



8. Review: Complete Inventory

You were contracted by Ice Cold Beverages (an imaginary company) to complete its first GHG emissions inventory. Information about the company's structure and data about its activities are provided below. Use the template provided on the last page of this exercise to complete Ice Cold's GHG inventory.

Ice Cold's management has asked that you use the operational control consolidation approach in determining organizational boundaries. Also, because a fixed amount of time has been allotted to completion of this exercise, please only account for Scopes 1 and 2.

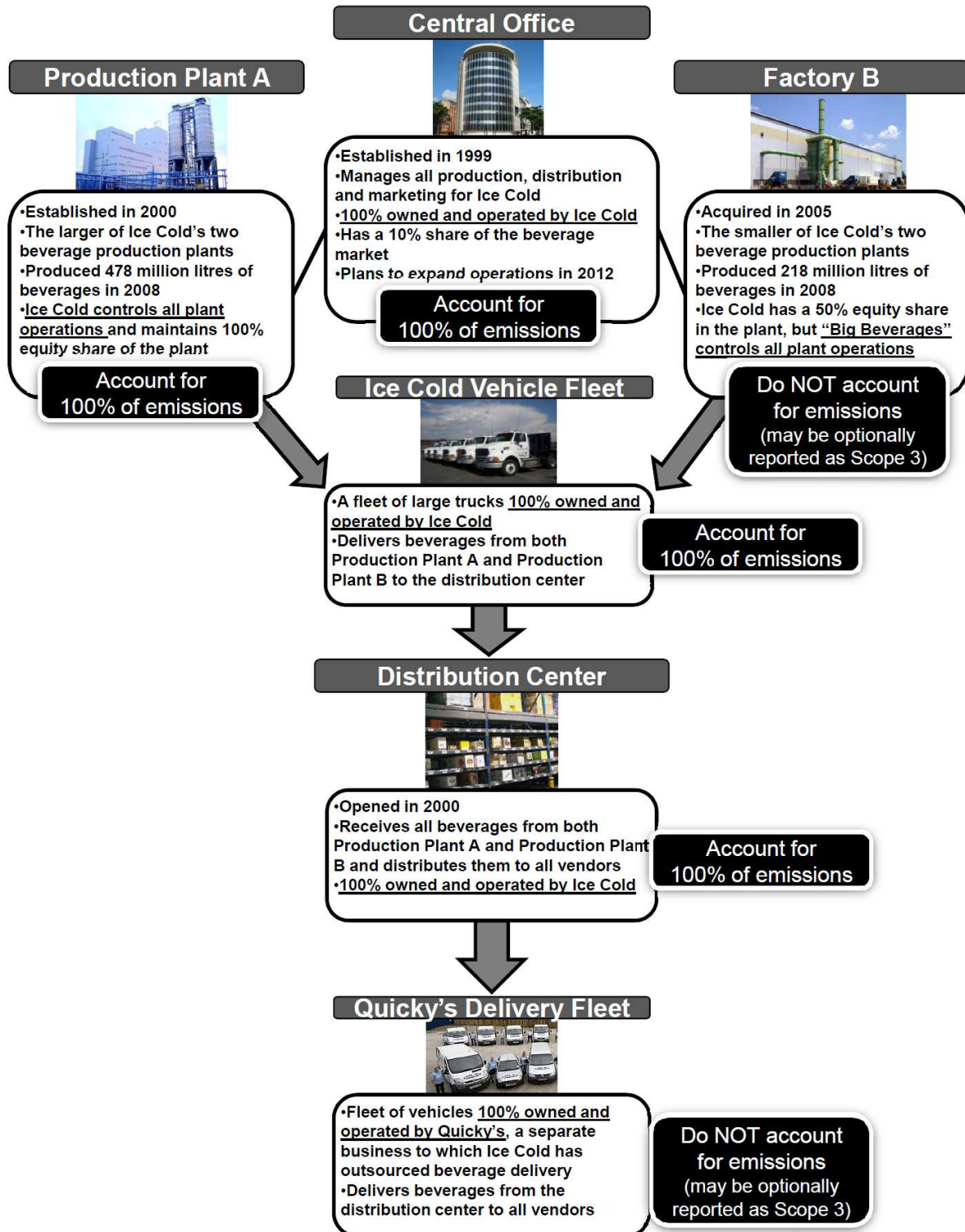
Description: Ice Cold Beverages

Ice Cold is a small beverage company that started operations in 1999. Today, Ice Cold has a 10% beverage market share in its region, and it consists of a central office, two beverage production plants, a distribution center and a delivery vehicle fleet.

Since management has decided to use the operational control consolidation approach, consult Ice Cold's structure to determine whether it has control of the operations of each of the facilities. According to the operational control consolidation approach, a reporting company will report 100% of the emissions of facilities it controls and 0% of the emissions of facilities it does not control.

See organizational boundary answers in black boxes below

Structure of Ice Cold Beverages



Data for Ice Cold's facilities

Central Office



Ice Cold's central office is located in New York City. The central office is in a commercial building and occupies 1,000 m² of the second floor, which is a total of 4,000 m². The electricity consumed monthly by the entire second floor is shown in the table below:

Table 1: Monthly electricity consumption of second floor

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
kWh	1610	1755	1770	1565	1735	1645	1655	1605	1640	1595	1655	1510

1. [Open the GHG Protocol calculation tool "GHG emissions from Purchased Electricity, Heat, or Steam."](#)
2. [Click on the Spreadsheet tab at the bottom.](#)
3. [Add up the total kWh of electricity used for the year \(19,740 kWh\).](#)
4. [Fill in the following information in the tool:](#)
5. [\(In the Year column, since specific factors are only available for 2005, leave the field blank to use the default.\)](#)

Facility information				Consumption data			
Facility description	% of electricity used by the facility	Country	Region (if available)	Year	Fuel mix	Amount	Units
Central Office	25	United States	NPCC NYC/ Westchester	2007		19740	kWh

6. [Find the total CO₂e:](#) **1.581 tCO₂e** [\(Scope 2\)](#)

Ice Cold's central office is also equipped with central air conditioning. The air conditioning equipment uses the refrigerant R-410A, of which there was 30 kg in storage at the beginning of 2009 (the reporting year), and 10 kg in storage at the end of the year. Over the reporting period, no refrigerant or air-conditioning equipment was purchased and no refrigerant was transferred offsite (e.g., sold to other companies or destroyed).

1. [Open the GHG Protocol calculation tool “GHG emissions from refrigeration and air-conditioning.”](#)
2. [Click on the “WS 1b – Sales Approach \(User\)” tab at the bottom of the spreadsheet.](#)
3. [Fill in the following information in the tool for R-410A in the “Refrigerant Used” column:](#)

Step 1	Step 2	Step 3	Step 4	Step 5
Equipment and Refrigerant Type		Decrease in Inventory (kilograms)		
A	B	C	D	E
Type of Air Conditioning and Refrigeration Equipment	Refrigerant Used	Refrigerant inventory (in storage, not equipment) at the beginning of the year	Refrigerant inventory (in storage, not equipment) at the end of the year	Decrease in Refrigerant Inventory E = C - D
	R-410A	30.00	10.00	20.00

4. [Find the total CO₂e:](#) **34.500** (Scope 1)

The sales team based in Ice Cold's central office uses company-owned vehicles for sales trips. The company-owned vehicles were purchased in 2007 and are only used for business travel. Ice Cold recorded each car's odometer at the beginning and end of the year to find that during the entire year, all company owned cars traveled a total of 450,000 miles.

1. [Open the GHG Protocol calculation tool “GHG emissions from transport or mobile sources.”](#)
2. [Click on “Enter Activity Data.”](#)
3. [Fill in the following information in the tool:](#)

Status	Source Description	Region	Mode of Transport	Scope	Type of Activity Data	Activity Data							
						Vehicle Type	Distance Travelled	Gross Weight	# of Passenger	Unit of Distance	Fuel Used	Fuel Amount	Unit of Fuel Amount
<input type="checkbox"/>	Central Office car fleet	US	Road	Scope 1	Vehicle Distance (e.g. Road Transport)	Passenger Car - Gasoline - Year 2005-present	450000			Mile			

4. [Find the total CO₂e in the Summary worksheet:](#) **177.425** (Scope 1)

Production Plant A

Ice Cold's Production Plant A, located in Mexico, gets all of its electricity from a local electric grid powered by energy from the combustion of a mix of fuels with an emission factor for CO₂ of 0.4698 kg CO₂/kWh (emission factors for CH₄ and N₂O are unavailable). Production Plant A's complete monthly electricity usage is shown in the table below.

Table 2: Total monthly electricity consumption for Production Plant A

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
kWh	26770	26110	25040	22565	23355	22325	20615	21660	25935	27740	29395	29935

1. [Open the GHG Protocol calculation tool "GHG emissions from Purchased Electricity, Heat, or Steam."](#)
2. [Click on the Spreadsheet tab at the bottom.](#)
3. [Add up the total kWh of electricity used for the year \(301,445 kWh\).](#)
4. [Fill in the following information in the tool:](#)
(Leave the year field blank to use the default.)

Facility information				Consumption data				Emission factor (kg GHG/ kWh)		
Facility description	% of electricity used by the facility	Country	Region (if available)	Year	Fuel mix	Amount	Units	CO ₂	CH ₄	N ₂ O
Production Plant A	100	Mexico		2008	All	301445	kWh	0.4698		

5. [Find the total CO₂e:](#) **141.619** [\(Scope 2\)](#)

The production processes at Production Plant A are powered by energy generated on-site from combustion of both diesel oil and natural gas. In 2009, Production Plant A combusted 7,500 litres of diesel oil and 1,000 m³ of natural gas.

1. Open the GHG Protocol calculation tool “GHG emissions from stationary combustion.”
2. Click on the Spreadsheet tab at the bottom.
3. Fill in the following information in the tool:

Source ID	Sector	Fuel type (e.g., solid fossil)	Fuel	Amount of fuel	Units (e.g., kg or kWh)	Heating value basis
Production Plant A	Manufacturing	Liquid fossil	Gas/ Diesel oil	7500	litres (l)	Not applicable
Production Plant A	Manufacturing	Gaseous fossil	Natural gas	1000	metre3	Not applicable

4. Find the total CO₂e: **22.028** (Scope 1)

Factory B



Ice Cold's Factory B, also located in Mexico, gets all of its electricity from a local electric grid powered by energy from the combustion of a mix of fuels with an emission factor for CO₂ of 0.4698 kg CO₂/kWh (emission factors for CH₄ and N₂O are unavailable). Factory B's complete monthly electricity usage is shown in the table below.

Table 3: Total monthly electricity consumption for Factory B

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
kWh	19274	18799	18029	16247	16816	16074	14843	15595	18673	19973	21664	21553

A boiler in Factory B combusts liquified petroleum gas (LPG) to power production processes. Ice Cold's financial records indicate that 84,600 kg of LPG were purchased and used throughout the year.

Factory B also utilizes a refrigerating unit, which uses HFC-134a, for cooling purposes during the production process. At the beginning of the year, Ice Cold had 1000 kg of HFC-134a in storage, and by the end of the year, it only had 200 kg of HFC-134a remaining in storage.

“Big Beverages” controls all of Factory B’s operations, so Factory B is not under the operational control of Ice Cold. Therefore, none of Factory B’s emissions should be accounted for in Ice Cold’s GHG inventory under Scope 1 or 2. Emissions from Factory B could optionally be reported under Scope 3.

Ice Cold Vehicle Fleet



Ice Cold has its own fleet of trucks to transport beverages between Production Plant A, Factory B and its distribution center. Over the course of the entire year, Ice Cold purchased 968,500 gallons of diesel for use in its fleet of heavy duty (rigid) trucks. (The truck fleet is based in and driven more miles in the United States.)

1. [Open the GHG Protocol calculation tool “GHG emissions from transport or mobile sources.”](#)
2. [Click on “Enter Activity Data.”](#)
3. [Fill in the following information in the tool:](#)

Status	Source Description	Region	Mode of Transport	Scope	Type of Activity Data	Activity Data							
						Vehicle Type	Distance Travelled	Gross Weight	# of Passenger	Unit of Distance	Fuel Used	Fuel Amount	Unit of Fuel Amount
	Ice Cold Vehicle Fleet	US	Road	Scope 1	Fuel Use	Heavy Duty Vehicle - Rigid - Diesel - Year 1960-present					On-Road Diesel Fuel	968500	US Gallon

4. [Find the total CO2e in the Summary worksheet:](#) **9843.553** [\(Scope 1\)](#)

Distribution Center



The Ice Cold Distribution Center is located in Texas and gets all of its electricity from the ERCOT regional grid. Ice Cold used its monthly energy bills to determine its entire monthly electricity consumption, shown in the table below:

Table 4: Total monthly electricity consumption for the Ice Cold Distribution Center

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
kWh	3855	3760	3606	3249	3363	3215	2969	3119	3735	3995	4233	4311

1. [Open the GHG Protocol calculation tool “GHG emissions from Purchased Electricity, Heat, or Steam.”](#)
2. [Click on the Spreadsheet tab at the bottom.](#)
3. [Add up the total kWh of electricity used for the year \(43,410 kWh\).](#)
4. [Fill in the following information in the tool:](#)
[\(In the Year column, since specific factors are only available for 2005, leave the field blank to use the default.\)](#)

Facility information				Consumption data			
Facility description	% of electricity used by the facility	Country	Region (if available)	Year	Fuel mix	Amount	Units
Distribution Center	100	United States	ERCOT - All			43410	kWh

5. [Find the total CO₂e:](#) **24.756** [\(Scope 2\)](#)

Quicky's Delivery Fleet



Quicky's Delivery Fleet is an independently owned and operated company to which Ice Cold has outsourced the transportation of beverages from the Ice Cold Distribution Center to all retail outlets. Each year Quicky's provides Ice Cold with a record of total miles traveled for the delivery of Ice Cold beverages. In 2009, Quicky's vehicles traveled 760,800,000 miles within the United States via its fleet of heavy duty (rigid) diesel trucks while providing delivery services to Ice Cold.

Quicky's Delivery Fleet is 100% operated by Quicky's, so Ice Cold does not have operational control over these vehicles. Therefore, none of the emissions from Quicky's Delivery Fleet vehicles should be accounted for in Ice Cold's GHG inventory as Scope 1 or 2, although they could optionally be reported as Scope 3.

Total emissions:

Facility	Emissions source	Scope 1	Scope 2
Central Office	electricity		1.581
	air conditioning	34.500	
	cars - sales trips	177.425	
Production Plant A	electricity		141.619
	on-site combustion	22.028	
Ice Cold Vehicle Fleet	truck fleet	9,843.553	
Distribution Center	electricity		24.756
TOTAL		10,077.506	167.96

GHG Inventory: Ice Cold Beverages

Organizational Boundaries

Consolidation Approach Chosen	<u>Operational Control</u>
Facilities included in GHG inventory	<u>Central Office</u>
	<u>Production Plant A</u>
	<u>Ice Cold Vehicle Fleet</u>
	<u>Distribution Center</u>

Operational Boundaries

Operational Boundaries (Scopes included)	<u>Scopes 1 and 2</u>
Reporting Period	<u>1 January 2009 – 31 December 2009</u>

Tracking Emissions Over Time

Base year and emissions profile over time	<u>Base year: 2009</u> <u>This is Ice Cold's first inventory, so 2009 will be its base year. Since this is the first GHG inventory Ice Cold has completed, its emissions profile over time cannot be provided.</u>
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Emissions Calculations

Total Scope 1 and 2 emissions	<u>10,245.462</u>
Total Scope 1 emissions	<u>10,077.506</u>
Total Scope 2 emissions	<u>167.96</u>