



VTC ENERGY OPERATION

2023 ISO 14064-1

Greenhouse Gas Inventory Report

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1. Introduction

VTC ENERGY has prepared a report in accordance with ISO 14064-1 for the purpose of calculating greenhouse gas emissions based on 2023 data.

VTC ENERGY

Our digital energy management platform, V-Gen, developed by our team of experts, integrates with all market tools (EXIST, TEİAŞ, OSOS, etc.) and manages the energy of all power plants regardless of the source.

Our V-Sensor software enables remote digital reading at all industrial facilities with consumption or production points, allowing managers to monitor production and consumption meters in real time.

Additionally, with our balancing group—one of Turkey's largest with a capacity of 5,500 MWh—we provide our stakeholders with up to 100% annual advantage through optimized operations.

Our Energy Efficiency Team, one of the most experienced in Turkey, conducts energy audits and implements projects to minimize energy costs and enhance efficiency. Through these initiatives, we help companies achieve significant savings in energy consumption.

Finally, we aim to reduce carbon emissions domestically and globally by providing consultancy services for I-REC and ISO 50001 Energy Management System certification processes.

We serve our customers through our offices in Kocaeli, Düsseldorf and Buchrest.



1.1. Information Related to the Study

VTC ENERGY has prepared this report using 2023 data to calculate its corporate carbon footprint with a focus on sustainability.

1.1.1. Purpose and Scope

Organizations around the world are developing climate change policies and implementing strategies to manage greenhouse gas risks, turning these challenges into opportunities. This report presents the 2023 activities of VTC ENERGY, in compliance with ISO 14064-1 and aims to raise awareness among subcontractors on climate change, energy efficiency, and sustainability.

The calculation approach used is operational control.

The Analysis Covers:

- Natural gas consumption for heating (fixed combustion)
- Vehicle fuels under mobile combustion (Scope 1)
- Electricity purchased for operations (Scope 2)

1.2. Climate Change

“Climate change,” the warming of the atmosphere, is the greatest environmental problem in human history. Its effects—decreasing rainfall, rising extreme weather events, and seasonal irregularities—threaten ecosystems and human life.

Scientists agree that human emissions drive the greenhouse effect, prompting global policy action. At COP21 (Paris, 2015), nations committed to coordinated measures to combat climate change.



1.3. Greenhouse Gases and Carbon Footprints

A carbon footprint measures the environmental impact of human or organizational activities, expressed as CO₂ equivalents (CO₂e).

According to the Kyoto Protocol, major greenhouse gases include: Carbon dioxide (CO₂), Methane (CH₄), Nitrous oxide (N₂O), Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), Sulfur hexafluoride (SF₆)

The global warming potentials are standardized as CO₂ equivalents.

Industrialization alters the atmosphere's chemical composition, increasing concentrations of CO₂, CH₄, and N₂O. Without mitigation, these gases raise global temperatures, sea levels, and disrupt ecosystems.

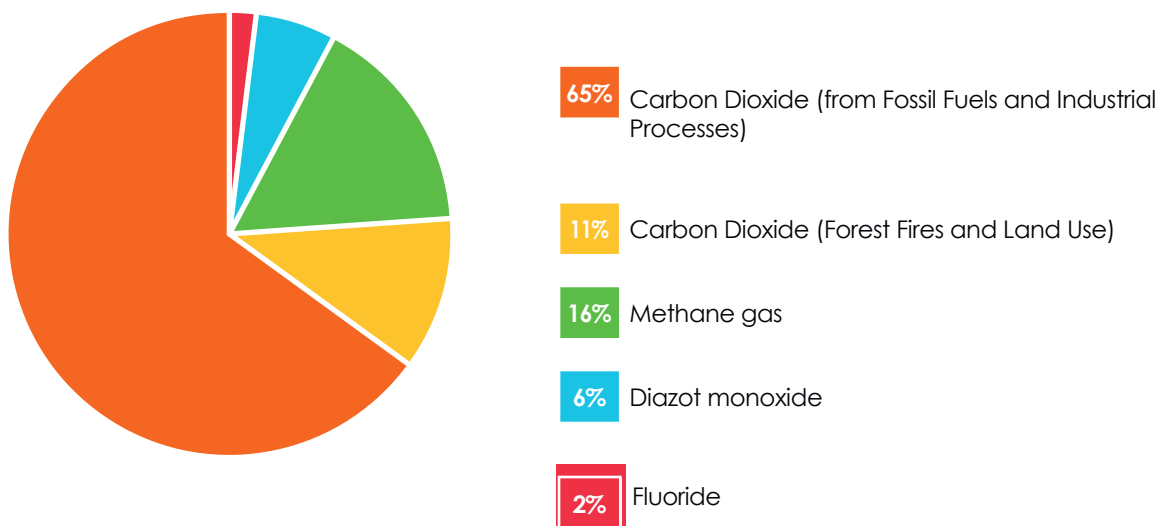


Figure1: The Effects of Different Greenhouse Gases on Global Warming



Industrial development is changing the chemical composition of the atmosphere, leading to the accumulation of greenhouse gases, particularly carbon dioxide, methane, and nitrous oxide levels. Unless measures are taken, global warming will lead to sea level rise, changes in local climate conditions, and negative impacts on vegetation and water resources. The impact of economic activities on greenhouse gas emissions is shown in Figure 2.

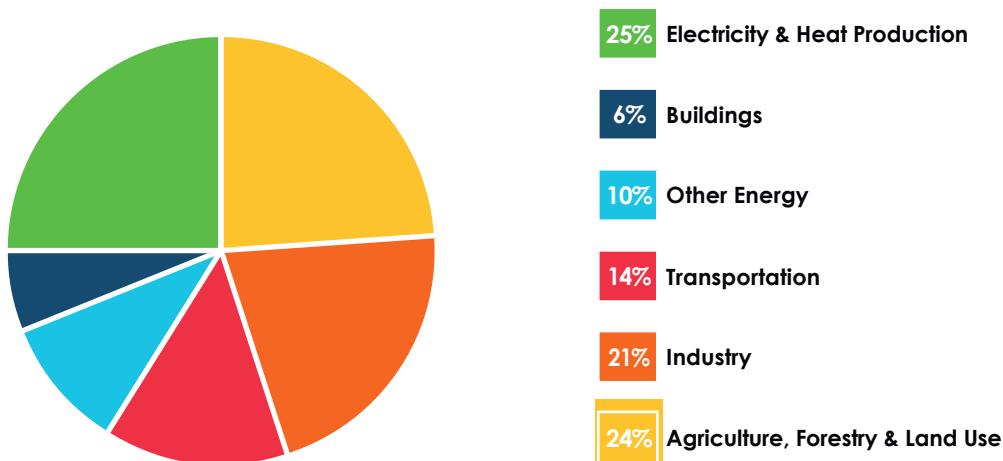


Figure 2: Distribution of Global Greenhouse Gas Emissions by Economic Sectors

As a result, human health will be affected and many ecosystems will be disrupted. For this reason, individuals, companies, organizations, and governments must unite in the common goal of reducing carbon emissions.

<https://www.epa.gov/ghgemissions/global-greenhouse-gas-emissions-data>
<https://www.ipcc.ch/report/ar5/wg3/>
<https://www.ipcc.ch/report/ar5/wg3>

1.3.1 Carbon Footprint Calculation Scopes

Scope 1; Direct Emissions (Greenhouse gases emitted directly by company operations, including combustion of natural gas, diesel, LPG, and refrigerant leaks.)

Scope 2; Indirect Emissions (Emissions from purchased electricity, heating, and cooling.)

2. BASELINE YEAR AND OPERATIONAL SCOPE

Carbon footprint calculations were made based on data within the scope of the period from January 1, 2023, to December 31, 2023.

Source: <https://www.gov.uk/government/collections/government-conversion-factors-for-company-reporting>

2.1. Inventory Data

2.1.1. Scope 1

Only fixed combustion data was used for Scope 1 calculations. Annual natural gas consumption figures for VTC ENERGY were obtained in sm³. Data obtained for mobile combustion at VTC ENERGY is shown in the table.

Table 1: 2022 Scope 1 Consumption Quantities

	VTC ENERGY	UNIT
<i>Natural Gas Consumption (Heating)</i>	<i>8.642,20</i>	<i>sm³</i>
<i>Active Combustion (Diesel)</i>	<i>12.745,58</i>	<i>lt</i>
<i>Combustion (Gasoline)</i>	<i>25.340,88</i>	<i>lt</i>

2.1.2. Scope 2

To calculate emissions from electricity sourced from the grid, the greenhouse gas impact value per kWh of electricity generated must be known on a country-by-country basis.

<https://enerji.gov.tr/evced-cevre-ve-iklim-elektrik-uretim-tuketim-emisyon-faktorleri>

The total amount of electricity consumed by VTC ENERGY from the grid has been supplied in kWh.

Source:

<https://enerji.gov.tr/evced-cevre-ve-iklim-elektrik-uretim-tuketim-emisyon-faktorleri>

Table 2: 2022 Scope: 2 Consumption Quantity

	VTC ENERGY	UNIT
<i>Purchased Electric Power</i>	<i>32.056,40</i>	<i>kWh</i>

3. GREENHOUSE GAS INVENTORY CALCULATIONS

Scope 1 Calculation

K.1.1 Sabit Yanma						
	Biri m	kg CO ₂ e of CO ₂ per unit	kg CO ₂ e of CH ₄ per unit	kg CO ₂ e of N ₂ O per unit	kg CO ₂ e	TON CO ₂ e
Doğalgaz	6,74 TON	2.557,53	3,85	1,19	17.274,10	17,27
Toplam						17,27
K.1.2. Haraketli Yanma						
	Biri m	kg CO ₂ e of CO ₂ per unit	kg CO ₂ e of CH ₄ per unit	kg CO ₂ e of N ₂ O per unit	kg CO ₂ e	TON CO ₂ e
Motorin	10,54 TON	2.976,42	0,35	38,89	31.790,62	31,79
Benzin	18,25 TON	2.787,93	10,84	7,89	51.208,72	51,21
Toplam						83,00
TOPLAM						100,27

Natural gas consumption in Scope 1 was converted from sm³ to nm³ and then converted to kg using density. Emissions were calculated by multiplying consumption in tons by CO₂, CH₄, and N₂O factors. These were then aggregated as CO₂ equivalents, resulting in a total of 17.27 tons of CO₂ equivalents. Scope 1.2 includes mobile combustion, which was calculated to be 83.00 tons of CO₂ equivalents. Thus, Scope 1 was calculated to be 100.27 tons of CO₂ equivalents.

Scope 2 Calculation

K.2. Elektrik Tüketimi					
		Birim	kg CO ₂ e	kg CO ₂ e	TON CO ₂ e
Elektrik	32.056,40	kW	0,4790	15.355,02	15,36
Toplam					15,36

In Scope 2, externally purchased electricity was converted into kWh and then multiplied by the emission units to arrive at the emission values. Multiplying by the emission units resulted in a value of 15.36 tons of CO₂ equivalent.
(<https://enerji.gov.tr/evced-cevre-ve-iklim-elektrik-uretim-tuketim-emisyon-faktorleri>)

RESULT

When carbon emissions were calculated, the total result was 115.63 tons of CO₂ equivalent. When examining Graph 1, it was observed that Scope 1 had the highest carbon emissions.

Scope 1	100,27	Ton CO ₂ e
Scope 2	15,36	Ton CO ₂ e
Total	115,63	Ton CO ₂ e

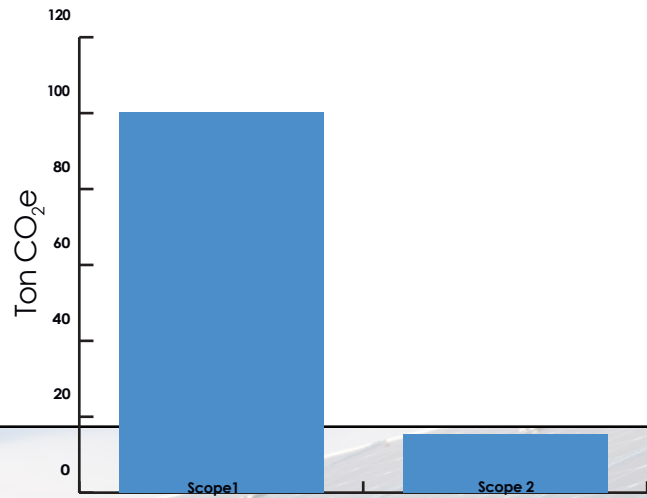


Figure 1: VTC ENERGY Emission Values



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www.vtcenergy.com