
# CARBON FOOTPRINT REPORT 2023

CARBON FOOTPRINT

δesfa

# CONTENTS



# ABBREVIATIONS

ETS : Emissions Trading System

GHG : Greenhouse Gas

SCV : Submerged Combustion Vaporizer

WEEE : Waste of Electrical and Electronic Equipment

WLO : Waste Lubricating Oils

AFIS: Batteries Recycling

DAPEEP: Renewable Energy Sources and Source Guarantees Operator

HEDNO : Hellenic Electricity Distribution Network Operator

DESFA : Hellenic Gas Transmission System Operator

HERRCO : Hellenic Recovery Recycling Corporation

ELTEPE (ΕΛΤΕΠΕ): Greek Environmental Technology

NNGTS : National Natural Gas Transmission System

NNGS : National Natural Gas System

RSC : Recycling Sorting Centers

LHV : Lower Heating Values

CHP : High-Efficiency Cogeneration

EMS : Environmental Management System

SYDESYS: Alternative Battery Management System

LNG : Liquefied Natural Gas

HSSEQ: Health, Safety, Security, Environment & Quality

# Declaration

The Carbon Footprint Report presents Greenhouse Gas emissions related to the activities of an institution or organization. In the 13th edition of the DESFA Carbon Footprint Report we present the consumption of energy resources; their equivalent $CO_2$ emissions and we calculate our carbon footprint as a quantity of pollutants per quantity of transported gas. The report is based on the ISO 14064-1 International Standard and includes 3 Scopes of Emission Monitoring, Direct, Indirect and Value Chain which are presented in detail. For the year 2023, DESFA emitted 8.94 grams (gr) of Carbon Dioxide ($CO_{2)}$ for the transfer of one cubic meter ($Nm^3$) of Natural Gas, achieving a decrease compared to previous 5-years average.

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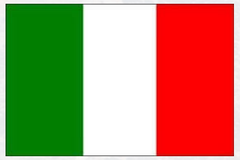
# Déclaration

Le rapport sur l'empreinte carbone présente les émissions de gaz de serre liées aux activités d'une entreprise ou d'un organisme. Dans la 13e édition du rapport sur l'empreinte carbone du DESFA (Gestionnaire du système national de transport de gaz naturel) nous présentons les niveaux de consommation des ressources énergétiques, d'émissions de $CO_2$ qui en découlent et le calcul de notre empreinte carbone en tant que quantité de polluants par quantité de gaz transporté. Ce rapport est établi conformément à la norme ISO 14064-1 et comprend trois champs de surveillance des émissions, directes, indirectes et d'échappement, lesquels sont présentés en détail. En 2023, pour le transport d'un mètre cube ($Nm^3$) de gaz naturel, le DESFA a émis 8.94 grammes (g) de dioxyde de carbone ($CO_2$), en baisse par rapport à la moyenne quinquennale précédente.

# Declaración

El informe de Huella de Carbono presenta las emisiones de Gases de Efecto Invernadero relacionados con el proceso de una organización. En la 13a versión del informe de Huella de Carbono del Gestor del Sistema Nacional de Gas Natural (DESFA) presentamos el consumo de recursos energéticos, sus emisiones equivalentes de $CO_2$ y calculamos nuestra huella como la cantidad de contaminantes por cantidad de gas transportado. El informe se basa en la Normativa Internacional ISO 14064-1 e incluye 3 Tipos de Seguimiento de Emisiones: Directas, Indirectas e Remociones, que se presentan en detalle. Para el año 2023, para el transporte de un metro cúbico ($Nm^3$) de Gas Natural, el Gestor del Sistema Nacional de Gas Natural (DESFA) emitió 8.94 gramos (gr) de Dióxido de Carbono ($CO_2$), logrando una disminución en comparación con la media de los 5 años anteriores.



## Dichiarazione

Il Rapporto sull'impronta di carbonio presenta le emissioni di gas serra relative alle attività di un'entità o di un'organizzazione. Nella 13a edizione del Rapporto sull'impronta di carbonio della DESFA (Gestore sistema nazionale gas naturale) presentiamo il consumo di risorse energetiche, le equivalenti emissioni di $CO_2$ e calcoliamo la nostra impronta di carbonio come quantità di inquinanti per quantità di gas trasportato. Il Rapporto si basa sulla norma internazionale ISO 14064-1 e comprende 3 campi di monitoraggio delle emissioni: dirette, indirette e prevenzione delle emissioni, presentate in dettaglio. Per l'anno 2023 per il trasporto di un metro cubo ($Nm^3$) di gas naturale, la DESFA ha emesso 8.94 grammi (gr) di anidride carbonica ($CO_2$), ottenendo una diminuzione rispetto alla media dei 5 anni precedenti.

## Verklaring

Het Carbon Footprint Report presenteert de uitstoot van broeikasgassen die verband houden met de activiteiten van een instelling of organisatie. In de 13e editie van het DESFA Carbon Footprint Report presenteren we het verbruik van energiebronnen, de overeenkomstige $CO_2$-uitstoot en berekenen we onze koolstofvoetafdruk in een hoeveelheid vervuilende stoffen per hoeveelheid getransporteerd gas. Het rapport is gebaseerd op de internationale ISO-norm 14064:2013 en omvat drie gebieden van emissiemonitoring, direct, indirect en vermijding, die in detail worden behandeld. In 2023 stootte DESFA 8.94 gram (gr) kooldioxide ($CO_2$) uit voor de overdracht van één kubieke meter ($Nm^3$) aardgas, een daling ten opzichte van het gemiddelde van de afgelopen 5 jaar.

# Management Message

For the 13th consecutive year, we are publishing the **δesfa Carbon Footprint Report**, presenting the results of direct and indirect greenhouse gas emissions from all our facilities, activities and the value chain, in accordance with the ISO 14064 methodology.

True to our principles, we continue our efforts to further reduce our carbon footprint. In 2023, we successfully reduced direct and indirect emissions (Scope 1 & 2) compared to the average of the previous five years. Additionally, for the 2nd consecutive year, we calculated emissions from the company's value chain (Scope 3), in line with the GHG Protocol Standard.

The same Report also includes the HSE (Health, Safety & Environment) Review, which provides data from the corresponding Certified Management Systems implemented by DESFA (ISO 14001, 45001, 50001 & 9001), covering the areas of Waste Recycling, Drills, Incidents, Training and Audits.

Finally, we are thrilled to announce that DESFA has been recognized as **Environmental Team of the Year** with **awards in 14 categories** at the Environmental Awards 2024, organized by Boussias Communications. Our achievements span a range of critical areas, including GHG Emissions Monitoring & Reduction, Energy Intensive Industry, Sustainable Supply Chain, Wastewater Treatment, and EU Green Deal Compliance.

I invite you to read the **2023 δesfa Carbon Footprint Report** and learn about the company’s significant environmental actions and achievements, which mark milestones on our journey towards Carbon Neutrality. With our commitment to shaping a sustainable future, we continue to invest in innovation and take initiatives which promote environmental protection.

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# 1 INTRODUCTION

# INTRODUCTION

For the 13th consecutive year, DESFA publishes the Carbon Footprint Report, which is prepared by DESFA's Division of Health & Safety, Security, Environment and Quality (HSSEQ) concerning data and consumption levels of the year 2023.

The analysis of Greenhouse Gas emissions from the activities of DESFA for the year 2023, includes direct emissions resulting from equipment and facilities, indirect emissions related to the electricity consumed by the company as well as emissions from DESFA's value chain according to the requirements of the Greenhouse Gas Protocol (GHG Protocol*).

In addition, in accordance with European and Greek Legislation, DESFA implements a Greenhouse Gas Emission Targeting System (ETS) at the Liquefied Natural Gas Terminal on the island of Revythousa and at the Compressor Station of Nea Mesimvria, Thessaloniki, with Status Compliance A.

In June 2023, DESFA, in the framework of its Environmental Policy, committed to reduce Scope 1 & Scope 2 emissions by at least 30% (with a base year of 2018) by 2030 and to achieve Carbon Neutrality by 2040. The Net-Zero Project was developed for this purpose.

The core responsibility of the HSSEQ team is to collect reliable primary data throughout the year from the company's facilities and to analyze the results on a scientific basis in order to identify any potential key environmental issues.


*Greenhouse Gas Protocol, Corporate Value Chain (Scope 3) Accounting and Reporting Standard, 2011*

**Disclaimer**

- This report introduces DESFA's carbon footprint for 2023, including modifications regarding to the methodology and calculation factors of the previous years.
- All amendments applicable retrospectively, have been implemented for the scope of the present report.
- Raw data has been provided to HSSEQ Division by various Divisions of DESFA.
- HSSEQ Division validated all data at the point in time they were provided.

# 2 COMPANY DESCRIPTION AND SCOPE

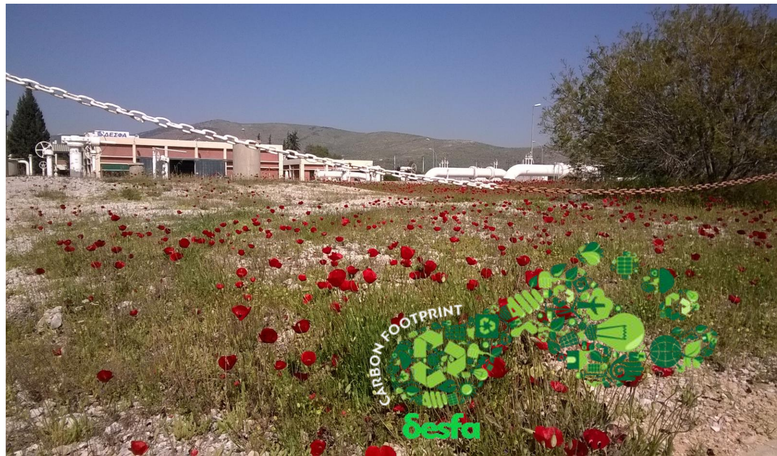
DESFA develops critical infrastructure, provides a wide range of high quality integrated services, and contributes to the expansion of the Greek and European gas market. The Natural Gas is delivered by the Transmission Users to DESFA, at one of the four Entry Points of the National Natural Gas Transmission System (NNGTS) located at the Greek-Bulgarian borders, at the Greek-Turkish borders, at Nea Mesimvria (connection withTAP) and at the liquefied Natural Gas terminal at the island of Revythousa, which then is delivered to forty three (43) Exit Points throughout continental Greece.

The NNGTS extends to a network of 1,466 kilometers and has:

- The main gas pipeline and its branches;
- The Border Metering Stations at Sidirokastro, near Serrers and at Kipi near Evros;
- The Compression Station in Nea Mesimvria, Thessaloniki;
- The Natural Gas Metering and Regulating Stations;
- The Natural Gas Control and Dispatching Centers;
- The Operation and Maintenance Centers of the Border Metering Station, of Sidirokastro, Eastern Greece, Northern Greece, Central Greece, Southern Greece and Peloponnese;
- The Remote Control and Telecommunications System; and
- The Liquefied Natural Gas Station (LNG) of Revythousa.

More information about the pipeline network and the other infrastructures of the company can be found on the DESFA website at **www.desfa.gr**.

The calculation of the Carbon Footprint of DESFA, as shown in the present Report, includes the greenhouse gas emissions, direct and indirect, derived from the aforementioned Facilities, Infrastructure and Equipment as well as the emissions from the company's value chain.



# HIGH PRESSURE NATURAL GAS TRANSMISSION SYSTEM

# 3 CARBON FOOTPRINT CALCULATION

# 3.1 Reference Period

The data presented in the present Carbon Footprint Report include the total equivalent carbon dioxide ($CO_2eq$) emissions of the company for the year 2023.

# 3.2 Reference year

The designation "Reference Year" allows the statistical monitoring of the development of Carbon Dioxide ($CO_2$) emissions and facilitates the monitoring of the progress of the targets set by the Management.

2018 is selected as the reference year. The main criteria for this selection are various changes in methodology, changes in emission factors, data flows and changes in the company's emission profile.

However, the data of all years, since 2011 which was the first year of the Carbon Footprint drafting, remain in our archives for possible comparisons in the future.

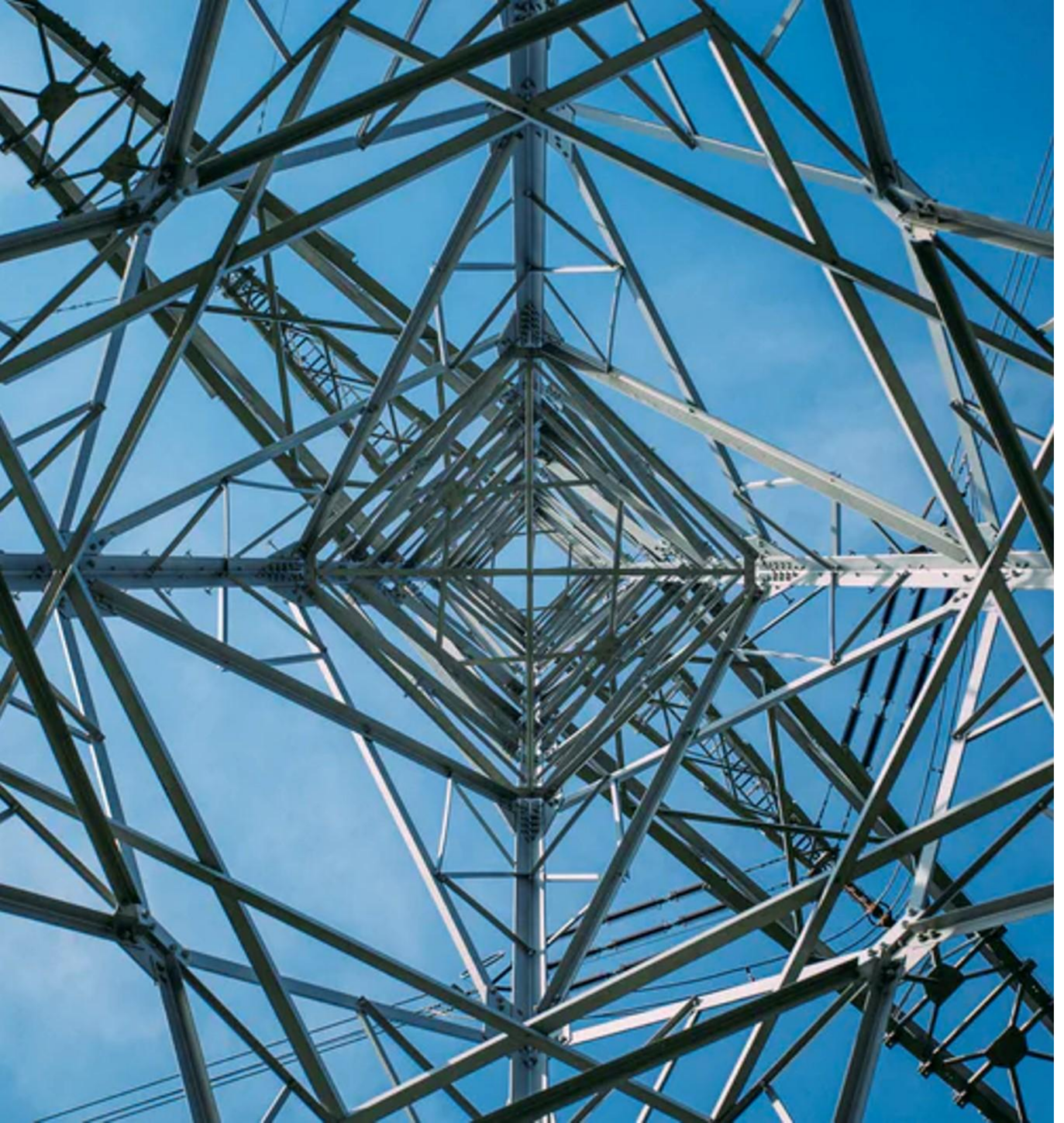
# 3.3 Fields of Monitoring

The Monitoring Fields (also reffered as Scopes), through which the total Carbon Footprint of DESFA is calculated, according to the requirements of the International Standard ISO 14064-1 and those of GHG Protocol, are Scope 1 (Direct Emissions), Scope 2 (Indirect Emissions reffering to electricity consumption) and Scope 3 (Value Chain Emissions).

**Scope 1 – Direct Emissions**

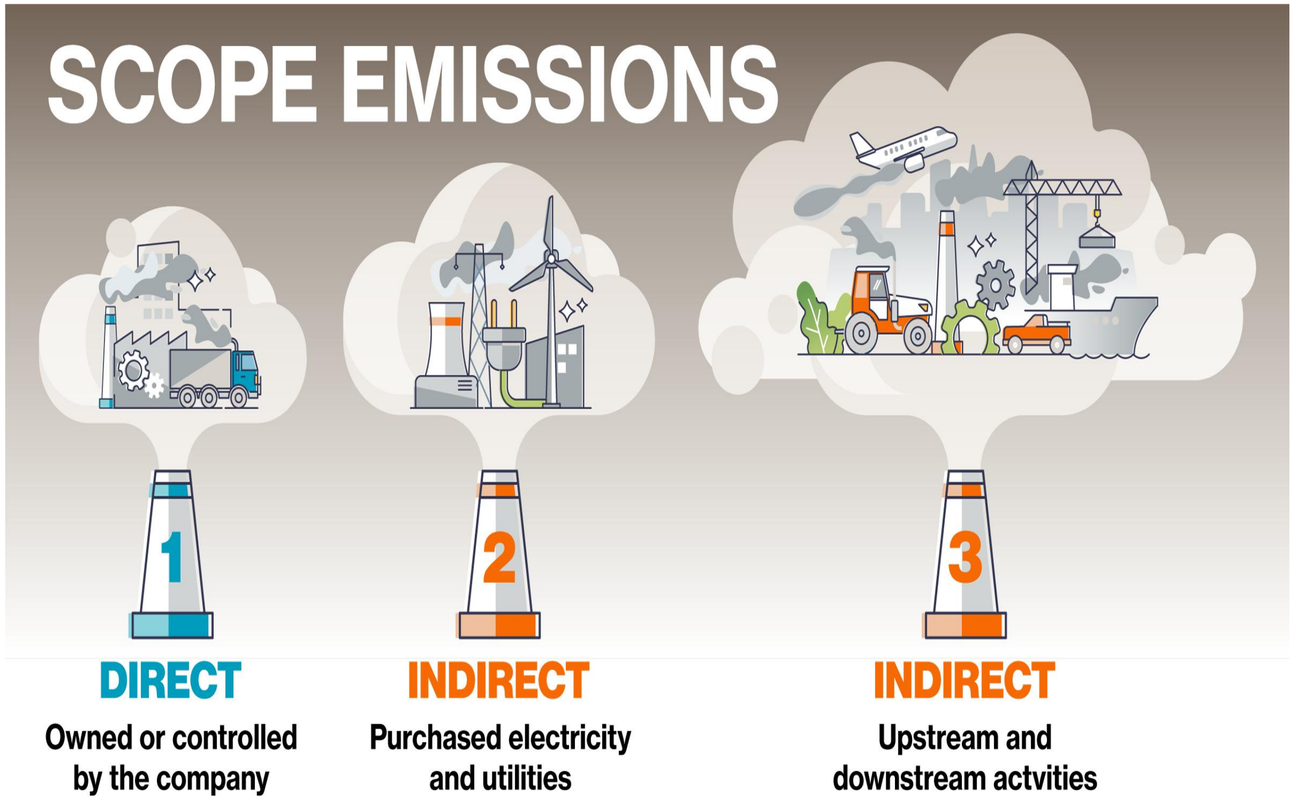
Includes Carbon Dioxide ($CO_2$) emissions from:

- Natural Gas Combustion
  - ➢Operation of Power and Heat Cogeneration Unit of High Performance (CHP)
  - ➢Submerged Combustion Vaporizers (SCVs)
  - ➢Flare Pilots Operation
  - ➢LNG Terminal Flue Gas Flare
  - ➢Compressor unit operation
  - ➢Installation consumption
- Release of Natural Gas into the atmosphere from:
  - ➢Controlled Venting during network operation/maintenance
  - ➢Pneumatic Equipment Operation
  - ➢Fugitive emissions NNGTS
- Vehicle and Equipment Fuels
  - ➢Cars
  - ➢Machinery
  - ➢Generators
  - ➢Air compressors



**Scope 2 – Indirect Emissions referring to electricity consumption:**

The Indirect Emissions presented in Scope 2, include the Carbon Dioxide ($CO_2$) emissions that derive from the production of electricity from the power generation units of the electricity provider, which is then consumed by the infrastructure of DESFA.




**Scope 3 – Value Chain emissions:**

Scope 3 includes all indirect emissions (not included in Scope 2) that occur from the company's value chain, referring to both upstream and downstream emissions (GHG Protocol*).

| Field of Monitoring | Quantities of $CO_2$ (tn) |
|---|---|
| **Scope 1 – Direct Emissions** | 26,551.83 |
| **Scope 2 – Indirect Emissions** | 14,951.29 |
| **Scope 3 – Value Chain Emissions** | 116,943.80 |

**Greenhouse Gas Protocol, Corporate Value Chain (Scope 3) Accounting and Reporting Standard, 2011*


# 3.4 Calculation Methodology

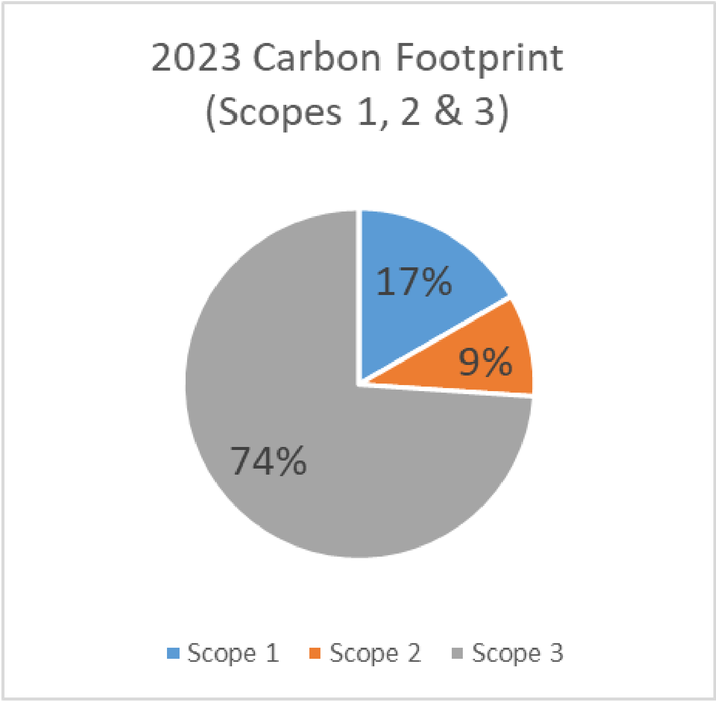
For the most analytical presentation of emission data, two internationally recognized calculation methods are used:

- Monitoring and Metering (MM): Calculations shall be performed using data from appropriately calibrated instruments installed at the sites of consumption.
- Measurement through Emissions Factors (EF): The calculations are performed using an appropriate factor to convert the consumed resources into carbon dioxide ($CO_2$) emissions.
- Monitoring of Value Chain Emissions: A statistical analysis of 15 upstream and downstream categories, in line with GHG Protocol, guidelines, was adopted.

The results of the emission measurements obtained through the Monitoring and Metering method are verified annually by a third independent licensed verification body and are submitted to the Hellenic Ministry of Environment and Energy, as two main facilities with a significant impact on the carbon footprint of DESFA (Revythousa Island Liquified Natural Gas Station and Nea Mesimvria Compressor Unit), are included in the Emissions Trading System – ETS.

| Scope 1 – Direct Emissions (MM+EF) | Scope 2 – Indirect Emissions referring to electricity consumption | Scope 3 – Value Chain Emissions |
|---|---|---|

| | |
|---|---|
| Scope 1 - Direct Emissions (MM) | • Consumption of Natural Gas and Diesel (de-minimis) of LNG Terminal<br>• Consumption of Natural Gas and Diesel (de-minimis) of Compressor Unit |
| Scope 1 - Direct Emissions (EF) | • Vehicle Fuel Consumption<br>• Natural Gas Consumption NNGTS<br>• Diesel consumption in fixed equipment (excluding T.S. LNG & Compressors) |
| Scope 2 - Indirect Emissions | • Electricity consumption |
| Scope 3 - Value Chain Emissions | • Upstream<br>• Downstream |

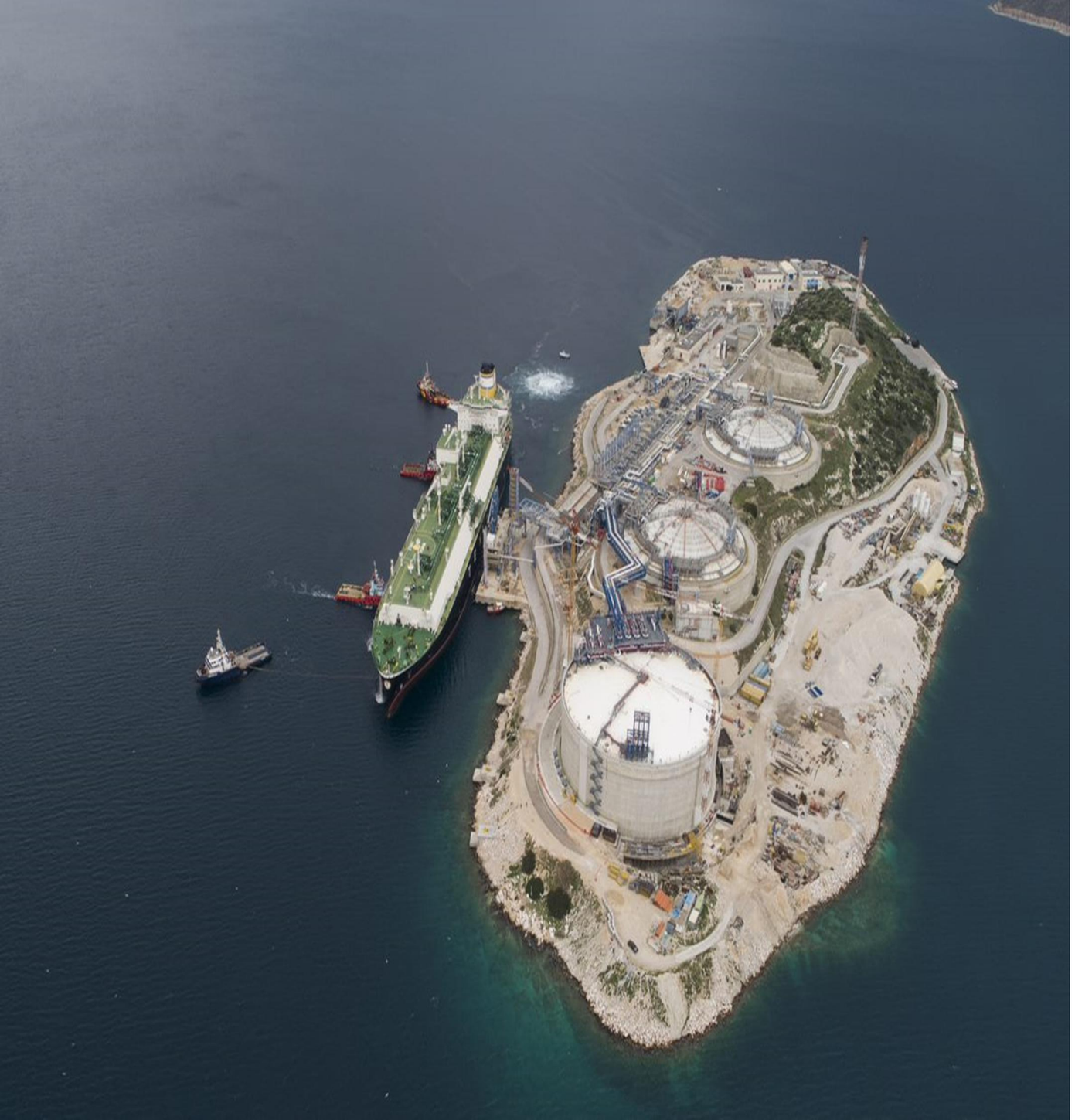



# 3.5 Emissions Trading System (ETS) Summary

DESFA, as an operator of fixed installations, monitors the emissions of greenhouse gases from its installations and submits relevant reports in pursuance of the 2003/87/EC Directive of the European Parliament & Council. Adopts and implements a Greenhouse Gas Emission Management & Monitoring System in accordance with European Regulation 2018/2066/EC for those activities defined in the above Directive.

By March 31st of each year, an Emission Report shall be submitted to the competent authority covering the reporting period and shall be verified in accordance with European Regulation (EU) No 600/2014 (MiFIR) by a third independent verification body.

The facilities that implement a Greenhouse Gas Emission Trading System are the Liquefied Natural Gas (LNG) Terminal on the island of Revythousa and the Compressor unit in Nea Mesimvria.



At the LNG Terminal, the emission sources as a distinct part of the installation or process from which greenhouse gases (only $CO_2$) are emitted, are the following:

- **High-Efficiency Cogeneration Unit (CHP)** with Natural Gas fuel. The CHP unit, of 13 MW power, consists of two IC engines with of 6.5 MW power each, with Natural Gas fuel. The Station utilizes the generated thermal energy for the gasification of the liquefied Natural Gas, increasing its overall efficiency and is therefore characterized as a High Efficiency unit.
- **Submerged Combustion Vaporizers (SCVs) Units** with Natural Gas and/or Gasification Gas (Gasification Gas comes from the natural exhaust of liquefied Natural Gas and differs in composition from Natural Gas). There are four Submerged Combustion Vaporizers (SCVs) Units, two gasification units with a capacity of 125 $m^3/h$ LNG each and two new units with a gasification capacity of 186.75 $m^3/h$ LNG each. Each of the new units can use the produced hot water of CHP for gasification. The operation of the two new gasifiers at higher loads is carried out by combustion.

- **Flare Pilots** with Natural Gas and/or Gasification Gas (Gasification Gas derives from the natural evaporation of Liquefied Natural Gas and differs in composition from Natural Gas). Flare pilots operate continuously throughout the year. When the station is in production no significant excess steam is produced. Under these conditions, an almost constant current of Natural Gas is driven to the flare pilots circulating at the station.
- **Gas Flare** with Gasification Gas. For reasons of safe operation of the installations, the boil-off gases from the LNG storage tanks and the relief valves are driven for combustion in the flare. However, in order to minimize natural gas losses and emissions, the flare system is connected to the pressure regulating valve of the storage tanks. Under normal conditions, i.e. when the tank pressure does not exceed a certain limit, the boil-off gases are recycled. When the pressure in the tanks exceeds the limit then the pressure regulating valve opens and part of the boil-off gases are led to the flare.
- **Auxiliary Equipment** with diesel fuel, fire-fighting pumps and emergency power generators.

Respectively, in the Compressor Unit the emission sources are the following:

- **<u>Gas turbine-Compressor</u>** with Natural Gas fuel. The operation of the station aims at the additional compression required by the National Natural Gas System, in order to meet the demands of the Greek Natural Gas market. The Compression Station consists of three compression units (one in operation and the other two in reserve), consisting of a centrifugal compressor and a gas turbine.
- **<u>Auxiliary Equipment</u>** with diesel fuel (electricity generator).

For the monitoring of emissions, DESFA adopts a methodology which is based on an approved computer model by the competent Service of the Hellenic Ministry of Environment and Energy. This methodology consists in determining the emissions based on the quantified activity data consumed. The data are obtained with the help of measurement systems and additional parameters resulting from the online chromatograph analyses. For the accuracy of the measurements, the company implements a program of maintenance and calibration of all the measuring equipment involved in the calculations in accordance with the requirements of the relevant European Regulation.

In accordance with 2003/87/EC Directive, as amended by 2021/1416/EU Directive, free emission allowances are allocated to DESFA relevant facilities on the basis of fully harmonized rules applicable throughout the Community for the period 2021-2030.

This allocation is based on the data collection carried out by the Member States in order to gather from the Operators of stationary installations all the relevant information required to calculate the free allocation of allowances.

From 2021, those data refer to Ad Hoc auditing within the installations that implement a Greenhouse Gas Emission Trading System - ETS.


For the facilities of DESFA 1) LNG Terminal and 2) Compressor Unit, the independent body TÜV AUSTRIA HELLAS verified the above data as follows:

1. Completeness: The historical data delivered was complete without gaps.
2. Accuracy: The calculations performed were accurate, correct and in accordance with the requirements of the approved emission monitoring plan.
3. Reliability: The equipment involved is maintained and calibrated as required by the relevant legislation.

DESFA recognizes that the proper operation of the system is the detailed recording of needs, in order to achieve high levels of Environmental Protection and the reduction of greenhouse gas emissions. In addition, through the continuous improvement of the implemented Emission Trading System, as well as the existing procedures, the expected result can be achieved.


# 3.6 Emissions Calculation

The total equivalent carbon dioxide emissions resulting from DESFA's Facilities and Activities for the year 2023 are analyzed in the following paragraphs and include:

**1) Direct Emissions**

- **<u>Monitoring & Measurement - (Scope 1)</u>**
  - LNG Terminal Gas Consumption
  - Compressors Unit Natural Gas Consumption
  - Diesel consumption at the LNG Terminal and the Compressor Unit

- **Emission Coefficients**
  - Vehicle Fuel Consumption
  - Diesel consumption in fixed equipment
  - Natural Gas Consumption NNGTS

**2) <u>Indirect Emissions - (Scope 2)</u>**

- Consumption of Electricity

**3) <u>Value Chain Emissions - (Scope 3)</u>**

# 3.6.1 Direct Emissions – Monitoring & Measurement

### 3.6.1.1 LNG Terminal Gas Consumption

The $CO_2$ emissions of the Liquefied Natural Gas Terminal on the island of Revythousa are calculated through an approved Greenhouse Gas Emission Monitoring System (ETS). More specifically:

I. For the operation of the High-Efficiency Cogeneration Unit (CHP) in 2023, 8.01 TJ of fuel were consumed and the emissions amounted to **445.09 tn $CO_2$**.

II. For the operation of combustion gas generators (SCVs) in 2023 16.64 TJ of fuel were consumed and emissions amounted to **907.44 tn $CO_2$**.

III. For the operation of the pilots flare in 2023, 9.66 TJ of fuel were consumed and the emissions amounted to **579.26 tn $CO_2$**.

IV. For the operation of the flue gas flare of the installation in 2023 134.77 TJ of fuel were consumed and the emissions reached **7,452.68 tn $CO_2$**.

### 3.6.1.2 Natural Gas Consumption at Compressor Unit

The $CO_2$ emissions of the Compressor unit in Nea Mesimvria, Thessaloniki, are calculated through an approved Greenhouse Gas Emission Monitoring System (ETS). Specifically, in 2023, 146,83 TJ of fuel were consumed, and the emissions found to be **8,207.68 tn $CO_2$**.

### 3.6.1.3 Diesel consumption at the LNG Terminal and the Compressor Unit

In 2023, 3.33 tn Diesel were consumed at the facilities of the Liquefied Natural Gas Terminal (LNG) on the island of Revythousa and 0.3 tn Diesel at the Compressor unit in Nea Mesimvria. The generated emissions are monitored by the Greenhouse Gas Emission Trading System (ETS) and found to be **11.46 tn $CO_2$** in total.


# 3.6.2 Direct Emissions – Emission Coefficients

### 3.6.2.1 Vehicle Fuel Consumption

The technical monitoring and control of the Natural Gas pipeline network is a daily routine of the company. For this reason, DESFA retains in its fleet suitable vehicles for:

- Pipeline zone patrolling
- On call
- Periodic maintenance, intervention, etc.

Ecological/economic driving is an issue for which DESFA raises the awareness of its vehicle drivers through targeted actions (trainings, updates, instructions, etc.). Our aim is to protect the environment by consuming less amount of fuel from the company's vehicles.

| Fuel Consumption (L) | 2023 |
|---|---|
| Gasoline | 135,316.35 |
| Diesel | 232,706.47 |
| LPG | 654.34 |


The calculation of the amount of Carbon Dioxide ($CO_2$), from the gasoline consumption of DESFA vehicles, results by multiplying the total liters of gasoline consumed in the year 2023, with the liters to kilos conversion coefficient of Carbon Dioxide ($CO_2$) that are produced by burning quantities (L) of gasoline (2.345[i] Kgr $CO_2$/L) and dividing by 1,000 to convert the result into tons (tn). The result of this calculation is **317.32 tn $CO_2$**.

Accordingly, in calculating the amount of Carbon Dioxide that is released into the atmosphere from the diesel consumption of DESFA vehicles, we multiply the total liters of oil were consumed in the year 2023, with the liters to kilos conversion coefficient of Carbon Dioxide ($CO_2$) produced by the combustion of quantities (L) of oil (2.6594[i] Kgr $CO_2$/L) and dividing by 1,000 to convert the result into tons (tn). The result of this calculation is **618.86 tn $CO_2$**.

Finally, the amount of Carbon Dioxide released into the atmosphere from the consumption of Natural Gas (NG) by the company's vehicles was measured at 0.29 tn CO2 with a corresponding conversion factor of 0.45[i] Kg CO2/L.

Thus, the total emissions from our fleet during 2023 amounted to **936.47 tn CO2**.

[i] Conversion Coefficients, *DEFRA 2023*

### 3.6.2.2 Diesel consumption in fixed equipment

The amount of diesel consumed in Fixed Equipment (Air Compressors, Generators, Oil Burners except the consumption in LNG Terminal and in the Compressor unit) for the year 2023 is shown in the following table:

| Fuel Consumption (L) | 2023 |
|---|---|
| Diesel Installation Equipment | 24,079.43 |

The calculation of the amount of Carbon Dioxide, from the consumption of diesel in the Fixed Equipment of DESFA, results by multiplying the total liters of oil consumed in the year 2023, with the density (0.8547 kgr/lt, at 15 $^{o}$C), then with LHV (42.8 MJ/kgr) and dividing by $10^6$, is converted to energy (TJ). The energy of the consumed oil multiplied by the emission coefficient (73.78[ii] tn $CO_2$/TJ) gives the $CO_2$ emissions in tons. The result of this calculation is **64.99** tn $CO_2$.

[ii] *Conversion Coefficients, Greece National Inventory Report 2023*

### 3.6.2.3 Natural Gas Consumption NNGTS

The Natural Gas that is consumed, for management purposes, is divided into the following two sectors according to the Management Code of the National Natural Gas System:

- Self-consumption, for heating/cooling of facilities and operation of equipment (does not include the consumption of Compressors which is monitored through ETS).

- Release of Natural Gas into the atmosphere from:

1. Controlled Venting during network operation/maintenance
2. Pneumatic Equipment Operation
3. Fugitive emissions NNGTS
4. Incomplete Cumbustion

| Natural Gas Consumption ($Nm^3$) | 2023 |
|---|---|
| Self-consumption | 472,223.16 |
| Natural Ventilation & Venting Losses | 342,133.49 |
| Total | 814,356.65 |

The calculation of the release of Carbon Dioxide into the atmosphere that derives from the "Consumption of Natural Gas", is divided into two (2) categories.

- In the first category, we calculate the $CO_2$ emissions from the combustion of Natural Gas for heating/cooling purposes of the facilities and for the operation of the equipment.
- In the second category, we calculate the equivalent $CO_2$ emissions resulting from the release of Natural Gas into the atmosphere due to the venting during maintenance work, as well as natural ventilation of the network.

For the first category, the energy content of 472,223.16 $Nm^3$ of Natural Gas consumed in our facilities is equal to 4,958.02 MWh (HHV), multiplying with 0.9 for its conversion to LHV and then with the coefficient that converts megawatt-hours to tons of Carbon Dioxide (0.2118[iii] tn $CO_2$ /MWh), the result is **1.050,11 tn $CO_2$**. This derives from the combustion of Natural Gas for heating/cooling of the facilities and for the operation of the equipment.

[iii] *Conversion Coefficients, Greece National Inventory Report 2023*

In the second category belong the cubic ($Nm^3$) of Natural Gas released to the atmosphere. According to the results of DESFA's participation in the OGMP (Gold Standard), 187.79 tn of CH4 were released. The Global Warming Potential factor for CH4 is 28[iv]. Consequently, the CO2 equivalent emissions amounted to **5,258.18 tn CO2**.

[iv] *Global Warming Potential, Greece National Inventory Report 2023*

### 3.6.2.4 Natural Gas Consumption in LNG Terminal

At the Liquefied Natural Gas Terminal (LNG Terminal) of Revythousa island, the $CO_2$ equivalent emissions deriving from the release of Natural Gas into the atmosphere due to venting during maintenance, network leakages and incomplete combustion of Natural Gas consumed, are calculated.

| Natural Gas Consumption in LNG Terminal (tn $CH_4$) | 2023 |
|---|---|
| Natural Ventilation, Venting Losses & Incomplete Combustion | 58.52 |

The 58.52 tn $CH_4$ which were released from our network into the atmosphere, are multiplied by the Global Warming Potential coefficient for methane (28). Thus, the result is **1,638.48 tn CO2**.

# 3.6.3 Indirect Emissions

The Carbon Dioxide ($CO_2$) that has been released into the atmosphere from the production of electricity that is finally consumed by DESFA, is registered in this report in **Scope 2 – Indirect Emissions** and is added to the company's Total Carbon Footprint.

| Electricity Consumption (MWh) | 2023 |
|---|---|
| Private Facilities | 44,383.62 |
| Central Offices | 693.84 |
| Total | 45,007.46 |

### 3.6.3.1 Electricity consumption emissions - Market based

The amount of Carbon dioxide emitted to the atmosphere from electricity consumption within the company, during the year 2023, is calculated by multiplying the megawatt hours consumed with the electricity conversion factor of the **provider,** in tonnes of Carbon Dioxide (0.332[v] tn $CO_2$ /MWh). The result of this calculation is **14,951.29 tn $CO_2$**.

### 3.6.3.2 Electricity consumption emissions - Location based

The amount of Carbon dioxide emitted to the atmosphere from electricity consumption within the company, during the year 2023, is calculated by multiplying the megawatt hours consumed with the electricity conversion factor as proposed by **Greece National Inventory Report 2023**, in tonnes of Carbon Dioxide (0.372[vi] tn$CO_2$/MWh). The result of this calculation is **16,754.39 tn $CO_2$.**

The calculation of DESFA's Carbon Footprint is taking into consideration $CO_2$ emissions from **Market Based** electricity consumption as they are more representative of our operational profile.

[v] *DAPEEP Emissions Coefficient 2023 tn $CO_2$ / MWh*

[vi] *Conversion Factor Greece National Inventory Report 2023*

# 3.6.4 Emissions from value chain (Scope 3)

HSSEQ team calculated for the third consecutive year the emissions from DESFA's value chain, which amount to **116,943.80 tn CO2** for 2023, an increase compared to 2022.

The main reasons for this increase were the high prices of products and services from suppliers, as well as the construction and materials for the company's new large expansion projects, which include Natural Gas transmission pipelines, Compressors, and Metering/Regulating Stations (M/R).

In order to calculate those emissions, a statistical analysis of 15 categories as proposed by the GHG Protocol[vii] was adopted.

[vii] *Greenhouse Gas Protocol, Corporate Value Chain (Scope 3) Accounting and Reporting Standard, 2011*

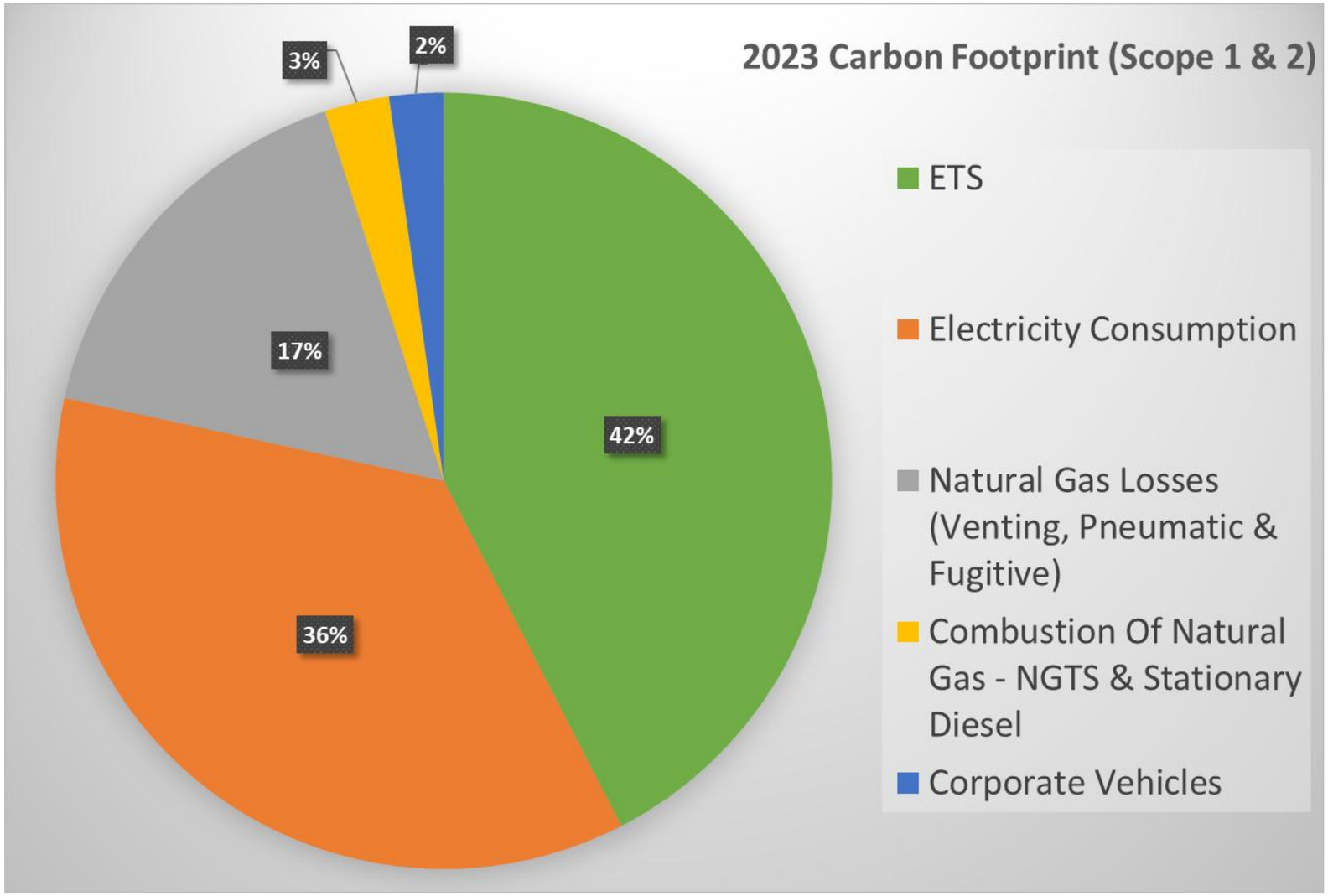
# 4 CARBON FOOTPRINT ANALYSIS DESFA 2023

The carbon footprint of DESFA is a business activity, intrinsically linked to the social and ecological priorities of our time. Total Carbon Dioxide ($CO_2$) emissions result from the sum of Direct and Indirect Emissions (**Scope 1 & Scope 2**), as they derive from the previous chapters.

The following table demonstrates the $CO_2$ emissions per **Monitoring Field**, which compose the Total Carbon Footprint of DESFA for 2023:

| **Field of Monitoring** | **CO2 Emissions (tn)** | **(%)** |
|---|---|---|
| LNG Terminal Flare - ETS | 7,452.68 | 18.0% |
| LNG Terminal CHP - ETS | 445.09 | 1.1% |
| LNG Terminal SCV's - ETS | 907.44 | 2.2% |
| LNG Terminal Pilots - ETS | 579.26 | 1.4% |
| Compressor Station Nea Mesimvria - ETS | 8,207.68 | 19.8% |
| Diesel Consumption for both installations - ETS | 11.46 | <0.0% |
| Electrical Energy Consumption (Market Based) | 14,951.29 | 36.0% |
| Natural Gas Losses (Venting, Pneumatic & Fugitive) | 6,896.65 | 16.6% |
| Combustion Of Natural Gas - NGTS | 1,050.11 | 2.5% |
| Diesel Consumption - Vehicles | 618.86 | 1.5% |
| Gasoline Consumption - Vehicles | 317.32 | 0.8% |
| LPG Consumption - Vehicles | 0.29 | <0.0% |
| Diesel Consumption - Stationary Equipment | 64.99 | 0.2% |
| **Total** | **41,503.12** | **100%** |

The following Figure illustrates the **sources of Carbon Dioxide ($CO_2$)** emissions of DESFA for 2023:



# Carbon Intensity

In the year 2023, DESFA transported 4,642,266,012 cubic meters ($Nm^3$) of Natural Gas, that is approximately 13% lower compared to the previous year (5,338,355,098) and emitted 41,479.75 tonnes (tn) of Carbon Dioxide.

Therefore:

For the transfer of one cubic meter ($Nm^3$) of Natural Gas, DESFA emitted 8.94 grams (gr) of Carbon Dioxide **(8.94 $grCO_2/Nm^3$).**

The average for the five-year period 2018-2022 was **10.48 $grCO_2$/ $Nm^3$**.

DESFA's objective is to act and operate in such a way that its Carbon Footprint is reduced each year compared to the previous five-year average.

# 5 HSE (Health Safety Environment) SUSTAINABILITY REPORT

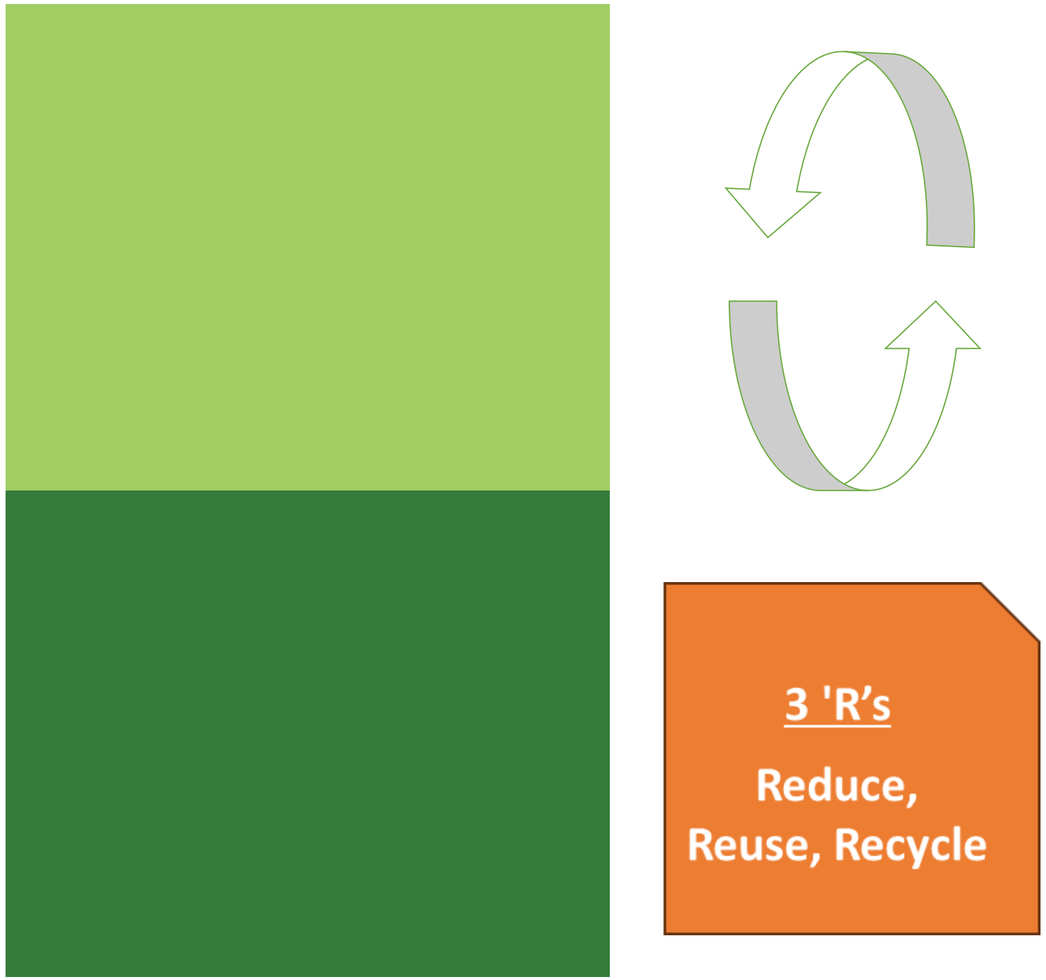
# 5.1 Environmental Management System

DESFA, in the context of its Environmental Policy and with the continuous effort to optimize operational and administrative actions as a compass for the future, has developed and implements Environmental, Energy and Health & Safety Management Systems, which are based on the International Standards EN ISO 14001, 50001 and 45001, respectively. DESFA receives annually relevant certifications for those Systems from an independent verified third party.

In addition to the consumption data that compose the Carbon Footprint of DESFA and described in detail above, other fields that are monitored and communicated through the Monthly Reports of the Health, Safety, Physical Security, Environment and Quality Department, to the Management, are the following:

1. Waste Management
2. Water Resources Management
3. Adequacy of Technical Staff in QHSE (Quality, Health, Safety & Environment) issues
4. Drills
5. Audits
6. Events
7. Environmental Voluntary Actions
8. Environmental Awards

# 5.2 Waste Management





**3 'R's**

**Reduce, Reuse, Recycle**

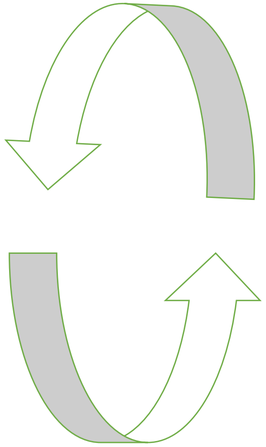
The broader framework of waste/litter management policy and liability at DESFA facilities is the collection and disposal of the following items for recycling to the respective recognized and licensed bodies:

**Non-Hazardous Materials**

- Paper
- Metal
- Glass
- Wood
- Plastic

**Hazardous Materials**

- Lubricants
- Accumulators
- Batteries
- Electrical and Electronic waste



**3 'R's**

**Reduce,**
**Reuse, Recycle**

The classic concept of waste management is based on the following actions:

a) estimating the quantity and quality of waste

b) temporary storage

c) the collection (possibly at the source)

d) transferring to the processing/disposal site

e) final processing and disposal

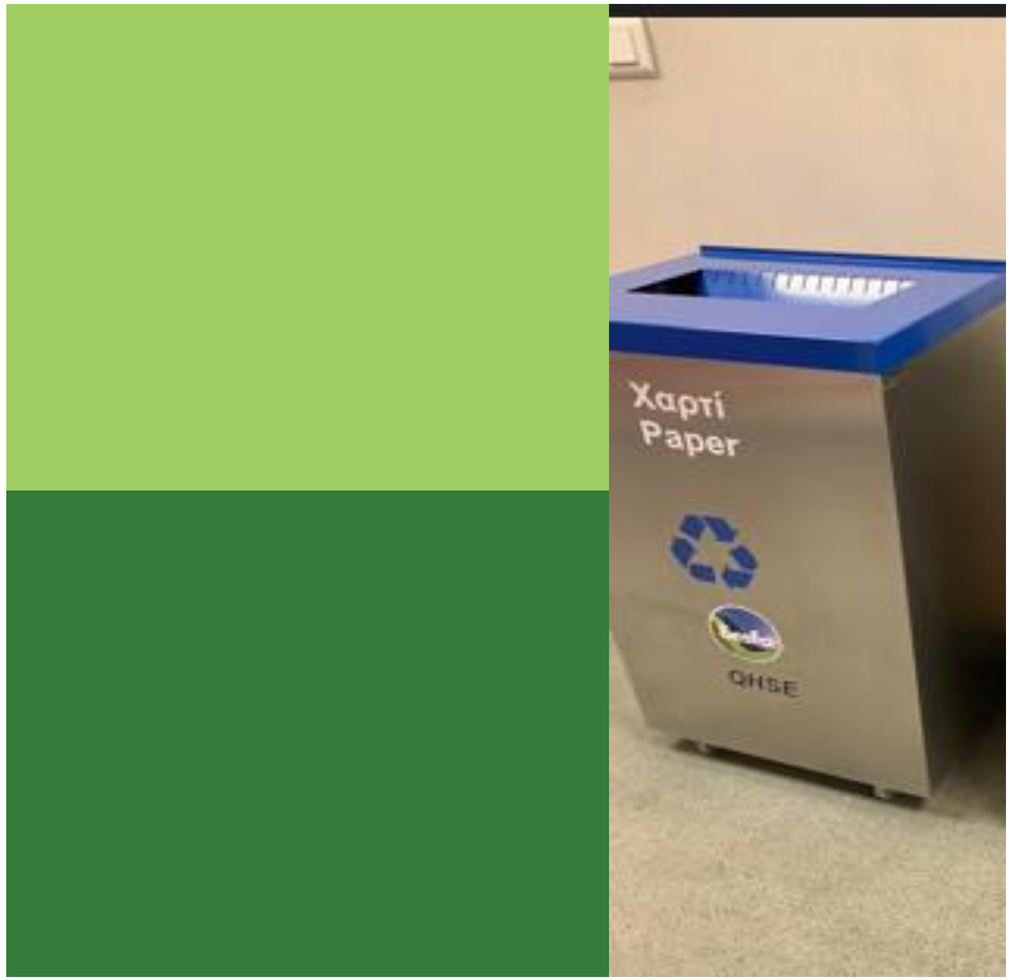
The proper solid waste management requires sufficient knowledge of:

i. their origin

ii. the rate of production

iii. their composition

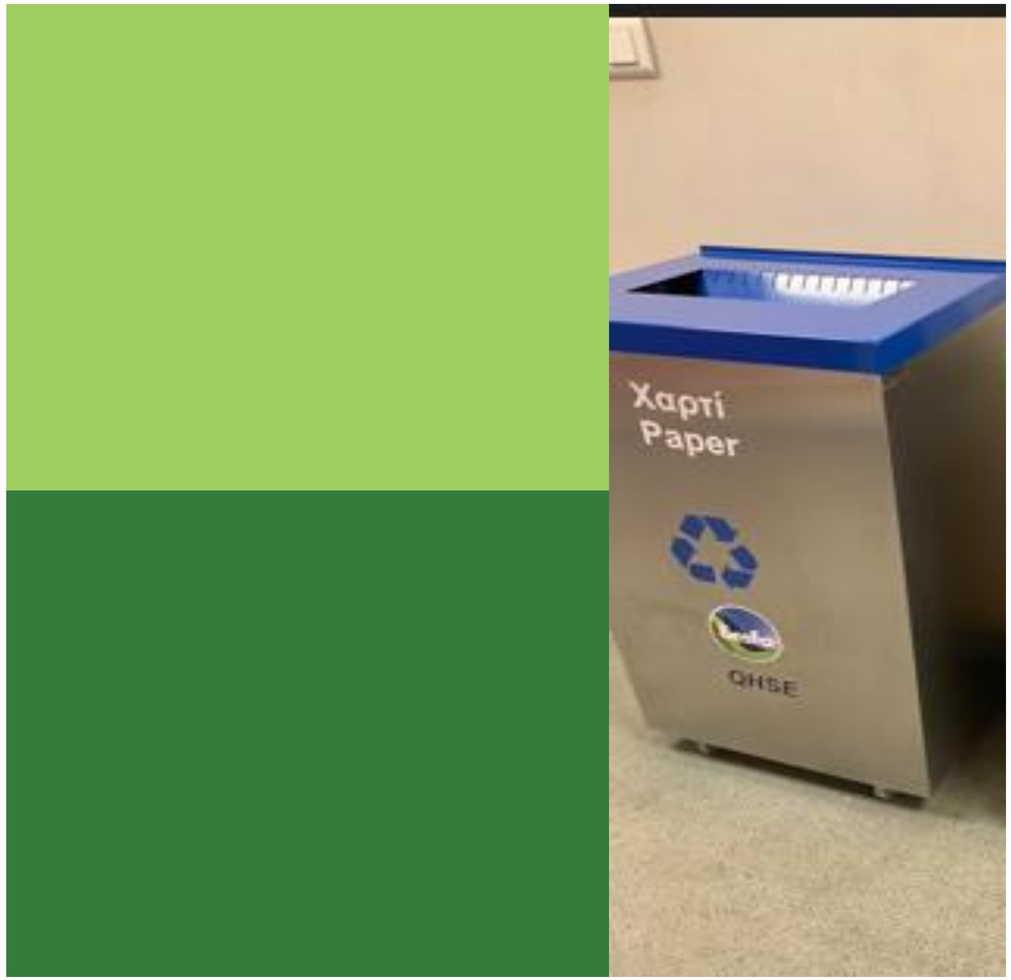
# Non-Hazardous Waste




### 5.2.1 Paper

Significant ecosystems are threatened by the consumption of paper, plastic and aluminum packaging. The intensive effort to be collected in the blue recycling bins, in collaboration with the Hellenic Recovery Recycling Corporation (HERRCO) results the contents of the collection bins to be taken into the Recycling Sorting Center (RSC), where they pass through moving belt and the different materials are separated. Upon the collection of the required quantities, the separated materials are sent to the recycling plants.

Wasting paper puts too much pressure on the world's forests. If we reduce unnecessary paper consumption, if we improve paper recycling programs, we may alleviate this pressure. This will also enable environmentally sound and integrated forest management.




Paper recycling is a process that, if done properly, can be cost effective, environmentally friendly and produce recycled paper of good quality. The paper is delivered to specific industries, where it is washed, mashed and then transformed into paper again.

DESFA pursues a comprehensive policy on paper recycling to reduce paper use, as well as to increase the use of digitalization as much as possible. The amount of paper collected at DESFA's facilities, given for recycling in the year 2023, is shown in the table below.

| **Paper Management** | 2018 | 2019 | 2020 | 2021 | 2022 | **2023** |
|---|---|---|---|---|---|---|
| Quantity (Kg): | 1,805 | 6,700 | 2,630 | 2,880 | 4,030 | **7,080** |

### 5.2.2 Metal

DESFA implements a strategy for the responsible management of metals and scrap, aiming to optimize the use of metal stock at its facilities. The data on the quantity of metals collected and recycled in 2023 is presented in the table below.

| Metal Management | 2023 |
|---|---|
| Quantity (kg): | **7,510** |

### 5.2.3 Glass

The company is supporting the responsible management of glass waste, aiming to reduce its usage and promote its recycling. This approach is intended to improve the utilization of glass materials at its facilities. The data on the quantity of glass collected and recycled in 2023 is demonstrated in the table below.

| Glass Management | 2023 |
|---|---|
| Quantity (kg): | **5,000** |

### 5.2.4 Wood

As part of various activities carried out at the facilities, as well as the collection of a large number of wooden packages and office furniture, DESFA managed wood products for 2023, as shown in the table below.

| Wood Management | 2023 |
|---|---|
| Quantity (kg): | **5,000** |

### 5.2.5 Plastic

DESFA enhances the sustainable management of plastic waste, aiming to reduce their usage and enhance their recycling. This initiative aims to optimize the utilization of plastic materials at its facilities. The data on the quantity of plastic collected and recycled in 2023 is presented below:

| Plastic Management | 2023 |
|---|---|
| Quantity (kg): | **50** |

# Hazardous Waste


### 5.2.6 Waste Lubricating Oils (WLO)

Lubricating oils are key elements of many people's daily life, as they are essential for the operation of machines and mechanisms. During their use, oils lose their properties, and as a result they are disposed as waste and replaced with new ones. The WLO produced by DESFA, derive from the maintenance of machinery and vehicles. The chain of activities which is followed for the proper utilization of WLO is the following:

I. Processing (regeneration)
II. Blending
III. Packing
IV. Disposal

The authorized body, responsible for WLO management, is the company called Hellenic Environmental Technology (ELTEPE SA) and its purpose is the organization and operation of a collective pan-Hellenic network of alternative WLO management.


The Center for Alternative Environmental Management (KEPED) has been established for the alternative management of lubricant packages.

The lubricant packages managed by the collective system KEPED refer to the following:

- Plastic packaging
- Metal barrels
- Cartons
- Pallets

The quantities of Waste Lubricating Oils (WLO) managed by DESFA amid the year 2023 are demonstrated in the table below.

| **Alternative Waste Lubricating Oils (WLO) Management** | 2018 | 2019 | 2020 | 2021 | 2022 | **2023** |
|---|---|---|---|---|---|---|
| Quantity (Lt): | 5,937 | 4,653 | 5,550 | 8,782 | 13,962 | **400** |

### 5.2.7 Batteries and Accumulators

Car batteries used every year in the EU are estimated at 110,000 tons, 80-95% of which are recycled. Replaced batteries are recycled in their entirety, while 15% is contained in end-of-life vehicles. Respectively, industrial batteries are estimated at about 200,000 tons, of which 97% are lead-acid batteries. These batteries are collected in their entirety but it is difficult to estimate their recycling rate due to their long service life.

The environmental impact of non-recycling of Batteries and Accumulators is related to the hazardous heavy metals and especially the lead they contain. In case of combustion, the metals are gasified and through the rain they end up on the ground and in water recipients. In addition, draining liquids in an unsealed landfill can pollute the groundwater. Batteries also contain corrosive acids which can cause damage to living organisms. Moreover, some batteries are flammable and can cause fire, especially if they are dumped uncontrollably in landfills near forest areas. To deal with this public threat, the "Alternative Management System for Batteries SA" was established in July 2004, with the distinctive title SYDESYS SA, which takes care of the collection, transport and alternative management of batteries.

The collection of accumulators in the facilities of DESFA is implemeted in plastic, rectangular bins, with an indicative capacity of 500 – 1000 liters, completely sealed and with appropriate labeling (recycling symbol, accumulator symbol). Those bins are provided by SYDESYS SA, after the signing of a relevant contract.

The table below presents the amount of accumulators provided by DESFA for alternative management during the year 2023.

| **Alternative Accumulator Management** | 2018 | 2019 | 2020 | 2021 | 2022 | **2023** |
|---|---|---|---|---|---|---|
| Quantity (Kg): | 25,896 | 10,129 | 0 | 17,321 | 13,641 | **11,502** |

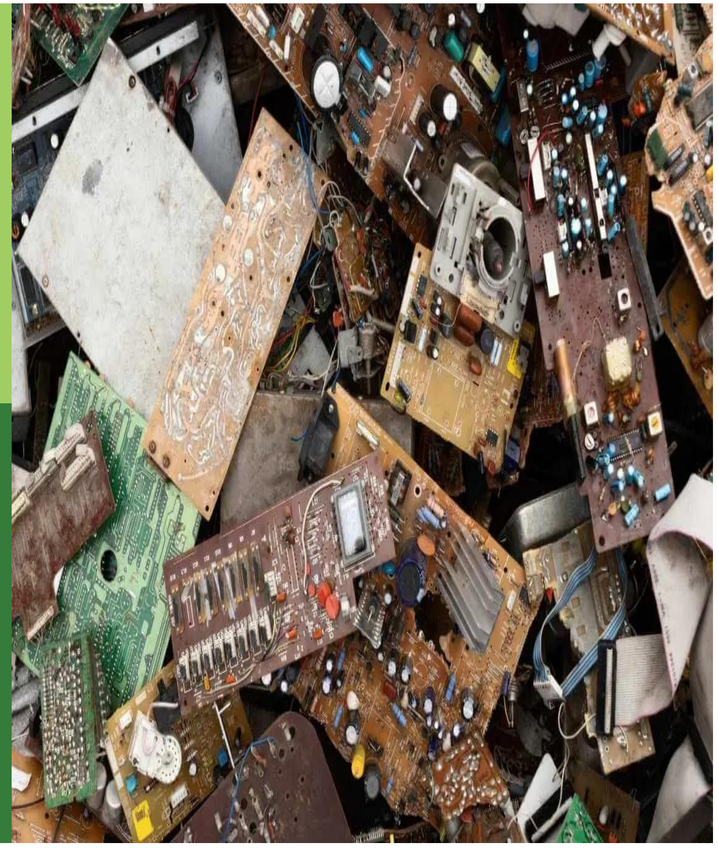

### 5.2.8 Batteries

Portable batteries unlike other recyclable materials are considered hazardous waste. What does this mean? Some batteries, mainly those that contain heavy metals such as mercury, cadmium, lead, chromium, etc. are particularly dangerous to public health. Their exposure to high temperatures, rain and humidity may contribute to the release of flammable or corrosive components that are transported through the soil to the groundwater and the environment.

The company "Recycling Portable Batteries" (AFIS) has been active in Greece since March 2005, which has transparent cylindrical vessels for collecting batteries. All types of portable batteries are collected in these vessels, i.e. those that weigh up to one and a half (1.5) kilo.

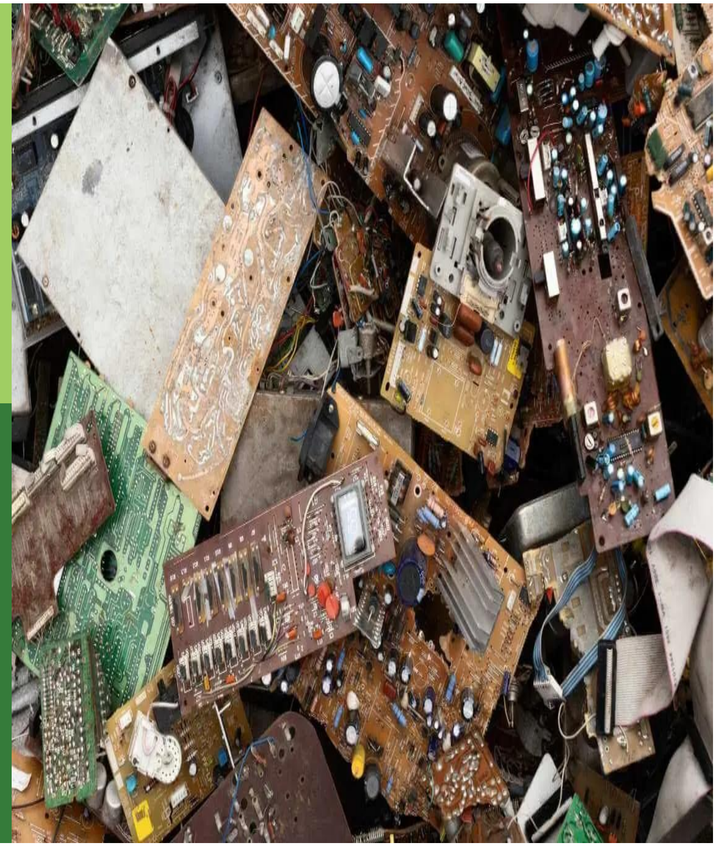
The quantity of batteries collected at the DESFA facilities and given for alternative management in the year 2023, is shown in the table below.

| **Alternative Battery Management** | 2018 | 2019 | 2020 | 2021 | 2022 | **2023** |
|---|---|---|---|---|---|---|
| Quantity (Kg): | 70 | 29 | 56 | 105 | 115 | **65** |



### 5.2.9 Electrical and Electronic waste

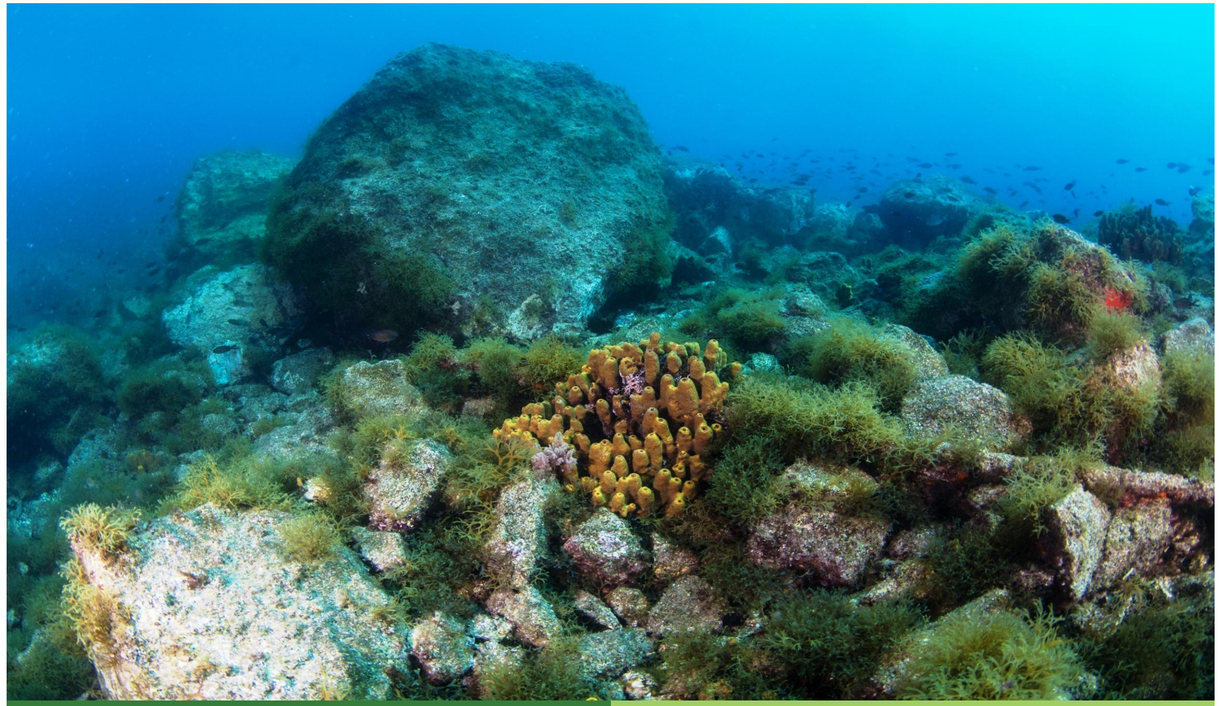
Recycling of Waste Electrical and Electronic Equipment (WEEE) is of particular importance for the management of hazardous materials contained in most appliances. European legislation requires the recycling of WEEE in certified units where materials such as copper, gold, silver, etc. are recovered and the leakage into the environment of dangerous heavy metals such as lead, mercury, cadmium, hexavalent chromium, etc. is prevented. Apart from the danger behind the uncontrolled dumping of some WEEE in landfills and the contamination of the food chain, the energy saving resulting from their recycling is also of great importance, as it is possible to reuse some of their components with obvious energy savings. An additional problem created by this type of waste is the volume they occupy in landfills.



Since July 2004, the Collective Management System of WEEE has been operating in Greece under the name "Appliance Recycling SA". Based on this system, the WEEE collection network is organized from all over the Greece in cooperation with private companies and mainly with the local authorities.

The quantities of Electronic & Electrical Waste managed by DESFA for the year 2023, are summarized in the table below.

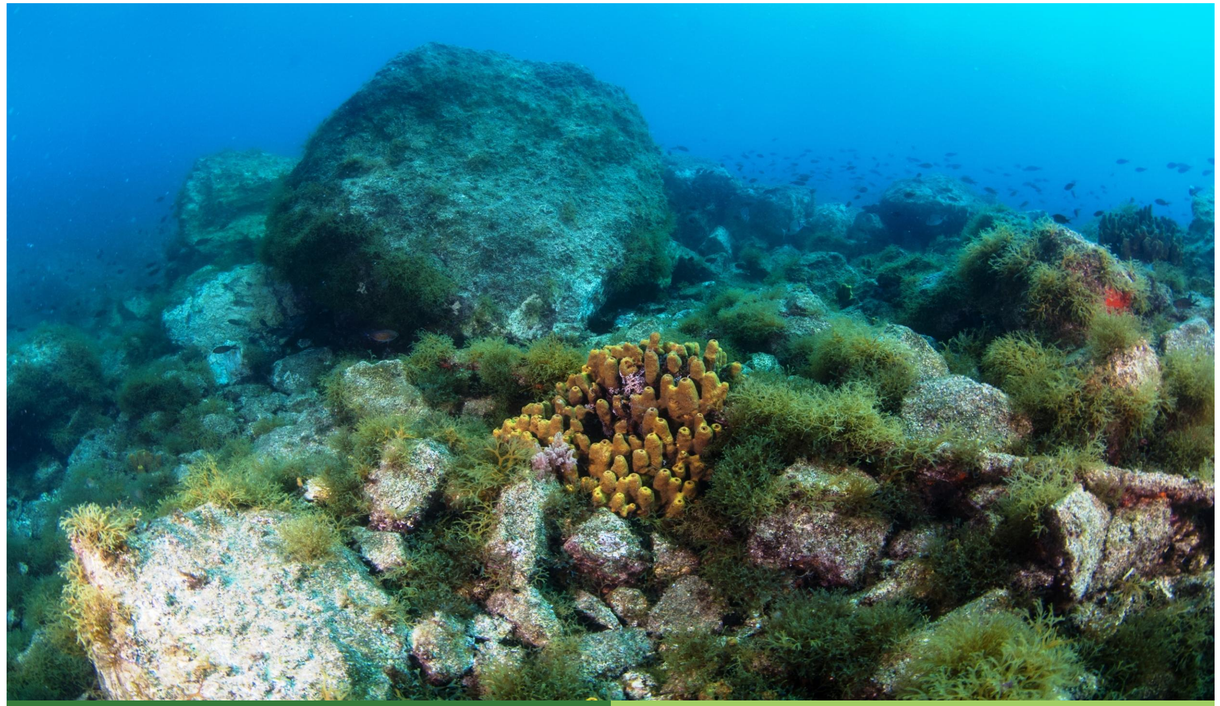
| **Alternative Electric & Electronic Waste Management** | 2018 | 2019 | 2020 | 2021 | 2022 | **2023** |
|---|---|---|---|---|---|---|
| Quantity (Kg): | 12,597 | 5,877 | 4,551 | 2,605 | 7,148 | **20,952** |



# 5.3 Management of Water Resources

The demands on water for the satisfaction of all human activities are constantly elevating. The permanent demand for water of high quality (for every use), the growing need for maintaining the balance in the environment, the increase of pollution in water resources and the uneven natural supply, create multiple complicated problems. Sustainable water resources management is the key to sustainable development. The water resources are not unlimited and that is why DESFA is sensitizing and implementing a series of actions, in order to achieve the rational use of the water resources which it manages. These actions include:

- Reuse of water, from the biological sewage treatment systems of the facilities, for irrigation
- Use of water from licensed drillings
- Continuous control and measurement of consumption (of the network and drillings)



The quantities of water resources consumed in DESFA's facilities during the year 2023 are shown in the table below.

| **Water Resources Consumption** | 2018 | 2019 | 2020 | 2021 | 2022 | **2023** |
|---|---|---|---|---|---|---|
| Total ($m^3$): | 37,115 | 36,095 | 42,892 | 25,052 | 78,244 | **21,439** |

The total amount of water resources consumed in the facilities of DESFA in 2023, derives from the sum of 8,284 $m^3$ from the water supply network and 13,155 $m^3$ from licensed drillings.

# 5.4 Adequacy of Technical Staff regarding to HSSEQ issues

In addition to training, the concepts of competence and evaluation have been incorporated into the QHSSE (Quality, Health & Safety, Security and Environment) Personnel Competence Management System of the DESFA Staff. The result of this was an impressive increase in the number of trainings, actions accompanied by a corresponding evaluation of the participating staff and subsequently in the certification of its adequacy. Specifically for 2023, DESFA carried out in all its facilities Educational Actions, with a total duration of **3,406** hours, covering a range of necessary skills for both new and old employees.

# 5.5 Drills

In the facilities of DESFA, in order to continuously improve the response of the staff in emergency situations, Drills are planned and implemented, the Scenarios of which are based on real events that may occur during the operation of the facilities, considering that during the incidents the assistance of other external bodies (such as Fire Service, Police, etc.) may be required.

During the year 2023, **53** Drills were performed at the facilities of DESFA, in which various Scenarios were addressed. Each Drill may include more than one Scenario, thus mobilizing a larger number of people involved in the Drill. The Scenarios in which the Drills are categorized are including:

- ❑ Field incident
- ❑ Fire in Installation
- ❑ Injured Person Rescue
- ❑ Evacuation of Premises

# 5.6 Audits

Carrying out certified inspections and audits, scheduled and emergent, over the year, contributes to the effectiveness of the Management Systems implemented by DESFA. The audits are Internal (performed by properly trained and certified Inspectors) and External (performed by third parties with appropriate authorization and experience). Audits are intended to examine whether a DESFA Management System is effectively implemented, updated and compatible with the requirements of International Standards.

During the year 2023, a total of **72** were carried out at DESFA's facilities.

| | Internal | External | Total |
|---|---|---|---|
| Audits: | 45 | 27 | 72 |

# 5.7 Events

The Management of DESFA treats, with particular attention, the emergencies that occur in our facilities and ensures that appropriate care is taken by the staff responsible, so as not to evolve into serious accidents that will primarily affect the most valuable "asset" of our company. That is none other than our human resources. All the Events for the year 2023 are presented in the following table.

| | Equipment Wear | Near-misses | Transport to hospital | First aid |
|---|---|---|---|---|
| Events | 6 | 44 | 2 | 8 |

# 5.8 Environmental Voluntary Actions



DESFA is at the core of the energy transition, moving towards **a clean energy future** by adopting and integrating ESG criteria into its business strategy and the entire value chain of its activities. The company is implementing **a series of initiatives and investments aimed, among other goals, at combating climate change.**

Part of this commitment includes the **execution of environmental actions with the voluntary participation of DESFA** employees and their families.

In **2023**, DESFA organized **two tree-planting** events in **Athens** (on Mount Hymettus and in Drafi, Penteli), **one** in **Thessaloniki** in the Kalochori area, and **one** in **Serres**. These events saw strong participation from employees and their families, with a total of **2,000** trees planted, which will produce 234 tons of O2 and absorb 44 tons of CO2. For 2024, we aim to double the number of trees to be planted.
Additionally, we carried out five beach clean-ups in the areas of Megara, Xanthi, Alexandroupoli, Corinth, and Volos, as well as the cleaning of a stream in Thessaloniki. With the goal of **raising awareness and properly educating the younger generation on environmental protection and best recycling practices**, DESFA organized five environmental education seminars in **primary schools** in Pefki, Melissia, and Elefsina, as well as in two **special education schools** in Agios Dimitrios and Acharnes. A total of 119 children participated in these seminars.

Finally, we organized **a seminar on "Fast Fashion"** aimed at informing all DESFA employees about the environmental impact of the fashion industry, analyzing:
The industry's responsibility for climate change-The causes-The consequences-Best practices.
These actions were made possible **by 340 volunteers across Greece** who dedicated **a total of 710 hours of voluntary service**. They were implemented in collaboration with **We4All, a Non-Profit Environmental Organization** with a mission to help heal our planet and remind us all that this planet is our home.

Guided by our **values**, we remain committed to our vision of safely operating and developing a technologically advanced network for the transmission and storage of clean, reliable, and affordable gas energy carriers, creating added value for the Greek economy and the communities where we operate, while shaping a brighter and more sustainable future for all.

# 5.9 Environmental Awards 2024

DESFA has achieved some of the highest standards in Greece for Occupational Health & Safety, Environmental, and Quality Management. Since 2013, the company has earned over 30 awards for its outstanding performance and innovation in areas such as the energy sector, emissions control, awareness, preparedness, employee participation, competency management, and waste management.

In the frame of Environmental Awards 2024 competition, organized by Boussias Communications (30/9/2024), the company was awarded as **Environmental Team of the Year** (14 categories) for its environmental performance during 2023.


| Category | Award |
|---|---|
| Green Deal Compliance | GOLD |
| CO2 Emissions Footprint Monitoring | GOLD |
| Sustainable Supply Chain | GOLD |
| Emissions Control Technology | GOLD |
| Energy Intensive Industry | GOLD |
| Sustainable Infrastructure Development | SILVER |
| GHG Offset | SILVER |
| Wastewater Treatment | SILVER |
| Energy Efficiency | SILVER |
| Energy Efficiency Certification | SILVER |
| Sustainable Business | SILVER |
| Climate Change | SILVER |
| GHG Reduction | BRONZE |
| Environmental Team of the Year | GRAND AWARD |

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