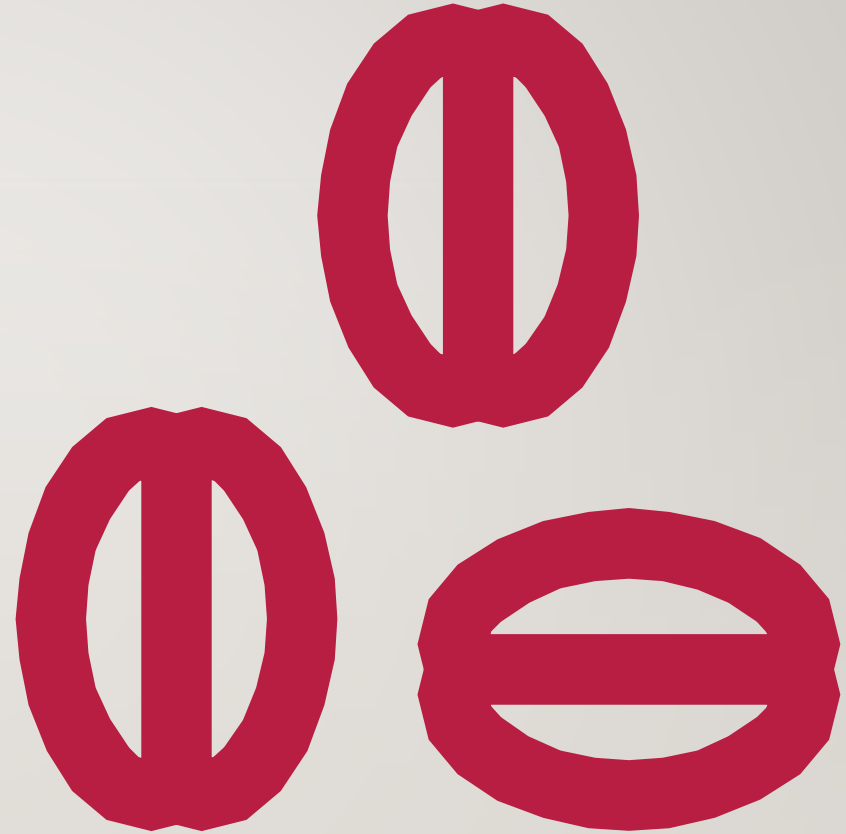

GHG INVENTORY:

FROSTY BEVERAGE CO
• (AS PER GHG PROTOCOL)



COMPANY OVERVIEW – FROSTY BEVERAGE CO.

- **Frosty Beverage Co.** is a regional beverage manufacturer established in **1999**, currently holding a **10% market share** in its sector. Known for its commitment to quality and regional distribution, the company operates through a well-integrated structure that includes:
- A **Central Office** in New York City
- **Two production plants** located in Mexico (Plant X and Plant Y)
- A **Distribution Center** in Texas, USA
- A **Company-owned delivery fleet** across the U.S.
- The company has undertaken its **first-ever Greenhouse Gas (GHG) Emissions Inventory** for the calendar year **2024**, focusing on **Scope 1 and Scope 2 emissions** under the **operational control** consolidation approach.



CONSOLIDATION APPROACH CHOSEN:

- **Organizational Boundaries: Operational Control** method is chosen rightly because Frosty Beverage Co. is reporting GHG emissions from all operations over and it has full authority to introduce and implement operating policies, regardless of ownership .need to note that
 - Frosty Beverage can directly influence energy use, fuel consumption, and refrigerant management in facilities it controls operationally — making it responsible for emissions from these sites.
 - Operational control allows the company to gather data only from places where it has access and governance — like its own production plants, distribution center, central office, and vehicle fleet.
 - Entities like **DHL (outsourced delivery)** are excluded, as Frosty Beverage Co. doesn't control how DHL manages its fleet. This fits well with the GHG Protocol's definition under this approach.
 - Using operational control ensures that Scope 1 and 2 emissions are reported only

FACILITIES INCLUDED IN GHG INVENTORY:



***1. CENTRAL OFFICE
(NEW YORK CITY, USA)***



INCLUDED BECAUSE IT IS OPERATED DIRECTLY BY FROSTY BEVERAGE CO.



EVEN THOUGH IT OCCUPIES ONLY A PORTION (1,000 M² OF A 4,000 M² BUILDING), IT FALLS UNDER **OPERATIONAL CONTROL** SO RESPONSIBILITY FOR REFRIGERANTS, PART OF THE ELECTRIC CONSUMPTION IS WITH THE COMPANY.



ELECTRICITY IS COVERED BY **100% RECS**, SO SCOPE 2 EMISSIONS = 0.



REFRIGERANT LEAKAGE (R-410A) = INCLUDED IN **SCOPE 1**.

FACILITIES INCLUDED IN GHG INVENTORY:



Production Plant X (Mexico)



Included, as the company controls this facility.



Contains significant emission sources:

Electricity from a local utility (Scope 2).

On-site combustion of **diesel** and **natural gas** (Scope 1).

FACILITIES INCLUDED IN GHG INVENTORY:



. Production Plant Y (Mexico)



Included, under company's operational control.



Electricity sourced via a wind PPA (0 emissions under Scope 2).



Large refrigerant leakage (800 kg of HFC-134a) = major Scope 1 source.



Boiler uses **LPG** fuel = Scope 1.

FACILITIES INCLUDED IN GHG INVENTORY:

- ***Distribution Center (Texas, USA)***
- **Included** due to operational control.
- Electricity partially offset by **50% RECs**, but since it meets quality criteria, emissions can be counted as **0 under market-based Scope 2**.

-

FACILITIES INCLUDED IN GHG INVENTORY:

- . ***Company-Owned Vehicle Fleet (USA)***
- Fully controlled and operated by Frosty Beverage Co.
- Fuel usage (diesel and gasoline) is a major **Scope I** emissions source.

EXCLUDED:

DHL Delivery (Third-party Logistics)

- Frosty Beverage does not have operational control over DHL's fuel, fleet, or policies.
- **So excluded** from Scope 1 & 2. This is a **Scope 3** activity (outsourced service).

OPERATIONAL BOUNDARIES (SCOPES INCLUDED):

- BY definition , Operational boundaries define **which emission sources** within the organizational boundaries are included in the GHG inventory, and they are categorised in to
- **Scope 1:** Direct GHG emissions from owned or controlled sources
- **Scope 2:** Indirect GHG emissions from the consumption of purchased electricity, steam, heating, or cooling
- (**Scope 3:** Optional for this case — includes all other indirect emissions)
- The boundary is **clearly and correctly defined** in line with the **GHG Protocol Corporate Standard**.
- **No major omissions** have been made within Scopes 1 and 2, based on the available data.
- **Use of market-based method for Scope 2** is applied where credible energy instruments (like RECs and PPAs) exist — which aligns with international best practices.

I. SCOPE I EMISSIONS INCLUDED:

- All **direct emission sources** under Frosty's operational control are appropriately identified:
- **Stationary Combustion:**
 - Diesel and natural gas use at **Plant X**
 - LPG use at **Plant Y**
- **Mobile Combustion:**
 - Company-owned vehicle fleet (diesel)
 - Company cars at the Central Office (gasoline)
- **Fugitive Emissions:**
 - Refrigerant leaks:
 - 20 kg R-410A (Central Office)
 - 800 kg HFC-134a (Plant Y)
- These are **clearly within Frosty's control**, and thus rightfully included in **Scope I**.

SCOPE 2 EMISSIONS INCLUDED:

- All **purchased electricity** for Frosty-owned/controlled facilities is included:
- Electricity consumption at:
 - **Central Office** (100% RECs → **0 emissions** under market-based approach)
 - **Plant X** (grid power)
 - **Plant Y** (Wind PPA → **0 emissions** under market-based)
 - **Distribution Center** (50% RECs → **0 emissions**, qualifies under quality criteria)

SCOPE 3 EMISSIONS EXCLUDED (APPROPRIATELY):

-
- **DHL Delivery** (outsourced logistics): Excluded because it's not under Frosty's operational control. This is a classic **Scope 3** activity, and not required here.

REPORTING YEAR AND BASE YEAR

- Reporting Period: this is the **first GHG inventory**, using a recent, complete year (2024) is logical and ensures data is relevant and actionable. further chosen calendar year is in **Alignment with Financial Reporting** and is as per consistent with international standards.
- Base year : No prior GHG data exists, so 2024 becomes the starting point. Future inventories (e.g., for 2025, 2026, etc.) will compare their GHG emissions against the 2024 base year emissions, allowing the company to evaluate progress toward emissions reduction goals.

SCOPE I CALCULATION

Source	Activity Data	Emission Factor	Emissions (kg CO ₂ e)	Emissions (t CO ₂ e)
Diesel combustion (Plant X)	7,500 litres	2.68 kg CO ₂ /litre	20100.0	20.1
Natural gas combustion (Plant X)	1,000 m³	1.93 kg CO ₂ /m³	1930.0	1.93
LPG combustion (Plant Y)	84,600 kg	2.95 kg CO ₂ /kg	249570.00000000000	249.5700000000000
Gasoline vehicles (Central Office)	450,000 miles	0.251 kg CO ₂ /mile	112950.0	112.95
Diesel vehicles (Fleet)	968,500 gallons	10.21 kg CO ₂ /gallon	9888385.0	9888.385
Refrigerant leak (R-410A, Central Office)	20 kg	GWP 2088.00	41760.0	41.76
Refrigerant leak (HFC-134a, Plant Y)	800 kg	GWP 1430.00	1144000.0	1144.0
			11458695	11458.70

SCOPE 2:

-
- **Market-Based Method**

- Reflects **electricity that the company chooses to purchase** through contracts like:
 - **RECs (Renewable Energy Certificates) and PPAs (Power Purchase Agreements)**
- If the energy comes from **certified renewable sources**, the emissions factor is **zero (0 tCO₂)**.
- So for Frosty Beverage Co., many facilities had **0 Scope 2 emissions** under this method
- because:
 - Central Office → 100% RECs
 - Plant Y → Wind farm PPA
 - Distribution Center → 50% RECs (qualified)
- **Only Plant X**, which used regular grid electricity, contributed to Scope 2 under the market-based method.

MARKET-BASED SCOPE 2

Source	Activity Data	Emission Factor	Emissions (kg CO ₂ e)	Emissions (t CO ₂ e)
Electricity (Plant X)	600,000 kWh (50,000 kWh/month)	0.252 kg CO ₂ /kWh	151200.0	151.2

scope 2 emission : 151.2 tCO₂e

Total emission (scope 1 and 2): 11,609.90 tCO₂e



SCOPE 1 AND 2 EMISSIONS (USING LOCATION-BASED METHOD)

- **Location-based** reflects the reality of **your grid's emissions** and helps compare across regions and higher than market based. One has to use **average emissions factor** of the regional or national **grid**, regardless of what energy source is purchased.
- ☐ It doesn't recognize green power contracts like RECs or PPAs like market base
- ☐ This method reflects the **physical grid mix** — including coal, natural gas, and renewable — in that region.

SCOPE I (LOCATION BASED)

- **Scope I :Total Scope I Emissions (unchanged):11,458.70 tCO₂e**
- **(Scope I emissions include only direct greenhouse gas emissions from sources that are owned or controlled by the company.These are independent of electricity procurement methods)**

SCOPE 2: LOCATION BASED

Facility	Electricity Use (kWh/year)	Emission Factor (kg CO ₂ /kWh)	Emissions (kg CO ₂ e)	Emissions (t CO ₂ e)
Central Office (New York City, USA)	120000	0.4	48000.0	48.0
Distribution Center (Texas, USA - ERCOT)	360000	0.453	163080.0	163.08
Production Plant X (Mexico)	600000	0.252	151200.0	151.2
Production Plant Y (Mexico)	840000	0.319	267960.0	267.96

Location-based Scope 2 = 630.24 tCO₂e

Total Scope 1 + Scope 2 Emissions (Location-Based):

12,088.94 tCO₂e

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- Thanks

