

Loughborough University

Loughborough Campus

Annual Energy Performance Report

August 2022 – July 2023



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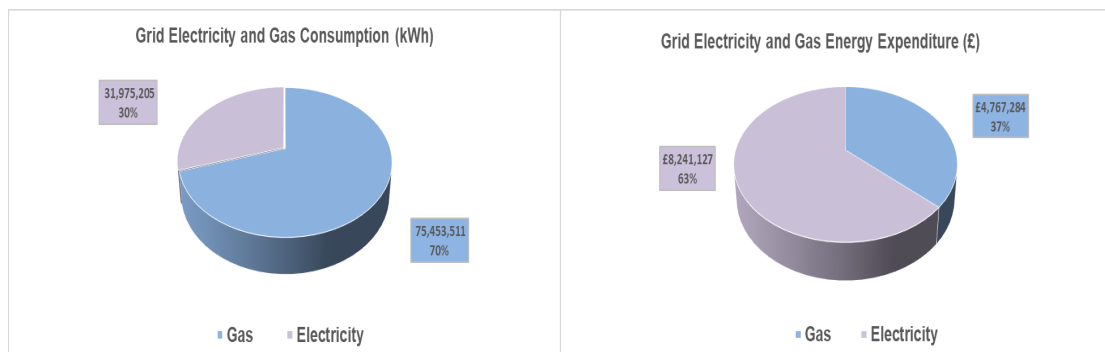
Management Summary

This report covers the energy performance for the Loughborough Campus for the 2022/23 academic year.

Energy Consumption and Cost Data

The annual energy consumption is presented in the following table:

Year	Electricity		Gas		Total	
	kWh	£	kWh	£	kWh	£
2022/23	31,975,205	£8,241,127	75,453,511	£4,767,284	107,428,716	£13,008,411



The electricity consumption represents 30% of the consumption and 63% of the expenditure, with the gas consumption representing 70% of the consumption and 37% of the expenditure.

CHP Performance

The Combined Heat and Power (CHP) units continue to form an integral part of the University thermal and electrical infrastructure, providing 21% of the annual University electricity consumption and saving £1.15 million in energy costs in 2022/23.

Carbon Emissions

The absolute scope 1 and 2 carbon emissions for the 2022/23 academic year have reduced by 40% compared to the 2010/11 baseline year.

The emissions relative to student numbers for the 2022/23 academic year have reduced by 47% compared to the 2010/11 baseline year.

The University has set a target of “net zero” scope 1 and 2 emission by 2035 and the Loughborough University Net Zero (LUNZ) group has been established to develop a road map that sets out the decarbonisation plan for the University to meet its 2035 reduction targets.

Energy Costs

The global utility supply markets are very volatile at present due to the continued conflict in Ukraine and this is having a significant impact of the cost of both gas and electricity.

Uncertainty over European gas and power supplies continue to create extraordinary challenging trading conditions, both in terms of high prices and the ability to fix prices against agreed hedging policies.

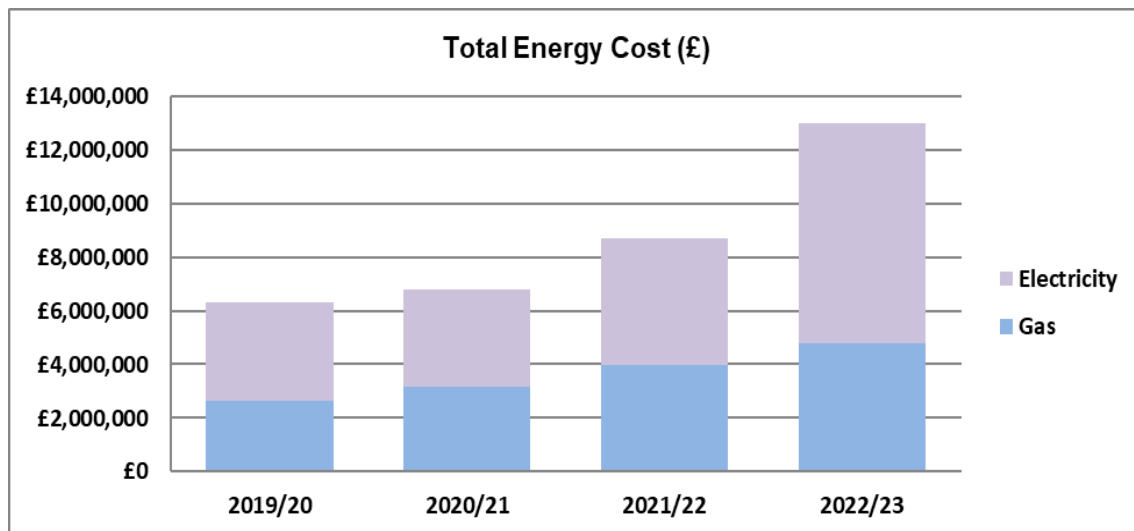
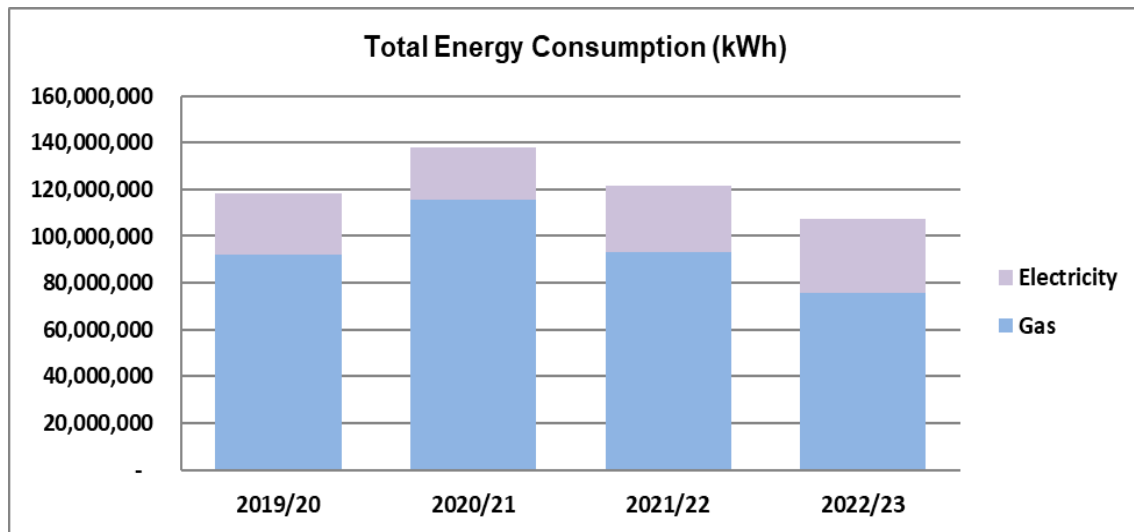
The University has hedged most of the forecast consumption (electricity: 89% and gas: 86%) for the 2023/24 financial year and is protected to a degree against the current volatility and high costs, however the forecast costs for 2023/24 will still be remain high compared to previous years.

1.1 Total Energy Consumption and Cost

The annual energy consumption and cost is summarised in the following table:

Year	Electricity		Gas		Total	
	kWh	£	kWh	£	kWh	£
2019/20	26,014,160	£3,671,554	92,004,395	£2,651,804	118,018,555	£6,323,358
2020/21	22,299,197	£3,641,994	115,631,650	£3,141,697	137,930,847	£6,783,691
2021/22	28,833,534	£4,705,812	92,896,160	£3,977,582	121,729,694	£8,683,394
2022/23	31,975,205	£8,241,127	75,453,511	£4,767,284	107,428,716	£13,008,411

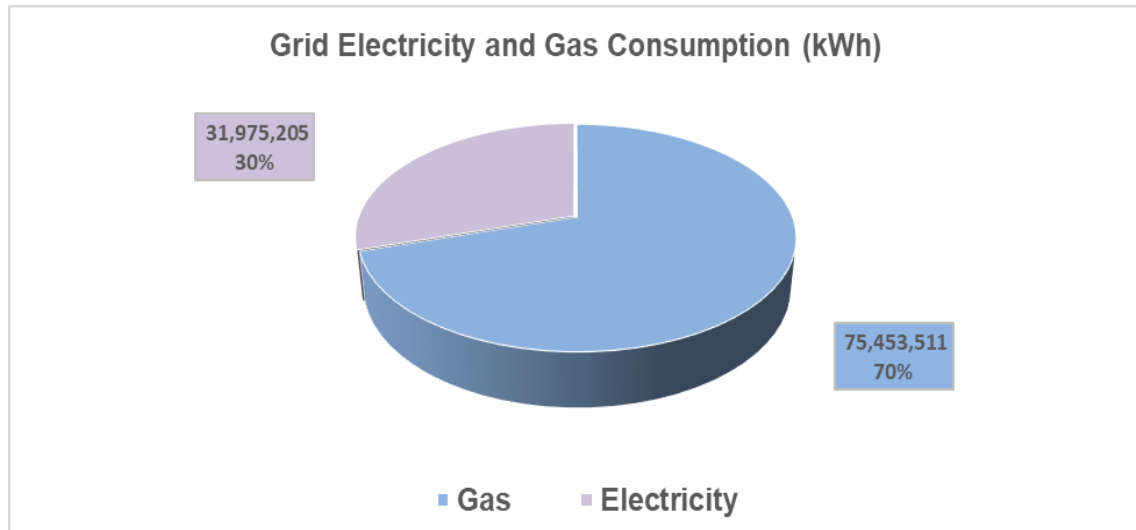
The energy consumption and costs are presented in the following graphs:



The combined grid electricity and gas consumption has decreased by 12% and the costs have increased by 50% compared to the corresponding period in 2021/22.

1.2 Total Energy Consumption

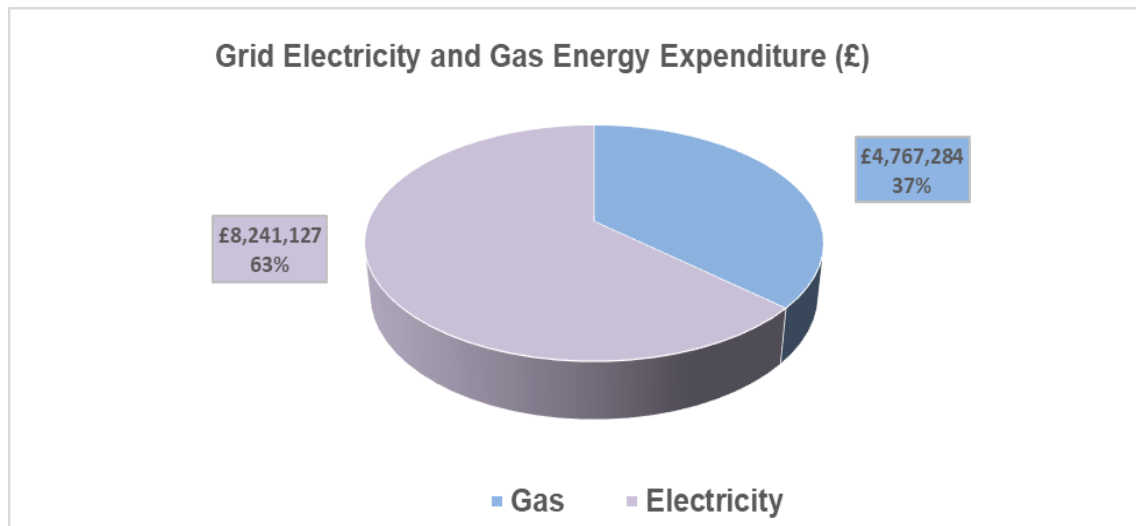
The total energy consumption breakdown for 2022/23 is presented in the following graph:



The "grid" electricity consumption represents 30% of the total annual energy consumption and the gas consumption represents 70% of the total annual energy consumption.

1.3 Total Energy Expenditure

The total energy cost breakdown for 2022/23 is presented in the following graph:



The "grid" electricity costs represent 63% of the total annual energy expenditure and the gas costs represent 37% of the total annual energy expenditure.

1.4 Electricity Consumption

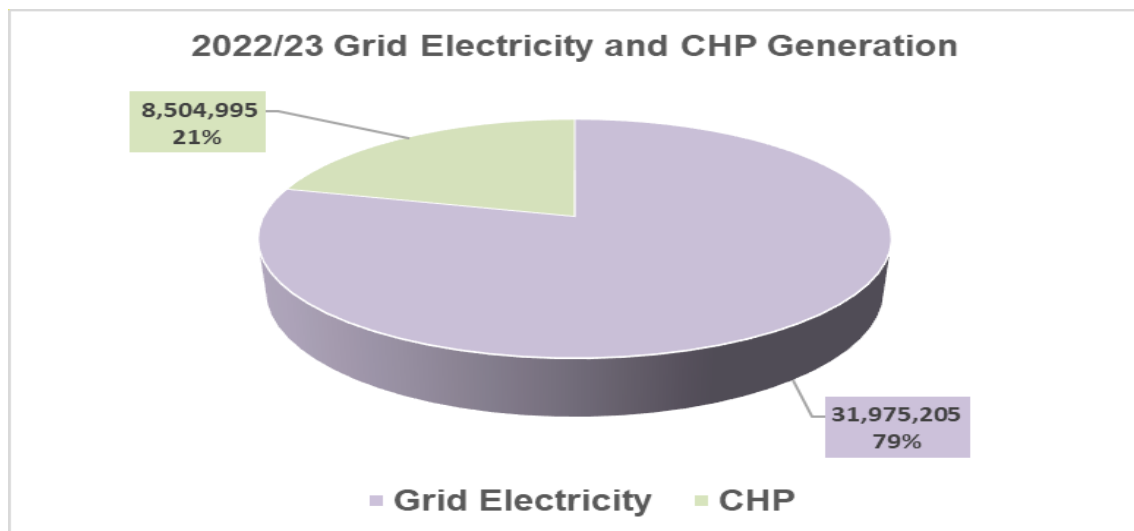
The total University electricity consumption represents the electricity that the University consumes across Loughborough Campus, but excludes the consumption associated with UPP managed student accommodation.

The total electricity consumption comprises a combination of electricity that is purchased from the National Grid and electricity that is generated on-site from the Combined Heat and Power (CHP) plant.

The total electricity consumption was 40,480,200 kWh.

The total electricity consumption for 2022/23 was 2.2% lower than the corresponding period in 2021/22.

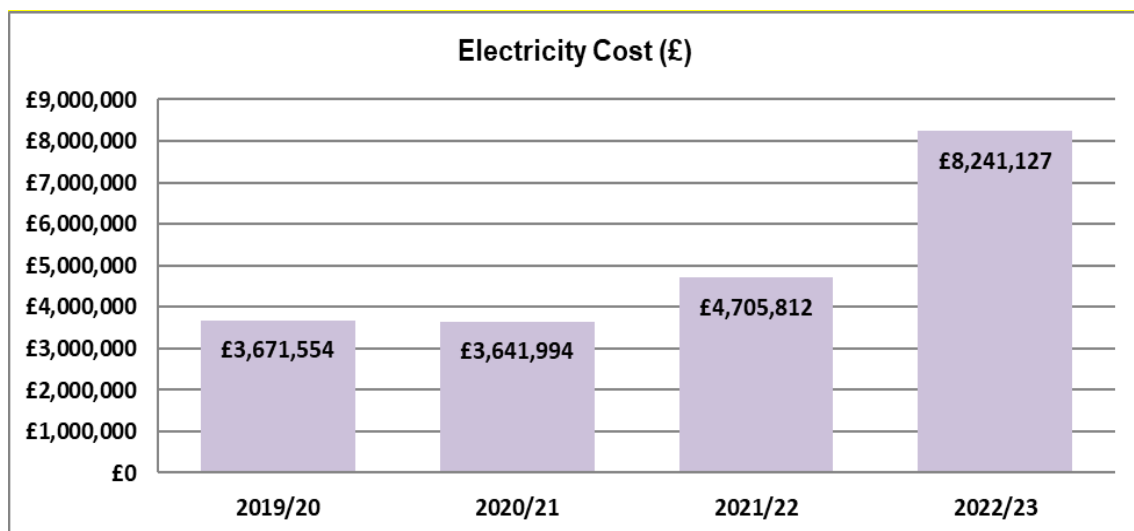
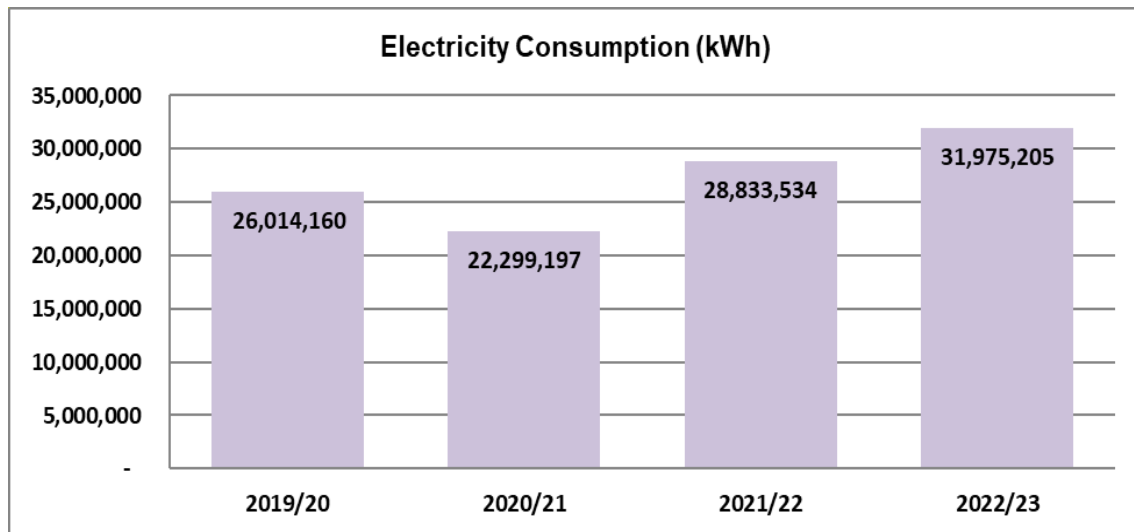
The breakdown between the “grid” electricity and the CHP generated electricity is presented in the following graph:



The grid electricity represents 79% of the total electricity consumption and the CHP generation 21% of the total electricity consumption.

1.4.1 Grid Electricity

The “grid” electricity consumption and cost data are presented in the following graphs:



The consumption of “grid” electricity for the 2022/23 has **increased by 3,141,671 kWh**, when compared to the corresponding period in 2021/22. This represents an **increase** in consumption of **11%**.

The costs for 2022/23 have **increased by £3,535,351**, when compared to the corresponding period in 2021/2022

This represents an **increase** in costs of **75%**.

1.4.2 Factors Contributing Towards the Electricity Performance

The main factor contributing towards the increase in “grid” electricity consumption is the reduction in the electricity supplied by the three “on-site”

CHP units, the electricity supplied by CHP only represented 21% of the total electricity consumption compared to 30% in 2021/22.

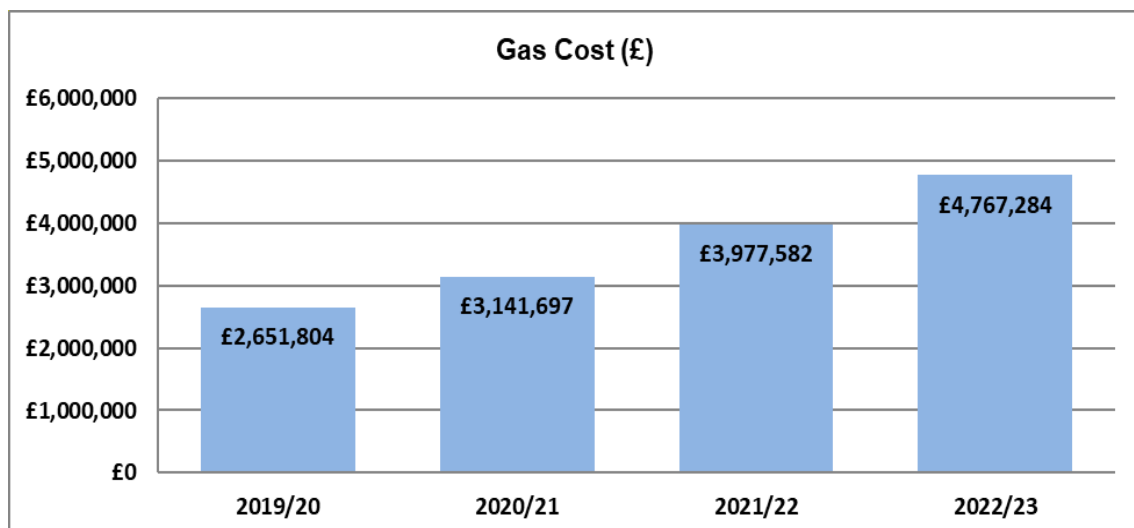
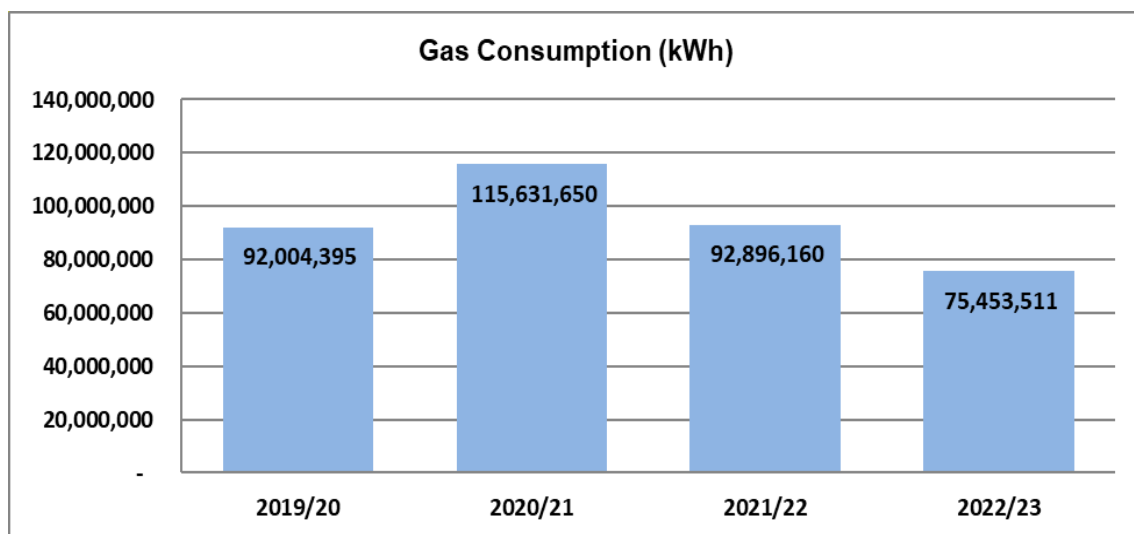
1.5 Gas Consumption

The total University gas consumption represents the gas that the University consumes across Loughborough Campus

The total gas consumption was 75,453,511 kWh.

The total gas consumption for 2022/23 was 19% lower than the corresponding period in 2021/22.

The gas consumption and cost data are presented in the following graphs:



The consumption of gas for the 2022/23 has **decreased by 17,442,649 kWh**, when compared to the corresponding period in 2021/22.

This represents a **decrease** in consumption of **19%**.

The costs for 2022/23 have **increased by £789,702**, when compared to the corresponding period in 2021/22.

This represents an **increase** in costs of **20%**.

1.5.1 Factors Contributing Towards the Gas Performance

The main factors contributing towards the significant decrease in gas consumption are:

- Reduction in the utilisation of the CHP Units resulting in a reduction in gas input.
- The start of the Holywell Park boilers and CHP plant was delayed until mid-October to facilitate the implementation of Long-Term Maintenance projects.
- Change in Government guidance in relation to Covid safe ventilation operation resulting in a reduction in the requirement for full fresh air ventilation operation.
- Isolation of heating services on the 30th of April in line with the new University heating policy and a reduction in room temperature setpoints to 18-20°C.
- Proactive isolation of non-essential heating services over the Christmas holiday period
- Milder winter compared to 2021/22.

2. Utility Supply Markets and Costs

There has been a significant increase in both electricity and gas costs, with electricity 75% higher and gas 20% higher than in 2021/22.

The global utility supply markets are still very volatile due to the continued conflict in Ukraine and uncertainty over European gas and power supplies continue to create extraordinary challenging trading conditions and this is having a significant impact of the cost of both gas and electricity.

The University operates a flexible procurement strategy which allows future hedging of future supply requirement.

The majority of the forecast gas and electricity demand for 2022/23 was secured or “hedged” at competitive rates and although significantly higher than in previous years it provided a degree of budget protection against the significant market volatility and record high prices.

The University work with The Energy Consortium (TEC) who are specialist energy brokers who support the Higher Education sector in the development and delivery of bespoke energy procurement strategies.

3. CHP Performance

The University has three Combined Heat and Power CHP Units:

- Central Park Energy Centre
- Holywell Park Energy Centre
- Claudia Parsons/ EAC Energy Centre

The CHP units continue to form an integral part of the University thermal and electrical infrastructure, providing **21% of the annual University electricity consumption and saving £1.15 million in energy costs in 2022/23.**

The annual electricity consumption data and financial savings associated with the CHP is summarised in the following table:

Unit	Unit Rating	Electricity Generation	Savings
	MWe	kWh	£
Central Park	1.6	4,853,760	£861,740
Holywell Park	1	3,314,386	£235,748
Claudia Parson Energy Centre	0.23	336,849	£50,239
Total	2.83	8,504,995	£1,147,727

CHP and Carbon Emissions

The investment in CHP technology has historically produced both carbon and financial benefits for the University.

The units continue to provide significant financial savings due the difference in the unit cost of electricity to gas, however with the de-carbonisation of the national grid (2010/11 Electricity Carbon intensity of 0.52114 kg CO₂/kWh, compared to 2022/23 Electricity Carbon Intensity of 0.207074 kgCO₂/kWh – *Department of Energy Security and Net Zero Data*), the carbon benefits associated with CHP operation have demised over the years as the electricity carbon emission factors approach parity with the gas carbon emission factors, as such CHP technology can no longer be considered a “low carbon” technology.

The CHP plant will continue to operate to support the University infrastructure until the units are life expired, at which point the options for low carbon energy generation to support the University thermal and electrical infrastructure will be reviewed in line with the University Energy Strategy and decarbonisation plan.

4. Carbon Reporting

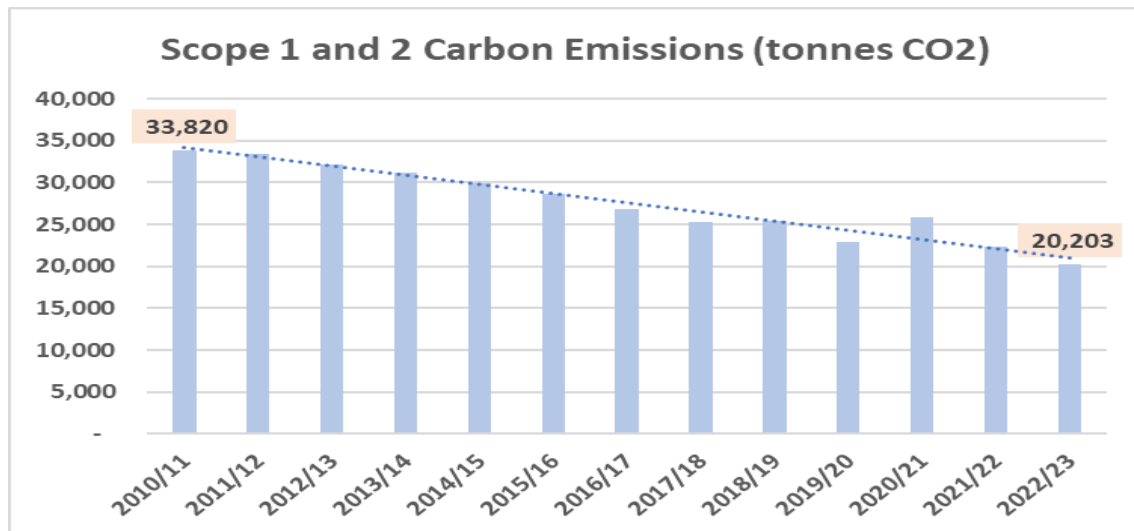
The University tracks its scope 1 and 2 carbon emissions against a 2010/11 baseline.

- Scope 1: Natural Gas used for Combustion in Boilers and CHP.
- Scope 2: Grid Electricity

The absolute carbon emissions and emissions relative to student numbers are presented in the following table:

Scope 1 & 2 Carbon Emissions - Loughborough Campus													
Year	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23
Scope 1 Emissions	17,135	19,603	21,351	19,654	18,609	17,547	17,827	16,828	18,280	16,917	21,179	16,721	13,582
Scope 2 Emissions	16,685	13,891	10,843	11,517	11,382	11,082	8,976	8,501	7,104	6,065	4,735	5,590	6,621
Total Scope 1 & 2 Emissions	33,820	33,494	32,194	31,171	29,992	28,628	26,803	25,330	25,384	22,982	25,914	22,312	20,203
Student Numbers	16,106	16,703	16,237	17,008	16,557	16,956	17,035	16,395	16,599	16,497	17,433	18,069	18,255
Scope 1 & 2 Emissions per Student	2.10	2.01	1.98	1.83	1.81	1.69	1.57	1.54	1.53	1.39	1.49	1.23	1.11

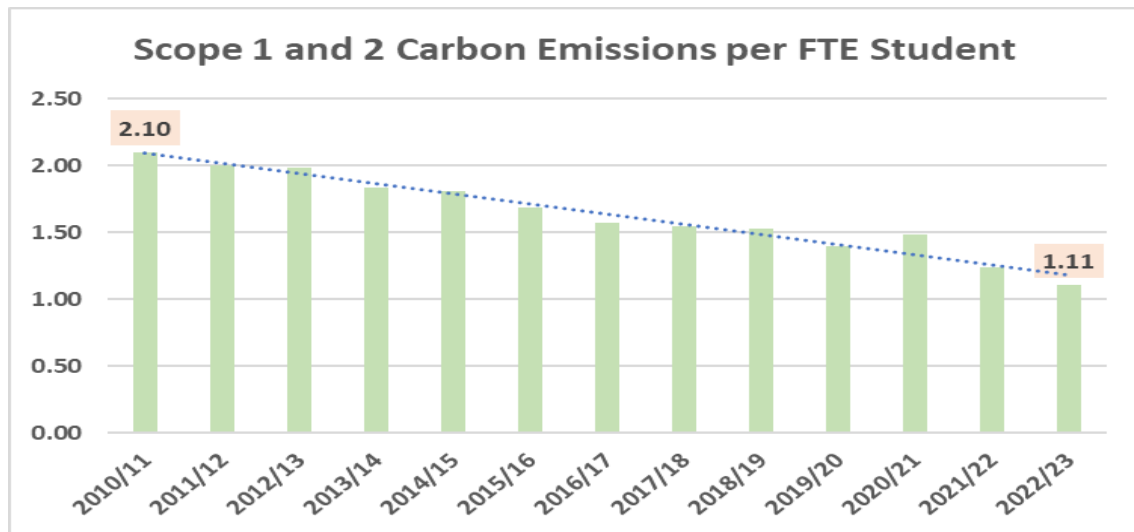
The following graph represents the absolute scope 1 and 2 carbon emissions:



The absolute emissions for the 2022/23 academic year have **reduced by 40.2%** compared to the baseline year.

Scope 1 and 2 Carbon Emission Relative to Student Numbers

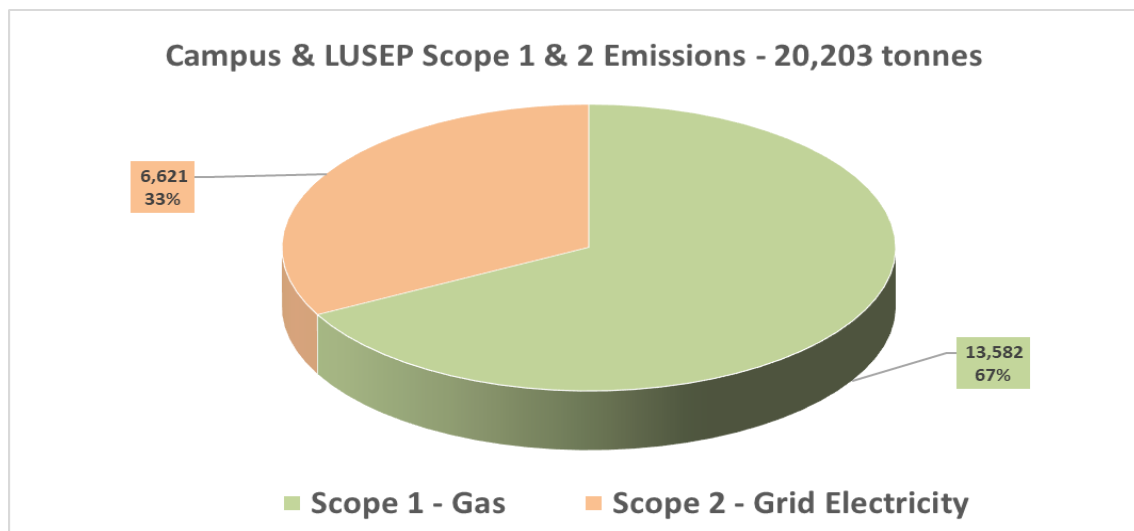
The following graph illustrates the emissions' relative' to student numbers:



The emissions relative to student numbers for the 2020/21 academic year have **reduced by 47.3%** compared to the baseline year.

Carbon Emissions Breakdown

The following graph illustrates the split in absolute scope 1 and 2 carbon emission between the grid electricity and gas consumption:



The gas consumption represents 67% of the total emissions and the grid electricity represents 33% of the total emissions.

