

Qassim University Campus footprint Report



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Campus building footprint Report

Building Area

Total area: 220,754.90 m² (2,376,186.01 ft²) Total distance: 1.68 km (1.04 mi)









The following	table is showing	the details of t	the buildings area	inside campus:
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Building's Name	Total Ground Area	No. of Floors	Total Floors' Area
Collage of business and economic	22.938,96	4	91.755,84
Collage of sciences and College of Applied Medical Sciences	10.995,36	4	43.981,44
College of Engineering	17.169,65	4	68.678,60
College of Sharia and Islamic Studies	13.570,92	4	54.283,68
College of Arabic Language and Social Studies	18.366,09	4	73.464,36
College of Dentistry	10.001,57	4	40.006,28
College of Pharmacy	10.963,27	4	43.853,08
Administration Building	11.096,90	5	55.484,50
Hall A	875,69	4	3.502,76
Hall B	705,18	4	2.820,72
Total	116,683.6 m ²		466.734,4



Qassim University Sustainable Carbon Footprint

Introduction

Qassim University is a public university located in Buraydah, the capital city of the Qassim Province in Saudi Arabia. Established in 2004, it is one of the leading universities in the country and offers a wide range of academic programs across various disciplines.

The university aims to provide quality education, promote research and innovation, and contribute to the overall development of the region. It offers undergraduate, graduate, and doctoral programs in fields such as engineering, medicine, dentistry, pharmacy, applied medical sciences, computer science, business administration, education, arts, and social sciences.

Qassim University, as a prominent institution of higher education, takes pride in its commitment to the environment, sustainability, and the fight against climate change. We recognize the importance of addressing these global challenges and taking an active role in protecting and preserving our natural environment for present and future generations.

In line with our vision of academic excellence and social responsibility, Qassim University strives to be a role model in sustainable practices and the promotion of a culture of respect and care for the environment. We are committed to implementing concrete policies and actions that reduce our environmental footprint and foster sustainability in all areas of our institutional activity.

Qassim University is firmly committed to addressing the challenge of climate change and contributing to the transition towards a low-carbon economy. As a leading institution in higher education, we recognize our responsibility in reducing greenhouse gas emissions and promoting sustainable practices in our operations.

This report presents the analysis of Qassim University's Carbon Footprint, which measures the greenhouse gas emissions generated by our institutional activities, we estimate the carbon footprint contributions mainly from transport, electricity consumption, total water consumption, and waste output. The aim of this report is to provide a comprehensive assessment of our environmental performance and highlight the actions we are taking to reduce our carbon footprint.

Methodology

Greenhouse Gas Protocol

The Greenhouse Gas Protocol is an internationally recognized methodology for the calculation and management of greenhouse gas (GHG) emissions from an organization. This protocol provides clear guidelines on how to measure and report GHG emissions, enabling organizations to assess their environmental performance and establish reduction strategies.





The Greenhouse Gas Protocol defines three main scopes for the measurement

and reporting of GHG emissions:

Scope 1:

It includes direct GHG emissions from sources that are owned or controlled by the organization. This includes emissions generated by the combustion of fossil fuels in the organization's facilities, operation of organization-owned vehicles, and fugitive emissions from refrigerants.

Scope 2:

It encompasses indirect GHG emissions derived from the generation of purchased electricity, heat, or steam consumed by the organization. These emissions are produced by external suppliers and are attributed to the organization that consumes them.

Scope 3:

It includes indirect GHG emissions associated with the organization's activities, but that occur from sources that are outside its ownership or control. These emissions may be related to product transportation, procurement of goods and services, waste management, business travel, and other indirect activities of the organization.

Universities should report and cover their 'scope 1' and 'scope 2' emissions in their buildings and campuses. Scope 1 emissions are the direct emissions produced by universities, like natural gas consumption on campus for heating buildings. Scope 2 emissions are those generated by electricity purchased by a university and produced using fossil fuels.





Measurement

The following sources were measured for the estimation of the carbon footprint: electricity, annual water consumption, number of cars for students, faculty, and staff, number of trees, and amount of waste on an annual basis.

Table 1 shows the various scope categories and their emission sources.

 Table 1: GHG Scope Categories

GHG Protocol					
Scope Categories	Emission Source				
	Natural Gas				
Scope I	Refrigerants				
	Vehicle Fleet				
	Landscape Compost				
Scope II	Purchased Electricity				
	Solid Waste				
	Water and Waste Water				
Scope III	Student/ Staff/ Faculty Commute				
	Air Travel				

Figure 1 shows the boundary of Qassim University about 10 km² in area, which will be the boundary of this project.



Figure 1: Qassim University





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Fuel consumption of 0.25 liters per km of petrol was assumed for heavy vehicles (VCA Car Fuel Data). A week was taken to be five working days, a semester 16 weeks, and an academic year two semesters.

Table 2: Emissions Related to Transportation

Type of Transport	No. of vehicles	Average Travel per day (km)	Fuel mileage (L/km)	Fuel per day(L)	Fuelper week(L)	Fuel per month(L)	Fuelper sem.(L)	Fuelper year(L)	Kg CO2 peryear
Buses (from campus)	35	25	0.25	218.75	1,093.75	4,375	17,500	35,000	108,500
Water transport	1	1	0.25	0.25	1.25	5	20	40	124
Wheelloader	1	1	0.25	0.25	1.25	5	20	40	124
Dump truck	3	1	0.25	0.75	3.75	15	60	120	372
Earth mover	1	1	0.25	0.25	1.25	5	20	40	124
Total	76								109,244

Table 3 lists the carbon footprint due to daily commute by faculty, staff, and students. An average fuel consumption of 0.125 liters per km was assumed (VCA Car Fuel Data).

Table 3: Emissions from Cars

Cars usedby	No.of cars	Ave.daily travel(km)	Ave. Fuel used (Liter/ km)	Fuel used per day (liters)	Fuel used per week (liters)	Fuel used per month (liters)	Fuel used per semester (liters)	Fuel used per year (liters)	Kg ofCO2 peryear
Faculty and staff	3141	25	0.125	9815	49078	196312	785250	1570500	4868550
Student car	25,300	25	0.125	79,062	395,312	1,581,250	6,325,000	12,650,000	39,215,000
Total	28,441								44,083,550

The carbon footprint related to electricity consumption: The estimation of the average annual consumption was made to carry out the calculations.

Table 4: Footprint related to electricity consumption

Measuring Months	kWh/month	kWh/ year	kg CO2 / year
Average	8,098,635.00	97,183,620	77,746,894.93



Scope III Contribution from Tree Plantation

Table 5 presents a record of tree plantation on the main campus of Qassim University. It is estimated that one tree will offset 10 kg of CO2/yr (Ashby, 2009].

Table 5: Contribution from Tree Plantation

Name of tree	Number of trees	CO2 kg/yr
Palm	750	
Lebbeck	4,200	
Parkinsonia	2,900	
Conocapus	6,900	
American palm	230	
Total	14,980	-149,800

Below is the summary of emissions and the calculation of "Net Carbon Footprint per person per year", considering that the current population is 31,248.

Table 6: Summary of Emissions

Scope	Details	Kg CO2	MT CO2
Scope 1	Vehicle Fleet	109,244.00	109
Scope 2	Purchased Electricity	77,746,894.93	77,747
Total Scope	1 and 2 Emissions	77,856,138.93	77,856
Scope 3	Student and Faculty Commute	44,083.550	44
Contribution from Tree Plantation		-149,800.00	-149
Total Scope	3 Emissions		
Total Carbo	n Footprint	77,750,422.48	77,750

During the period from 2016 to 2024, Qassim University has experienced significant improvements in its carbon footprint. Thanks to the implementation of sustainable policies and practices, as well as the adoption of more efficient and cleaner technologies, we have successfully reduced our greenhouse gas emissions. These improvements are the result of a continuous commitment to sustainability and the environment, reflecting our efforts to actively contribute to climate change mitigation and the protection of the natural surroundings.



Qassim University

Moreover, the university succeeded to get the Carbon Neutrality Certification, as shown in the following figure.



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Table 7: Net Carbon Footprint per person per year 2022

Population: Faculty, Staff and Students	31,248	
Net Carbon Footprint per person per year	3,898.10	3.9

Table 8: Net Carbon Footprint per person per year 2016

Population: Faculty, Staff and Students	28,441	
Net Carbon Footprint per person per year	4.360	4.3

We are proud of our commitment to the environment, sustainability, and the fight against climate change. Through education, research, and the implementation of sustainable practices, Qassim University positions itself as an agent of change in building.

Proposed Interventions for lowering carbon emissions:

Scope 1:

- Transition fleet vehicles to electric or hybrid alternatives.
- Regular maintenance and fuel optimization.

Scope 2:

- Install renewable energy solutions (solar panels).
- Real-time energy monitoring systems.
- Awareness campaigns for reducing electricity consumption.

Scope 3:

- Promote carpooling and use of public transportation.
- Increase campus transportation services.

