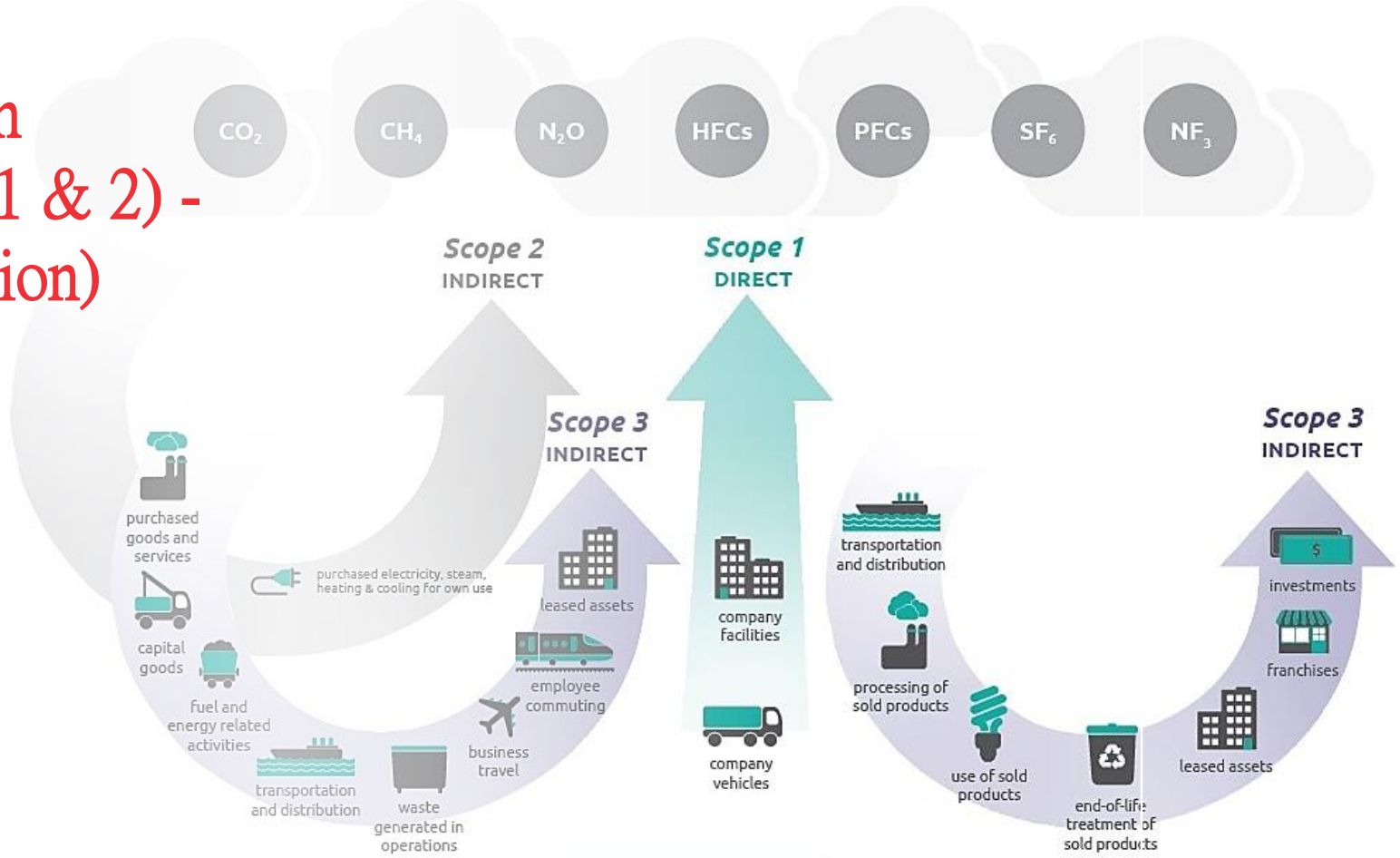
Deep Dive into CASG SME Questionnaire

Practical Guide for SMEs on Carbon Accounting (Scope 1 & 2) - Calculation Exercise (Question)



Carbon Accounting (Scope 1 & 2) Calculation Exercise

Company name: BlueSky HK Limited(BSHK)
Industry: Manufacturing
Scope: Head Office of Hong Kong

The Chief Sustainability office of BSHK (a rubber manufacturing company) has requested our Sustainability team to conduct a carbon calculation report for the 2022 GHG emissions (Reporting year: Jan 1-Dec 31st, 2022). Scope 1 & Scope 2 emission data is as follows:

- The company controls an office in the Kowloon with a Gross internal Floor Area (GIA) of 8,000 sq meters. The building comprises of an office area, conference rooms, canteen, lift lobbies, warehouse, and car park areas.
- Air conditioning is supplied by independent split air conditioning units
- There are around 400 staff working for the company
- Company vehicles were used to deliver the goods to clients

Office	
Utilities	• Towngas: 1,750 units for cooking in the canteen • Air Conditioning: R-412A was used. The opening and closing stocks were 80 kg and 90 kg respectfully and a total of 180kg was purchased during the year. 60kg was disposed(through environmentally responsible means) during the period. • Electricity: 6,000,000 kWh consumed
Transportation	1 - Unleaded petrol Private passenger car, consuming 2,000 liters per annum 6 - Diesel-fueled heavy goods vehicle consuming a total of 6,000 litres per annum

Total:_____Tonnes CO_2e

Carbon Accounting (Scope 1 & 2) Calculation Exercise

Scope 1: Towngas

Step 1	Step 2	Step 3	Step 4	Step 5	Step 6	Step 7	Step 8
A	B	C	D	E	F	G	H
Source description with location (e.g., boilers, furnaces, ovens, and emergency electricity generator etc.)	Amount of fuel used (Unit)	CO_2 emission factor*	CO_2 emissions in tonnes of CO_2 equivalent ((B×C)/1000)	CH_4 emission factor*	CH_4 emissions in tonnes of CO_2 equivalent ((B×E)/(1000×1000)×28)	N_2O emission factor*	N_2O emissions in tonnes of CO_2 equivalent ((B×G)/(1000×1000)×265)
Total: Tonnes CO_2e	-	-		-		-	

Scope 1: Air conditioning

Step 1	Step 2	Step 3	Step 4	Step 5	Step 6	Step 7
A	B	C	D	E	F	G
Type of refrigerant	Amount of HFC/PFC at the beginning of the reporting period (kg)	Amount of HFC/PFC purchased during the reporting period (kg)	Amount of HFC/PFC disposed (through environmentally responsible means) during the reporting period (kg)	Amount of HFC/PFC at the end of the reporting period (kg)	GWP of refrigerant*	HFC/PFC emissions in tonnes of CO_2 equivalent ((B+C-D-E)×F/1000)
Total	-	-	-	-	-	Tonnes CO_2e

Carbon Accounting (Scope 1 & 2) Calculation Exercise

Scope 1: In-house vehicle fleet

Step 1	Step 2		Step 3	Step 4	Step 5	Step 6	Step 7	Step 8
A	B	C	D	E	F	G	H	I
Source description (by different vehicle and fuel types)	Fuel Information		CO_2 emission factor*	CO_2 emissions in tonnes of CO_2 equivalent ((B×D)/1000)	CH_4 emission factor*	CH_4 emissions in tonnes of CO_2 equivalent ((B×F)/(1000×1000)×28)	N_2O emission factor*	N_2O emissions in tonnes of CO_2 equivalent ((B×H)/(1000×1000)×265)
	Amount of fuel used (litres)	Fuel Type						
Total: Tonnes CO_2e	-	-	-		-		-	

Carbon Accounting (Scope 1 & 2) Calculation Exercise

Scope 2: Electricity

Step 1	Step 2	Step 3	Step 4
A	B	C	D
Facility/source description (i.e., area/facilities the electricity bill is reporting)	Amount of electricity purchased(kwh)	Emission factor ($kg/ CO_2e/ kWh$)	Indirect GHG emissions in tonnes of CO_2 equivalent(BxC/1000)
Total	-	-	Tonnes CO_2e

Scope 2: Towngas

Step 1	Step 2	Step 3	Step 4
A	B	C	D
Facility/source description (i.e., area/facilities the Towngas bill is reporting)	Amount of Towngas purchased(Unit)	Emission factor (kg/Unit)	Indirect GHG emissions in tonnes of CO_2 equivalent(BxC/1000)
Total	-	-	Tonnes CO_2e

GHG Emissions from Stationary Sources

Emission Factors for Stationary Combustion Sources

Table 1-1 CO_2 Emission factor by fuel type (for stationary combustion sources)

Fuel Type	Emission Factor	Unit
Diesel Oil	2.614	kg/litre
LPG	3.017	kg/kg
Kerosene	2.429	kg/litre
Charcoal	2.970	kg/kg
Towngas	2.549	kg/Unit

Table 1-2 CH_4 Emission factor by fuel type (for stationary combustion sources)

Fuel Type	Emission Factor	Unit
Diesel Oil	0.0239	g/litre
LPG	0.0020	g/kg
Kerosene	0.0241	g/litre
Charcoal	5.5290	g/kg
Towngas	0.0446	g/Unit

Table 1-3 N_2O Emission factor by fuel type (for stationary combustion sources)

Fuel Type	Emission Factor	Unit
Diesel Oil	0.0074	g/litre
LPG	0.0000	g/kg
Kerosene	0.0076	g/litre
Charcoal	0.0276	g/kg
Towngas	0.0099	g/unit

Quick tips

IMPORTANT: For CH_4& N_2O, the measurement is in grams so remember to divide by 1,000 to get kg

GHG Emissions from Mobile Combustion Sources

Table 2-1 CO_2 Emission factor (For mobile combustion sources)

Fuel Type	Emission Factor	Unit
Diesel Oil (DO)	2.614	kg/litre
Unleaded Petrol (ULP)	2.360	kg/litre
Liquefied Petroleum Gas (LPG)	1.679	kg/litre
	3.017	kg/kg
Gas Oil (For Ships only)	2.645	kg/litre
Kerosene (Including Jet Kerosene)	2.429	kg/litre

Table 2-2 CH_4 Emission factor (For mobile combustion sources)

Vehicle Type	Fuel Type	Emission Factor	Unit
Motorcycle	ULP	1.422	g/litre
Passenger Car	ULP	0.253	g/litre
	DO	0.072	g/litre
Private Van	ULP	0.203	g/litre
	DO	0.072	g/litre
	LPG	0.248	g/litre
Public Light Bus	DO	0.072	g/litre
	LPG	0.248	g/litre
Light Goods Vehicle	ULP	0.203	g/litre
	DO	0.072	g/litre
Heavy Goods Vehicle	DO	0.145	g/litre
Medium Goods Vehicle	DO	0.145	g/litre
Ships	Gas Oil	0.146	g/litre
Aviation	Jet Kerosene	0.069	g/litre
Other Mobile Machinery	DO	0.0239	g/litre
	LPG	0.0036	g/litre
		0.006	g/kg
	Kerosene	0.0241	g/litre

Quick tips

IMPORTANT: For CH_4& N_2O, the measurement is in grams so remember to divide by 1,000 to get kg

Table 2-3 N_2O Emission factor (For mobile combustion sources)

Vehicle Type	Fuel Type	Emission Factor	Unit
Motorcycle	ULP	0.046	g/litre
Passenger Car	ULP	1.105	g/litre
	DO	0.110	g/litre
Private Van	ULP	1.140	g/litre

Vehicle Type	Fuel Type	Emission Factor	Unit
	DO	0.506	g/litre
	LPG	0.000	g/litre
Public Light Bus	DO	0.506	g/litre
	LPG	0.000	g/litre
Light Goods Vehicle	ULP	1.105	g/litre
	DO	0.506	g/litre
Heavy Goods Vehicle	DO	0.072	g/litre
Medium Goods Vehicle	DO	0.072	g/litre
Ships	Gas Oil	1.095	g/litre
Aviation	Jet Kerosene	0.000	g/litre
Other Mobile Machinery	DO	0.007	g/litre
	LPG	0.000	g/litre or g/kg
	Kerosene	0.0076	g/litre

Source: Guidelines to Account for and Report on Greenhouse Gas Emissions and Removals for Buildings (Commercial, Residential or Institutional Purposes) in Hong Kong

HFC and PFC Emission from Refrigeration/ Air-conditioning Equipment

Table 3-1 Global Warming Potentials (GWP) of Common Refrigeration / Air-Conditioning Refrigerants [Note 1]

Gas or Blend	GWP	Information Source [Note 2]
HFC-23	11,700	A
HFC-32	650	A
HFC-125	2,800	A
HFC-134a	1,300	A
HFC-143a	3,800	A
HFC-152a	140	A
HFC-236fa	6,300	A
R-401A	18	B
R-401B	15	B
R-401C	21	B
R-402A	1,680	B
R-402B	1,064	B
R-403A	1,400	B
R-403B	2,730	B
R-404A	3,260	B
R-406A	0	B
R-407A	1,770	B
R-407B	2,285	B
R-407C	1,526	B
R-407D	1,428	B
R-407E	1,363	B
R-408A	1,944	B
R-409A	0	B
R-409B	0	B
R-410A	1,725	B
R-410B	1,833	B
R-411A	15	B
R-411B	4	B
R-412A	350	B
R-413A	1,774	B
R-414A	0	B
R-414B	0	B
R-415A	25	B
R-415B	105	B
R-416A	767	B
R-417A	1,955	B
R-418A	4	B
R-419A	2,403	B
R-420A	1,144	B
R-500	37	B
R-501	0	B
R-502	0	B
R-503	4,692	B
R-504	313	B
R-505	0	B
R-506	0	B
R-507 or R-507A	3,300	B
R-508A	10,175	B
R-508B	10,350	B
R-509 or R-509A	3,920	B
PFC-116 (C_2F_6)	9,200	A
PFC-14 (CF_4)	6,500	A

Source:

- *Guidelines to Account for and Report on Greenhouse Gas Emissions and Removals for Buildings (Commercial, Residential or Institutional Purposes) in Hong Kong*
- *IPCC AR5*

Additional sources may be found in the following global references:

- *US Government EPA's emission factors for greenhouse gas inventories(p.5)*
- *EU's guidance for importers of equipment containing fluorinated greenhouse gases (p.35)*

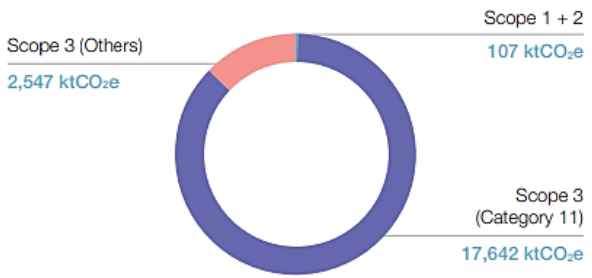
CLP Power Hong Kong Limited – GHG emissions intensity of electricity sold

	2022	2021	2020	2019	2018	GRI/HKEx/ SASB/ISSB
CLP Power Hong Kong – GHG emissions intensity of electricity sold[1,2]						
CO_2e emissions intensity of electricity sold by CLP Power Hong Kong (kg CO_2e/kWh)	**0.39**	0.39	0.37	0.50	0.51	
CO_2 emissions intensity of electricity sold by CLP Power Hong Kong (kg CO_2/kWh)	**0.39**	0.39	0.37	0.49	0.51	

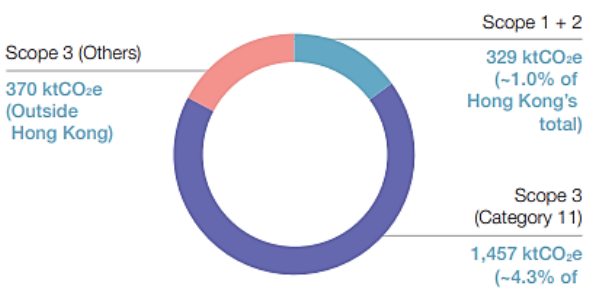
1 In accordance with the Greenhouse Gas Protocol, WE Station, which makes use of landfill gas from waste for power generation, is not included in CLP's Scope 1 CO_2 emissions and is reported separately in the Asset Performance Statistics. Its non-CO_2 GHG emissions (i.e. CH_4 and N_2O) are included in CLP's Scope 1 CO_2e emissions.

2 "Electricity sold" is the total electricity energy sold to CLP Power Hong Kong Limited's customers before the adjustment of Renewable Energy Certificates.

2022 GHG Emissions of Gas Distribution Business (Chinese Mainland)



2022 GHG Emissions of Gas Production (Hong Kong)



Scope 1: direct emissions from owned or controlled sources
Scope 2: indirect emissions from the generation of purchased energy
Scope 3: other indirect emissions that occur in the value chain
Category 11 refers to the use of sold products (e.g., town gas, natural gas)

For Hong Kong gas production, our scope 1, 2 and 3 emissions totalled 2,156,000 tCO_2e, with scope 3 emissions accounting for approximately 85%. Town gas production and consumption account only for approximately 1.0% and 4.3% of GHG emissions in Hong Kong, respectively. The carbon intensity of gas production in Hong Kong in 2022 was 0.576 kg CO_2e per unit of town gas – a decrease of 25% compared to the 2005 baseline.

The carbon inventory was verified against ISO 14064-1:2018 by a third party.