אוניברסיטת חיפה
UNIVERSITY OF HAIFA
جامعة حيفا

University of Haifa

2024 Carbon Footprint

July 2025

EcoTraders
Energy & Environment

Preface by the University of Haifa

At the University of Haifa, our compass is set towards environmental and social sustainability, in accordance with the UN Sustainable Development Goals (SDGs). The 17 SDGs provide a roadmap for the future of humanity and our planet. We are advancing towards these goals through research, teaching, public engagement, and the management of our operations.

In particular, we strive towards a sustainable management of our facilities, attempting to limit the University's negative impact on the environment. For example, currently we are the country's only campus to be recognized as ISO 14001 compliant by the Israel Standards Institute, a certification that ensures we operate strategically in order to reduce carbon emissions; electricity, water, gas, and paper usage; and are committed to green building practices.

Moreover, our facilities serve as a living laboratory for the research of people and the environment, and the geographic area in which we operate – from the mountain (Carmel national park campus), through the city (Downtown Haifa Campus) and into the sea (laboratories along the Mediterranean) – offer unique opportunities for research that advances the SDGs.

In an ongoing effort to reduce the University of Haifa's environmental impact, we are proud to publish our second carbon footprint report. The first report, released in 2023 and covering the year 2019, served to establish a baseline. This current report presents the university's carbon footprint for the year 2024, following the merger with the WIZO Haifa Academy of Design and Art.

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תקציר מנהלים

דו"ח זה מנתח את טביעת הרגל הפחמנית של אוניברסיטת חיפה. הניתוח מזהה את המקורות המרכזיים לפליטות גזי חממה ומהווה בסיס לגיבוש תוכנית הפחתת הפליטות של האוניברסיטה.

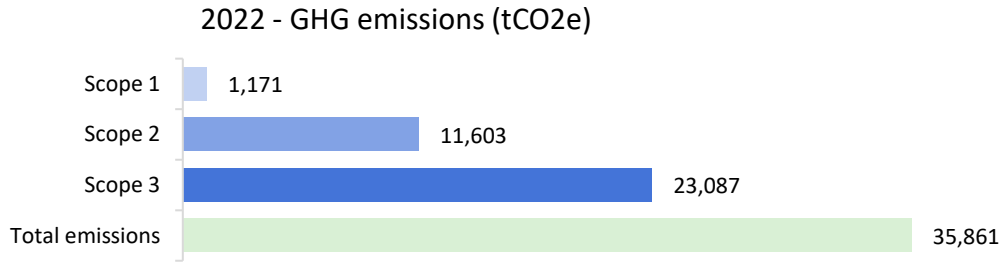
הניתוח התבצע בהתאם להנחיות פרוטוקול GHG - התקן המקובל בעולם לחשבונאות גזי חממה - ומתייחס לטביעת הרגל הפחמנית של ארבעת הקמפוסים המרכזיים באוניברסיטה: קמפוס ראשי (ראשי), קמפוס עירוני (דילן והנמל), מדעי הים (חקר הימים והאגמים) ובית הספר לעיצוב ויצו שנהיה חלק מהאוניברסיטה בשנת הניתוח. הניתוח מתייחס לפליטות הנובעות מפעילויות נלוות של האוניברסיטה לרבות מעונות, קפיטריות, וכן חללים מושכרים נוספים כגון סניף דואר, בנק וכו.'

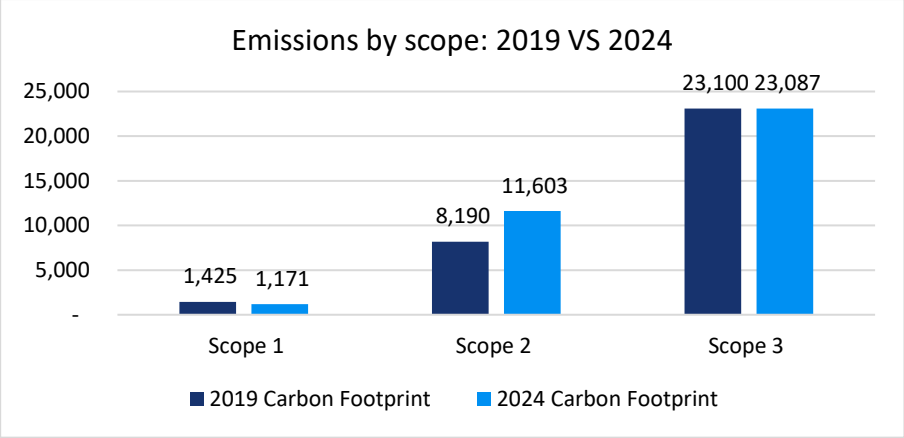
טביעת הרגל הפחמנית כוללת פליטות ישירות של האוניברסיטה (הקשורות לצריכת הדלק בכלי רכב ובבניינים, ושימוש בחומרי קירור בתוך מערכות HVAC) פליטות עקיפות הנובעות מצריכת חשמל ומים, טיפול בפסולת, נסיעות עסקים, ויוממות של אנשי הסגל והסטודנטים; פליטות הקשורות לייצור, הובלה ואספקה של סחורות ושירותים מרכזיים.

תוצאות

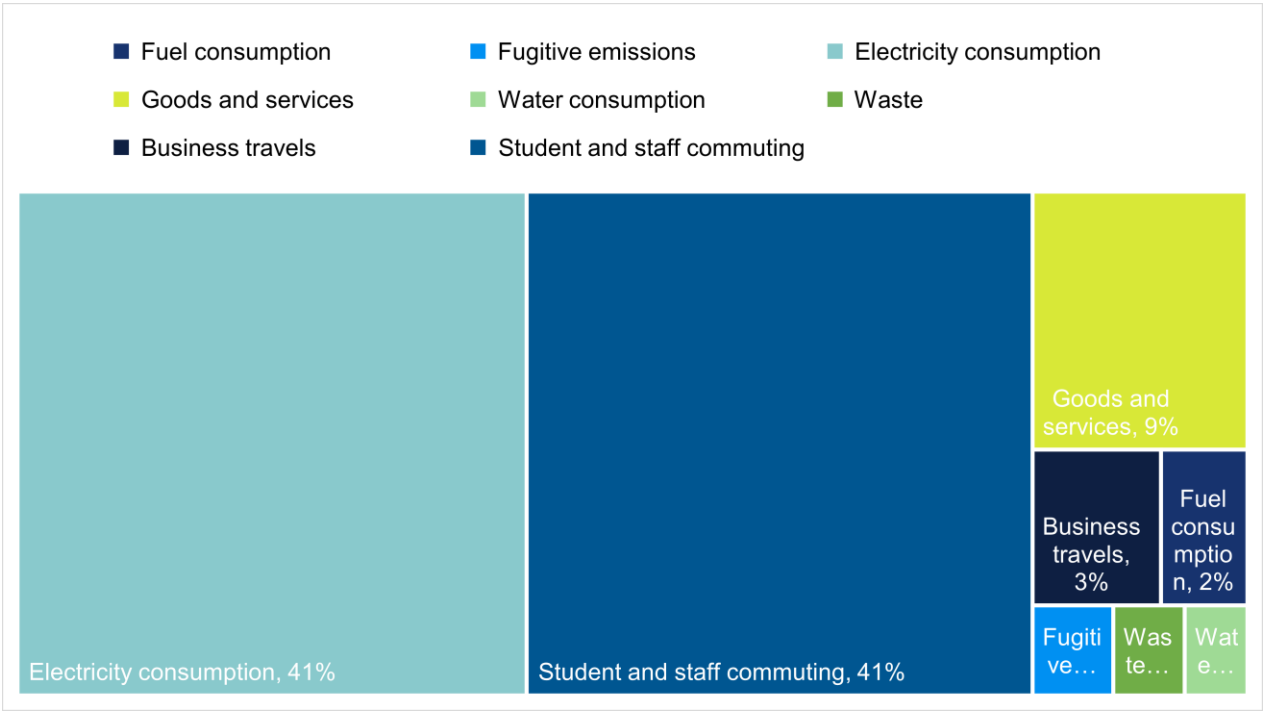
סך הפליטות של אוניברסיטת חיפה הוא 35,861 tCO2e שהם שווי ערך ל:

כפי שניתן לראות בגרף להלן, פליטות גזי חממה עקיפות (מכלול 3) הן החלק העיקרי והן מהוות 64% מסך הפליטות של האוניברסיטה, בעוד שפליטות עקיפות הנובעות מצריכת חשמל (מכלול 2) מהוות 33%.





נסיעות של סטודנטים ועובדים היו מקור הפליטות העיקרי (41%), לצד כלל צריכת החשמל ממכלולים 2+3 (41%) ולאחר מכן רכישת סחורות ושירותים (9%).



זיהוי מקורות הפליטה המרכזיים מהווה בסיס לפיתוח אסטרטגיות יעילות להפחתת פליטות. בפרט, אופטימיזציה של צריכת האנרגיה ומעבר למקורות אנרגיה מתחדשים הם קריטיים להפחתת פליטות הנובעות מצריכת חשמל. בין השנים 2019 ל-2024 חלה עלייה של 42% בפליטות הנובעות מצריכת חשמל במכלול 2, בעיקר בשל מעבר לספק חשמל בעל מקדם פליטה גבוה יותר. מצב זה מדגיש את החשיבות של מעבר לספק חשמל ממקורות מתחדשים, כדי להפחית את אחד ממקורות הפליטה המרכזיים של האוניברסיטה.

הפליטות מיוממות חושבו על בסיס נתוני סקר תחבורה ארצי בחיפה, הן עבור שנת 2019 והן עבור שנת 2024 .כתוצאה מכך, לא נצפה שינוי מהותי בפליטות מיוממות בין שנים אלו. בהיעדר סקר ייעודי בנושא יוממות בקרב סטודנטים ועובדים, שינויים בדפוסי התחבורה והפליטות הנלוות אליהם לא צפויים להתבטא בחישוב מצאי הפליטות.

Executive summary

This report analyzes the carbon footprint of the University of Haifa for 2024, identifying the key emission sources and serving as a basis for the identification and implementation of abatement measures, in view to formulate the emissions reductions plan of the University.

The analysis was conducted according to the GHG Protocol guidelines – the world's most widely used greenhouse gas accounting standard. It calculates the carbon footprint of the University of Haifa's four campuses (Main campus (ראשי), City campus (דילן והנמל), Marine Sciences (חקר הימים והאגמים), WIZO Haifa Academy of Design and Art (ויצו בית הספר לעיצוב)). The assessment also includes associated activities, including dormitories, and the rented spaces operated within the university, such as post office, bank, etc. In 2024, the University of Haifa merged with the WIZO Haifa Academy of Design and Art, and this is the first report to include WIZO as part of the university's carbon footprint.

The carbon footprint includes direct emissions at the University (associated with the fuel consumption in vehicles and buildings, and the use of refrigerants within the HVAC system) as well as indirect emissions from electricity and water consumption, waste treatment, business travels, staff and student commuting, and emissions associated with the manufacture, transport and provision of goods and services.

Results

The total 2024 emissions of the University of Haifa amounted to 35,861 tCO2e, which is equivalent[i] to:

[i] References of equivalence:

- Car: 0.205 kgCO2e / km / car using gasoline (based on Fuel efficiency 2014, Assessment of Greenhouse Gas Emission Reduction Potential and Recommended National Target for Israel and CBS emission factor)
- Round trip Tel Aviv – New York: 0.871 tCO2e / passenger ((International Civil Aviation Organization (ICAO), no date)
- Israel total emissions in 2022: 81,063,061 tCO2e (CBS, 2022)

175 million kilometers travelled by a gasoline car

41,172 round-trip flights Tel Aviv - New York

0.044% of Israel's total emissions (2023)

Indirect emissions (scope 3) are the main emission source, representing 64% of total university emissions, while other indirect emissions from electricity consumption (scope 2) represented 32%.

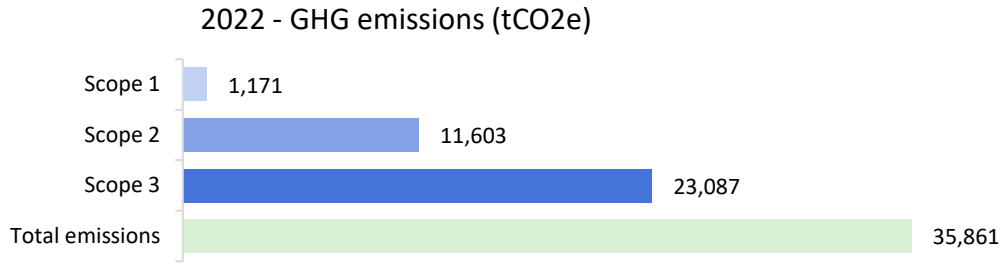


Figure 1: Greenhouse gas emissions breakdown per scope (tCO_2e)

Student and staff commuting was the main emission source (42% of the total), alongside electricity consumption (also 42% including both scopes 2 and 3), followed by the purchase of goods and services (10%). Business travel were responsible for 3%.

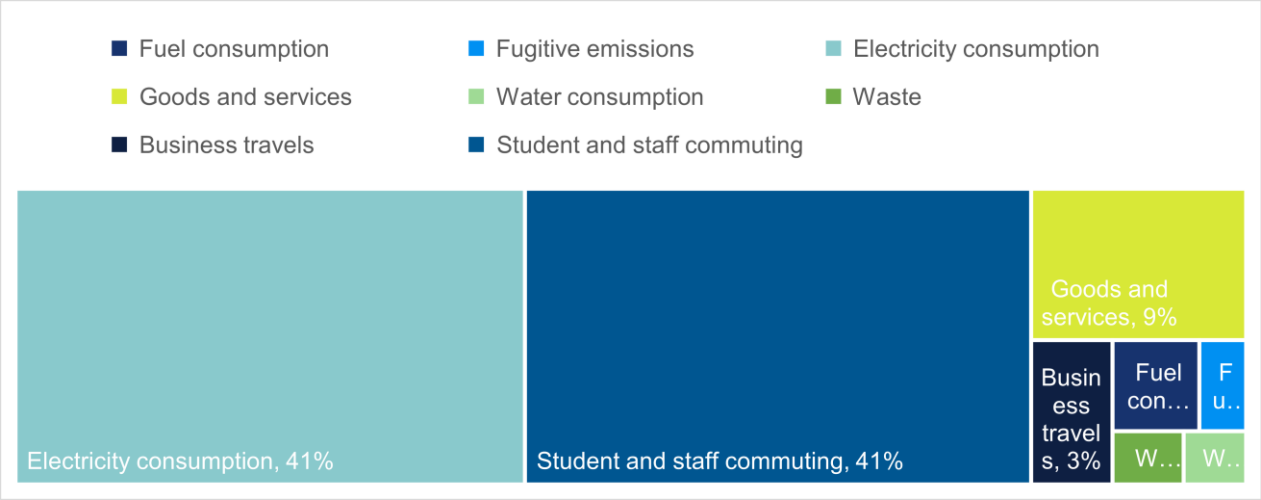


Figure 2: Greenhouse gas emissions breakdown per subject (tCO_2e)

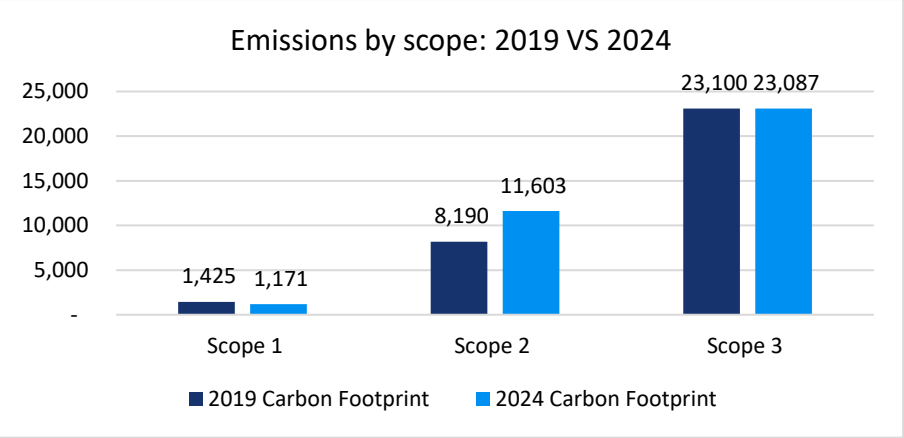


Figure 3: Greenhouse gas emissions breakdown per scope (tCO_2e) 2024 compared to 2019

Total emissions increased by 9.6% between 2019 and 2024, primarily due to a 41.7% rise in Scope 2 electricity emissions, while Scope 1 emissions declined by 17.8% and Scope 3 emissions remained almost the same.

The identification of the main emission sources serves as a foundation for developing effective reduction strategies. In particular, optimizing energy use and transitioning to renewable energy sources are key to reducing electricity-related emissions. However, emissions from electricity consumption have increased by 42% between 2019 and 2024, primarily due to a shift to a more carbon-intensive electricity supplier. This highlights the critical importance of switching to a renewable electricity provider to significantly reduce one of the university's major sources of emissions.

Emissions from commuting were calculated using national transportation survey data and Haifa-specific average values for both 2019 and 2024. As a result, no significant change is observed between the two years. Without conducting a dedicated commuting survey among students and staff, year-to-year variations in commuting patterns and emissions are unlikely to be captured.

Analysis overview

Objectives and work process

The main objectives of the carbon footprint study for the University of Haifa were:

1. Calculation of the direct and indirect emissions of the University of Haifa (2024)
2. Identification of key emission sources as a basis for potential emission reduction measures
3. Providing a basis for comparison with the 2019 carbon footprint to assess trends and progress.

This study was mandated and overseen by the following Work Team:

- Prof. Ofer Arazy, Director of Innovation and Sustainability,
- Ronen Chitterer, Vice President of Engineering and Operations
- Aid Rohana, Manager of Data Collection and Analysis, Division of Innovation & Sustainability.

- Evgeny Saburov, Data Coordinator and Analyst

The data collection was conducted through the review of the University's Energy Survey, as well as through direct data collection.

Selected standard – GHG Protocol

The carbon footprint of the University of Haifa was conducted following the principles and requirements of the GHG Protocol Corporate Accounting and Reporting Standard (The Greenhouse Gas Protocol, 2011, 2015), which is the world's most widely-used greenhouse gas accounting standard[ii].

The GHG Protocol standard takes into account emissions across the value chain of an organization, a project or a product.

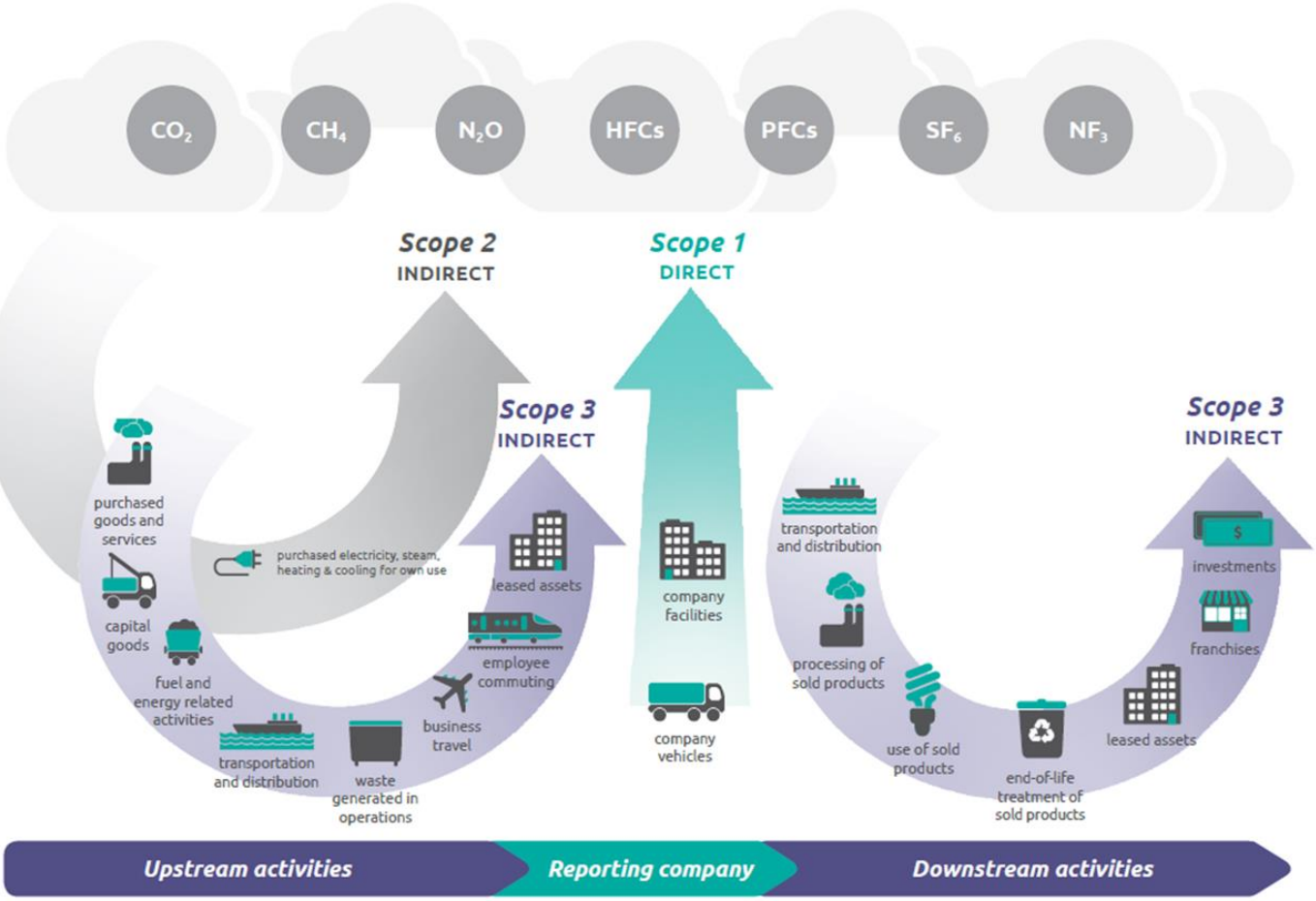


Figure 4: Overview of GHG Protocol scopes and emissions across the value chain[iii]

Direct and indirect emissions are categorized into three scopes:

- Scope 1 = Direct GHG emissions

  Direct GHG emissions are emissions from sources that are owned or controlled by the organization and include emissions due to fuel consumption (in vehicles, heating equipment or other), and fugitive emissions due to the use of refrigerants in HVAC.
- Scope 2 and 3 = Indirect GHG emissions

[ii] The Greenhouse Gas Protocol (GHG Protocol) is a multi-stakeholder partnership of businesses, non-governmental organizations (NGOs), governments, and others convened by the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD). Launched in 1998, the mission of the GHG Protocol is to develop internationally accepted greenhouse gas (GHG) accounting and reporting standards and tools, and to promote their adoption in order to achieve a low emissions economy worldwide. https://ghgprotocol.org/

[iii] Source: GHG Protocol

Indirect GHG emissions are emissions that are a consequence of the activities of the organization but occur at sources owned or controlled by another organization. Indirect emissions are divided into two scopes:

- → Scope 2 = Indirect emissions from energy (electricity) consumption
- → Scope 3 = Other indirect emissions (separated into 15 different categories, such as Goods and Services, Waste treatment, Business travel, Students and staff commuting, etc.). Detailed descriptions of each category are provided annex 1.

Boundaries of the analysis

The carbon footprint was performed for all four campuses of the University of Haifa (Main campus (ראשי), City campus (דילן והנמל), Marine Sciences Campus (חקר הימים והאגמים), WIZO Haifa Academy of Design and Art (ויצו בית הספר לעיצוב)). The first step in performing the carbon footprint is setting the boundaries of the analysis, both in terms of the organizational boundaries, as well as the operational boundaries, as detailed below.

Setting organizational boundaries

In addition to the direct operations of the University, the Haifa campus itself hosts activities by external organizations in its facilities, both on a regular (such as vendors) and an ad-hoc basis. Setting the organizational boundaries essentially determines which activities at the Haifa campus "belong" to the University of Haifa, and which do not.

In setting organizational boundaries, an approach is selected for consolidating GHG emissions. This approach is then consistently applied to define those buildings and operations that constitute the university for the purpose of accounting and reporting GHG emissions.

The operational control approach for the University of Haifa's carbon footprint was selected as the consolidation approach: the analysis included emissions from operations over which the University has operational control, meaning if it has the full authority to introduce and implement its operating policies at the operation. As opposed to financial control, this approach did not account for GHG emissions from operations in which the University owns a financial interest, but does not have operational control; conversely, it includes activities for which the University has operational control despite having no direct financial interest.

Most importantly, this means that emissions associated with activities by external organizations conducted on-campus in the University facilities, such as organizational meetings and events, are included in the University's organizational boundaries, as it is the University itself that has operational control over these facilities. However, on-campus facilities and activities that are not operated by the University are, to the extent that they provide services to the University, included as indirect emissions (scope 3 – for more detail see operational boundaries below).

Consequently, the boundaries of the analysis considered the following buildings:

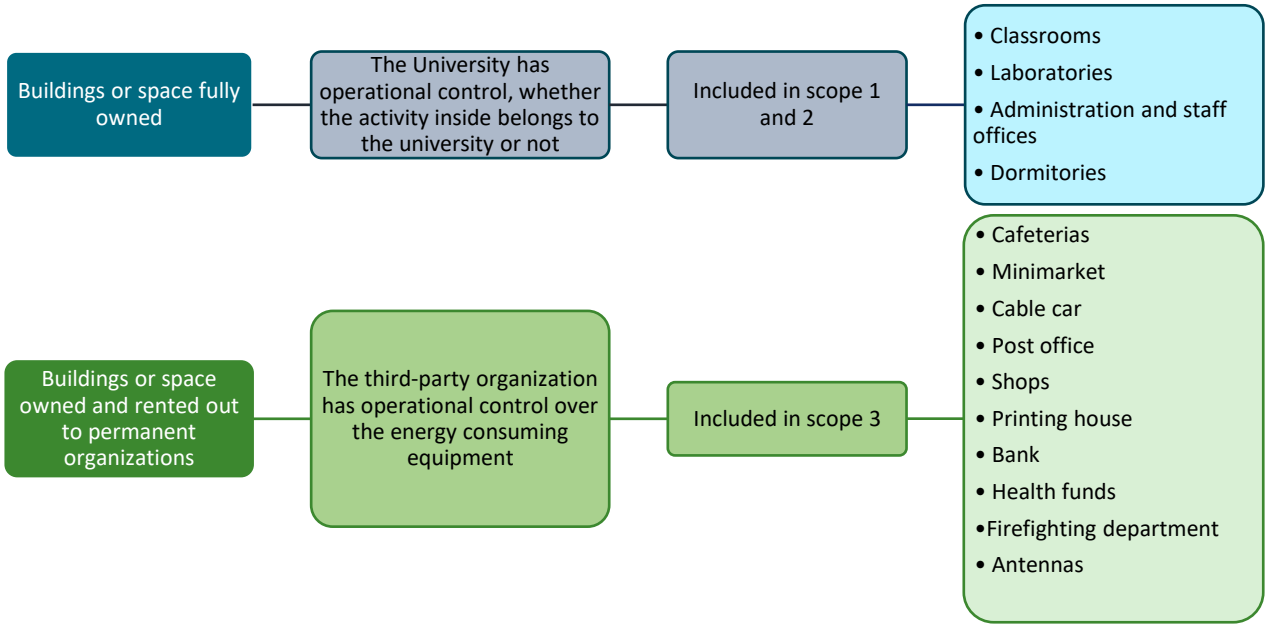


Figure 5: Definition of the analysis' organizational boundaries

Setting operational boundaries

After an organization has determined its organizational boundaries in terms of the operations that it owns or controls, it then sets its operational boundaries. This involves identifying emissions associated with its operations, categorizing them as direct and indirect emissions, and choosing the scope of accounting and reporting for indirect emissions.

What is classified as direct and indirect emissions is dependent on the consolidation approach selected previously for setting the organizational boundary.

Consequently, the following emissions sources were included in the analysis:

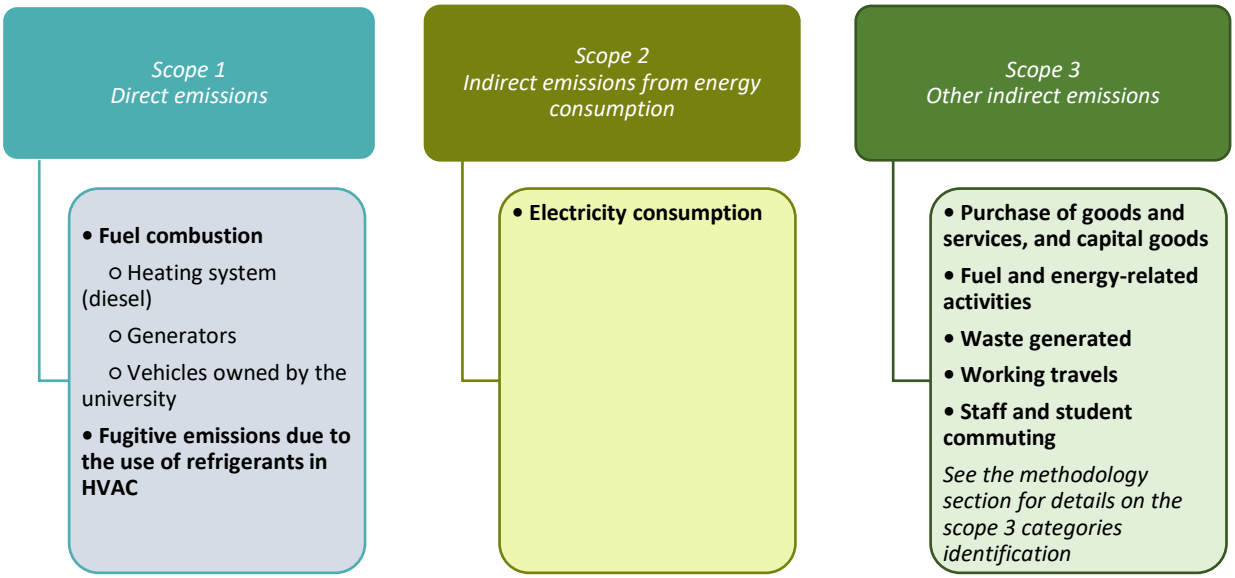


Figure 6: Summary of emissions sources included in the analysis

Methodologies and data used

Scope 1 and 2

In general, high-quality activity data was available at the University level for scope 1 and 2, and the associated emissions factors were University- and Israel-specific.

Therefore, for these scopes, the carbon footprint was conducted using the University's activity-specific data, as follows:

Scope	Methodologies	University activity data	Emission factors (EF) and other parameters used
Scope 1 – Direct emissions			
→ Fuel consumption in buildings	Application of documented emission factors per quantity of fuel Application of documented emission factors per quantity of fuel	• Fuel consumption in generators and diesel for heating	Coefficients of 2023, Israel Voluntary CO2 Emissions Reporting Mechanism of the Ministry of Environmental Protection
→ Fuel consumption in vehicles		• Fuel consumption from vehicles (owned or leased by the University)	

→ Used of refrigerants in HVAC system	The total quantity of refrigerants consumed during 2024 was estimated by the university. Refrigerant types were available only for chillers, and the quantity of each type was determined based on the chiller's cooling capacity (measured in TR).	• Quantities of gas refilled in all systems in 2024.	• Coefficients of 2023, Israel Voluntary CO2 Emissions Reporting Mechanism of the Ministry of Environmental Protection
Scope 2 – Indirect emissions from electricity consumption			
→ Emissions from the **combustion** of fuels to generate electricity[iv]	Market-based: electricity purchased to one supplier. The University of Haifa purchases its electricity from the Israel Electric Corporation (IEC)	• Electricity consumption (global, campus and for specific buildings)	Combustion emission factor associated with the national grid was taken from 2023 Israel Voluntary CO2 Emissions Reporting Mechanism of the Ministry of Environmental Protection, which was the most recent emission factor available.

* This emission factor does not include the upstream emissions from production and transmission of the fossil fuels to the power plant, or the emissions related to T&D losses, as those are included separately under scope 3 (fuel and energy-related activities).

Scope 3

As mentioned previously, Scope 3 can be divided into 15 categories. However, categories might not all be relevant and GHG Protocol Scope 3 standard gives flexibility on whether and how to account for scope 3 emissions.

Identification of the applicable categories

The following categories were included in the carbon footprint under scope 3, as they are relevant to the University's activities: Categories 1- Purchased goods and services, 2 – Capital goods, 3 – Fuel and energy-related activities, 5 – Waste generated in operations, 6 – Business travels and 7 – Staff and students commuting.

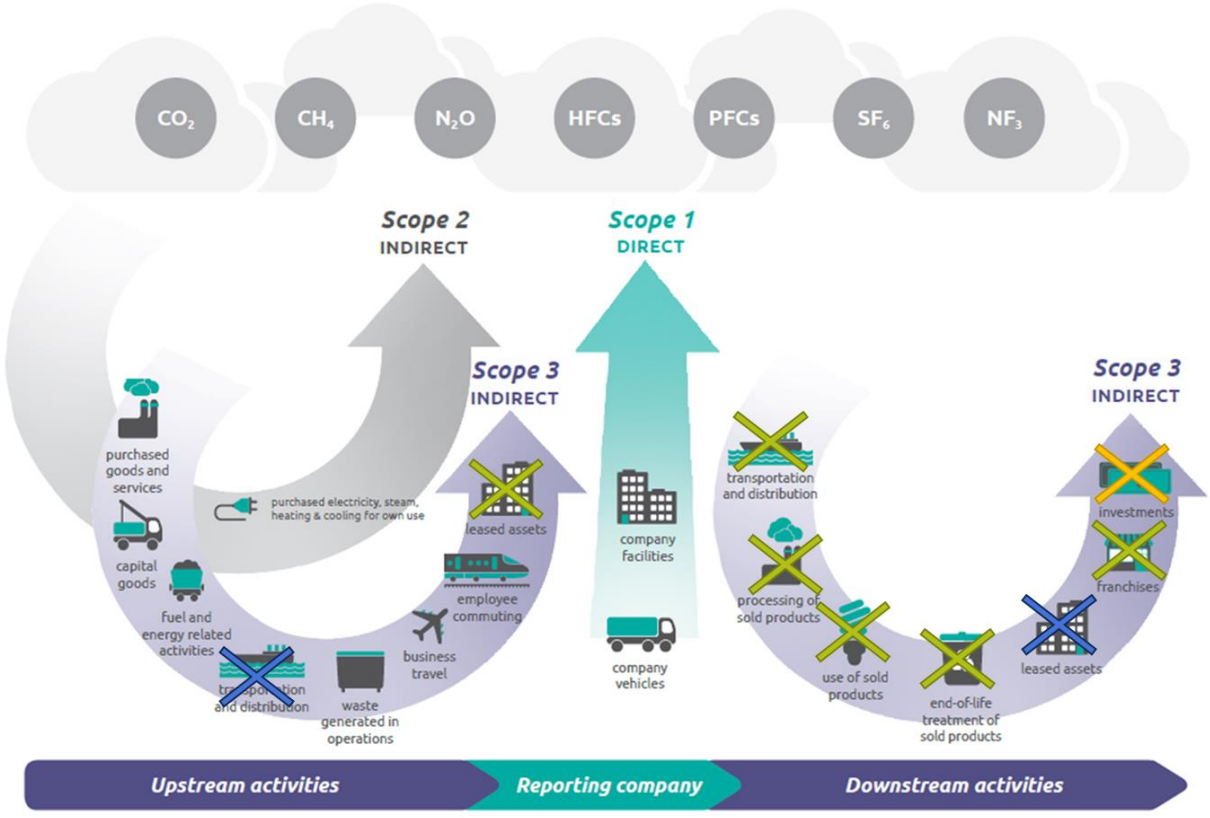
Although relevant, categories 4 – Upstream transportation and distribution, 13 - Downstream leased assets and 15 – Investments were not included in the final analysis for the following reasons:

[iv] Do not include the upstream emissions or the emissions related to T&D losses; such emissions are calculated in scope 3 – category "Fuel- and Energy-Related Activities".

- Category 4 (Upstream transportation and distribution) is included in Category 1 (Purchased goods and services), as a sub-category of type of services necessary for the good functioning of the University.
- In the case of the University of Haifa and according to the standard requirements, Category 13 (downstream leased assets) shall include scope 1 and 2 emissions of leased buildings, namely cafeterias, minimarket, shops, printing house, bank, post office, health funds, antennas. However, fuel consumption and refrigerants data were not fully available.
  Therefore, in order to avoid double counting emissions from electricity consumption (data available) were included in category 3 (Fuel- and energy- related activities) as "electricity purchased and sold" by the University.
  Due to the complexity of obtaining detailed data regarding investments, the corresponding category (category 15) was not included in this analysis. This estimation was conducted using the GHG Protocol "Scope 3 evaluator" online tool[v] which combines financial data with an Environmentally Extended Input Output (EEIO) analysis.

Other categories were considered as not applicable.[vi]

<u>As a result, categories included in the analysis are the following</u>:



[v] https://ghgprotocol.org/scope-3-evaluator

[vi] Non-applicable categories include: 4. Upstream transportation and distribution, 8. upstream leased assets, 9. Downstream transportation and distribution, 10. Processing of sold products, 11. Use of sold products, 12. End-of-life treatment of sold products, 14. Franchises.

Not applicable

Lack of data availability

Emissions included in other categories

Figure 7: Summary of scope 3 categories included in the University of Haifa's carbon footprint.

Prioritization of data collection

Data collection efforts were prioritized on specific scope 3 activities. Collecting higher quality data for priority activities allows to focus resources on the most significant GHG emissions in the value chain, more effectively set reduction targets, and track and demonstrate GHG reductions over time.

A combination of approaches and criteria to identify priority activities was used. Broadly speaking, higher quality data was sought for all:

i. *Activities where more accurate data can be easily obtained*
ii. *Activities that are significant in size.*
iii. *Activities where the university can potentially reduce emissions*

For activities that were expected to have insignificant emissions or where accurate data was not available in a timely manner, broader, less site-specific approaches were used to estimate emissions.
Consequently, methodological decisions were taken for each category based on the following decision tree:

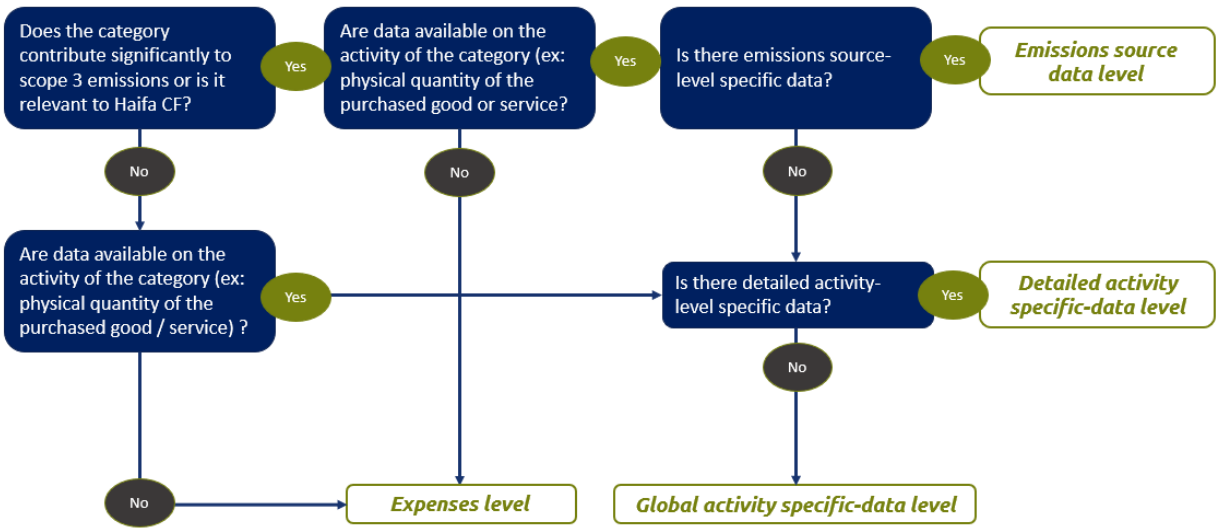


Figure 8: Methodological decision tree.

The specific methods applied under each level are as follows, in order of how site-specific the resulting emissions calculation is:

- **Emissions source data level**, which requires collection of emissions factors directly from the emissions source.
    - *Supplier-specific method.* This method collects product-level cradle-to-gate GHG inventory data from goods or services suppliers or fuel providers.

- **Detailed activity specific level**, which requires collection detailed activity data from the University. Depending on the category, it can correspond to the following method:
    - *Average-data method*. This method was applied to some sub-categories of "Goods and services purchases", and "Fuel- and Energy-Related Activities" categories. It estimates emissions for goods and services by collecting data on relevant physical units of goods or services purchased (e.g. kilograms, liter) and multiplying by the relevant secondary (e.g., industry average) emission factors.
    - *Waste-type specific method*. As the name indicates, this method applies to the waste category and involves using emission factors for specific waste types and waste treatment methods.
    - *Distance-based method*. Relevant for "Business travels", this method involves determining the distance and mode of business trips, and applying appropriate emission factors for the modes used.
- **General activity-specific level**, which requires data relevant to the University's activities but based on national-level data. This level was only used for student and staff commuting – and is based on the "*average-data method*" using national commuting patterns.
- **Expenses level,** based on the *spend-based method*, emissions are estimated by collecting data on the economic value of goods and services purchased and multiplying it by relevant secondary emission factors. This method is relevant only to "Goods and services purchases", "Capital goods" and part of "Business travel" categories.

Detailed methodologies and data description related to scope 3 are provided in the following table.

Scope and category	Description of the methodology used to calculate emissions	Description of the activity-data collected from the University	Main assumptions used to calculate emissions	Data sources of the emission factors (EF) and other essential parameters used
Scope 3 emissions				
Category 1+2 : Purchased goods and services and capital goods				
→ Water consumption	Supplier-specific method	Include quantity of water consumed in the four campuses	-	• Israeli-specific LCA study on the water supply system (Meron, Blass and Thoma, 2020)
→ All other categories	Spend-based method	Expenses in NIS of all university purchases, aggregating them into subcategories (e.g., food purchases, detergents and cleaning products, paper, office supply, etc.).	Total expenses of goods and services (including capital goods) summed to approximately 98 million NIS, excluding the annual municipal tax payment. This entire amount was included in the present analysis.	• United States Environmentally-Extended Input-Output (USEEIO) (U.S. Environmental Protection Agency, 2022)
Category 3: Fuel- and energy-related activities (not included in scope 1 or scope 2)				
→ Upstream emissions[vii] of purchased fuels and purchased electricity	Average-data method based on quantity of fuels	• Data collected for scope 1 on fuel consumed by the University •Information on the quantities of electricity used by third parties (i.e., electricity purchased by the University and resold to rented spaces such as cafeterias, banks,	Assumption that only natural gas is used to generate the electricity purchased	• Emission factor from CDM projects (United Nations. Framework Convention on Climate Change, 2014)

[vii] Emissions related to the extraction, production, and transportation of fuels purchased directly by the University or of fuels consumed in the generation of electricity that is purchased by the University, Emissions from fuels combustion to generate the electricity are accounted in scope 2.

		etc.) was not available. Therefore, we estimated electricity consumption based on the annual payments made by renters for electricity. An average yearly electricity tariff was calculated and applied to assess the total kWh consumed.		
→ Transmission and distribution (T&D) losses[viii]	Average-data method estimating emissions by using national average on T&D loss rate	• Data collected for scope 2 on electricity consumed and purchased by the University.	-	• National average on T&D loss rate (6% - conventional power) (Ministry of Environmental Protection, 2021)
→ Power that is purchased and sold (only combustion emissions)	• Supplier-specific method: electricity purchased from one supplier (IEC)	• Electricity consumption of rented spaces such as cafeterias, bank, post office, etc..	• Include the emissions from the combustion of fuels to generate electricity, upstream emissions are included in its specific category (see above0	• Combustion emission factor associated to IEC was taken from 2023 Israel Voluntary CO2 Emissions Reporting
Category 5: Waste generated in operations				
→ Waste	Waste-type specific method, using emission factors for specific waste types and waste treatment methods (landfilling, recycling and composting were included).	• Collected waste quantity per type of waste: ○ Mixed waste, from the food court (אתר הסעדה) – collected by Veridis Environment (2019 data),	• In the absence of monitored data on **waste composition** of the University of Haifa, the following compositions were used:	• IPCC landfill emissions model per type of waste (Intergovernmental Panel on Climate Change (IPCC). National Greenhouse gas

[viii] Emissions related to generation (upstream activities and combustion) of electricity reported by the University

	In addition, in order to determine the final waste quantity going to landfill, recycling rates were applied to each collected waste stream (organic, paper and cardboard, plastic, etc.) separated at the source or sorted out from municipal solid waste.	→ *treatment*: sorting and landfilling. ○ Mixed waste, from the rest of the University – collected by the municipality of Haifa (estimation based on quantity collected from mid-December 2021 to mid-December 2022), → *treatment*: direct landfilling in the Evron and Afeh sites; sorting and landfilling in Dudaim site. ○ Paper and cardboard (separated at source), collected by the company Infinia, → *treatment*: recycling ○ Fat pit (בור שומן): → *treatment*: landfilling • Emissions from recycling of batteries, electronic waste, toners and ink, beverages cans and the inert waste part of the mixed waste (glass, metals and others) were assumed not significant and were not included in the analysis.	○ Mixed waste, from the food court: based on a UK waste study on hospitality and food service sector (WRAP, 2013) ○ Mixed waste, from the rest of the University: based on national CBS data (CBS, 2017) • **Recycling rates** were determined after contacting the relevant entities and waste treatment sites: ○ For the food court mixed waste: Since 50% is recycled (cardboard and paper, plastic, metals, and organic waste goes is composted) and 50% is landfilled (mainly wet cardboard and nylon), the following recycling rates were assumed: – Organic waste: 95% – Other (glass, metals and other): 95% – Paper and cardboard: 5% – Plastic: 9% ○ For the rest of the University mixed waste: it was assumed that 1/3 of the waste goes to each of the three landfill sites (Dudaim, Evron and Afeh). Only Dudaim has a sorting station, the following national recycling rates were assumed for this site (CBS, 2017): – Organic waste: 36% – Paper: 19%	inventories programme., 2006) • National recycling rate per waste stream (CBS, 2017) • Collection of methane from landfill site: 6%, based on CBS value • GWP methane = 25

			– Cardboard: 45% Plastic: 9% In this carbon footprint, emissions from recycling processes were not considered, except composting.	
Category 6: Business travel				
→ Plane travels of the University staff	Distance-based method	• Total number of flights • Percentage of travels per destination (country) Note: 10% were not assigned to a specific destination.	• Assumption that the city of arrival is the capital city of the destination country • For the USA, assumption that half of the travels were to the east coast (New York), and half to the west coast (San Francisco) • Assumptions were made on the layover city when no direct flights were available. • For the 10% of the unassigned flights, an average emission factor was calculated.	• ICAO (International Civil Aviation Organization, a UN organization) Carbon Emissions Calculator (based on the cabin class, number of passengers, city of departure and city of arrival) (International Civil Aviation Organization (ICAO), no date)
→ Plane travels of the management staff	Spend-based method	Expenses in NIS	-	• United States Environmentally-Extended Input-Output (USEEIO) (U.S. Environmental Protection Agency, 2020)
Category 7: Staff and student commuting				
→ Staff and students	Average-data method, using average national data on workers commuting patterns (Haim Bleikh, 2018):	• Number of students • Number of staff • Number of students in dormitories	• Estimation on number of academic days (University of Haifa, 2018) • Estimation on number of working days (University of Haifa, 2018)	• Fuel efficiency and load factor per transport mode (Ministry of Environmental Protection, EcoTraders Ltd.,

	○ Regarding average distance: data representative of the Haifa area ○ Regarding transport modes: national average. Transport modes include the following: car, shuttle, bus, train and bicycle /by foot.		• Percentage of workers per transport mode was recalculated considering the following: 1. All students from the dormitories arrived by foot. 2. There is a shuttle organized by the University (distance: 10 km). 3. People who commute by train live at least 10 km from the university, with an average distance of 20 km, resulting in a total of 40 km per day. They are evenly distributed across three distance groups: 10–20 km, 20–40 km, and over 40 km. 4. People who commute by train take a bus for the final stretch to reach the university, covering approximately 2 km round trip (1 km each way).	and Ricardo Energy & Environment, 2015)

Summary of methodological decisions

Main decisions impacting the analysis are summarized in the following table:

Parameters	Methodological decisions taken
Chosen consolidation approach	Operational Control
Description of the operations included in the company's organizational boundary	• All buildings on the four campuses were included within the analysis' boundaries. • Only emissions sources from the electricity consumption related to buildings rented out to permanent organizations (cafeterias, bank, post office, etc.) were included in scope 3.
Reporting period covered	2024
Scope 3 activities (other indirect emissions) included in the analysis	1- Purchased goods and services, 2 – Capital goods, 3 – Fuel and energy-related activities, 5 – Waste generated in operations, 6 – Business travels and 7 – Staff and students commuting
Scope 3 activities excluded from the analysis with justification for their exclusion	• All scope 1 and 2 activities were included in the analysis • Non-applicable scope 3 categories include: 8. upstream leased assets, 9. Downstream transportation and distribution, 10. Processing of sold products, 11. Use of sold products, 12. End-of-life treatment of sold products, 14. Franchises • Scope 3 category 4 (upstream transportation and distribution) is included in category 1. • Scope 3 Category 13 (downstream leased assets) is included in category 3. • Scope 3 category 15 - Investments was not included due to data availability.

Data confidence:

Data were ranked according three levels of confidence:

- High-confidence: activity data monitored and site/supplier-specific emission factor
- Medium confidence: activity data monitored, but the emission factor applied was not site/supplier-specific, or the activity data was estimated but the emission factor was site/supplier-specific
- Low confidence: activity data estimated and non-site/supplier specific emission factor.

The following emissions were estimated based on high-confidence data:

1. Fuel consumption (scope 1): actual fuel consumption was collected, and specific emission factor for each fuel were used;
2. Scope 2 emissions: electricity consumption was read from electricity meter, and the emission factor used is specific to the University electricity supplier, IEC.
3. Water consumption in scope 3;
4. Power that is purchased and sold in scope 3;

The following emissions were estimated based on medium-confidence data:

1. Refrigerant types were available only for chillers, and the quantity of each type was determined based on the chiller's cooling capacity (measured in TR).
2. Remainder of scope 3 categories.

No data was ranked with a low confidence.

Results confidence:

Emissions were calculating via an Excel tool and subject to a dual QA/QC process:

- One technical, conducted by a fellow project manager who reviewed all the formulas, data relations, conversions, etc.
- One from a final results point of view, conducted by the team manager who reviewed the logic of the results in terms of scale, or comparison with similar projects.

Results

Total emissions

In 2024, the University of Haifa emitted a total of 35,861 tCO2e.

Other indirect emissions (scope 3) was the main emission category, representing 64.4% of total emissions from the University, while indirect emissions from electricity consumption (scope 2) represented 32.3%. Direct emissions due to fuel consumption and the use of refrigerants in the HVAC system constituted only 3.3% of total emissions.

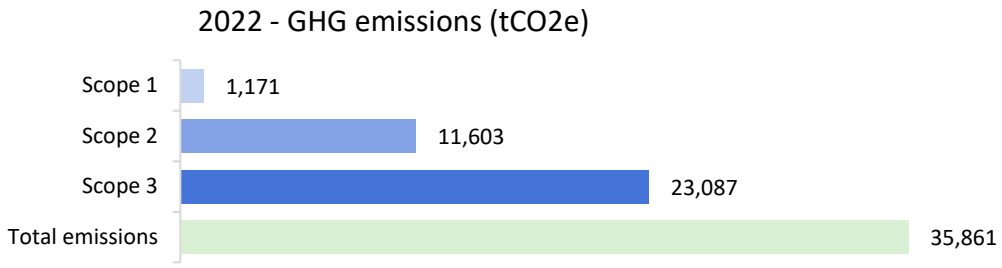


Figure 9: 2019 emissions breakdown per scope (tCO2e)

With 17,623 students and 2,931 staff members (faculty and administrators) the emissions remained stable 1.74 tCO_2e / capita.
When considering the total gross constructed buildings' area, equal to 215,067 m^2, the University emitted 0.167 tCO_2 per square meter.

Scope 1 – Direct emissions

Scope 1 emissions = 1,171 tCO2e, representing 3.3% of total emissions

Direct emissions were mainly due to the use of diesel for heating (50% of direct emissions).

The use of refrigerants in the University's HVAC systems (gas used for the air-conditioning of the buildings – R410, R22 or R134) was responsible for 36%.

Emissions from fuel consumption in vehicles owned and leased by the University represented 13% of direct emissions, while generators, used only for emergencies, represented only 2%.

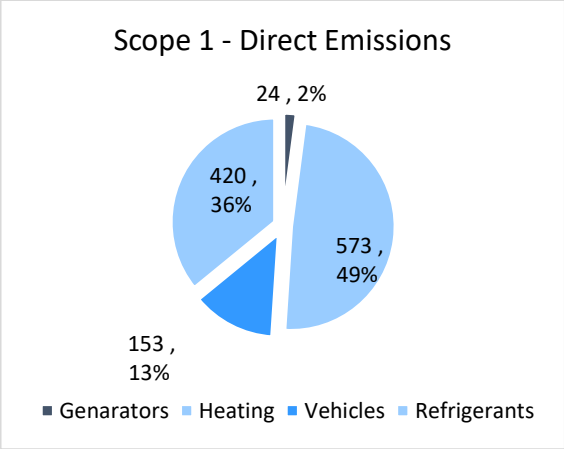


Figure 10: Scope 1 emissions by source (tCO2e)

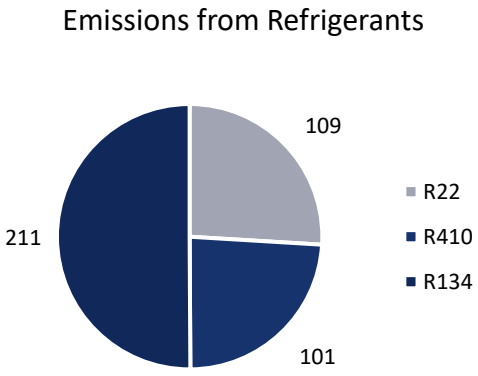


Figure 11: Refrigerants emissions by type of refrigerant (tCO2e)

Scope 2 – Indirect emissions from electricity consumption

Scope 2 emissions = 11,603 tCO2e, representing 32% of total emissions

Unlike in 2019, in 2024 the University of Haifa purchased its electricity directly from the Israel Electricity Corporation (IEC).

An analysis of electricity consumption by campus shows that the Carmel Campus accounts for the vast majority of emissions (97%), followed by the WIZO Campus (2%) and the City Campus (1%).

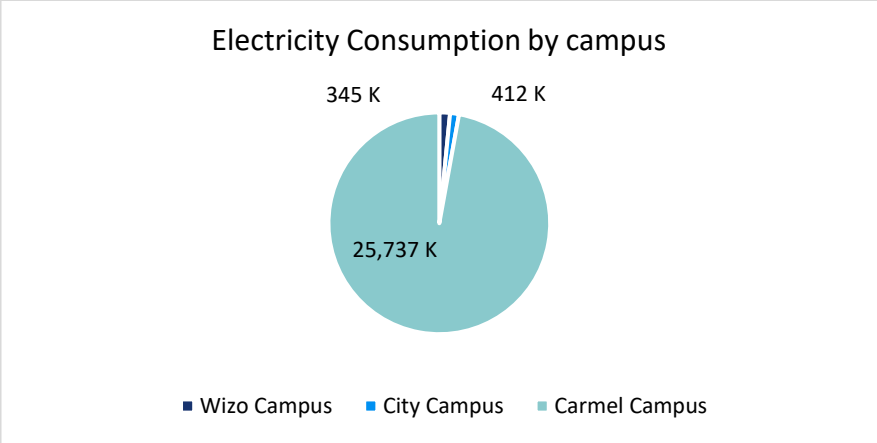
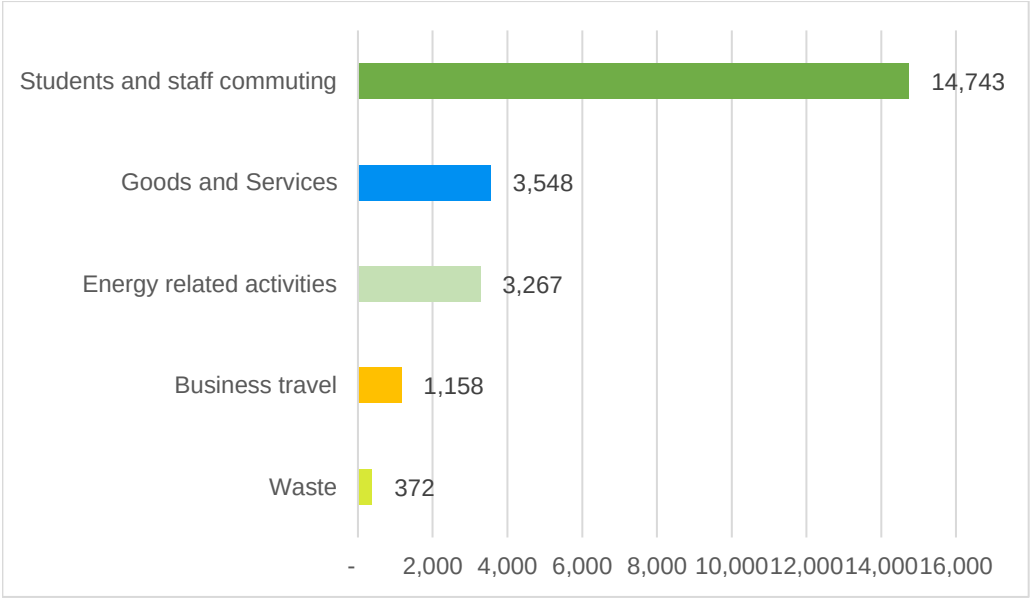


Figure 12: Scope 2 emissions per campus (thousand kwh)

Scope 3 – Other indirect emissions

Scope 3 emissions = 23,087 tCO_2e, representing 63.7% of total emissions

Student and staff commuting is the main indirect emission source. Purchase of goods and services, is second, followed by business travels.



Category	Emissions estimation ($tCO2_e$)	% within scope 3	% of total emissions
Students and staff commuting	14,743	64%	41%
Goods and Services	3,548	15%	10%
Energy related activities	3,267	14%	9%
Business travel	1,158	5%	3%
Waste	372	2%	1%

Figure 13: Scope 3 emissions per category

Student and staff commuting

Represent 41. 1% of total emissions

In the absence of monitored data (such as an employee and student transportation survey), national data on employee commuting by transportation mode was used in combination with Haifa-specific data on commuting distances to estimate total annual person-kilometers travelled by staff and students by mode as a basis for the emissions calculation.

Consequently, 60% of the 2,931 staff members were assumed to arrive by car; 55% of the 17,623 students were assumed to arrive by car, due to the fact that the national and Haifa-specific data were only applied to the 95% of the student body that do not reside in the dormitories. The 5% of the students that do reside in the dormitories were assumed to arrive by foot. Student commuting represents 83% of the commuting emissions.

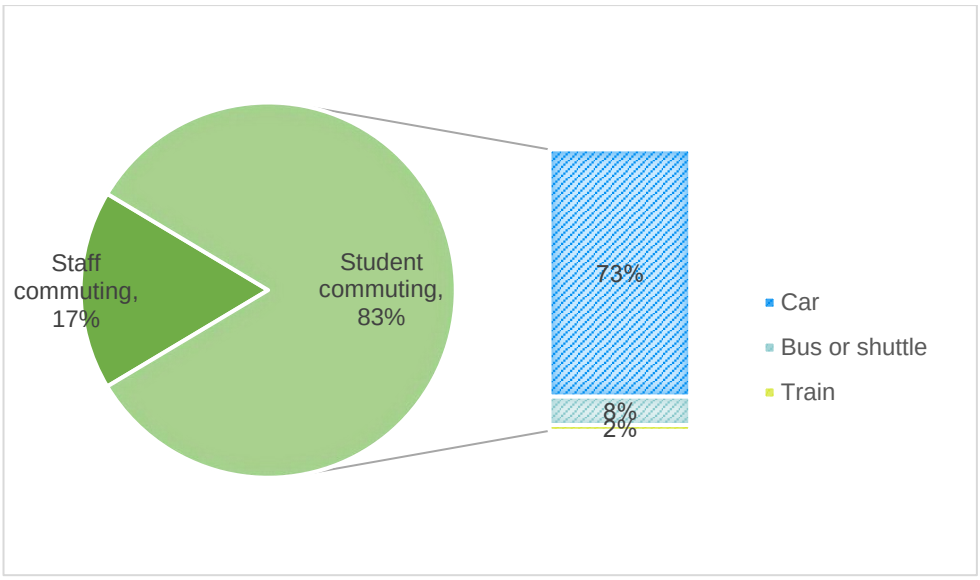


Figure 14: Student and staff commuting emissions by source

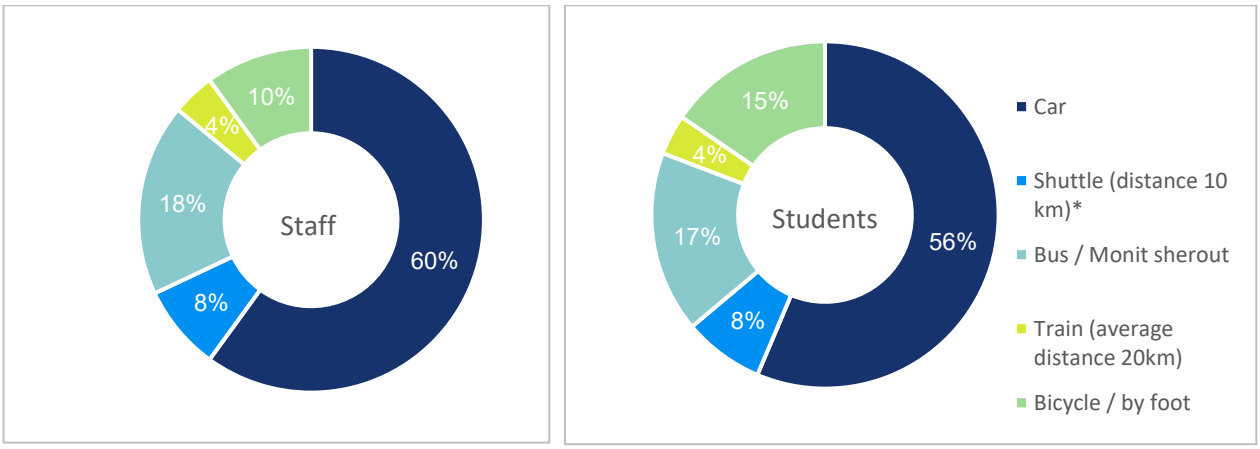


Figure 15: Breakdown of students (left) and staff's (right) arrival means

Purchase of goods ,services and capital goods

Represents 10% of total emissions.

In this carbon footprint, all university purchases on goods, services, and capital goods were included. The breakdown of emissions from the top 20 most polluted categories is presented in the graph below.

Custom computer program services were responsible for around 10% of the emissions in this category, followed by other basic inorganic chemical manufacturing (7%), advertising agencies (6%), educational support services (6%), all other professional, scientific and technical services (5%).

All categories apart from "water consumption" were calculated using the spend-based method. The expenses related to these categories totaled 98 million NIS.

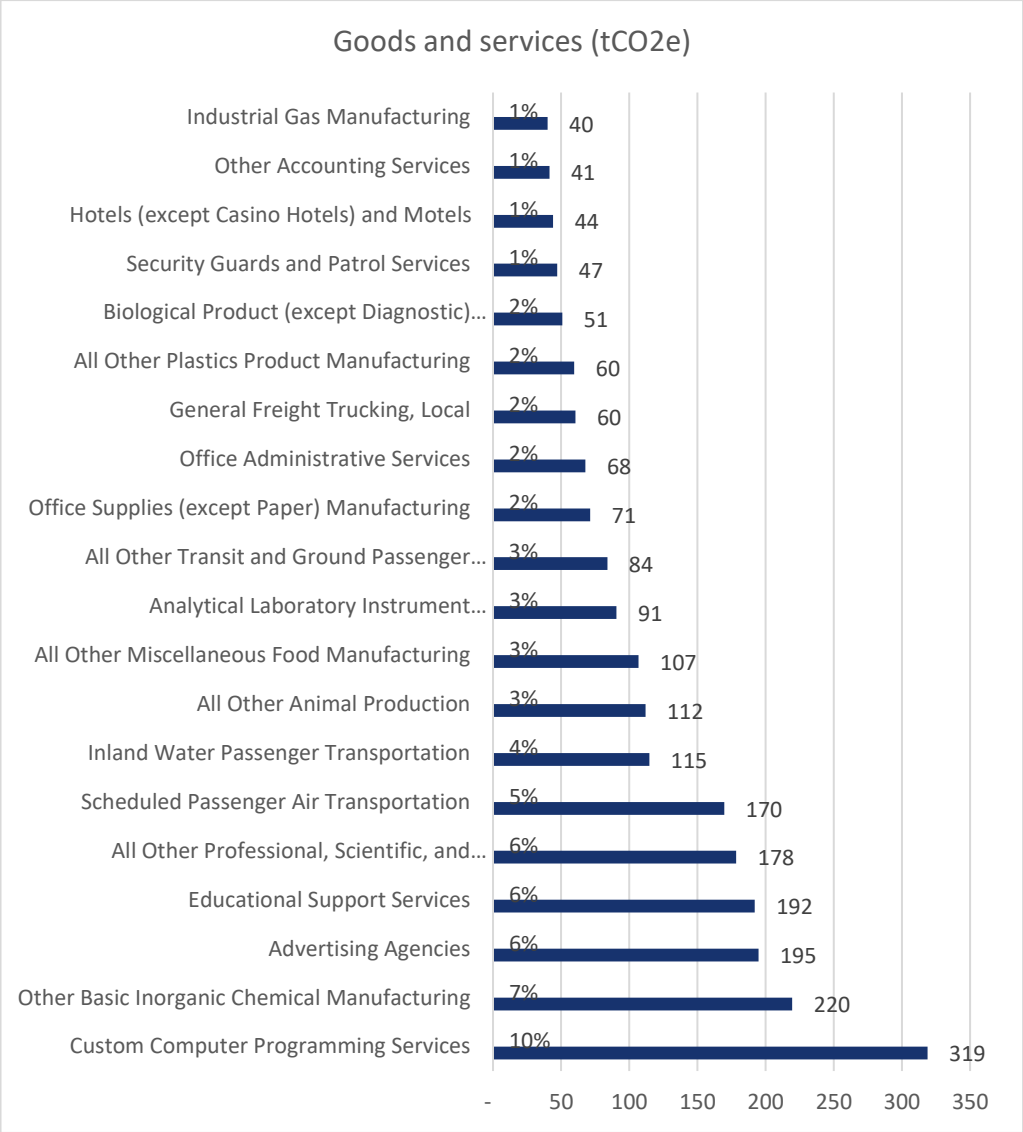


Figure 16: Most polluted categories in goods, services and capital goods ($tCO2_e$)

Business travels

Represent 3% of total emissions

A total of 1,800 flights were taken by staff. 30% of these were to the United States, followed by flights to the United Kingdom, Germany, and other countries, each accounting for approximately 10%.

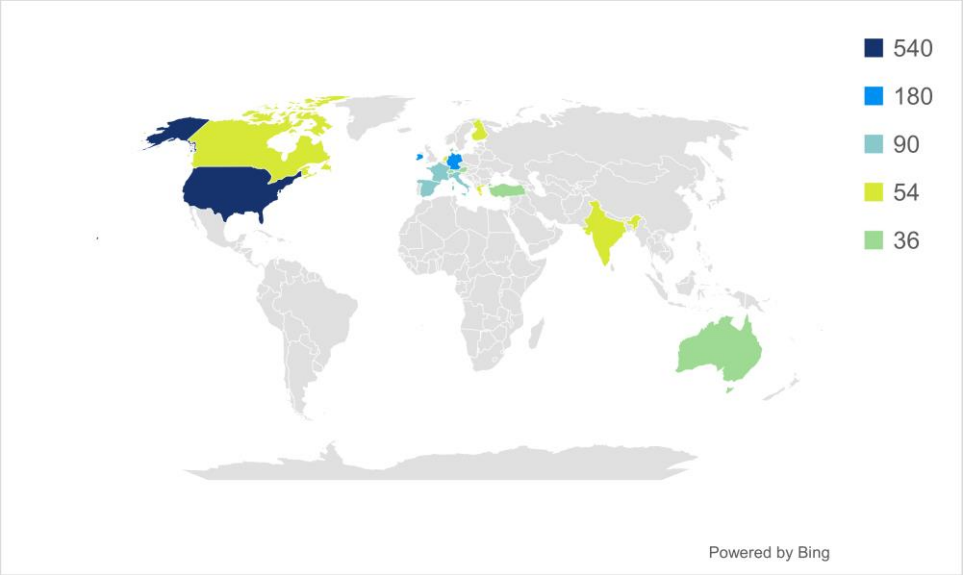


Figure 17: Business travels flights by destination

Fuel and energy-related activities

Represent 9% of total emissions

Fuel and energy-related activities emissions (not included in scope 1 or scope 2) encompass the emissions related to the production of fuels and energy purchased and consumed by the University.

These emissions are divided into four sub-categories. Power that is purchased and sold (emissions due to fuel combustion to generate the electricity) is the main source (66%), followed by emissions due to transmission and distribution losses (31%).

In 2024, total electricity purchased and sold amounted to 3,871,997 kWh, and relates to the electricity consumed by the cafeterias, minimarket, shops, printing house, bank, post office, health funds, or antennas present on campus.

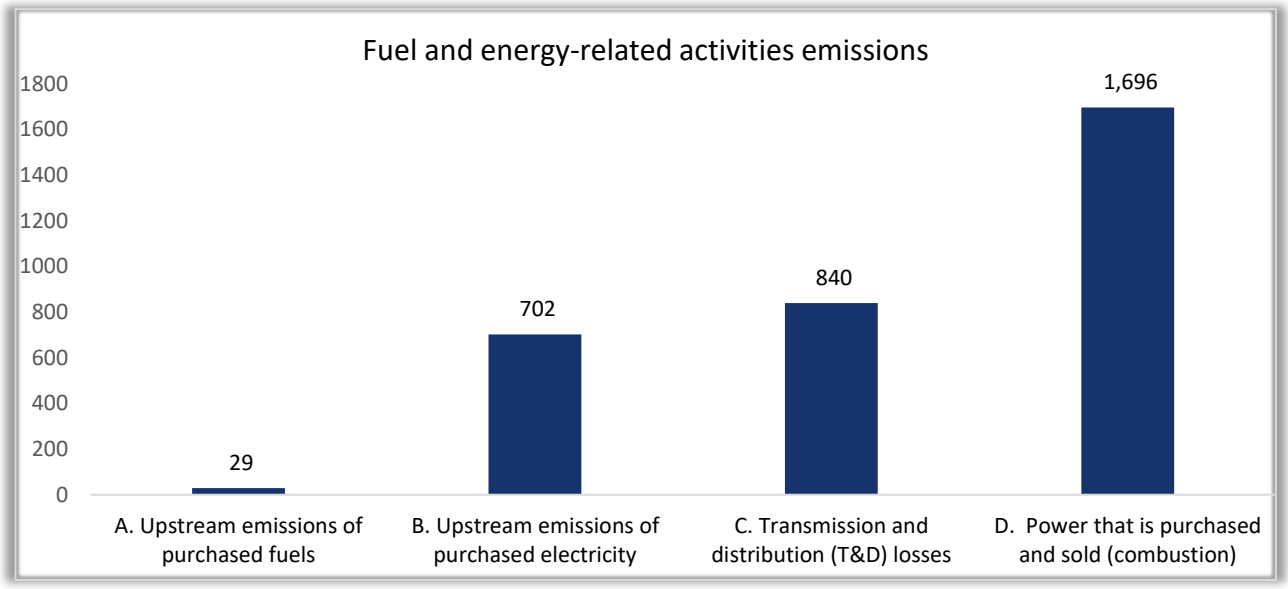


Figure 18: Fuel and energy-related activities emissions (tCO_2e)

Waste

Represent 1% of total emissions

Waste emissions are mainly due to the landfilling of mixed waste that was not separated at the source. Indeed, 81% of the total waste generated on campus is non-separated mixed waste, of which 64% is biodegradable waste going to landfill, around 19% is recycled and the remaining is inert waste going to landfill).

It should be noted that emissions included in the analysis are only related to landfilling, and composting. Emissions from recycling of batteries, electronic waste, toners and ink, beverages cans and the inert waste part of the mixed waste (glass, metals and others) were assumed to be insignificant and were not included in the analysis.

In order to determine the final quantity landfilled, the following stages were applied (see the methodology for further details):

1. Waste composition was applied to the mixed waste to determine the fraction of each waste stream (organic, paper, plastic, cardboard, garden waste, etc.):
2. Recycling rates were then applied to each collected waste stream that are sorted out from municipal solid waste or separated at the source, in accordance with the recycling rates applicable to the company or waste station site in charge of sending the waste to treatment.

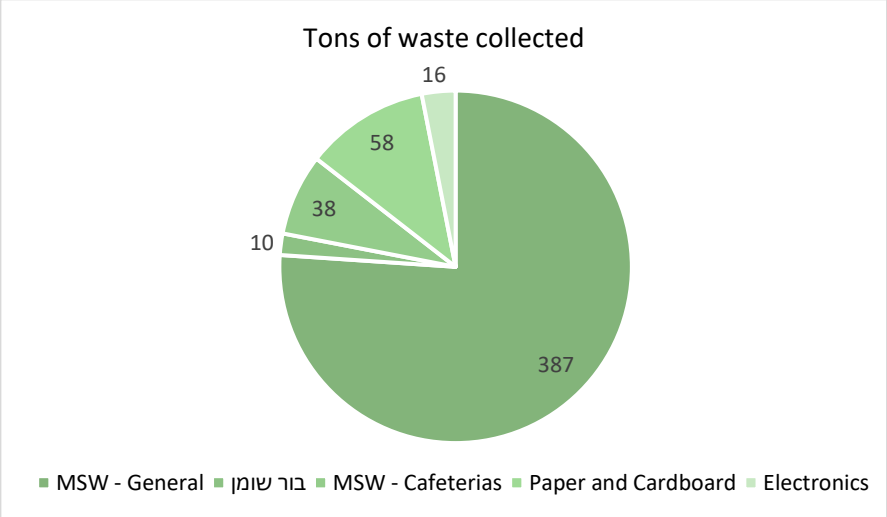


Figure 19: Waste collection by source (tons)

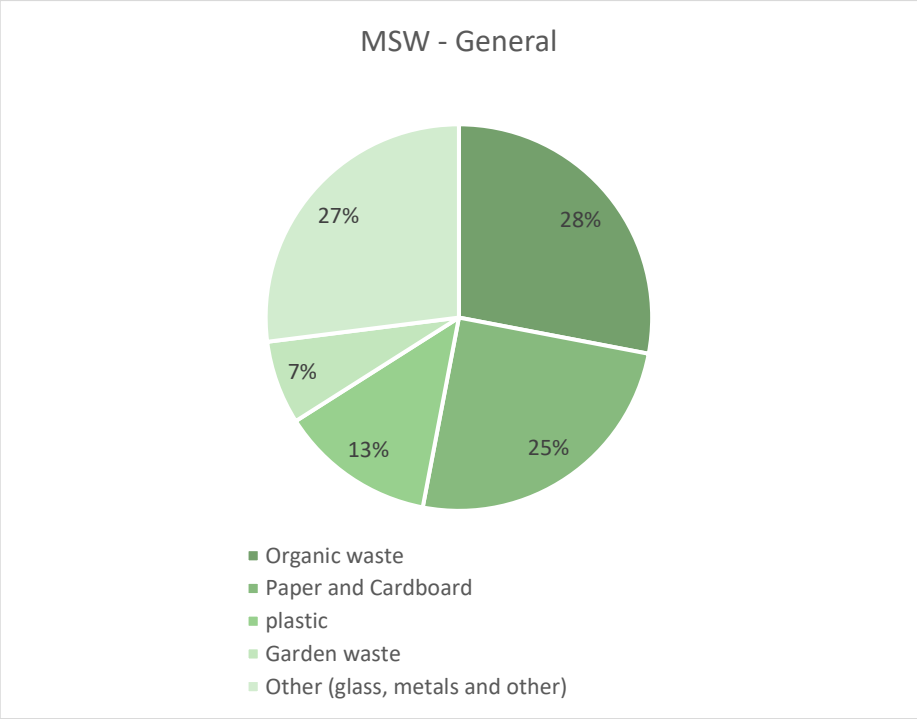


Figure 20: Breakdown of MSW quantities per type of waste

Comparison to the University's 2019 carbon footprint

The University's 2024 carbon footprint increased by 9.6 % compared to the 2019 carbon footprint, amounting to a total of 35,861 tCO2e compared to 32,715 tCO2e in 2019.

Scope 1 emissions

Total Scope 1 emissions decreased by 18% in 2024, primarily due to a change in the emission factor used for combustion of diesel in equipment. Specifically, the source of the diesel density factor was updated from the Israel Voluntary CO_2 Emissions Reporting Mechanism to the Conversion Factors Between Fuel Types – Based on Lower Calorific Values (LCVs), published by the Natural Gas Authority in the Ministry of Energy.

This change revised the diesel density factor from 0.96 to 0.85 kg/liter. In 2024, refrigerant emissions were 420 tCO2e. Had the 0.85 factor been applied in 2019, emissions from equipment in that year would have been 651 tCO2e instead of 735 tCO2e.

Refrigerant emissions in 2024 were 23% lower than in 2019; however, it should be noted that in 2019, detailed data on refrigerant use was available, while in 2024, only general estimates were provided.

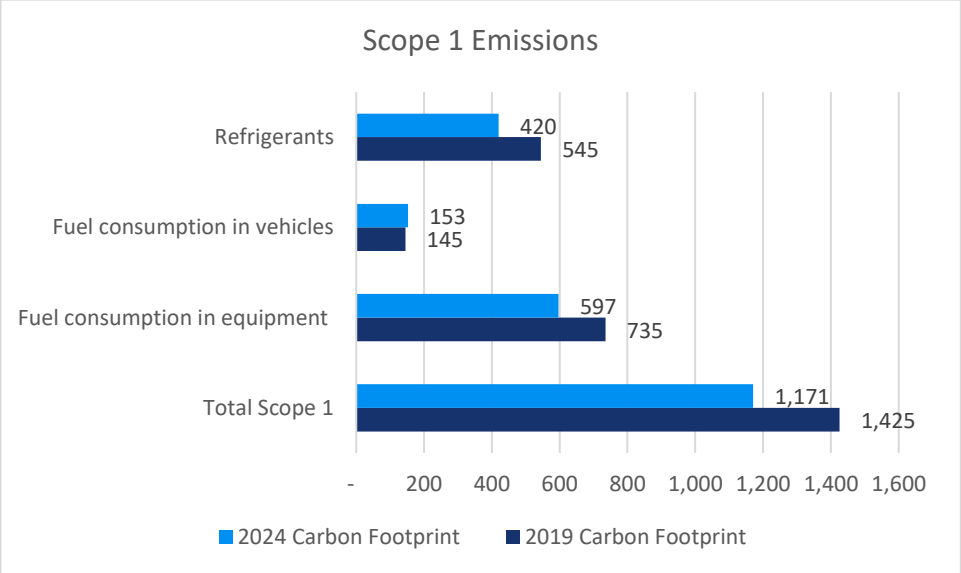


Figure 21: Scope 1 emissions by source (tCO2e)

Scope 2 emissions

Total emissions from scope 2 electricity consumption increased by 42% between 2019 and 2024 due to two main factors. First, the University of Haifa's overall electricity consumption grew following its merger with the WIZO campus. This led to a 10% increase in total electricity use and an 8% increase in Scope 2 electricity consumption in 2024.

Second, the university switched its electricity supplier from Ashdod Energy to the Israel Electric Corporation (IEC), which significantly affected the emission factor applied. In 2019, the emission factor for Ashdod Energy was 0.33470 tCO2e/MWh. In contrast, the emission factor used for IEC in the 2024 carbon footprint was 0.4379 tCO2e/MWh, approximately 30% higher.

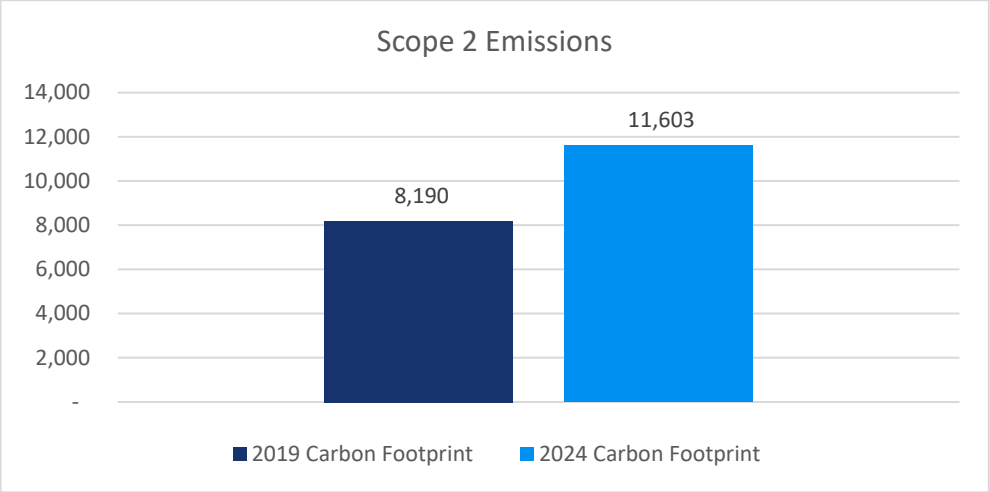


Figure 22: Comparison of Scope 2 emissions between 2019 and 2024 (tCO2e)

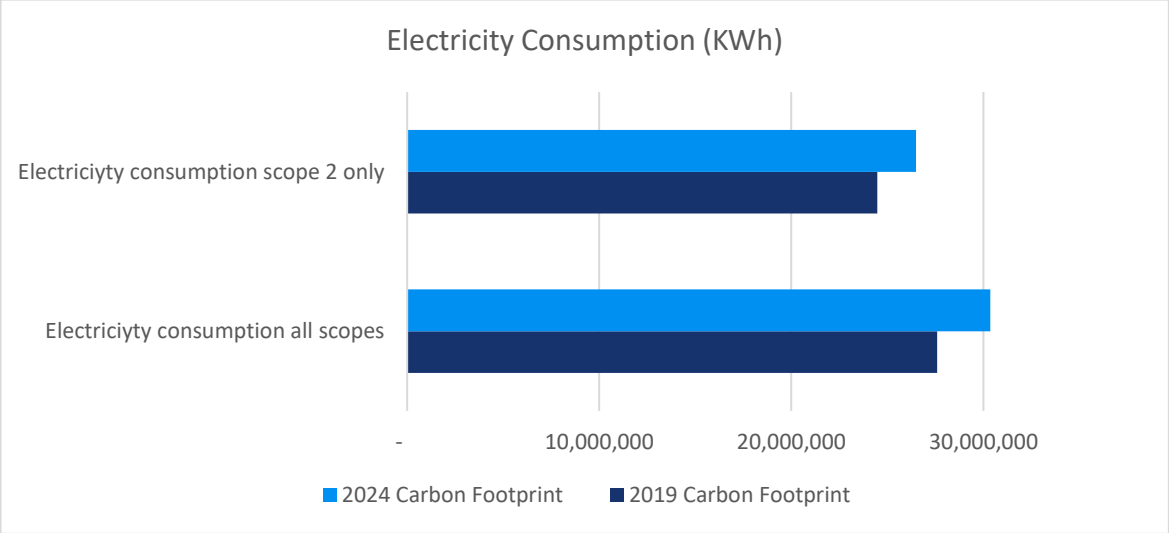


Figure 23: Comparison of electricity consumption between 2019 and 2024

Scope 3 Emissions

Total Scope 3 emissions remained nearly unchanged between 2019 and 2024. Emissions from energy-related services, however, increased by 74%. About half of this increase reflects the switch to an electricity supplier with a higher emission factor, while the remaining growth is due to improvements in the calculation method. Waste and students and staff commuting emissions remain nearly unchanged.

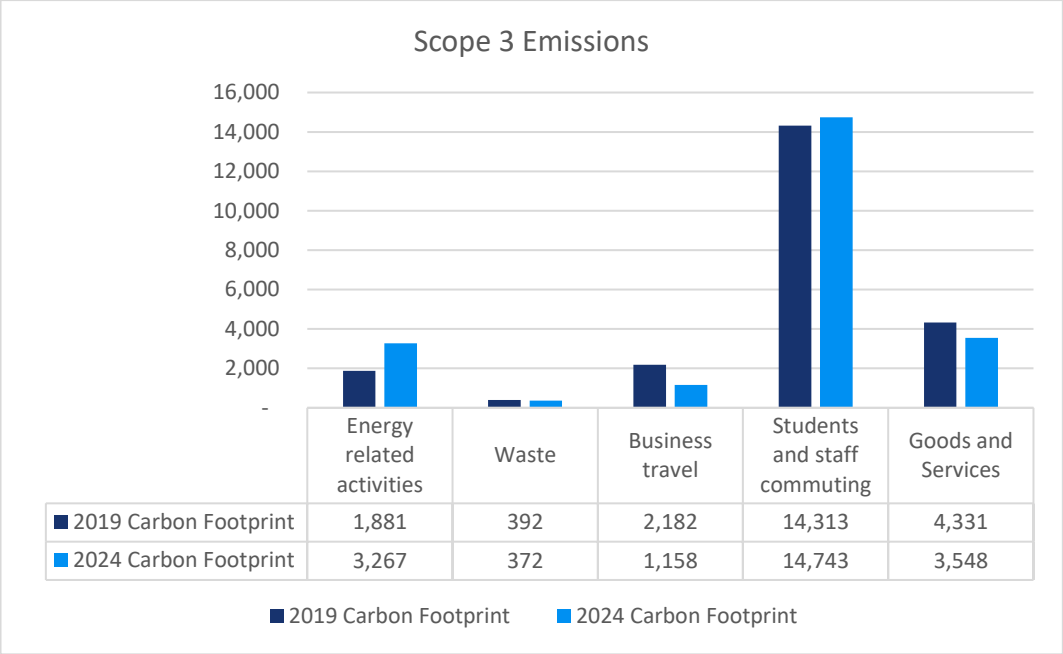


Figure 24: Comparison of Scope 3 emissions between 2019 and 2024

Emissions from business travel decreased significantly between 2019 and 2024, due to a reduction in the number of flights, from 2,300 in 2019 to 1,800 in 2024, despite an increase in the number of staff members. As a result, per capita emissions from business travel dropped by more than 40%.

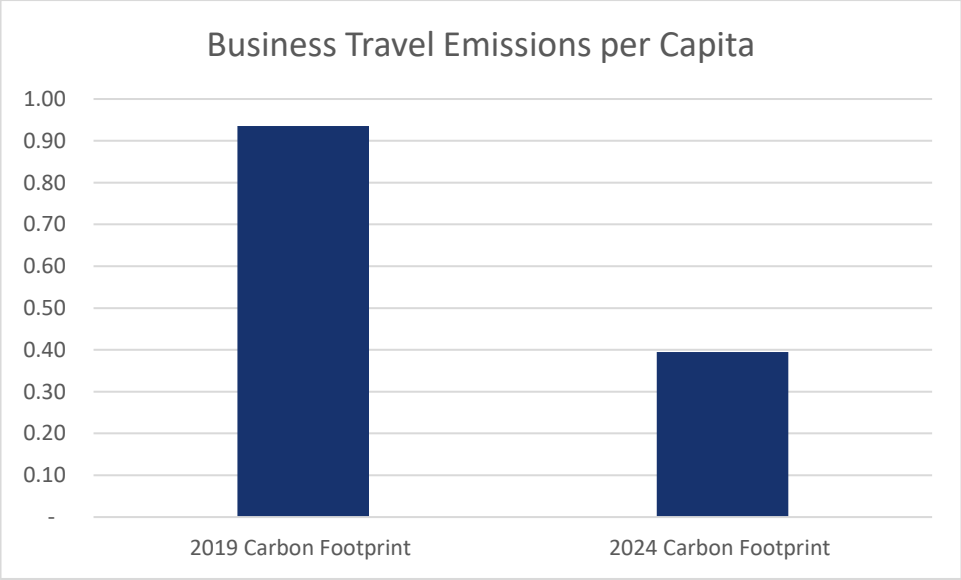


Figure 25: Comparison of business travel per capita between 2019 and 2024

Emissions from goods and services decreased by 18%, even though the total spending included in the 2024 footprint was significantly higher than in 2019. This reduction is mainly due to a change in the categorization of purchases, which resulted in the application of different emission factors. These updated categories had a significant impact on the overall emissions calculation. In addition, the emission factors used in the 2024 footprint were updated to the most recent version available at the time of reporting.

Conclusions

The total 2024 emissions of the University of Haifa amounted to 35,861 tCO2e, which is equivalent[9] to:

175 million kilometers travelled by a gasoline car

41,172 round-trip flights Tel Aviv - New York

0.044% of Israel's total emissions (2022)

Student and staff commuting was the main emissions source (42% of the total), followed by electricity consumption (40% for both scopes 2 and 3), and purchase of goods and services (10%).

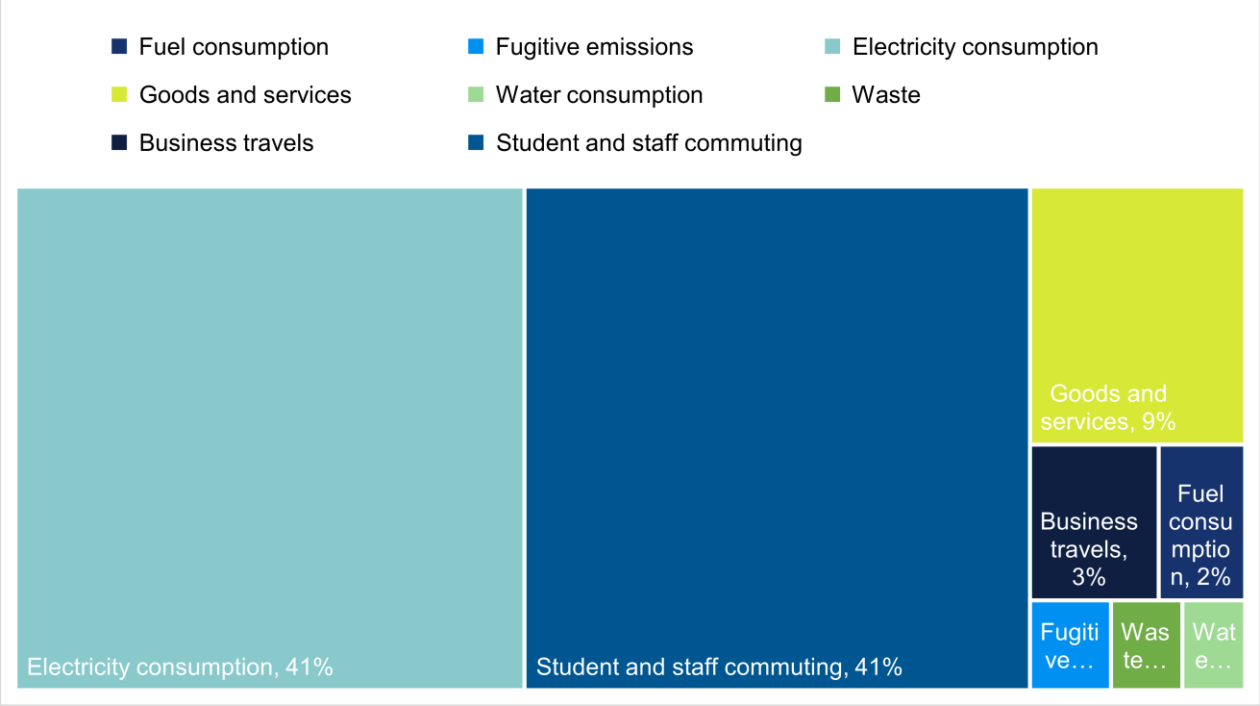


Figure 26: Summary of main emissions source of the University of Haifa.

The identification of the main emissions sources provides a basis on which to focus future efforts to reduce GHG emissions. As such, future mitigation measures should deal with those sources that account for more than 85% of the university emissions:

[9] References of equivalence:

- Car: 0.205 kgCO2e / km / car using gasoline (based on Fuel efficiency 2014, Assessment of Greenhouse Gas Emission Reduction Potential and Recommended National Target for Israel and CBS emission factor)
- Round trip Tel Aviv – New York: 0.871 tCO2e / passenger ((International Civil Aviation Organization (ICAO), no date)
- Israel total emissions in 2019: 79,044,644 tCO2e (CBS, 2021)

- Emissions from electricity consumption have increased by 42% between 2019 and 2024, primarily due to a shift to a more carbon-intensive electricity supplier, highlighting the importance of optimizing energy use and transitioning to renewable energy sources in order to reduce electricity-related emissions.
- Emissions from commuting remained relatively constant between 2019 and 2024; however, for both years the emissions were calculated using national transportation survey data and Haifa-specific average values for both 2019 and 2024. Without conducting a dedicated commuting survey among students and staff, year-to-year variations in commuting patterns and emissions – as well as the impact of measures designed to reduce these emissions by changing student behavior – will not be captured.

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Annex 1. Scope 3 categories' description

Upstream scope 3 emissions

Category	Category description
1. Purchased goods and services	• Extraction, production, and transportation of goods and services purchased or acquired by the reporting company in the reporting year, not otherwise included in Categories 2 - 8
2. Capital goods	• Extraction, production, and transportation of capital goods purchased or acquired by the reporting company in the reporting year
3. Fuel- and energy-related activities (not included in scope 1 or scope 2)	• Extraction, production, and transportation of fuels and energy purchased or acquired by the reporting company in the reporting year, not already accounted for in scope 1 or scope 2, including: **a.** Upstream emissions of purchased fuels (extraction, production, and transportation of fuels consumed by the reporting company) **b.** Upstream emissions of purchased electricity (extraction, production, and transportation of fuels consumed in the generation of electricity, steam, heating, and cooling consumed by the reporting company) **c.** Transmission and distribution (T&D) losses (generation of electricity, steam, heating and cooling that is consumed (i.e., lost) in a T&D system) – reported by end user **d.** Generation of purchased electricity that is sold to end users (generation of electricity, steam, heating, and cooling that is purchased by the reporting company and sold to end users) – reported by utility company or energy retailer only

Upstream scope 3 emissions

Category	Category description
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) • Transportation and distribution services purchased by the reporting company in the reporting year, 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)
5. Waste generated in operations	• 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)
6. Business travel	• Transportation of employees for business-related activities during the reporting year (in vehicles not owned or operated by the reporting company)
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)
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

Downstream scope 3 emissions

Category	*Category description*
9. Downstream transportation and distribution	• Transportation and distribution of products sold by the reporting company in the reporting year between the reporting company's operations and the end consumer (if not paid for by the reporting company), including retail and storage (in vehicles and facilities not owned or controlled by the reporting company)
10. Processing of sold products	• Processing of intermediate products sold in the reporting year by downstream companies (e.g., manufacturers)
11. Use of sold products	• End use of goods and services sold by the reporting company in the reporting year
12. End-of-life treatment of sold products	• Waste disposal and treatment of products sold by the reporting company (in the reporting year) at the end of their life
13. Downstream leased assets	• Operation of assets owned by the reporting company (lessor) and leased to other entities in the reporting year, not included in scope 1 and scope 2 – reported by lessor

Category	Category description
14. Franchises	• Operation of franchises in the reporting year, not included in scope 1 and scope 2 – reported by franchisor
15. Investments	• Operation of investments (including equity and debt investments and project finance) in the reporting year, not included in scope 1 or scope 2