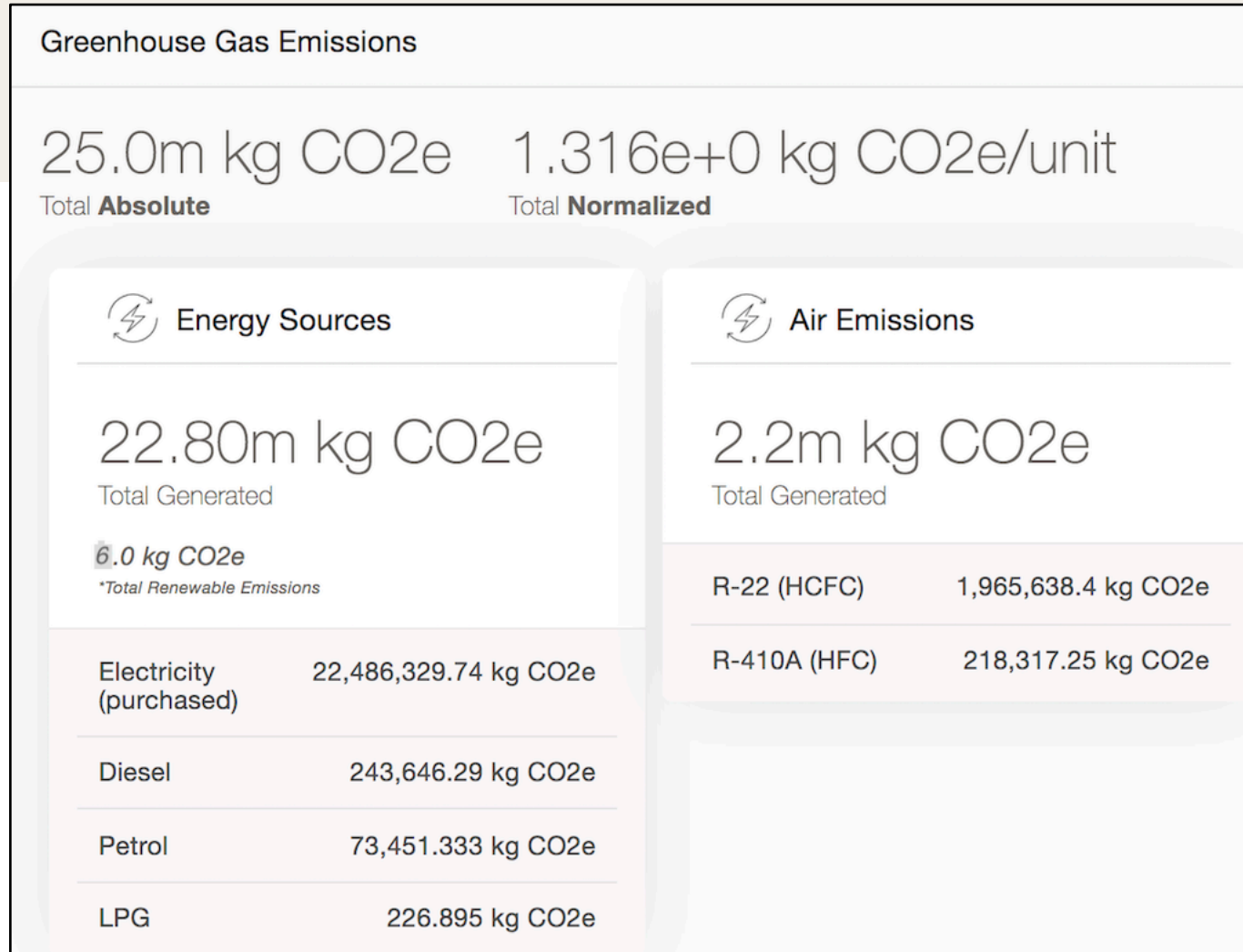
- Renewable emission GHG
  - Total GHG
  - Each source emission GHG
- Non-renewable emission GHG
  - Total GHG
  - Each source emission GHG

## Air Emissions GHG

- Total air emission GHG
- Each source emission GHG



# Higg FEM GHG Report



Total GHG = Total energy sources GHG (non-renewable energy GHG) + total air emissions GHG  
(e.g., 25.0m kg=22.80mkg+2.20mkg)

Total Energy Sources GHG = The sum of individual energy source GHG

- Non-renewable GHG total (e.g., 22.8m kg)
- Renewable GHG total (e.g., 6kg)

Total Air Emissions GHG = The sum of individual refrigerant emissions GHG (e.g., 2.2mkg)

# Higg FEM GHG Report – Energy Sources GHG Calculation

* Energy sources			
	Does your facility track its energy use from this source?	What quantity of energy was used by this source during this reporting year?	Unit of Measure
Electricity (purchased)	Yes	29495656	kWh
Diesel	Yes	89748.28	liter
Petrol	Yes	32157.89	liter
* Natural gas sources			
	Does your facility track its energy use from this source?	What quantity of energy was used by this source during this reporting year?	Unit of Measure
LPG	Yes	3864	MJ

**GHG Calculation Formula:** Emission source \* conversion to MJ (if applicable) \* Emission factor per MJ



$29,495,656 \text{ kWh} \times 3.6 \text{ MJ/kWh} =$   
 $106,184,361.6 \text{ MJ} \times 0.2216 \text{ kg CO}_2\text{e/MJ} =$   
 $22,486,329.74 \text{ kg CO}_2\text{e}$

# Higg FEM GHG Report – Air Emission GHG Calculation

* Refrigerant
R-22 (HCFC)
Accurate
Verifier Comments:
* Quantity of refrigerant added to existing equipment during this reporting year
1116.84

Refrigerant
R-410A (HFC)
Accurate
Verifier Comments:
Quantity of refrigerant added to existing equipment during this reporting year
113.5

**GHG Calculation Formula:** Emission source \* conversion to kg \* Emission factor per kg of Refrigerant



$$113.5 \text{ kg R410a} * 1,923.5 \text{ kg CO}_2\text{e/kg} = 218317.25 \text{ kg CO}_2\text{e}$$





# Higg FEM CSV GHG Data

# Higg FEM CSV GHG Data

FEM										
Dashboard Modules Benchmarking Purchase Modules										
All Modules				Share module	Request / Accept modules	Download Bulk CSV v1	Download Bulk CSV v2	Download Table		
All Modules My Modules Shared with me	Year	Account Name	Country	Tags	Higg ID	Status	Self	Verified	Actions	Modified
	Filter.. ▼	Search...	Search...	Filter... ▼	Search...	Filter.. ▼	Filter.. ▼	Filter.. ▼		
	2018			Enter a new tag		VRF Verification Finalized	99% Posted	96% Posted	...	5/28/2019
Receive Modules Modules Requested Modules Received	2017			Enter a new tag		ASC Assessment Completed	91% Not Posted		...	1/19/2018

CSV V1: only total GHG

CSV V2: total GHG and individual source of GHG (recommend to download)

# Higg FEM CSV GHG Data

totalGHGEmissions.facility	totalRefrigerants.facility	totalNonRenewables.facility	biomassbeg.GHG: renewable
24987609.91	2183955.65	22803654.26	
23362433.58	2012876.8	21349556.78	

natgaslpg.GHG	natgaslng.GHG	natgasng.GHG	natgasother.GHG	natgaspropa.GHG	petrol.GHG	diesel.GHG	steampurch.GHG	electricpurch.GHG
226.894704					73451.3329	243646.29		22486329.7
551.029996					73856.301	303016.007		20972133.4

## CSV V2

- Total GHG
- Total Air Emission GHG
- Total Non-renewable GHG
- Individual source GHG
  - Renewable, non-renewable and air emission GHG
- Verified GHG data
  - If the FEM has been verified







# Guidance & Support

# GHG Guidance on Howtohigg.org

Howtohigg.org: Higg Tools -> Higg FEM -> Step by Step Guidance -> [GHG Revision](#)



Higg Tools   Verification Program   Events   Industry Resources   About   

Home / Higg Facility Environmental Module (Higg FEM) / **GHG Revision**

## GHG Revision

**Start the Process**

1. [Complete FEM Self-Assessment](#)
2. [Complete FEM Verification](#)

**Table of Contents**

1. [Overview](#)
2. [Parameters apply to GHG Calculations](#)
3. [Notes for using the GHG calculations](#)
4. [Guidance for using the GHG Dashboard](#)

**1. Overview**

# GHG Guidance on Howtohigg.org

Howtohigg.org: Higg Tools -> Higg FEM -> Step by Step Guidance -> [GHG Revision](#)

In the FEM CSV bulk export files, you can review the GHG revision data. Below is the updated bulk CSV V2 reference guidance.

[Download Guide](#)

totalGHGEmissions.facility	Total non-renewable GHG emissions (sum of total NR energy and total refrigerants- self reported)
totalRefrigerants.facility	Total Refrigerant emissions (self-reported)
totalNonRenewables.facility	Total non-renewable energy emissions (self-reported)
biomassbeg.GHG: renewable	Total GHG emissions-Biomass-Begasse (self-reported)
biomassother.GHG: renewable	Total GHG emissions-Biomass-Biomass- type unknown (self-reported)
biomasscane.GHG: renewable	Total GHG emissions-Biomass-Cane Sugar (self-reported)
biomasscashew.GHG: renewable	Total GHG emissions-Biomass-Cashew Nut Shell (self-reported)
biomasscorncob.GHG: renewable	Total GHG emissions-Biomass-Corncob (self-reported)
biomasscornstalk.GHG: renewable	Total GHG emissions-Biomass-Cornstalk (self-reported)
biomassefb.GHG: renewable	Total GHG emissions-Biomass-Empty Fruit Branch (self-reported)
biomasseuca.GHG: renewable	Total GHG emissions-Biomass-Eucalyptus Bark (self-reported)
biomasspalmfiber.GHG: renewable	Total GHG emissions-Biomass-Palm Fiber (self-reported)
biomasspalmleaf.GHG: renewable	Total GHG emissions-Biomass-Palm Leaf (self-reported)
biomasspalmshell.GHG: renewable	Total GHG emissions-Biomass-Palm Shell (self-reported)
biomasspalmtrunk.GHG: renewable	Total GHG emissions-Biomass-Palm Trunk (self-reported)
biomassparawood.GHG: renewable	Total GHG emissions-Biomass-Parawood (self-reported)
biomasspeanutshells.GHG: renewable	Total GHG emissions-Biomass-Peanut Shells (self-reported)
biomassricehusks.GHG: renewable	Total GHG emissions-Biomass-Rice Husk (self-reported)
biomassricestraw.GHG: renewable	Total GHG emissions-Biomass-Rice Straw (self-reported)
biomassstapioca.GHG: renewable	Total GHG emissions-Biomass-Saw Dust (self-reported)
biomasssawdust.GHG: renewable	Total GHG emissions-Biomass-Sliver of wood (self-reported)
biomassliverwood.GHG: renewable	Total GHG emissions-Biomass-Tapioca Rhizome (self-reported)
biomasswood.GHG: renewable	Total GHG emissions-Biomass-Wood Briquette (self-reported)
biomassbiodiesel.GHG: renewable	Total GHG emissions-Biomass-Biodiesel (self-reported)
solarphoto.GHG: renewable	Total GHG emissions-Solar Photovoltaic (self-reported)
wind.GHG: renewable	Total GHG emissions-Wind (self-reported)
geotherm.GHG: renewable	Total GHG emissions-Geothermal (self-reported)
hydro.GHG: renewable	Total GHG emissions-Hydro (self-reported)
microhydro.GHG: renewable	Total GHG emissions-Micro-Hydro (self-reported)
coalbhva.GHG: nonrenewable	Total GHG emissions-Coal (Bituminous - high volatile A; medium volatile; low volatile; Anthracite -
coalbhb.GHG: nonrenewable	Total GHG emissions-Coal (Bituminous High Volatile B) (self-reported)
coalother.GHG: nonrenewable	Total GHG emissions-Coal- Specific type not known (self-reported)
coalsba.GHG: nonrenewable	Total GHG emissions-Coal (Sub-Bituminous A) (self-reported)
coalsbb.GHG: nonrenewable	Total GHG emissions-Coal (Sub-Bituminous B) (self-reported)
coalsbc.GHG: nonrenewable	Total GHG emissions-Coal (Sub-Bituminous C) (self-reported)
coalsbhvc.GHG: nonrenewable	Total GHG emissions-Coal (Sub-Bituminous High Volatile C) (self-reported)
fueloilone.GHG: nonrenewable	Total GHG emissions-Fuel Oil (No. 1-Kerosene) (self-reported)
fueloilother.GHG: nonrenewable	Total GHG emissions-Fuel Oil- Specific type not known (self-reported)
fueloiltwo.GHG: nonrenewable	Total GHG emissions-Fuel Oil (No. 2-Bunker A; Diesel Oil) (self-reported)

Account-Scoring

Module Responses


Applicabilities

Answer Options

+



# Submit a Support Ticket



ENGLISH

SUPPORT

Higg Tools

Verification Program

Events

Industry Resources

About

Q

## SUBMIT A REQUEST

Please choose a request type below

Posting My Module

Sharing My Module

**My Module Score and Data (FEM, FSLM, BRM)**

Higg Facility Module Verification

Product Tools

Howtohigg.org -> Support  
or Howtohigg.org/request

What score or data issue can we help you with? \*

-

Green House Gas (GHG) report or data

Viewing my module's score or data (on-going/posted/shared)

Need explanation regarding the score or data

Other module score or data issue or question

# Platform Demo

The background of the image is a blurred industrial scene, likely a manufacturing or assembly line. It features various mechanical components, including what appears to be a robotic arm or a conveyor system with rollers. A semi-transparent teal rectangular box is overlaid on the left side of the image, serving as a background for the text.

**Questions?**



A person wearing a black and white striped shirt is working on a cable management system. The image is overlaid with a semi-transparent blue rectangle. The text "Thank you!" is centered within this rectangle in a white, sans-serif font.

# Thank you!

A close-up shot of a cable management system, showing a metal bracket and several cables. The text "Higg Co" is overlaid in a white, sans-serif font.

**Higg Co**