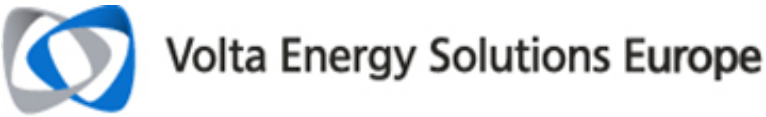
Bay Zoltán Kutatóközpont

REPORT

CORPORATE CARBON FOOTPRINT OF

VOLTA ENERGY SOLUTIONS HUNGARY KFT.

(REPORTING YEAR: 2024)



BAY ZOLTÁN NONPROFIT LTD. FOR APPLIED RESEARCH

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1 Executive Summary

Volta Energy Solutions Hungary Ltd. mandated the Bay Zoltán Research Institute to calculate their corporate carbon footprint (CCFP). The report presents the CCFP calculation and summarizes the results, including the relevant value chain emissions (Scope 3) for the reporting year (2024). The report identifies the emission hotspots which contribute significantly to the organisational carbon footprint of *Volta Energy Solutions Hungary Ltd*. Besides the carbon accounting, the report presents suggestions on the potential organisational carbon footprint reduction opportunities, taking into consideration both legally regulated approaches and operational process related advices.

For calculation, the emission factors were looked up from the latest and acclaimed EcoInvent database mostly, but other – also relevant - sources (i.e. EPA, Exiobase) were considered.

Based on this thorough data collection and calculations, the CCFP of *Volta Energy Solutions Hungary Ltd.* is as follows:

- Scope 1 emissions: 9 002,0 tCO_2e
- Scope 2 emissions (market-based): 51 139,8 tCO_2e
- Scope 3 emissions (market-based): 31 051,1 tCO_2e
- **Total (market based) CCFP: 91 192,9 tCO_2e**

Emission under Scope 2 gives the largest contribution, with 56,08% of the total CCFP, then Scope 3 emissions making up 34,05%. **The second most relevant GHG emission** (31 051,1 tCO_2e) **belongs to Scope 3** category, dominantly from the emissions related the production of the consumed electricity.

The smallest share belongs to Scope1 category (9,87%). Here, the most dominant factor is the consumption of natural gas from the stationary combustion equipment of the company.

In the last part of the report **recommendations on further best practices,** and legally regulated **carbon mitigation strategies** are included.

The carbon accounting introduced in this report was conducted by the use of the latest EcoInvent database, as a trusted global resource for environmental data and adhering to the CCFP related guidelines and standards, as GHG Protocol and ISO 14064.

2 Principles of CCFP Accounting

A carbon footprint is the *„amount of carbon dioxide (CO_2) emissions associated with all the activities of a person or other entity (e.g., building, corporation, country, etc.). It includes direct emissions, such as those that result from fossil-fuel combustion in manufacturing, heating, and transportation, as well as emissions required to produce the electricity associated with goods and services consumed."*[1]

According to the Kyoto Protocol which was entered into force on 16 February 2005, besides carbon dioxide (CO_2), five other greenhouse gases are considered while accounting carbon footprint, namely: methane (CH_4), nitrous oxide (N_2O), the F-gases (hydrofluorocarbons and perfluorocarbons) and sulphur hexafluoride (SF_6). *„Each gas is weighted by its global warming potential and aggregated to give total greenhouse gas emissions in CO_2 equivalents."*[2]

Early adopters, who can recognize prematurely in time the changing customer attitudes toward sustainability and also the legal environment shifting forward the mandatory and clear disclosures of the polluting activities, can gain significant advantages in the market in contrast to late adopters. Besides these market opportunities, carbon accounting can directly motivate companies to invest in technology and optimization methods (e.g. energy efficiency) resulting in huge savings and cost reductions.

The principles of present CCFP accounting are based on the standards and guidance published by the Greenhouse Gas Protocol (GHG Protocol). In the following subchapter, the main aspects of the CCFP methodology are introduced.

2.1 The GHG Protocol Initiative

In 1998, the Washington-based (US) World Resources Institute and the Geneva-based (CH) World Business Council for Sustainable Development (WBCSD) has founded the **Greenhouse Gas Protocol Initiative** with the cooperation of corporates, governmental bodies with the aim of setting a comprehensive, globally accepted standard framework to measure, control, manage and report GHGs emitted by the private and public sector.[3]

The methodology about measuring and reporting the emissions of the six main GHGs (CO_2, CH_4, N_2O, HFC, PFC, SF_6) has been introduced in the **GHG Protocol Corporate Accounting and Reporting Standard** in 2001. The standard's revised and more detailed version has been

[1] https://www.britannica.com/science/carbon-footprint
[2] https://unfccc.int/process-and-meetings/the-kyoto-protocol/what-is-the-kyoto-protocol/kyoto-protocol-targets-for-the-first-commitment-period
https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:Kyoto_basket
[3] https://ghgprotocol.org/about-us

published in 2004. Since the publication, there have been much more standards, guidance and calculation tools developed.[4,5,6,7]

The methodologies described in the following subchapters are derived from these standards and guidance, as the methodological basis for the present CCFP accounting.

2.2 System boundaries

One of the first main tasks to undertake a CCFP accounting is to set the system boundaries which give the framework for this work, namely, which company activities, assets and their related emissions should be involved in the measurement. In CCFP, two kinds of system boundaries can be applied: organizational and operational boundaries.

Solus Advanced Materials' battery foil plant in Hungary is the only battery foil production centre in Europe, enabling them to ensure the fastest delivery of high-quality foils to local customers. Battery foil is a material used in electric vehicle batteries, and is a key material in increasing total vehicle mileage and densifying batteries. The production takes place at *H-2851 Környe, Han folyó utca 1. Hungary*. The report includes the CCFP assessment of this premise.

2.2.1 Organizational boundary

There are two approaches in CCFP reporting: the **equity-share** and the **control approach**.

According to the GHG Protocol Corporate Standard[8]:

"*Under the **equity share approach**, a company accounts for GHG emissions from operations according to its share of equity in the operation. The equity share reflects economic interest, which is the extent of rights a company has to the risks and rewards flowing from an operation. Typically, the share of economic risks and rewards in an operation is aligned with the company's percentage ownership of that operation, and equity share will normally be the same as the ownership percentage*".

The other approach is the following:

*"Under the **control approach**, a company accounts for 100 percent of the GHG emissions from operations over which it has control. It does not account for GHG emissions from operations in which it owns an interest but has no control. Control can be defined in either financial or operational terms. When using the control approach to consolidate GHG emissions, companies shall choose between either the operational control or financial control criteria."*

[4] https://ghgprotocol.org/standards
[5] https://ghgprotocol.org/guidance-0
[6] https://ghgprotocol.org/calculation-tools
[7] https://quantis-suite.com/Scope-3-Evaluator/
[8] https://ghgprotocol.org/corporate-standard

The control approach can be further divided into two methods, namely the **financial control** and the **operational control**:

"Financial Control. The company has financial control over the operation if the former has the ability to direct the financial and operating policies of the latter with a view to gaining economic benefits from its activities."

„Operational Control. A company has operational control over an operation if the former or one of its subsidiaries […] has the full authority to introduce and implement its operating policies at the operation."

The CCFP accounting of *Volta Energy Solutions Hungary Ltd.* follows the equity-share approach.

2.2.2 Operational boundary

According to the Corporate Standard, GHG emissions caused by company activities can be direct and indirect ones, depending on the emission source: **direct emissions** are generated within the company, while **indirect emissions** are generated in other locations, but company activities are causing these emissions (e.g. electric supply; stakeholders in the value chain).

"*Direct emissions are emissions from sources that are owned or controlled by the reporting company*."

"*Indirect emissions are emissions that are a consequence of the activities of the reporting company, but occur at sources owned or controlled by another company.*"

Based on the emissions, the standard differentiates 3 categories called as **scopes**. "*The scopes are defined to ensure that two or more companies do not account for the same emission within scope 1 or scope 2.*"[9] as follows:

- **Scope 1:** *"Companies report GHG emissions from sources they own or control as scope 1."*
- **Scope 2**: *"Companies report the emissions from the generation of purchased electricity that is consumed in its owned or controlled equipment or operations as scope 2."*
- **Scope 3:** *„By definition, scope 3 emissions occur from sources owned or controlled by other entities in the value chain (e.g., materials suppliers, third-party logistics providers, waste management suppliers, travel suppliers, lessees and lessors, franchisees, retailers, employees, and customers).*

[9] cited from GHG Protocol: Corporate value chain

2.2.2.1 Scope 1 activities

According to the Corporate Standard, the following company activities and relating emissions shall be categorized as Scope 1 in general:

- *"**Generation of electricity, heat, or steam.** These emissions result from combustion of fuels in stationary sources, e.g., boilers, furnaces, turbines".*
- *"**Physical or chemical processing.** Most of these emissions result from manufacture or processing of chemicals and materials, e.g., cement, aluminium, adipic acid, ammonia manufacture, and waste processing".*
- ***"Transportation of materials, products, waste, and employees.** These emissions result from the combustion of fuels in company owned/controlled mobile combustion sources (e.g., trucks, trains, ships, airplanes, buses, and cars)".*
- *"**Fugitive emissions.** These emissions result from intentional or unintentional releases, e.g., equipment leaks from joints, seals, packing, and gaskets; methane emissions from coal mines and venting; hydrofluorocarbon (HFC) emissions during the use of refrigeration and air conditioning equipment; and methane leakages from gas transport."*

In this CCFP accounting, the following *Volta Energy Solutions Hungary Ltd*. activities are relevant and reported under Scope 1:

- Generation of electricity, heat or steam from stationary combustion equipment (boilers, scorcher);
- Business use of vehicles (i.e. for business trips) by own fleet of the reporting company.

The following Scope1 emissions are not included as they did not occur in the reporting year:

- Fugitive emissions from stationary cooling equipment as air conditioners, refrigerators, technology coolers and a heat pump, as no emissions were reported.
- Physical or chemical processing, including the local management of generated waste water at the company's own facility. *Volta Energy Solutions Hungary Ltd*. has chemical processes, albeit no emissions were reported for the analysed period.
- Scope 1 transportation and distribution of goods with the company's own fleet has not occurred.

2.2.2.2 Scope 2 activities

According to the Corporate Standard, the following company activities and relating emissions shall be categorized as Scope 2:

"Companies report the emissions from the generation of purchased electricity that is consumed in its owned or controlled equipment or operations as scope 2. Scope 2 emissions are a special category of indirect emissions. For many companies, purchased electricity represents one of the largest sources of GHG emissions and the most significant opportunity to reduce these emissions. Accounting for scope 2 emissions allows companies to assess the risks and opportunities associated with changing electricity and GHG emissions costs."[10]

GHG Protocol provides two methods for calculating Scope 2 emissions. These are the **location- and market-based methods**.

„ The location-based method reveals what the company is physically putting into the air, and the market-based approach shows emissions the company is responsible for through its purchasing decisions, such as a renewable energy contract.

The location-based or place-based method calculates the emissions from electricity use based on the average emission intensity of the power grid you're using. […]

A market-based method calculates the emissions from the electricity you and your company purchase. The market-based method is intended to support the use and reporting of green energy tariffs via Renewable Energy Certificates (REC) and Renewable Energy Guarantees of Origin (REGO).

Why does this matter? For most companies, especially SMEs, it's not always possible to put solar on your roof or directly produce renewable energy, however, it's fairly simple to shift towards a renewable energy tariff. This market-based approach rewards companies for making better environmental decisions.

*Importantly, **companies are required to report their emissions under both methods**."* [11]

Further introduction to Guarantees of Origin certificates can be found in Chapter 5.2.2. In this CCFP accounting, the indirect emissions originating from *Volta Energy Solutions Hungary Ltd*. purchased energy consumption are reported under Scope 2, based on the two approaches (both location- and market-based).

The market-based accounting of Scope 2 emissions has been undertaken by the use of the electricity energy mix. Energy-mix of the supplied electricity was available published by the supplier (CEZ Hungary Ltd.). The location-based accounting of Scope 2 emissions has been undertaken by the use of Hungarian average electricity mix (EcoInvent database 3.11. 2024.).

[10] GHG Corporate Standard

[11] https://www.zevero.earth/post/location-vs-market-based-carbon-reporting

2.2.2.3 Scope 3 activities

GHG Protocol has published a standard for Scope 3 reporting (Corporate Value Chain (Scope 3) Accounting and Reporting Standard). According to this, the following company activities and relating emissions shall be categorized as Scope 3:

- *"Emissions from activities in the value chain of the entities included in the company's organizational boundary"*
- *"Emissions from leased assets, investments, and franchises that are excluded from the company's organizational boundary but that the company partially or wholly owns or controls".*

Currently, the accounting of emissions generated from Scope 3 activities is optional if the reporting is in conformance with the GHG Protocol Corporate Standard. However, if the company decides that reporting is made in conformance with both the GHG Protocol Corporate Standard and the GHG Protocol Scope 3 Standard, then the reporting of Scope 3 emissions is required to be based on the principles of Scope 3 standard.

Scope 3 emissions generated from the value chain activities can be classified into two, main categories: upstream and downstream emissions, where **upstream emissions** mean "*the indirect GHG emissions from purchased or acquired goods and services*", while **downstream emissions** mean the *"indirect GHG emissions from sold goods and services […] also include emissions from products that are distributed but not sold (i.e., without receiving payment)"*.

Based on this categorisation, there are 15 optional subcategories within Scope 3. These subcategories are presented in 1. Table.

1. Table Scope 3 emissions

UPSTREAM OR DOWNSTREAM EMISSION	SCOPE 3 CATEGORY
Upstream Scope 3 emissions	1. Purchased goods and services
	2. Capital goods
	3. Fuel- and energy-related activities (not included in Scope 1 or Scope 2)
	4. Upstream transportation and distribution
	5. Waste generated in operations
	6. Business travel
	7. Employee commuting
	8. Upstream leased assets
Downstream Scope 3 emissions	9. Downstream transportation and distribution
	10. Processing of sold products
	11. Use of sold products
	12. End-of-life treatment of sold products
	13. Downstream leased assets
	14. Franchises
	15. Investments

Volta Energy Solutions Hungary Ltd. decided to report its Scope 3 emissions, which are relevant from the company's profile and may significantly contribute to the overall CCFP, and related emission data can be calculated.

Therefore, the relevant Scope 3 emissions are presented in 2. Table (corresponding excerpt from GHG Protocol Standard text is highlighted *in italic*):

2. Table: Scope 3 categories relevant to *Volta Energy Solutions Hungary Ltd*. in the CCFP analysis

CATEGORY NUMBER	CATEGORY	CATEGORY DESCRIPTION
1	**Purchased goods and services**	*"This category includes all upstream (i.e., cradle-to-gate) emissions from the production of products purchased or acquired by the reporting company in the reporting year. Products include both goods (tangible products) and services (intangible products)."* For the GHG emission of the production of the main feedstocks were included.
2	**Capital goods**	*"This category includes all upstream (i.e., cradle-to-gate) emissions from the production of capital goods purchased or acquired by the reporting company in the reporting year. Emissions from the use of capital goods by the reporting company are accounted for in either scope 1 (e.g., for fuel use) or scope 2 (e.g., for electricity use), rather than in scope 3."* This category embraces the primarily production related equipment, auxiliary equipment goods, i.e. IT and other general-purpose products are also considered.
3	**Fuel- and energy-related activities not included in Scope1 or Scope2**	*"A. **Upstream emissions of purchased fuels**:* *Extraction, production, and transportation of fuels consumed by the reporting company Examples include mining of coal, refining of gasoline, transmission and distribution of natural gas, production of biofuels, etc.* *B. **Upstream emissions of purchased electricity**:* *Extraction, production, and transportation of fuels consumed in the generation of electricity, steam, heating, and cooling that is consumed by the reporting company. Examples include mining of coal, refining of fuels, extraction of natural gas, etc.* *C. **Transmission and distribution losses**:* *(T&D) losses Transmission and distribution (T&D) losses (generation of electricity, steam, heating and*

CATEGORY NUMBER	CATEGORY	CATEGORY DESCRIPTION
		cooling that is consumed (i.e., lost) in a T&D system) – reported by end user …" – GHG Protocol The generation of electricity produces CO_2 emission, which is considered under Scope 2. Though the production of the consumed fuel for generating electricity is also accompanied by CO_2 emission, as well as the electric power transmission and distribution (T&D) losses. These emissions are considered under Scope 3. The T&D rate for Hungary has been derived from the EcoInvent database.
4	**Upstream transportation and distribution**	*"Transportation and distribution of products purchased by the reporting company in the reporting year:* *- between a company's tier 1 suppliers and its own operations (in vehicles and facilities not owned or controlled by the reporting company)* *- including inbound logistics, outbound logistics (e.g., of sold products), and transportation and distribution between a company's own facilities (in vehicles and facilities not owned or controlled by the reporting company)"* The transportation of main feedstock input materials from Tier1 suppliers (i.e. copper chip and wire).
5	**Waste generated in operations**	*"Includes emissions from third-party disposal and treatment of waste generated in the reporting company's owned or controlled operations in the reporting year. This category includes emissions from disposal of both solid waste and wastewater.* *Disposal and treatment of waste generated in the reporting company's operations in the reporting year (in facilities not owned or controlled by the reporting company).* *…* *Companies may optionally include emissions from transportation of waste in vehicles operated by a third party."* Here the GHG emissions of transportation of generated waste to the treatment sites and their treatment were considered.

CATEGORY NUMBER	CATEGORY	CATEGORY DESCRIPTION
		The accounted GHG emission of transportation was calculated by the latest EcoInvent database.
6	**Business travel**	*"Transportation of employees for business-related activities during the reporting year (in vehicles not owned or operated by the reporting company)"* In this category the reported business travels by passenger cars and flights were accounted.
7	**Employee commuting**	*"Transportation of employees between their homes and their worksites during the reporting year (in vehicles not owned or operated by the reporting company)"* Here the average commutation of the employees by own car, or public transportation (bus) were analysed. The input data was the means of transport and the overall commuting distance during the reporting year.
9	**Downstream transportation and distribution**	*"This category includes emissions that occur in the reporting year from transportation and distribution of sold products in vehicles and facilities not owned or controlled by the reporting company."* The transportation of *Volta Energy Solutions Hungary Ltd.* products from the place of production to end-consumer (gate-to-gate were included. The transportation relations including the transported weights, means and distance were reported.

The related data to the characterisation of operation were provided by *Volta Energy Solutions Hungary Ltd.* The Scope 3 categories that were not relevant to *Volta Energy Solutions Hungary Ltd*. in 2024. are also introduced (3. Table) below.

3. Table: Scope 3 categories excluded from the CCFP analysis

CATEGORY NUMBER	CATEGORY NAME	CATEGORY DESCRIPTION
8	**Upstream leased assets**	*"Operation of assets leased by the reporting company (lessee) in the reporting year and not included in scope 1 and scope 2 – reported by lessee"* The *Volta Energy Solutions Hungary Ltd.* leases passenger cars for the management. As this is not is an operative leasing, it is accounted under Scope 1.
10	**Processing of sold products**	*"Category 10 includes emissions from processing of sold intermediate products by third parties (e.g., manufacturers) subsequent to sale by the reporting company. Intermediate products are products that require further processing, transformation, or inclusion in another product before use"* This category considered as not relevant, as the products of *Volta Energy Solutions Hungary Ltd.* are not considered fully as intermediate products as their scale of applications is wide and various that its footprint cannot be estimated reasonably.
11	**Use of sold products**	*"This category includes emissions from the use of goods and services sold by the reporting company in the reporting year."* The use of *Volta Energy Solutions Hungary Ltd*'s products do not result considerable direct, or indirect emissions. The *Volta Energy Solutions Hungary Ltd*'s products are used in the production of more complex products (batteries), so their life-span, especially the duration of their use phase is difficult to estimate.
12	**End-of-life treatment of sold products**	*"Category 12 includes emissions from the waste disposal and treatment of products sold by the reporting company (in the reporting year) at the end of their life. This category includes the total expected end-of-life emissions from all products sold in the reporting year."* The main material of the manufactured products is copper, which recovery has a relatively low environmental footprint. As a consequence, this

CATEGORY NUMBER	CATEGORY NAME	CATEGORY DESCRIPTION
		category is neglected, as not playing significant share in the overall corporate carbon footprint.
13	**Downstream leased assets**	*"This category includes emissions from the operation of assets that are owned by the reporting company (acting as lessor) and leased to other entities in the reporting year …"* *Volta Energy Solutions Hungary Ltd*. does not own any leased assets.
14	**Franchises**	*"Category 14 includes emissions from the operation of franchises not included in scope 1 or scope 2. A franchise is a business operating under a license to sell or distribute another company's goods or services within a certain location."* This category is irrelevant for *Volta Energy Solutions Hungary Ltd.*
15	**Investments**	*"This category includes scope 3 emissions associated with the reporting company's investments in the reporting year…* *This category is applicable to investors (i.e., companies that make an investment with the objective of making a profit) and companies that provide financial services."* This category is irrelevant for *Volta Energy Solutions Hungary Ltd.*

2.3 The elements of CCFP accounting

The calculation principles of CCFP are based on the multiplication of activity data and the relevant emission factors (1. Figure):

Activity data: *"A quantitative measure of a level of activity that results in GHG emissions. Activity data is multiplied by an emissions factor to derive the GHG emissions associated with a process or an operation. Examples of activity data include kilowatt-hours of electricity used, quantity of fuel used, output of a process, hours equipment is operated, distance travelled, and floor area of a building."*

Emission factor: *"A factor that converts activity data into GHG emissions data (e.g., kg CO_2e emitted per litre of fuel consumed, kg CO_2e emitted per kilometre travelled, etc.)."* EcoInvent offers a comprehensive database for emission factors from most sectors and activities.

Global Warming Potential, GWP: *"A factor describing the radiative forcing impact (degree of harm to the atmosphere) of one unit of a given GHG relative to one unit of CO_2."* E.g. 100-year GWP for CO_2 is 1, 100-year GWP for CH_4 is 28, it means that CH_4 is 28 times stronger GHG-intensifying gas than CO_2, considering a 100-year period. Multiplying the emission results with GWP, the overall CCFP will be resulted in CO_2-equivalents (CO_2e).

1. Figure: The elements of CCFP accounting

3 Inventory

3.1 Reference year

Volta Energy Solutions Hungary Ltd. assigned year 2024. for reporting their CCFP, thus, all company activities considered and the calculated emissions generated from these activities are referred to this year.

3.2 Data accuracy

The company production and process related data used for the CCFP calculation was collected and shared by *Volta Energy Solutions Hungary Ltd.* Therefore, these data are considered to be authentic and reliable.

4. Table: the assessment of harvested data quality

SCOPE	EMISSION SOURCE	LEVEL OF DATA QUALITY
Scope 1	▪ Energy sources burned locally by the company	Measured
	▪ Emissions from the use of vehicles owned or operated by the company including on-site material handling	Estimated
Scope 2	▪ Electricity purchased by the company (market-based and location-based)	Measured
Scope 3	**Upstream (necessary for the company's activities)**	
	▪ Production of materials	Measured
	▪ Transport of materials	Estimated
	▪ Capital goods	Derived (spend-based)
	▪ Purchased services	Derived (spend-based)
	▪ Water used for production and sanitary purposes	Measured
	▪ Emissions generated by the commuting of company employees (both by public transport and by individual car journeys)	Derived
	▪ Business trips not made by company vehicles	Estimated
	Downstream (resulting from the company's activities)	
	▪ Transport of products to the clients	Measured
	▪ Treatment and transport of waste and wastewater generated by the company's activities	Measured

The assessment of the quality of the harvested data is presented in 4. Table, above. The colour codes represent the uncertainty of the harvested data for calculating the related emissions. Green is the most certain, while the different fades into red represents decreasing level of data quality.

The most confident data is the *"Measured"*, while the *"Derived"*, and the *"Estimated"* are less accurate, but still accepted by the GHG Protocol for carbon footprint calculations. Despite the fact that spend-based method uses financial related specific emissions, its less reliable due to the relatively weak statistical correlation between the money spent and the GHG emission of the activity itself. However, if no rational method for mass-based calculation could be implemented, the spend-based method is also accepted and applicable.

3.3 Emission factors

The data refers directly to the amount material and energy in most of the cases; however, in case of few categories (capital goods, purchased services), where mass volumes and compositions are not feasible to determine, the related emissions can be calculated based on other dimension, that specific emission factors exist, i.e. from financial aspect. This is called spend-based emission factors, that are estimated using Input-Output Models that are applied internationally and then Environmentally Extended (EE MRIO)[12].

The emission factors are derived from internationally acknowledged sources and databases (i.e. EcoInvent, Exiobase for spend-based emissions).

[12] https://www.climatiq.io/blog/science-behind-spend-based-emission-factors

4 CCFP Calculations

4.1 Scope 1

Regarding the Scope 1 emissions, for *Volta Energy Solutions Hungary Ltd.* the relevant subcategories are:

- Generation of electricity, heat, or steam (stationary combustion)
- Transportation of materials, products, waste, and employees (mobile emissions)

Volta Energy Solutions Hungary Ltd. operates stationary combustion and HVAC equipment: gas boilers, air conditioners, coolers and heat pumps as their own asset. Therefore, the emissions generated from the combustion of natural gas was reported under Scope 1. Fugitive emissions were not reported. The main inventory data for Scope 1 can be found in 5. Table.

5. Table: *Volta Energy Solutions Hungary Ltd.* own assets on heating and cooling equipment and electricity generation

VOLTA ENERGY SOLUTIONS HUNGARY LTD.	2024.
Stationary combustion [piece]	6
Consumed natural gas [m^3]	4 563 371
Stationary cooling equipment [piece]	7
Stationary heat pump [piece]	150
Aggregator [piece]	1

The inventory of the stationary combustion equipment consists of 6 different units for producing heat for technology purposes. The amount of natural gas consumed by these units was 4 563 371 m^3 in 2024. The company also owns and operates 150 stationary heat pumps for technology purposes as well, but as for fugitive emission, no leakage was reported. The 1 piece of electricity generator consumes diesel fuel (6 089 l in 2024.).

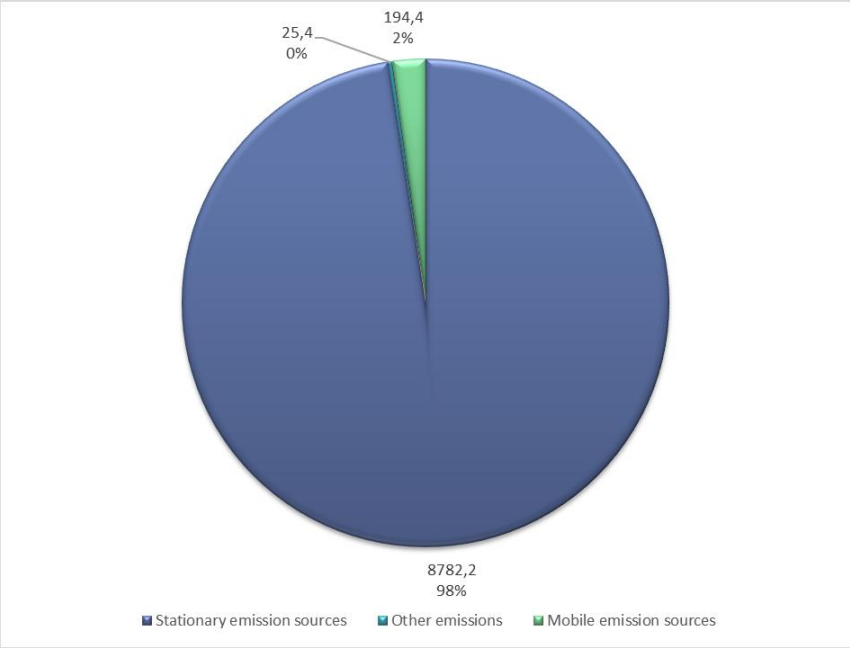
The mobile emission of *Volta Energy Solutions Hungary Ltd.* from its own assets stems from the overall consumption of 57 298 l gasoline and 16 574 l diesel fuel.

The summarised emissions originating from the stationary installed equipment and the company owned vehicles were calculated with the use of factors from EcoInvent database. The Scope 1 emission results are presented in 6. Table below.

6. Table: Scope 1 emissions (2023.)

SCOPE 1 EMISSION	QUANTIFIED EMISSION [tCO2e]
Stationary combustion emission	8 782,2
Mobile emissions	194,4
Generated electricity by own assets	25,4
Scope 1 Sum:	**9002,0**

The 2. Figure below illustrates the share of these emissions.



2. Figure: share of Scope1 emissions

The summarised results of Scope1 shows that the GHG emissions from **the natural gas consumption of the stationary heating equipment are the most prevailing** (98%).

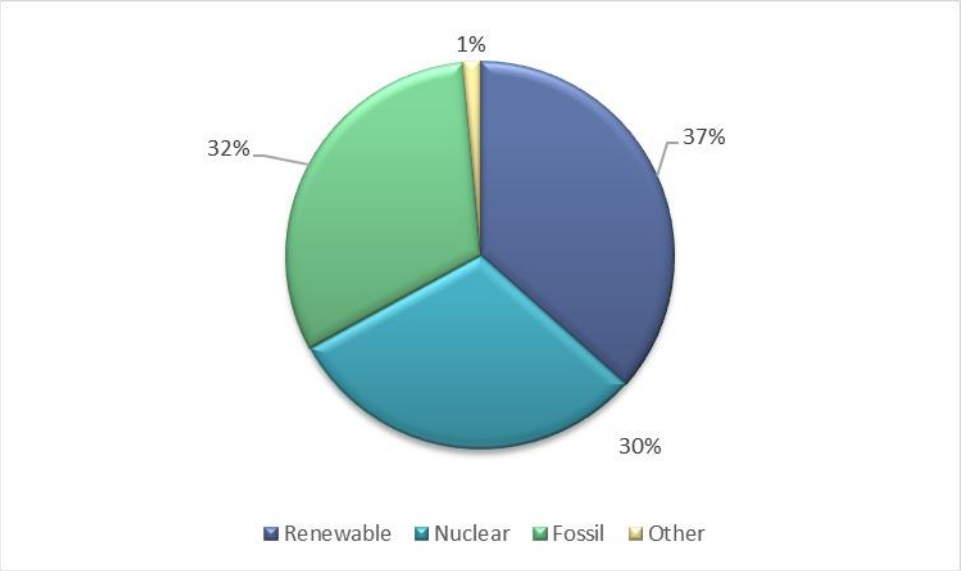
The other emission comes from the mobile emission - which represents about 2% of the overall Scope 1 emission sources - is very limited. The emission from the generation of electricity by own asset is unremarkably low.

The quantified Scope1 results of GHG emission of *Volta Energy Solutions Hungary Ltd.* in 2024. was

9 002,0 tCO_2e

4.2 Scope 2

For *Volta Energy Solutions Hungary Ltd.*, the **market-based approach** for Scope 2 can be calculated. For *Volta Energy Solutions Hungary Ltd*., the service provider in 2024. was CEZ Hungary Ltd. The service provider publishes its annual energy mix, though – in the time of compilation of this report – the energy mix for 2023[13]. was available and used for calculating the related emissions.



3. Figure: Mix of consumed electricity purchased by CEZ Hungary Ltd. (2023.)

For Scope2 emissions both options – market-based and location-based approach – are required to calculate. However, the market-based method is more realistic, due to its more specific information on the mix of the consumed electricity.

The location-based calculation was made on the Hungarian, country-specific factors available in EcoInvent database. This resulted a slightly higher GHG emission.

As a result, the Scope 2 emission of *Volta Energy Solutions Hungary Ltd*. in 2024. is:

Market-based method: **51 139,8 t CO2e**

Location-based method: **57 206,3 t CO2e**

This category represents the 56,1% (market-based) of the overall GHG emission in 2024. On location-based approach, this share is 58,8%.

[13] https://www.cez.hu/webpublic/file/edee/2024/07/forrasosszetetel-2023.pdf

4.3 Scope 3

The Scope 3 emission is the most complex amongst the others. According to the GHG Protocol "*by developing a Scope 3 inventory, companies can understand the overall emissions profile of their upstream and downstream activities. This information provides companies with an understanding of where potential emissions and associated risks and opportunities lie in the value chain, as well as the relative risks and opportunities of scope 3 emissions compared to companies' direct emissions.*"

The Scope 3 is currently a non-mandatory emission category to calculate. However, according to the relevance of Scope 3, it is essential to the companies to conduct a Scope 3 analysis on their indirect emissions.

As a first step, the relevant Scope 3 categories for *Volta Energy Solutions Hungary Ltd.* had already been identified in chapter 2.2.2.3., where the justification of excluded Scope 3 categories was also explained.

4.3.1 Category 1 – Purchased Goods and Services

As a frequent conclusion, this category result is highly dominant part of the overall GHG emissions of a manufacturer that uses relevant amount of feedstock material from energy-intensive industry as copper production and recycling. The most prevailing feedstock consumed by *Volta Energy Solutions Hungary Ltd*. is the different forms of copper, representing overall 12,9 ktons in 2024. The copper feedstock is 100% recycled material, which is excellent. Beside feedstock consumption, the requisite services could be also relevant.

The GHG emission of *Volta Energy Solutions Hungary Ltd.* from the upstream (cradle-to-gate) emission of feedstock materials represents 3 513,4 tCO_2e, while the purchased services eventuate 2 437,9 tCO_2e GHG emission.

The Scope3 Category 1 emission of *Volta Energy Solutions Hungary Ltd.* was

5 951,3 tCO_2e

This category overall means 5 951,3 tCO_2e, representing 19,2% of the total Scope 3 emissions and 6,5% of the overall GHG emission in 2024.

4.3.2 Category 2 – Capital Goods

This category includes all upstream (i.e., cradle-to-gate) emissions from the production of capital goods purchased or acquired by *Volta Energy Solutions Hungary Ltd.* in 2024.

The Scope3 Category 2 emission of *Volta Energy Solutions Hungary Ltd.* was

1 704,3 tCO_2e

This category represents 5,5% of the total Scope 3 emissions and 1,9% of the overall GHG emission in 2024.

4.3.3 Category 3 – Fuel- and Energy-Related Activities

In this category the relevant activity of *Volta Energy Solutions Hungary Ltd.* is the transmission and distribution (T&D) losses (15 742,8 tCO_2e). Beside the T&D losses, the production of consumed fuels was also significant (4 035,8 tCO_2e).

The Scope3 Category 3 emission of *Volta Energy Solutions Hungary Ltd.* was

19 778,5 tCO_2e

This category represents 63,7% of the total Scope 3 emissions and 21,7% of the overall GHG emission in 2024.

4.3.4 Category 4 – Upstream Transportation and Distribution

The transportation of feedstock materials is done by subcontracted parties and so it is counted as a Scope3 emission. Not surprisingly, the most significant input material for production dominates this category, as copper chip, wire, and granules, on one hand by its amount and the distance of transportation.

The Scope3 Category 4 emission of *Volta Energy Solutions Hungary Ltd.* was

1 196,4 tCO_2e

This category represents 3,9% of the total Scope 3 emissions and 1,3% of the overall GHG emission in 2024.

4.3.5 Category 5 - Waste generated in operations

Here the GHG emissions related to the treatment of generated wastes was considered. The generated waste streams (including solid and liquid forms) can be classified into 3 categories:

- hazardous industrial waste
- non-hazardous industrial waste
- municipal solid waste

The most significant sources of related GHG emissions are linked to the waste streams, which has the most relevant quantity and environmentally critical property, as contaminated acidic aqueous waste, chrome-sludge, spent-activated carbon.

It is worth to analyse how the different waste streams contribute to the emissions within the category (7. Table). The most relevant waste streams are the treatment of the generated municipal sludge and the spent activated carbon (1,5% and 0,9% of the total Scope 3 emissions accordingly). Notably, the GHG emission of the treatment of mixed municipal waste, contaminated packaging waste and chrome-sludge can be mentioned.

7. Table: GHG emissions from the treatment of wastes generated at Volta Energy Solutions Hungary Ltd. in 2024.

GENERATED WASTE	EWC-CODE	QUANTITY	UNIT	GHG EMISSION [tCO_2e]
Municipal waste				
Mixed	200301	100 000	kg	52,05
Selective paper	150101	45 160	kg	3,26
Selective plastics	150102	12 660	kg	0,15
Selective metal	170401	3 010	kg	0,13
Municipal sludge		571 708	m^3	471,66
Industrial, non-hazardous waste				
Selective wood	150103	282 020	kg	0,00
Mixed packaging	150106	95 880	kg	1,11
Distilled salt	_060314	147 460	kg	0,89
Copper sludge	190814	104 580	kg	4,02
Technology waste water		260 764	m^3	0,00
Industrial, hazardous waste				
Contaminated acidic aqueous waste	110111	2 251 735	kg	0,73
Contaminated packaging waste	150110	8 360	kg	20,07
Contaminated solid mixed waste	150202	32 135	kg	6,71
Expired chemicals or laboratory waste	160506	5 451	kg	13,09
Chrome sludge	190813	247 600	kg	36,82
Spent activated carbon	_061302	122 664	kg	294,47
Waste oil	130205	1 060	kg	3,02

The transportation of these generated wastes to the treatment facility eventuates an additional 11,6 tCO_2e GHG emission.

The Scope3 Category 5 emission (including waste transportation) of *Volta Energy Solutions Hungary Ltd.* was

919,8 tCO_2e

This category represents 3,0% of the total Scope 3 emissions and 1,0% of the overall GHG emission in 2024.

4.3.6 Category 6 – Business Travel

The transportation of employees for business-related activities (business trips) during the reporting year by vehicles not owned or operated by the reporting company is accounted within this category.

In 2024. *Volta Energy Solutions Hungary Ltd*. reported 636 126 passenger km by plane. The emission factors for calculation were obtained from EcoInvent database.

The results shows that the related GHG emission of *Volta Energy Solutions Hungary Ltd.* in Scope 3 Category 6 in 2024. was

55,9 tCO_2e

This category represents 0,2% of the total Scope 3 emissions and 0,1% of the overall GHG emission in 2024.

4.3.7 Category 7 – Employee Commuting

Under Category 7 the regular commutation of the employees between their homes and their worksites is reported, by any means of transportation that are not owned or controlled by the reporting company.

Volta Energy Solutions Hungary Ltd. reported data for year 2024. is summarized in 8. Table, which also includes the related GHG emissions.

8. Table: GHG emissions of the employee commuting

MEANS OF COMMUTING	PASSENGER DISTANCE [KM]	TRANSPORTATION [tCO_2e]
Own car	2 090 536	405,78
Bus	437 138	34,49

The results shows that the highest share of commutation derives from the own cars of the employees (92,2% within the category and the rest is for bus transportation).

The summarised Scope3 Category 7 GHG emission of *Volta Energy Solutions Hungary Ltd.* in Scope 3 Category 7 in 2024. was

440,3 tCO_2e

This category represents 1,4% of the total Scope 3 emissions and 0,5% of the overall GHG emission in 2024.

4.3.8 Category 9 – Downstream transportation and distribution

This category includes emissions that occur in the reporting year from transportation and distribution of sold products by vehicles and facilities not owned or controlled by the reporting company and not included in Scope1 and Scope2. The transportation of *Volta Energy Solutions Hungary Ltd*. products to Tier1 partners from gate-to-gate were included. The transportation relations including the transported weights, means and distance were reported.

Based on the data from *Volta Energy Solutions Hungary Ltd.* the overall amount of transported product can be estimated to be equivalent to the amount of inbound amount of copper feedstock (chip, wire, granules) (12.924 tons) transported to destinations to various destinations.

The summarised Scope3 Category 9 GHG emission of *Volta Energy Solutions Hungary Ltd.* result in 2024. was

1 004,6 tCO_2e

This category represents 3,2% of the total Scope 3 emissions and 1,1% of the overall GHG emission in 2024.

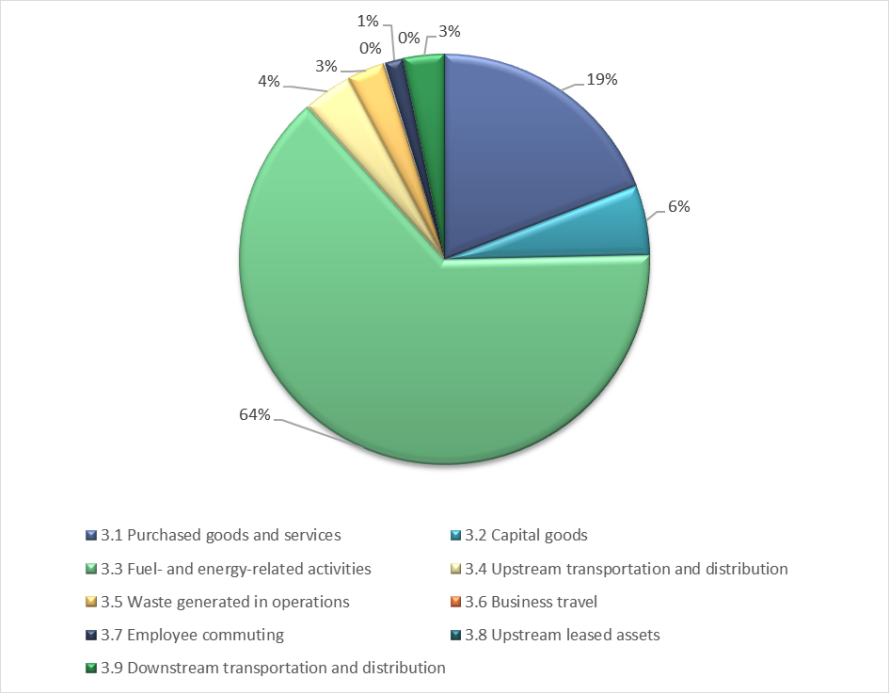
4.3.9 Summarized Scope3 emissions

This chapter aims to sum up all the relevant Scope3 emissions of *Volta Energy Solutions Hungary Ltd*. The amount and share of GHG emissions of Scope3 categories is presented in 9. Table and 4. Figure.

As the result shows, the most decisive emission belongs to Category 3 (Fuel- and energy-related activities). This represents 64% of the total Scope3 emissions. The share of Category 1 (Purchased goods and services) is also significant (19%).

9. Table: Summarized Scope3 emissions

SCOPE 3 CATEGORY	GHG EMISSION [tCO_2e]
3.1. Purchased goods and services	5 951,3
3.2. Capital goods	1 704,3
3.3. Fuel- and energy-related activities	19 778,5
3.4. Upstream transportation and distribution	1 196,4
3.5. Waste generated in operations	919,8
3.6 Business travel	55,9
3.7. Employee commuting	440,3
3.9. Downstream transportation and distribution	1 004,6
SUM:	**31 051,1**



4. Figure: Overall share of Scope3 category emissions

The overall Scope3 GHG emission of *Volta Energy Solutions Hungary Ltd*. in 2024. was

31 051,1 tCO_2e

4.4 Overall Corporate Carbon Footprint

Summing up Scope 1-2-3 emissions of *Volta Energy Solutions Hungary Ltd.* in 2024. (10. Table), Scope 2 has the most dominant share (56,08 %) due to the GHG emission stemming from the generation of the consumed electricity. The second highest share (34,05%) belongs to Scope 3, while Scope 1 represents the smallest portion (9,87%).

10. Table: Overall GHG emission of Volta Energy Solutions Hungary Ltd. in 2024.

Overall GHG emission of *Volta Energy Solutions Hungary Ltd.* in 2024.			
SCOPE 1	**Category**	**[tCO_2e]**	**Share in the overall GHG emission [%]**
	Stationary combustion emissions	8 782,2	9,6%
	Mobile emissions	194,4	0,2%
	Generated electricity by own assets	25,4	0,03%
	Scope 1 Total:	***9 002,0***	**9,87%**
SCOPE 2			
	Emissions from purchased energy (market-based)	51 139,8	56,08%
	Scope 2 Total:	***51 139,8***	**56,08%**
SCOPE 3			
3.1	Purchased goods and services	5 951,3	6,5%
3.2	Capital goods	1 704,3	1,9
3.3	Fuel- and energy-related activities	19 778,5	21,7%
3.4	Upstream transportation and distribution	1 196,4	1,3%
3.5	Waste generated in operations	919,8	1,0%
3.6	Business travel	55,9	0,1%
3.7	Employee commuting	440,3	0,5%
3.9	Downstream transportation and distribution	1 004,6	1,1%
	Scope 3 Total:	***31 051,1***	**34,05%**
	Overall sum:	**91 192,9**	**100%**

The underlined values represent the highest impact within the corresponding Scope Category.

4.5 CCFP comparison with previous years

Volta Energy Solutions Hungary Ltd. published its CCFP results for 2022. and 2023. This gives an opportunity to compare its 2024. related CCFP results with the previous years.

The applied calculation methodology for previous years was not included in those reports. It implies that the calculation for some subcategories cannot be recovered. Moreover, the classification of Scope 3 categories of those reports did not follow the related GHG Protocol Standard, so their comparison with the 2024. CCFP calculation and especially conclusions can be made with certain reservations.

11. Table: Comparison of the Organisational Carbon Footprint Calculations of Volta Energy Solutions Hungary Ltd. 2022-2024.

Scope		Activity	tCO2e (2022)	tCO2e (2023)	tCO2e (2024)
Scope 1		Stationary combustion emission	7 744,75	9 655,42	8 782,20
		Mobile emissions	138,45	201,45	194,40
		Generated electricity for own purposes	0	0	25,4
		Scope 1 overall	**7 883,20**	**9 856,87**	**9 002,00**
Scope 2		**Purchased electricity (market-based)**	**34 085,44**	**55 597,87**	**51 139,80**
		Purchased electricity (location-based)	26 979,88	38 450,95	57 206,30
Scope3	Upstream	3.1. Purchased goods and services	6 039,98	10 630,33	5 951,30
		Goods	*5 500,88*	*9 634,97*	*3 513,40*
		Services	*539,10*	*995,36*	*2 437,90*
		3.2. Capital goods	454,73	709,57	1 704,30
		3.3. Fuel- and energy-related activities	14 118,62	20 997,74	19 778,00
		3.4. Upstream transportation and distribution	1 205,69	2 022,78	1 196,40
		3.5. Waste generated in operations	738,76	1 473,36	919,80
		Waste treatment	*734,84*	*1 466,77*	*908,20*
		Waste transport	*3,92*	*6,59*	*11,60*
	Downstream	3.6. Business travel	41,09	170,08	55,90
		3.7. Employee commuting	160,84	442,94	440,30
		3.8. Downstream transportation and distribution of product	491,77	744,01	1 004,60
		Scope 3 overall	**23 251,48**	**37 190,81**	**31 051,10**
		Total market-based	**65 220,12**	**102 645,55**	**91 192,90**
		Total location-based	58 114,56	85 498,63	97 259,40

5 Recommendations on carbon emissions mitigation

5.1 Specific recommendations

To reduce the organisational carbon footprint of *Volta Energy Solutions Hungary Ltd.,* the following recommendations can be made addressing the largest emission source:

1. **Reducing the amount of consumed fuels electricity and shifting to a bigger share of applied renewable energy sources during manufacturing:** the emissions related to the production (Scope 2) and Distribution & Transportation of consumed electricity (Scope 3.1) make up the 77,8 % of the overall CCFP. The emission from stationary sources (i.e. technology furnace) contributes by an additional 9,6% to the overall GHG emissions. These two together represents 87,4%.
   Therefore, it is highly recommended to consider the potential impacts of energy savings of the manufacturing. As examples, rational good practices are switching to renewable energy sources, utilization of compressor waste heat for hot water preparation and social heating, operating heat pump, energy-optimized building control system, using energy-saving lighting and water-saving valves, launching a biomass-based trigeneration power plant (power, heating, cooling), planning to install solar power systems. Carbon footprint can be significantly reduced by ceasing stationary combustion equipment which directly emit GHGs. Instead of boilers and furnaces, operating heat pumps may provide a much more efficient solution:

   - "*Heat pumps can reduce energy use for heating by up to 60%*
   - *Heat pumps deliver about 3 times the amount of energy as heat compared to the electricity they consume*".[14]

   Other possibility is to encourage the electricity provider (CEZ Ltd.) to raise the share of the renewables within their electricity mix. According to their latest publication (2023.) the share of produced fossil-based electricity is 36% that significantly contribute to the overall GHG emission.

5.2 General CCFP Reduction and climate mitigation strategies

This chapter intends to provide some of the best practices in CCFP reduction and climate mitigation strategies, taking into consideration both legally regulated approaches and both technological advices.

5.2.1 Carbon credits and carbon offsets

According to the legislations on carbon emission regulations, there is a difference between a mandatory and voluntary carbon credit system. In the EU, emission regulations are provided by the mandatory carbon credit system which is based on the EU ETS 'cap and trade' system.

[14] https://www.fluorocarbons.org/wp-content/uploads/2016/01/EFCTC-HFCsAndHeatPumps_Infographicupdate2021_Final.pdf

Based on the principle, if companies do not comply with the regulated maximum emission allowances (which means they can only emit certain amount of GHGs), there are sanctions (penalty fees and extra taxes). However, if the company cannot comply with this criterion, then it is allowed to buy further carbon credits from those companies which have successfully cut their emissions below the required amount level, thus could sell these extra amounts of emission allowances in the form of carbon credit.

Besides this mandatory system, there is a voluntary carbon market which helps companies to reach net zero emission by financing such projects verified by third parties which can directly reduce or save emissions (e.g. natural habitat rehabilitation projects). If a carbon offset project is made, it is verified by a carbon offset credit which can be purchased to reach net zero. The geographical locations of these kinds of projects are independent from the location of the company where emissions are actually occurring, this is based on the principle that global emissions are globally accumulated by warming the atmosphere, thus, carbon removal projects can globally save or reduce emissions.[15]

The carbon offset credits help to achieve net zero emission and hence, companies can communicate their efforts toward environmental sustainability, however, the corporate carbon footprint cannot be directly reduced by carbon offset projects. It means, that the company can counterbalance its emissions by purchasing carbon offset credits, and thus, these emissions can be eliminated, reaching net zero emissions, but these emissions are not ceased.

Furthermore, there can be certain negative aspects or downsides of the emerging trend of carbon offset purchases. The relevant Guardian article highlights that there are many 'phantom credits' which can even counteract the original emission reduction purposes.[16]

The Carboncredits.com site extensively summarizes the main aspects of the carbon trade system and highlights the main differences between the mandatory carbon credits and the voluntary carbon offsets. Here are the main key aspects of the carbon market (cited from the site):

„Carbon credits, also known as carbon allowances, work like permission slips for emissions. When a company buys a carbon credit, usually from the government, they gain permission to generate one ton of CO2 emissions. With carbon credits, carbon revenue flows vertically from companies to regulators, though companies who end up with excess credits can sell them to other companies.

Offsets flow horizontally, trading carbon revenue between companies. When one company removes a unit of carbon from the atmosphere as part of their normal business activity, they can generate a carbon offset. Other companies can then purchase that carbon offset to reduce their own carbon footprint."

[15] *Broekhoff, D., Gillenwater, M., Colbert-Sangree, T., and Cage, P. 2019. "Securing Climate Benefit: A Guide to Using Carbon Offsets." Stockholm Environment Institute & Greenhouse Gas Management Institute. Offsetguide.org/pdf-download/*
[16] https://www.theguardian.com/environment/2023/jan/18/revealed-forest-carbon-offsets-biggest-provider-worthless-verra-aoe

„Credits and offsets form two slightly different markets, although the basic unit traded is the same – the equivalent of one ton of carbon emissions, also known as CO_2e."

„The number of credits issued each year is typically based on emissions targets. Credits are frequently issued under what's known as a "cap-and-trade" program. Regulators set a limit on carbon emissions – the cap. That cap slowly decreases over time, making it harder and harder for businesses to stay within that cap."

„Organizations with operations that reduce the amount of carbon already in the atmosphere, say by planting more trees or investing in renewable energy, have the ability to issue carbon offsets. The purchase of these offsets is voluntary, which is why carbon offsets form what's known as the "Voluntary Carbon Market". However, by buying these carbon offsets, companies can measurably decrease the amount of CO_2e they emit even further."

When it comes to the sale of carbon credits within the carbon marketplace, there are two significant, separate markets to choose from.

„One is a regulated market, set by "cap-and-trade" regulations at the regional and state levels.

The other is a voluntary market where businesses and individuals buy credits (of their own accord) to offset their carbon emissions.

Think of it this way: the regulatory market is mandated, while the voluntary market is optional.

When it comes to the regulatory market, each company operating under a cap-and-trade program is issued a certain number of carbon credits each year. Some of these companies produce less emissions than the number of credits they're allotted, giving them a surplus of carbon credits.

On the flip side, some companies (particularly those with older and less efficient operations) produce more emissions than the number of credits they receive each year can cover. These businesses are looking to purchase carbon credits to offset their emissions because they must."

Many different types of businesses can create and sell carbon credits by reducing, capturing, and storing emissions through different processes.

„There are countless ways for companies to offset carbon emissions.

Though not a comprehensive list, here are some popular practices that typically qualify as offset projects:

- *Investing in renewable energy by funding wind, hydro, geothermal, and solar power generation projects, or switching to such power sources wherever possible.*
- *Improving energy efficiency across the world, for instance by providing more efficient cookstoves to those living in rural or more impoverished regions.*
- *Capturing carbon from the atmosphere and using it to create biofuel, which makes it a carbon-neutral fuel source.*

- *Returning biomass to the soil as mulch after harvest instead of removing or burning. This practice reduces evaporation from the soil surface, which helps to preserve water. The biomass also helps feed soil microbes and earthworms, allowing nutrients to cycle and strengthen soil structure.*
- *Promoting forest regrowth through tree-planting and reforestation projects.*
- *Switching to alternate fuel types, such as lower-carbon biofuels like corn and biomass-derived ethanol and biodiesel."*

„Both offsets and credits don't always work as intended. Voluntary carbon offsets rely on a clear link between the activity undertaken and the positive environmental impact.

Sometimes that link is obvious – companies that use carbon capture technology to remove CO_2 emissions and lock them away can point to hard numbers.

Other programs, like offsets that promote green tourism or seek to offset the damage of international travel, can be more difficult to measure. The reputation of the organization issuing the credit determines the value of the offset."

„Once properly vetted, "high-quality" offsets represent tangible, measurable amounts of reductions in CO_2e emissions that companies can use like they reduced their own greenhouse gas emissions themselves. Though the company has not yet actually reduced their own emissions, the world is just as well off as if the company had actually done so."

„Blue Carbon are special carbon credits derived from sites known as blue carbon ecosystems. These ecosystems primarily feature marine forests, such as tidal marshes, mangrove forests and seagrass beds.

The significant positive second-order effects attributed to each blue carbon credit are why many believe they will trade at a premium to other carbon credits."[17]

Besides financing carbon offset projects, investing in carbon stocks is becoming more and more popular to finance green transition and low-energy emission technologies. In 2023, the best choices for carbon stock investments can be:

- Carbon Streaming Corporation (NETZ.NEO and OFSTF.OTC)
- DevvStream (DESG.NEO)
- Base Carbon (BCBN.NEO)
- Brookfield Renewable Partners (BEP).[18]

According to a GreenBiz article, *"Blue carbon will be the next frontier of carbon crediting"*.[19]

[17] https://carboncredits.com/the-ultimate-guide-to-understanding-carbon-credits/
[18] https://carboncredits.com/top-4-carbon-stocks-to-watch-2023/
[19] https://www.greenbiz.com/article/blue-carbon-will-be-next-frontier-carbon-crediting

5.2.2 Guarantees of Origin

Carbon offsetting helps reaching net zero emissions, but does not prevent emissions originating from company activities, thus, does not reduce directly the corporate carbon footprint.

However, there is a scheme accepted in the EU, the so-called Guarantees of Origin certification scheme which helps promoting renewable energy and can directly reduce Scope 2 emissions.

Statkraft mentions the facts about the Guarantees of Origin certification scheme:

„Certification scheme documenting that a given amount of power is produced by a specific power plant and thus stems from a renewable or non-renewable energy source.

Introduced with the EU's first Renewable Energy Directive in 2001.

One Guarantee of Origin is equivalent to 1 MWh of electricity produced.

Businesses or individuals wishing to document the origin of their electricity consumption and its greenhouse gas footprint may choose to buy electricity certified with a Guarantee of Origin and thus help increase the demand for renewable energy."[20]

According to the scheme, by purchasing such certification the company can prove that the certain amount of energy was produced by renewable technology (1 certification = 1 MWh electricity) and by reclaiming the certification, the company can directly reduce its Scope 2 emissions (thus acts as the company would consume zero-emission renewable energy during its activity).

In Hungary, Hungarian Energy and Public Utility Regulatory Authority (Magyar Energetikai és Közműszabályozási Hivatal, MEKH) published a leaflet about the use of Guarantees of Origin in the country. From June 2022 companies can purchase in the relevant auction scheme such certifications, but foreign certifications (renewable energy is generated abroad, e.g. Norwegian hydropower) are also accepted and can be reclaimed.[21]

5.2.3 Green bonds

In 2014, the International Capital Market Association set the rules of the *"Green Bond Principles"* and the EU Taxonomy Regulation provides guidelines for the assessment of environmentally sustainable projects. Green bonds are served to implement green projects, thus investing in green bonds means that the investor is committed in green finance and sustainability.

[20] https://www.statkraft.com/newsroom/news-and-stories/2020/guarantees-of-origin-ensuring-100-per-cent-renewable-power-in-europe/
[21] https://www.mekh.hu/tajekoztatas-a-szarmazasi-garanciak-magyarorszagi-rendszererol-es-piacarol-1

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