BAKI ALİ NEFT MƏKTƏBİ
BAKU HIGHER OIL SCHOOL

GREEN HOUSE GAS EMISSION REPORT 2023

Author: Mehriban Bagirova – Baku Higher Oil School

Supervisor: Aysel Orujova – Baku Higher Oil School

Roya Kazimova – Technical University of Munich

Table of contents

Introduction

Trying to address climate change and environmental sustainability, BHOS recognizes its responsibility in the pursuit of a greener, more sustainable future. As an institution deeply intertwined with the energy sector, BHOS understands the profound impact its operations can have on carbon emissions and environmental stewardship. In order to do that, this document which provides an interpretation of recognized GHG accounting standards, aiming to ensure credible and consistent GHG emissions accounting practices at BHOS was designed.

The foundation of this guidance is the GHG Protocol Corporate Accounting and Reporting Standard, recognized as a widely accepted and adopted global GHG accounting standard. Additionally, the guidance draws on relevant accounting programs and protocols consistent with the GHG Protocol, tailored to the context of BHOS.

Furthermore, the guidance recommends using a simplified GHG emissions calculator specific to BHOS for estimating and inventorying greenhouse gas emissions. It is crucial to note that processors at BHOS adhering to this guidance will need to establish an inventory management plan, set operational boundaries, and collect and enter activity data into the chosen GHG accounting tool. This approach ensures uniformity in GHG emissions accounting practices across reporting facilities at BHOS .

Purpose and Principles

Purposes and Principles of the Baku Higher Oil School (BHOS) Carbon Emissions Report are as following.

- **Transparency and Accountability**: The primary purpose of the report is to provide transparent and comprehensive disclosure of BHOS's carbon emissions, ensuring accountability to stakeholders, including students, faculty, staff, regulatory bodies, and the broader community.
- **Data-driven Decision Making**: The report aims to facilitate data-driven decision-making processes within BHOS by providing accurate and reliable information on carbon emissions, enabling the identification of areas for improvement and the development of effective mitigation strategies.
- **Sustainability Commitment**: BHOS is committed to environmental sustainability and reducing its carbon footprint. The report serves as a tangible demonstration of this commitment, outlining current emission levels, ongoing initiatives, and future targets to mitigate climate change impacts.
- **Benchmarking and Progress Tracking**: By adhering to internationally recognized standards such as the GHG Protocol Corporate Standard, the report allows BHOS to benchmark its carbon emissions performance against industry peers and track progress over time towards emission reduction goals.
- **Education and Awareness**: The report serves as an educational tool, raising awareness among the BHOS community and beyond about the environmental impact of university operations and the importance of sustainability efforts in mitigating climate change.
- **Engagement and Collaboration**: BHOS recognizes that addressing climate change requires collective action. The report encourages engagement and collaboration with stakeholders, including students, faculty, staff, industry partners, and policymakers, to develop and implement effective emission reduction strategies.
- **Continuous Improvement**: BHOS is committed to a process of continuous improvement in its sustainability practices. The report provides a framework for monitoring, evaluating, and refining emission reduction initiatives to ensure that BHOS remains at the forefront of environmental stewardship in higher education.
- **Alignment with Strategic Goals**: The carbon emissions report aligns with BHOS's broader strategic goals, including promoting innovation, academic excellence, and responsible citizenship. It demonstrates how sustainability efforts are integrated into the university's overall mission and vision for the future.
- **Compliance and Reporting Obligations**: Finally, the report fulfills compliance and reporting obligations mandated by regulatory authorities or accreditation bodies, ensuring that BHOS remains in good standing and demonstrates adherence to best practices in sustainability reporting.

A GHG inventory provides a comprehensive overview of Baku Higher Oil School's (BHOS) total emissions. A well-structured and meticulously maintained inventory serves as a management tool, aiding in the achievement of various business goals for BHOS, such as increased brand recognition, participation in voluntary reporting programs, or the establishment and attainment of GHG emissions reduction targets. It is important to note that, while an inventory supports BHOS's reporting goals, it should not be confused with GHG emissions reporting, which involves presenting emission data in formats tailored to meet various reporting requirements. Figure 1 outlines the steps taken to develop an inventory, ensuring alignment with industry standards through consistent reporting in the Baku Higher Oil School's commitment to environmental stewardship.

Additionally, the methodology section continues to detail the specific steps taken in data collection, emission calculation, boundary setting, and quality assurance measures, ensuring transparency and accuracy in BHOS's carbon emissions reporting efforts.

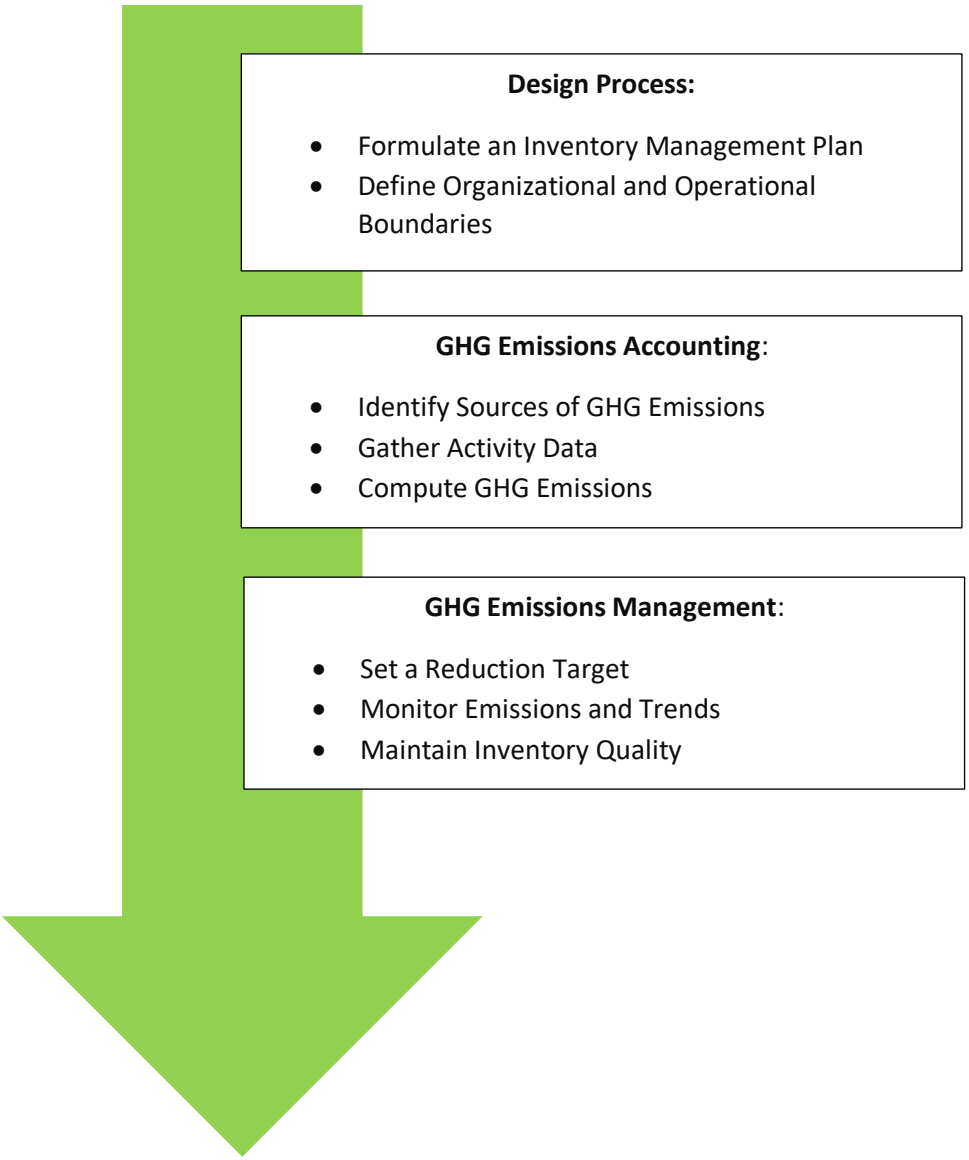

Figure 1 *Essential stages in crafting a greenhouse gas (GHG) inventory.*

Scope 1 calculation methodology

This segment offers instructions for determining Scope 1 emissions, specifically those arising directly from stationary fuel combustion. These sources typically involve devices that burn solid, liquid, or gaseous fuels, primarily to generate electricity, produce steam, or provide heat for dairy processing.

Supporting Resources

In addition to the GHG Protocol Corporate Accounting and Reporting Standard, this section of the document includes guidance from the following resources:

- EPA GHG Inventory Guidance Direct Emissions from Stationary Combustion Sources
- Environmental Protection Agency. General Stationary Combustion Source (Subpart C), Calculating CO2 Emissions from Combustion. EPA, Greenhouse Gas Reporting Program

Stationary Combustion Sources and Fuels	
Stationary Combustion Sources	Common Fuels Used
Generator	Diesel
Gas oven	Natural gas

Figure 2 stationary combustion sources and fuels

In order to gather the data necessary for this computation, the volume of fuel utilized for each stationary combustion source and the specific characteristics of each fuel type employed are required. Two calculation approaches are delineated below.:

1. **On-site metering:** Measure the mass or volume flow of fuel at the inlet of one or more combustion units. This data can be obtained through measuring devices like scales or flow meters.

2. **Purchase records:** Determine the mass or volume of fuel entering the facility, relying on data from fuel receipts, purchase records, or information directly provided by the energy vendor and/or customer online portal.

In the case of BHOS, we gather information about the fuel used based on receipts, ensuring accurate tracking and accountability. These receipts provide essential data for assessing our energy consumption, guiding us in making informed decisions to optimize efficiency and reduce environmental impact.

Scope 1: Steps to Calculate Location-Based Guidelines	
Feature	Description
Emission Calculations	Calculates CO2 , CH4 and N2 O emissions resulting from the combustion of fuels in stationary combustion equipment. Totals emissions in tons of CO2 e
Unit Conversion	Automatically converts data to common measurement units. If certain units are available, use the EIA Energy Conversion Calculator to first convert the units.

Figure 2 Stationary combustion emissions calculator tool highlights

Referring to Scope 1 Mobile Combustion

This segment offers instructions for determining Scope 1 emissions, specifically those arising directly from stationary fuel combustion. These sources typically involve devices that burn solid, liquid, or gaseous fuels, primarily to generate electricity, produce steam, or provide heat for dairy processing.

Supporting Resources

This section of the document includes guidance the following resources:

- EPA Center for Corporate Climate Leadership, Greenhouse Gas Inventory Guidance Direct Emissions from Mobile Combustion Sources.
- The Climate Registry, General Reporting Protocol Version 2.1, Chapter 13 Direct Emissions from Mobile Combustion2

1

Recognize Origins: Identify Origins: Scope 1 mobile emissions involve company-owned vehicles, engines, and equipment generating greenhouse gas emissions while moving. This includes road vehicles for employee transport, distribution trucks, and off-road equipment. Stationary combustion sources, like transportable equipment without self-propulsion, are excluded. For dairy processors, company-owned distribution trucks are likely the main mobile emission sources. If a processing company lacks ownership or direct operational control of vehicles or equipment, these sources are categorized as Scope 3, not Scope 1 emissions. Refer to Figure 4 for a list of mobile combustion emission sources.

Mobile Emission Sources	
Mobile Combustion Sources	Common Fuels Used
Company vehicles	Gasoline

Figure 4 mobile emission sources and fuels used

2

Gather Activity Data: The most straightforward method for estimating greenhouse gas (GHG) emissions from mobile combustion involves collecting data on fuel consumption, distance traveled, and the characteristics of each identified source's vehicles and fuel.

3

Measure Emissions: Utilize the EPA Simplified GHG Emissions Calculator, specifically the 'Mobile Sources' tab, to quantify emissions arising from mobile combustion. Consult the EPA Direct Emissions from Mobile Combustion Sources for guidance in this sector. The tool calculates CO2, CH4, and N2O emissions for company-owned/controlled vehicles, transportation and via road, and rail.

Scope 2 Calculation methodology

This segment outlines techniques employed to compute Scope 2 greenhouse gas (GHG) emissions, which stem from the indirect impact of procured energy generation. These emissions are categorized as indirect since they result from the activities of the reporting organization but transpire at facilities owned and managed by an external entity, such as an electricity utility.

Supporting Resources

This section of the document includes guidance the following resources:

- EPA Center for Corporate Climate Leadership, Greenhouse Gas Inventory Guidance Direct Emissions from Mobile Combustion Sources.
- The Climate Registry, General Reporting Protocol Version 2.1, Chapter 13 Direct Emissions from Mobile Combustion2

Defining Scope 2 Emissions:

The GHG Protocol Scope 2 Guidance Amendment to the Corporate Standard, effective from January 2015, outlines updated requirements and best practices for accounting Scope 2 emissions. These emissions result indirectly from the generation of purchased energy, occurring at sources controlled by external entities, such as electricity utilities.

The key revision introduced by the amendment is the inclusion of both Market-Based and Location-Based Scope 2 emissions in reporting. Previously, only the Location-Based method was mandated. The Market-Based method reflects emissions tied to a consumer's choices regarding electricity suppliers or products, as outlined in contractual agreements. This includes supplier-specific emission factors and profiles associated with renewable energy credits (RECs) and power purchase agreements (PPAs). On the other hand, the Location-Based method uses average emission factors for the electricity grids supplying energy to a facility, considering emissions intensities based on the locations of electricity use.

When calculating Scope 2 emissions, companies are advised to report both Market-Based and Location-Based totals. In cases where a credible emission factor is unidentifiable in a specific contract, the grid-average emission factor can be used as a proxy. Quality criteria for instruments applied to Market-Based emissions are outlined in the GHG Protocol's Scope 2 Guidance.

Scope 2: Steps to Calculate Location-Based Guidelines	
Step 1: Determine the amount of electricity purchased.	The most accurate activity data for the reporting period is derived from the total electricity purchased and consumed, measured in energy units such as MWh or kWh. For assistance in interpreting utility bills, refer to Chapter 7 of the EDF Climate Corps Handbook.
Step 2: Select emission factors	Emission Factors: Companies, including Baku Higher Oil School, procuring electricity from the Azerbaijani electric grid, are encouraged to apply regional or sub-regional emission factors sourced from the EPA's Emissions and Generation Resource Integrated Database (eGRID). The diverse methods of electricity generation specific to Azerbaijan, and relevant to Baku Higher Oil School, are reflected in eGRID emission factors. This approach ensures an accurate assessment of greenhouse gas emissions linked to the distinct energy generation practices prevalent in the region. Refer to the EPA's eGRID sub-region map to determine the appropriate sub-region for Baku Higher Oil School.
Step 3: Quantify emissions	The EPA Simplified GHG Emissions Calculator employs emission factors from the 2018 eGRID dataset. To calculate emissions, companies enter the purchased electricity amount and choose the corresponding eGRID sub-region where their processing facility is situated.

Figure 5 Steps to calculate Location-Based guideline

Scope 1 and 2 emissions inventory

Information on electricity consumption, gas stove fuel, and water usage consumed at the campus of Baku Higher Oil School during the year 2023

2023						
Months	Boiler Fuel		Water M^3		Electricity	
	M^3	AZN	M^3	AZN	kVt/saat	AZN
January	120562	24112	0	0	88800	9768
February	95269	19054	0	0	86400	9504
March	111558	22312	876	1752	79200	8712
April	50088	10018	1763	3526	62400	6864
May	18467	3693	1889	3778	57600	6336
June	9511	1902	3246	6492	52800	5808
July	8606	1721	3239	6478	74400	8184
August	4741	948	3188	6376	67200	7392
September	6311	1262	1353	2706	62400	6864
October	23725	4.745	1868	3736	76800	8448
November	54823	10964	1765	3530	79200	8712
December	99228	19845	0	0	86400	9504
Total	***602889***	***115835***	***19187***	***38374***	***873600***	***96096***
Average monthly	***49901***	***9980***	***1595***	***3190***	***73400***	***7942***

Information about electricity consumption and water usage consumed at the Khatai building of Baku Higher Oil School during the year 2023.

2023		
Months	**Electricity**	
	kVt.hours	**AZN**
January	12883	1417
February	9557	1051
March	13313	1465
April	10203	1122
May	8402	924
June	8826	971
July	9128	1004
August	10372	1141
September	9883	1087
October	9236	1016
November	10495	1154
December	9677	1064
Total	***121975***	***13416***

Scope 1 and Scope 2 results

Scope 1&2 emissions	
Total equity gas emissions- tonnes carbon dioxide equivalent (tCO2)	**2023**
Total Emissions	6493.3
Scope 1 Emissions	4978
Scope 2 Emissions	1515.3

Appendix

2023 Calculations

Scope 1 Emissions (Fuel):

Given that 1 AZN of fuel consumption emits a certain amount of CO2, we will use the provided data to calculate the emissions.

Given:

- Total Scope 1 emissions for 2023: 602889 cubic meter

- CO2 emissions factor: 2.5 kg CO2 per litre of fuel consumption

Total Scope 1 CO2 emissions = Total Scope 1 emissions (cubic meter) * CO2 emissions factor (kg CO2/AZN)

Scope 1 CO2 emissions = 602889 *1000lt * 2.5 kg CO2/lt

Scope 1 CO2 emissions ≈ 1507.2 tCO2

Scope 1 CO2 emissions from cars ≈ 10800 liter gasoline

Total Scope 1 CO2 emissions= 1507.2+ 8.1 =1515.3 tons of CO2

Scope 2 Emissions (Electricity):

Given that 1 kWh of electricity consumption emits a certain amount of CO2, we'll use the provided data to calculate the emissions.

Given:

- Total electricity consumption for 2023: 995575 (for both buildings) kWh

- CO2 emissions factor: 0.5 kg CO2 per kWh of electricity consumption

Total Scope 2 CO2 emissions = Total electricity consumption (kWh) * CO2 emissions factor (kg CO2/kWh)

Total Scope 2 CO2 emissions = 873600+121975=995575 (both buildings are included) kWh * 0.5 kg CO2/kWh

Total Scope 2 CO2 emissions ≈ 4978 tCO2

Total Managed Greenhouse Gas Emissions:

Now, we sum up the CO2 emissions from both Scope 1 and Scope 2.

Total managed GHG emissions = Total Scope 1 CO2 emissions + Total Scope 2 CO2 emissions

Total managed GHG emissions ≈ 4978+1515.3

Total managed GHG emissions ≈ 6493.3 tCO2