



HZ UNIVERSITY OF APPLIED SCIENCES

CO2 FOOTPRINT

FOR A BETTER FUTURE

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Management Summary

The HZ university is a governmentally funded organization and as one they have certain social responsibilities connected to being transparent and responsible for their actions. According to the HZ Strategic Plan (HZ UAS, 2017), sustainability in education and research is a basic condition for a successfully working and viable planet, and a green economy. Therefore, the HZ has agreed to a collaboration agreement with all the universities in the Netherlands that aims to reduce their energy consumption by 2% per year (MJA-3 + Routekaart RVO). The HZ has also stated that they support and work on the implementation of the SDG's within the university and one of the nine goals of the university is CO₂ reduction.

To combat climate change, the Dutch government wants to reduce the Netherlands' greenhouse gas emissions by 49% by 2030, compared to the 1990 levels, and a 95% reduction by 2050. These goals are laid down in the Climate Act on May 28, 2019 (Ministerie van Economische Zaken, L. (Climate policy, 2020)



CO₂ Footprint 2019

Main sources of emissions

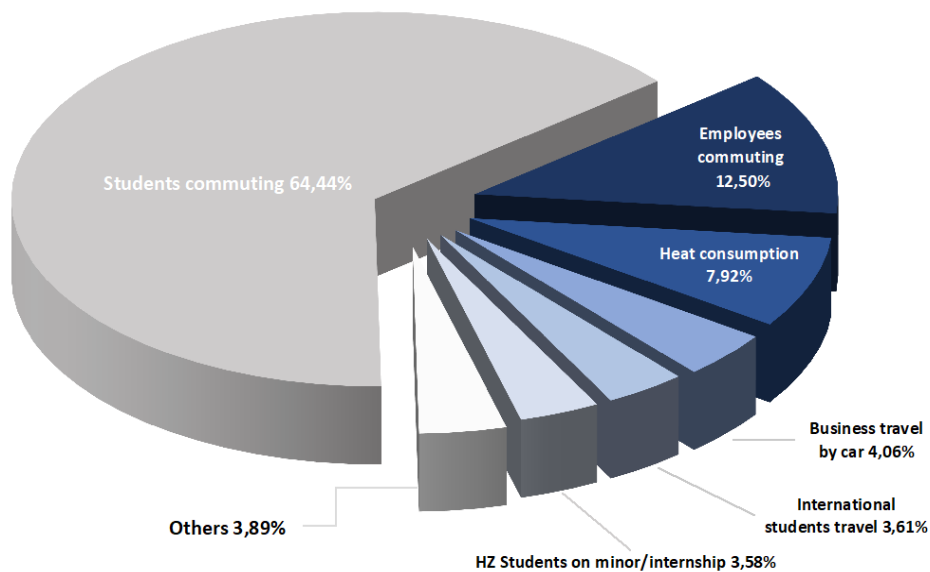








Figure 1. Main sources of emissions

Other sources of emissions:

	Natural gas consumption	0,08%		Business travel by plane	1,39%
	Fuel consumption of HZ owned vehicles	1,30%		Exchange students travels	1,06%
	Electricity consumption	0,01%		Water	0,04%

INTRODUCTION

Dear HZ University of Applied Sciences Board of Directors,

Thank you for taking the time to read the first annual 2019 carbon footprint report. We hope this report inspires bold action to support initiatives to drastically reduce the carbon footprint of HZ University of Applied Sciences and inspires each of you to find lasting solutions to reduce our carbon footprint.

In this report you will find the following:

- ❖ A management summary that outlines the key takeaways and our recommendations for reducing HZ University's carbon footprint.
- ❖ A more in-depth analysis of HZ University's CO₂ emissions, divided into 3 scopes, with each including their respective sources of CO₂ emissions. Each scope has a designated section.
- ❖ A retrospective review – how CO₂ emissions changed between 2015 and 2019.
- ❖ Opportunities and recommendations for further exploration for HZ University to reduce its carbon footprint.

This work has been a joint effort of the International Business students: Yana Hadzhigeorgieva, Mayalen Blanco and Kristián Tankina.

Yana conducted the original Co₂ calculations as professional product, as part of her graduation internship for the HZ Green Office in 2020.

As part of the HZ minor Becoming fit for the Future, Kristian and Mayalen then used Yana's work as input for writing this management report.

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Overview

HZ University of Applied Sciences (HZ UAS), a governmentally funded University has a mission and vision that includes sustainability as a key underpinning. As stated in the Strategic Plan of HZ University of Applied Sciences:

“...the ambition of the HZ is to contribute to the realization of a green economy and a liveable planet. In order to be able to make this work for the long term, it is important that teachers, staff, and students develop knowledge and skills to understand the context of the challengers, based on their work, study and role and content. Education and research will play a crucial role in this.”

(HZ University of Applied Science Strategic Plan, 2018-2021)

HZ has a critical role to play in educating and training students to work in a green economy as well as to become climate scientists who continue to study the impacts of global warming and climate change. HZ must mitigate its contribution to GHG emissions too if it is to fully embrace its mission and vision. In this document Green House Gas Emissions (GHG emissions) are also referred to as CO₂ emissions. In accordance to the Greenhouse Gas Protocol, all emissions are calculated in terms as Co₂ equivalents.

The primary contributor to the GHG emissions at HZ University is student and employee commuting, followed by heat consumption and business travel.

HZ University must take decisive action to mitigate its contributions to climate change. We outline recommendations in detail below and they are broken down into the following pillars:

- ❖ Research commuting behaviour and test new ideas
- ❖ Improved Access to HZ University
- ❖ Campus Wide Initiatives
- ❖ Online Learning/Remote Work
- ❖ Other initiatives that do not directly relate to student and employee commuting

Total Green House Gas Consumption at University College of Applied Sciences

The HZ University's total CO₂ emissions in 2019 amounted to 5,090,376 kilograms. Student and employee commuting were the greatest contributor at 77% followed by heat consumption at 8%.

Main sources of emissions

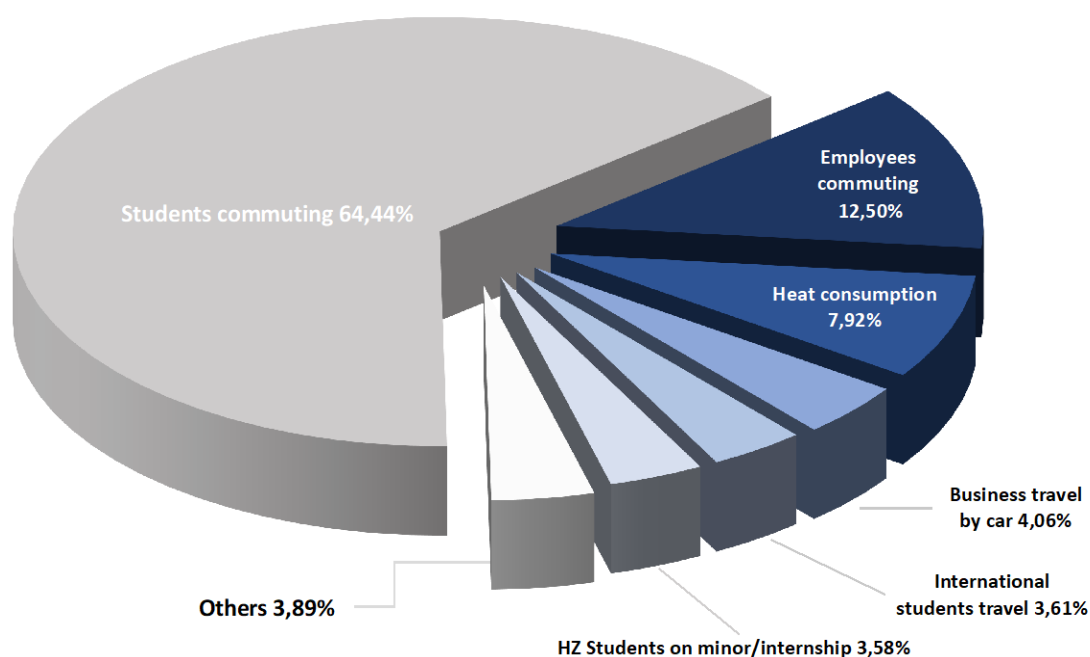


Figure 2. Distribution of CO₂ footprint in 2019, US EPA. 2021. Greenhouse Gas Equivalencies Calculator | US EPA. [online] Available at: <<https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>> [Accessed 6 February 2021].

The chart below shows the different types of emissions by scope for the HZ University. This will be further broken down in the following sections.

Types of emissions per scope for HZ UAS			CO ₂ emissions (kg)	TOTAL (%)
Scope 1	Direct emissions	Natural gas consumption	4,073	0.08%
		Fuel consumption of university owned vehicle	66,097	1.30%
Scope 2	Indirect emissions	Electricity consumption	701	0.01%
		Heat consumption	403,255	7.92%
Scope 3	Other indirect emissions	Employees commuting	636,372	12.50%
		Students commuting	3,279,901	64.43%
		Business travel by plane	70,935	1.39%
		Business travel by car	206,726	4.06%
		Exchange students travels	53,724	1.06%
		International students travel	183,900	3.61%
		HZ students on exchange/internship abroad	182,443	3.58%
		Water	2,250	0.04%
Total emissions			5,090,376	

Table 1. Types of emissions per scope by HZ UAS

SCOPE 1 – Direct Greenhouse Gas Emissions

HZ University has two direct sources of GHG emissions. Scope 1 contributors include university owned vehicle fuel consumption and natural gas consumption. Overall, Scope 1 only contributes approximately 1% to the total greenhouse gas emissions at HZ.

Scope 1 Direct emissions	Natural gas consumption	4,073	0,08%
	Fuel consumption of university owned vehicles	66,097	1,30%

Table 2. Direct GHG emissions by HZ UAS

SCOPE 2 – Indirect Greenhouse Gas Emissions

Indirect GHG emissions are created by the electricity and district heating consumed at the university. These forms of energy are generated elsewhere but are directly consumed by the university. Heat consumption contributes 8% to the overall GHG emissions. The HZ has installed solar panels which has reduced CO₂ emissions. The purchased electricity of the university is 1358 MWh and 97 MWh were self-generated. Additionally, 57 MWh was fed back into the net.

→ By self-generating green energy, the HZ has reduced its emissions coming from electricity with over 7%.

Scope 2 Indirect emissions	Electricity consumption	701	0%
	Heat consumption	403,255	8%

Table 3. Indirect GHG emissions by HZ UAS

SCOPE 3 – Sphere of Influence

The third scope of CO₂ emissions evaluates upstream and downstream GHG emissions. Upstream refers to purchased goods and services, rented assets, work-related travel, and transport and distribution. Downstream emissions include water and waste processing.

The upstream and downstream categories are further specified by: Employee Commuting, Student Commuting, Business Travel by Plane, Business Travel by Car, Exchange Student Travel, International Student Travel, HZ Student Study Abroad, and Water.

Scope 3 Other indirect emissions	Employees commuting	636,372	13%
	Students commuting	3,279,901	64%
	Business travel by plane	70,935	1%
	Business travel by car	206,726	4%
	Exchange students travels	53,724	1%
	International students travel	183,900	4%
	HZ students on exchange/internship abroad	182,443	4%
	Water	2,250	0,04%
	Total emission	5,090,376	100%

Table 4. Other indirect GHG emissions by HZ UAS

Commuting contributes the most CO₂ emissions at HZ University: 77% of total emissions, of which 12,5% is caused by employee commuting and 64% by student commuting.

→ **Emissions produced per person by the commuting of employees are almost 30% higher than those from the commuting of students**

Business travel, including by plane and car, contributes 5% of GHG emissions. Both international student travel and student study abroad contribute 4%.

A commuting survey filled out by 272 HZ University students, indicates that 31.6% commuted by bike, 15.1% commuted by car, 14% commuted by train, and 13.2% commuted by bus. See survey results in the graph below.

What transportation method do you use for going to an HZ building?

272 responses

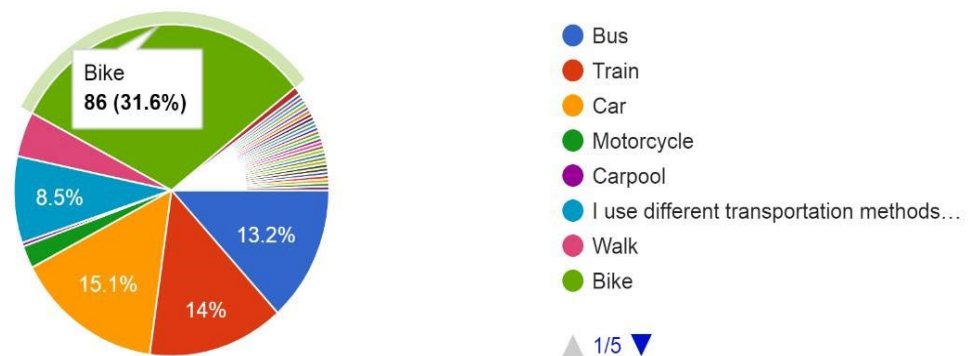


Figure 3. Means of transportation among students

Comparing GHG Emissions: 2015 and 2019

HZ University of Applied Sciences has decreased their overall GHG emissions from 2015-2019 by 37%. The table below shows the differences in GHG emissions in 2015 and 2019 and the percent difference. The greatest decrease in GHG emission can be seen in student commuting and electricity consumption.

Types of emissions per scope (kg)			2015	2019	TOTAL (%)
Scope 1	Direct emissions	Natural gas consumption	462,223	4,073	-99%
		Fuel consumption of university owned vehicle	37,909	66,097	74%
Scope 2	Indirect emissions	Electricity consumption	681,642	701	-99%
		Electricity consumption for heating		403,255	-41%
Scope 3	Other indirect emissions	Employees commuting	759,612	636,372	-16%
		Students commuting	5,144,643	3,279,901	-36%
		Business travel	383,497	277,661	-28%
		Exchange/international students travels	583,451	420,067	-28%
		Water	1,628	2,250	38%
		Waste	14,082		
		Total emissions		8,068,688	5,090,377

Table 5. Comparison of types of emissions per scope in kilograms

Difference in measurement 2015 vs. 2019

- In 2015, natural gas has been mistakenly categorized under scope 1. In 2019, natural gas has been correctly defined under scope 2, resulting in a large difference between emissions under scope 1 and scope 2 in 2015 vs. 2019.
- In 2015 the Co₂ emissions of the waste streams were calculated by Van Gansewinkel. For 2019, these numbers were not available since HZ was at the time in the process of changing their waste processing company. The fact that Co₂ emissions from waste have not been taken into account over 2019, however, hardly impacts the comparison between 2015 and 2019, since the amount of Co₂ emissions resulting from waste streams is very low, compared to total Co₂ emissions. In 2015, only 0,17% of total CO₂ emissions were caused by waste streams.

The reduction in CO₂ emissions between 2015 and 2019 has resulted from HZ University's commitment to reduction. It has a collaborative agreement with all universities in the Netherlands for reducing their energy consumption by 2% per year.

The HZ is currently (=2020) changing the air conditioning used for cooling the IT facilities which will reduce this specific energy consumption by 90%. The HZ has also worked with the city to change bus and train schedules so that it aligns more closely with student and employee commuting schedules. HZ offers its employees an NS Business card. Since 2019, HZ participates in an electric car sharing initiative from Stichting Duurzame Mobiliteit Zeeland; for business travel HZ employees can use electric cars, parked nearby (5 min walk) at the E-Mobility Park. The HZ has also committed to transitioning university vehicles to electric vehicles for university transportation. Since 2020, HZ offers shared bikes to its students via the GoAbout system. HZ Green Office and the HZ Marketing director collaboratively promote the use of these bikes. Marketing assists in the communication whereas HZ Green Office works together with GoAbout student ambassadors and organizes bike tours visiting farms selling local and organic foods.

Recommendations

Our recommendations are primarily focused on addressing commuting as it is the greatest contributor to GHG emissions.

Research commuting behaviour and test new ideas

- ❖ The University can offer its research capabilities in collaboration with the Province of Zeeland and the municipality of Vlissingen and Middelburg to better understand commuting and test new ideas.

Improve Access to HZ University

- ❖ Strengthen relationships with public transportation companies like Connexion and NS to provide special transportation services for students and employees of the university during peak hours.
- ❖ Promote more ride sharing apps specific to university students/staff and individuals driving electric cars.

Campus-Wide Initiatives

- ❖ Determine a more specific, university wide strategy for decreasing CO₂ emissions at HZ University including goals for becoming net neutral or net negative.
- ❖ Create a CO₂ emission awareness campaign. This would provide education to students and staff about their impact on GHG emissions and what they can do to reduce them.
- ❖ Implement a parking fee for the campus in Vlissingen (parking in Middelburg is only possible at the nearby AH, which results in increased usage of public transport and bike). Currently, parking is free of charge at the campus in Vlissingen, making it hard to promote more sustainable modes of transport. Students and staff with special needs would be exempt of paying duties. The facilities team, working with HZ Operations' management, would determine the parking fee structure.
- ❖ Promote a 'bike to uni' reward system to encourage staff and students to bike more.
- ❖ Add e-bikes to the university vehicle program
- ❖ Mandate all employees use the E-Mobility Park services for business purposes.
- ❖ Install more electric charging stations throughout both campuses, ensuring both fast charging stations and regular charging stations for electric cars and bicycles.
- ❖ Create a policy which limits how often employees fly for business trips or purchase carbon offsets when employees fly for business.

Online Learning/Remote Work

- ❖ Determine online class opportunities and the ease of administration
- ❖ Determine remote work opportunities and ease of administration

Other GHG Reduction Opportunities, not related to commuting

- ❖ Currently the HZ is making plans to renovate a building in Vlissingen. This provides a perfect opportunity to create a net-0 or net negative building.
Other ideas include:
 - ❖ Educate staff to switch off beamers and lights after leaving their classrooms
 - ❖ Some radiators in a few classrooms cannot be switched off, since the switch / turn buttons of the radiators are broken. As a result, these radiators cannot be turned lower or switched off even when it's very hot in a classroom
 - ❖ Install more solar panels
 - ❖ Supply electricity to the university from a green source

Conclusion

HZ University of Applied Sciences stands to make big changes to impact their CO₂ emissions. It is the hope that this report guides decision makers now and into the future to model the way as a university leader in the reduction of GHG emissions.

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Appendix

Methodology for Calculating the CO₂ Emissions

The method chosen for this carbon footprint scan has been retrieved by the GHG (Green House Gas) Protocol. GHG Protocol establishes comprehensive global standardized frameworks to measure and manage greenhouse gas emissions from private and public sector operations, value chains and mitigation actions (Janet Ranganathan, Laurent Corbier, 2004).

Specifically, for this report not only the World Resources Institute (WRI) GHG Protocol has been used but also the ‘Working 9 to 5 on Climate Change Office Guide’ has been adopted which is also a creation of the WRI. This Guide is for office-based organizations that do not undertake any manufacturing activities. Examples include consulting companies, research and educational institutions, government agencies, and nongovernmental organizations (Bhatia, Samantha Putt del Pino, and Pankaj, 2002).

To help delineate direct and indirect emission sources, improve transparency, and provide utility for different types of organizations and different types of climate policies and business goals, three “scopes” (scope 1, scope 2, and scope 3) are defined for GHG accounting and reporting purposes (Bhatia, Samantha Putt del Pino, and Pankaj, 2002).

In the following table the GHG Scopes are described.

Scope 1 Direct GHG emissions	Direct GHG emissions occur from sources that are owned or controlled by the company, for example, emissions from combustion in owned or controlled boilers, furnaces, vehicles, etc.
Scope 2 Electricity indirect GHG emissions	Scope 2 accounts for GHG emissions from the generation of purchased electricity consumed by the company. Scope 2 emissions physically occur at the facility where electricity is generated.
Scope3 Other indirect GHG emissions	Scope 3 is an optional reporting category that allows for the treatment of all other indirect emissions. Scope 3 emissions are a consequence of the activities of the company but occur from sources not owned or controlled by the company. Some examples of scope 3 activities are extraction and production of purchased materials; transportation of purchased fuels; and use of sold products and services.

Table 3. Scopes description

The three scopes have been adjusted to the activities of the organization which emit CO₂ emissions. Those activities have been also identified by looking at what other universities, such as Erasmus University Rotterdam, have been measuring, as well as a previous CO₂ scan at HZ in 2015.