

---

# Summery

# Technion's 2019

# Carbon Footprint

# report



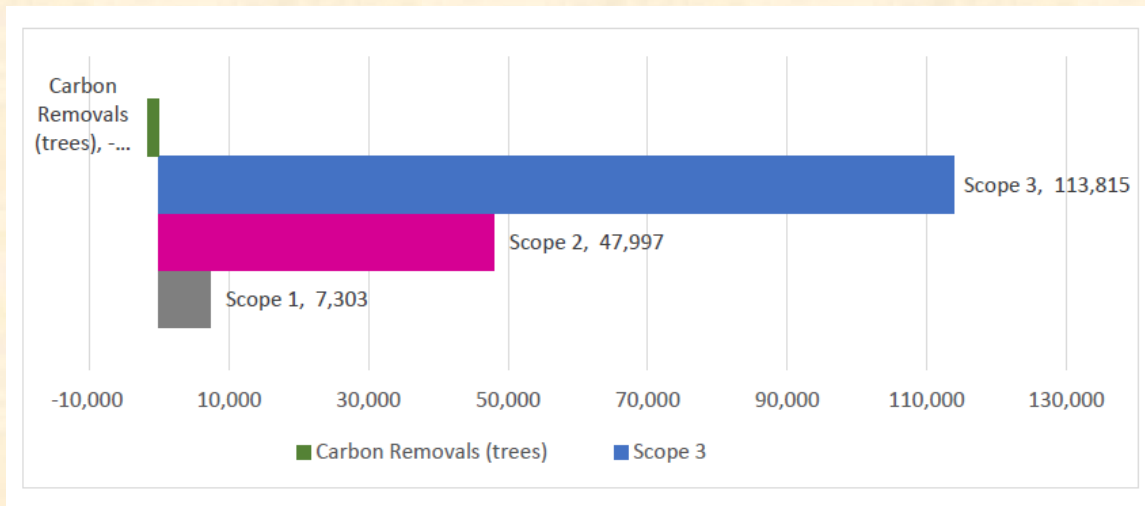


# Technion's 2019 Carbon Footprint

Technion's Carbon footprint report builds on the efforts of the Sustainability Center, aims to present a baseline from which the Technion should actively pursue emissions reductions and the development of further research and educational opportunities in bringing carbon reductions to practice. By engaging the campus, across departments, staff, faculty, and students in this effort, the Technion can leverage its campus as a living lab, working synergistically as one.

The Technion has been reporting Scope 1 and 2 emissions to the Ministry of Environmental Protection since 2017. This was the university's first accounting of Scope 3 emissions. Scope 1 emissions are direct emissions which occur on site, for example, fleet vehicles. Scope 2 emissions are the result of purchased electricity and are highly dependent on the types of fuels used to generate electricity for the national grid. Scope 3 emissions relate to all services and goods consumed by the university upstream, and as products of the university's activities downstream, such as waste and Commuting.

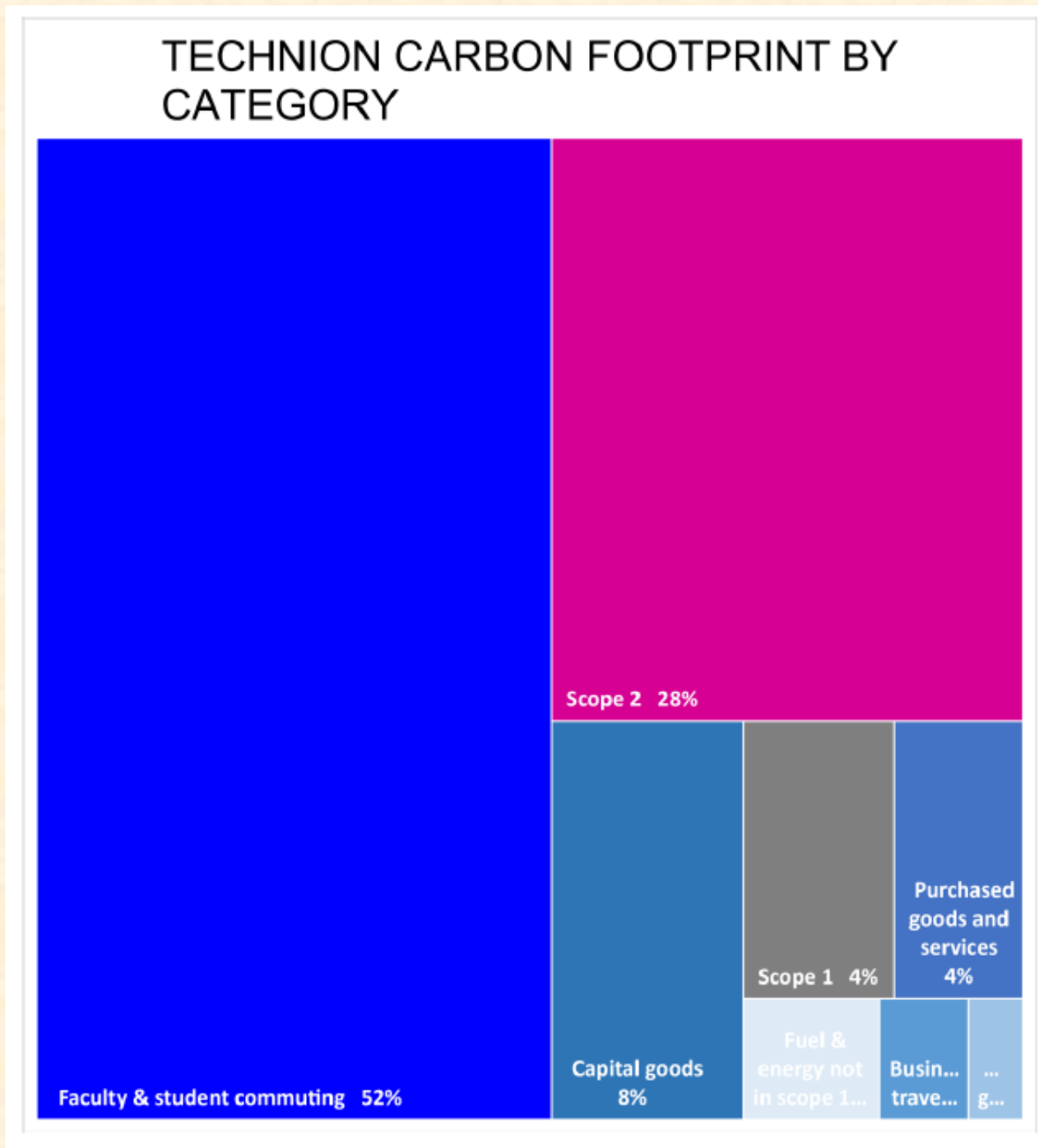
The total carbon emissions produced by the Technion in the calendar year 2019 are estimated to be **169,115tCO<sub>2</sub>e**. These emissions are predominantly due to Scope 3 emissions (representing 67% of total emissions), with Scope 2 (representing 28% of total emissions), comprising the second largest category. Scope 1 emissions representing only 4% of total emissions. The total offset estimated to be removed by the Technion's forested campus during 2019 is 1,704 tCO<sub>2</sub>e. **The net carbon emissions of the Technion during the reporting period are 167,410tCO<sub>2</sub>e.**



*The Technion's Carbon Footprint, 2019*



## Overall Results



Carbon footprint split by emissions categories.

Pink is Scope 2.

Grey is Scope 1.

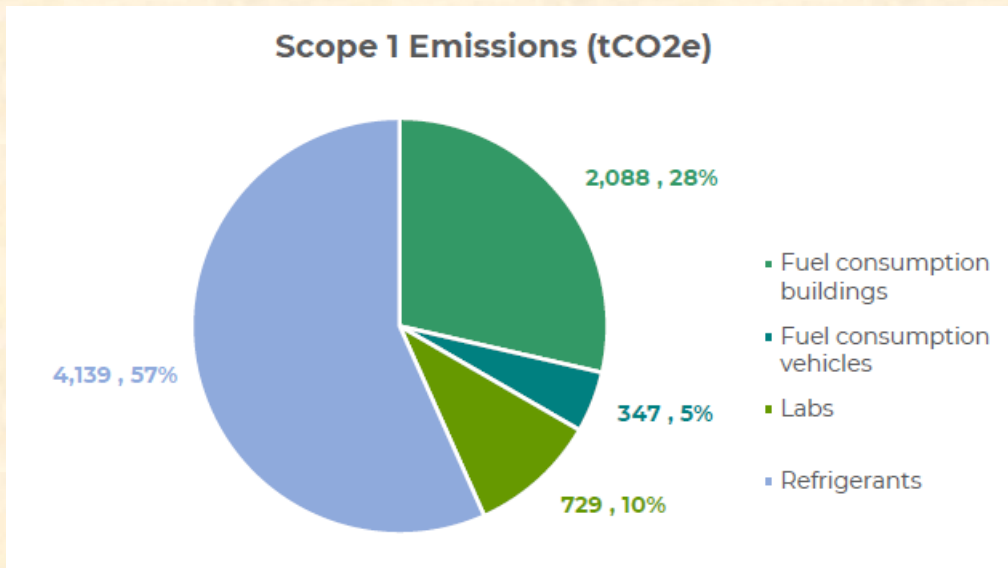
Blue is Scope 3.

Total carbon emissions in 2019 = 169,115 tCO<sub>2</sub>e.



## Scope 1

Scope 1 emissions are a result of direct emissions from sources owned by the Technion. The Technion's emissions in this category had been previously quantified through reporting to the Ministry of the Environment for the last 10 years. The Technion's scope 1 emissions mainly come from refrigerants, fuel consumption in buildings, followed by labs and fleet vehicles. Changes in land use could not be quantified at this stage and were therefore excluded.



The majority of the Technion's emissions in scope 1 are due to F-gas refrigerants, used for cooling.

The Technion's facilities may require replacements of chillers, and other investments in more efficient cooling systems. The Technion's Sustainability Center, in concert with Operations, has already developed a plan to replace chillers and reduce emissions from this category. In parallel, improved building design, insulation, window glazing, and other construction innovations can improve cooling efficiency in current and future buildings.



## Scope 2

Scope 2 emissions are indirect emissions stemming from electricity consumption at the Technion. The Technion purchases its electricity from a private supplier that produces electricity by burning natural gas (as opposed to purchasing electricity from the Israel Electric Corporation, which also uses unfriendly fuels such as coal and diesel). In addition, the Technion produces solar electricity through 3 systems totaling about 350 KWP and plans to expand this in 2024.

**The Technion's total electricity emissions for 2019 were 47,997 tCO<sub>2</sub>e.**

Beyond metering the total electricity purchased by the campus (88,075,940 kilowatt-hours), the Technion also measures most of the buildings in the Technion (over 200 buildings) by measuring secondary systems. The information collected provides details for understanding which systems consume the most electricity on campus and provides the ability to help identify wasted electricity.

The Technion could explore possibilities to directly reduce the amount of fossil-fuel based electricity supplied to the campus, through renewable energy production on or off site. As renewable energy utility companies become a feasible option in Israel the Technion can buy its electricity from a renewable utility company.

Indirectly reducing carbon emissions from Scope 2 would involve either:

1. Reducing the electricity consumption (for example, through improved insulation in new upcoming buildings)
2. Substituting alternative energy sources for the university's heating and cooling needs.

If the Technion will buy its electricity from a renewable utility company, it will reduce most of Scope 2 emissions. Also, Technion's research and technological innovation capabilities offer a huge opportunity for innovation in reducing scope 2 emissions by implementing advanced energy saving strategies and solutions.



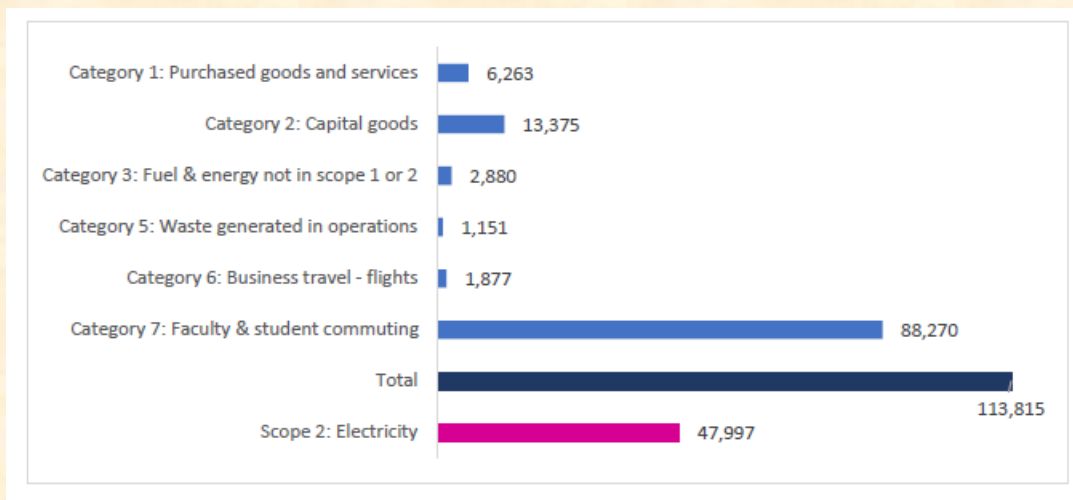


## Scope 3

Scope 3 emissions include all indirect emissions not included in Scope 2. Scope 3 emissions are a result of sources controlled or owned by other entities in the emissions value chain, such as suppliers of goods and services. Scope 3 emissions are divided into 15 categories per the GHG Protocol, as well as upstream and downstream emissions. Upstream emissions include those emitted from goods and services purchased and/or consumed by the thechnion. Downstream emissions include those related to sold goods and services. Due to data availability, and the nature of activities at the campus, 6 of the 15 Scope 3 categories were included into the carbon footprint report.

Investment emissions were excluded from this report and reported separately.

The emissions categories, and their respective footprints:



*Scope 3 Emissions Breakdown, 2019 (tCO<sub>2</sub>e)*

### CATEGORY 1 & 2: Purchased goods and services and Capital Goods

The estimated carbon footprint for purchased goods and services (**excluding food other than catering**) is 6,263 tCO<sub>2</sub>e.

The estimated carbon footprint for capital goods (**excluding buildings and construction**) is 13,375 tCO<sub>2</sub>e.

As an Institute of Technology, the Technion's footprint for lab-related materials is significant. Both lab chemicals and cleaning supplies were included in the chemicals and chemical products category, which is the largest subcategory in category 1. It is noteworthy that Capital Goods (electric and optical equipment and machinery) is larger than all other subcategories of purchasing. This is consistent with the large equipment needs of the Technion's core activities in technical scientific research and engineering.



### Category 3: Fuel and energy not in Scope 1 or 2

This category includes emissions related to the production of fuels and energy purchased and consumed by the Technion in 2019 that are not included in Scope 1 or Scope 2.

According to the Ministry of Environmental Protection, 2021, the average T&D losses in Israel were 6%. The 6% rate was multiplied by the total emissions for Scope 2.

The total emissions from transmission and distribution losses for 2019 were 2,880 tCO<sub>2</sub>e.

### Category 5: Waste

The household, paper/cardboard waste, and “other” (bulk) waste have a combined carbon footprint of 1,151 tCO<sub>2</sub>e.

Category 5 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. In this report, due to data availability and the boundaries determined for this analysis, the carbon footprint includes only household waste, cardboard/paper waste, and bulk waste. Household waste was assumed to be sent to landfill. As the data on destinations for cardboard waste and bulk waste or percent of waste recycled could not be obtained, emissions from recycling and transportation of the solid waste were excluded from the footprint. As of 2022, there is registration and monitoring of the percentage of recycling and transportation of all solid waste.

Water consumption and wastewater/liquid waste treatment emissions were excluded as this subcategory was determined to be outside the Technion’s operational control.

### Category 6: Business travel

According to the GHG Protocol, this category includes emissions from the transportation of employees for business related activities in vehicles owned or operated by third parties, such as aircraft, trains, buses, and passenger cars. However due to a lack of specific data on business travel in all modes of transportation except flights, only these can be considered, therefore assumptions must be made, and overall transport emissions must be higher than those solely calculated from flights.

1,877 tCO<sub>2</sub>e are emitted from student and faculty flights. Student flights account for 260 tCO<sub>2</sub>e, while faculty account for 1,617 tCO<sub>2</sub>e.



### Category 7: Staff and student commuting

The commuting category includes emissions from the transportation of employees (in the Technion's case, students faculty and staff) between their homes and the university. Emissions from employee commuting may arise from: automobile travel, bus travel, rail travel, air travel, other modes of transportation (e.g. bicycling, walking).

The Technion draws students and employees from the entire country. Some commute from peripheral towns within a certain radius of the campus, and some move to the city of Haifa / Neshet. The campus is located in Neve Sha'anani in the center of Haifa and therefore it is difficult to reach by public transportation that requires a combination of train and bus. This difficulty increases commuting in private vehicles.

The assumptions are significant and introduce large subjectivity and uncertainty into the final value for this emissions category.

**Due to the large volume of assumptions used to calculate a carbon footprint for this category, the resulting value should be treated as a rough initial estimate.** The estimate emphasizes the potential scale of this emissions category, and the need for more accurate data collection to better understand emissions from this source.

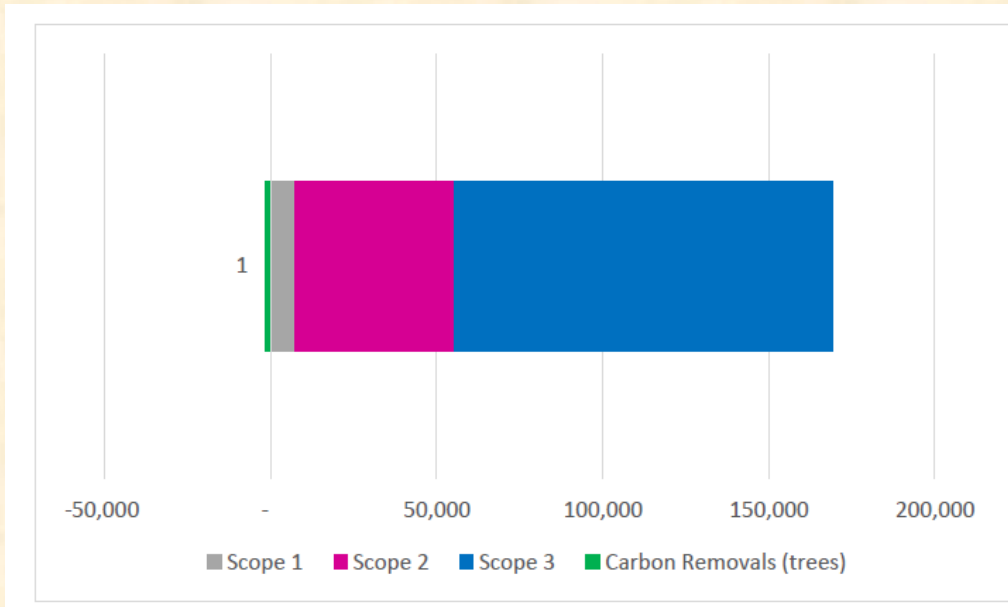
The total emissions estimate for the commuting category is 88,270tCO<sub>2</sub>e.



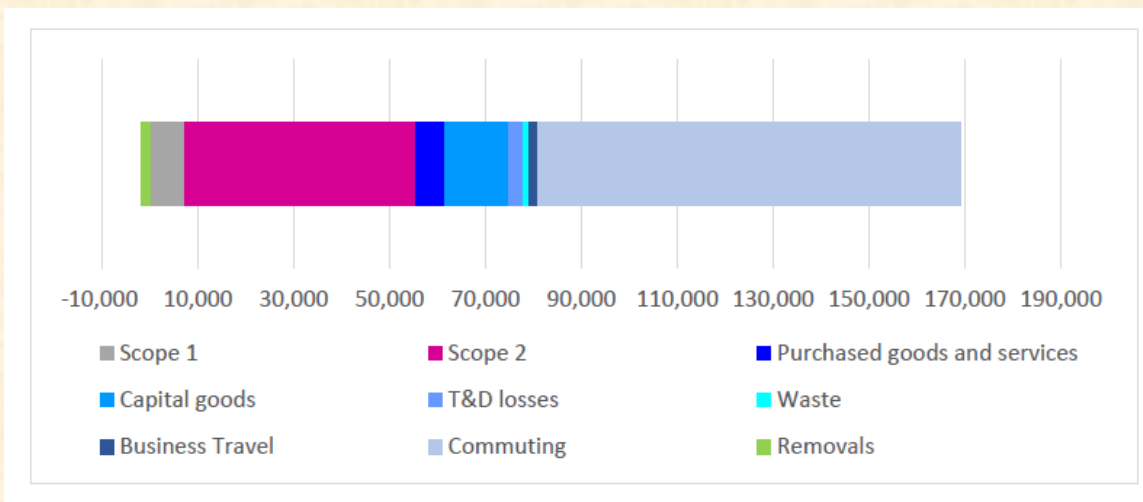


## Final Results

The total tCO<sub>2</sub>e produced by the Technion in the calendar year 2019 are estimated to be 169,115tCO<sub>2</sub>e. The total offset tCO<sub>2</sub>e estimated to be removed by the Technion's forested campus during 2019 is 1,704 tCO<sub>2</sub>e. The total net emissions of the Technion during the reporting period are 167,410 tCO<sub>2</sub>e.



*Net carbon emissions from the Technion in academic year starting 2019. (tCO<sub>2</sub>e)*



*Net Carbon emissions from the Technion in the academic year 2019. Scope 1 emissions are shown in grey; Scope 2 emissions are shown in pink, Scope 3 emissions are shown in shades of blue, and Scope 1 removals are shown in green.*