



Decarbonisation Strategic Plan

2024 - 2028

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CQUniversity respectfully acknowledges the Traditional Owners of the lands on which we live, work and learn and pays respect to Aboriginal and Torres Strait Islander people as the first peoples, educators and innovators of this country.

00

EXECUTIVE SUMMARY

Reducing carbon emissions underpins our vision for the Planet

Strategic Context

CQU's Strategic Plan 2024-2028 identifies greenhouse gas (GHG) emissions reduction as a key measure for quantifying progress against its sustainability goals. Appropriate emissions reduction actions and targets thus directly feed into CQU's strategic plan. To substantiate emissions reduction targets, the Directorate of Facilities Management has developed a comprehensive decarbonisation planning system. Despite CQU's 2023 GHG emissions being below the threshold for mandatory reporting under the National Greenhouse Emissions Reporting Scheme (NGERS), the planning system is consistent with international and Australian carbon inventory protocols and standards including the GHG Protocol, Climate Active and NGERS where appropriate. The keystone of the decarbonisation system is this Decarbonisation Plan.

Emissions Boundary and Baseline

CQU has defined its emissions boundary as its Scope 1 and Scope 2 emissions from its Australian operations. Scope 1 and 2 emissions include:

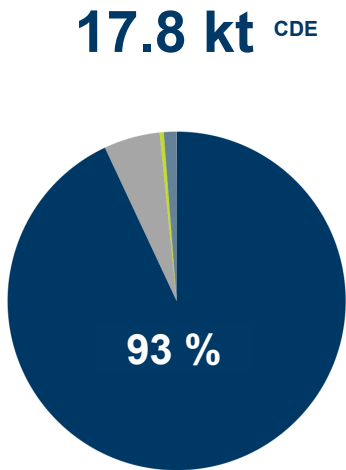
- direct consumption of energy such as natural gas and LPG (Scope 1),
- direct consumption of fuels used for transport such as petrol, ethanol and diesel (Scope 1),
- emissions that escape from industrial processes and equipment such as refrigerant leaks (Scope 1),
- emissions that occur due to physical and chemical processes of research activities not already covered such as methane from livestock (Scope 1), and
- indirect emissions from consumption of energy supplied through a grid such as electricity (Scope 2).

2021 has been selected as CQU's baseline GHG emissions year for several reasons:

- it is the beginning of a period of improved data availability and granularity,
- it follows the completion of a major air-conditioning program at CQU campuses,
- it is the beginning of a step-change focus on energy and emissions, and
- it eliminates claims of historical reductions in emissions that have naturally occurred through greening of the electricity grid.

CQU's Scope 1 and 2 emissions within Australian operations in 2021 were 17.8 kt of carbon dioxide equivalent (CDE). More than 93% of emissions were due to grid-supplied electricity. Refrigerant leakage was the second largest contributor with over 5%.

Figure i CQ University's 2021 Baseline Scope 1 and Scope 2 Emissions
Electricity represents more than 93% of the total 17.8 kt CDE.



Electricity purchased from grid	93%	16,540,412
Refrigerant emissions	5.4%	953,732
Stationary energy generation	0.4%	70,792
Transport Fuels	1.2%	210,923
Research Processes - Livestock	0.03%	5,091
Total	100.00%	17,781,032

- Energy - Electricity purchased from grid Electricity
- Industrial processes - HV elec equipment
- Industrial processes - HVAC-R
- Stationary Energy
- Transport Energy
- Physical or Chemical Processes - Livestock

Emissions targets and pathway

Preliminary investigations have been undertaken to identify and, where possible, quantify actions for CQU to reduce its Scope 1, 2 and 3 emissions. The focus has been on energy efficiency and self-generation options that deliver the greatest emissions reduction benefit for lowest marginal abatement cost. The ease of implementing solutions has also been considered in prioritising initiatives.

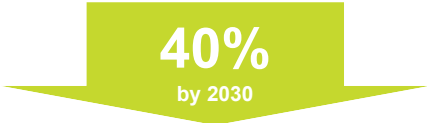
This work has helped inform two emissions reductions targets:



A 40% reduction in emissions compared with our 2021 baseline by 2030*



Zero Scope 1 and Scope 2 emissions (net) by 2050.



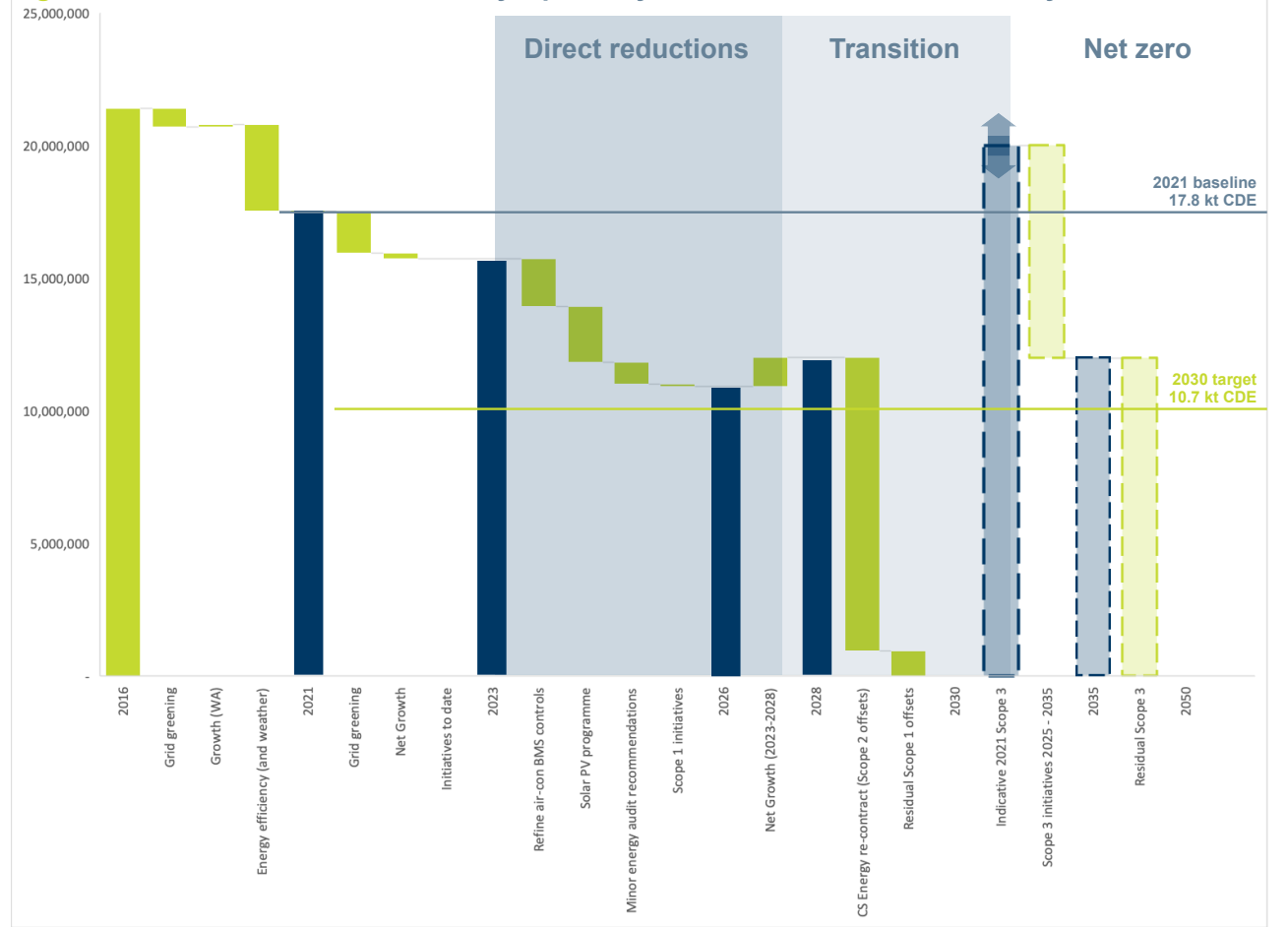
40%
by 2030



100%
by 2050

*based on market-based method for Scope 2 emissions

Figure ii Waterfall chart: CQ University's pathway to 40% emissions reduction by 2030



Implementation Strategy

An implementation strategy is presented in Figure iii. It highlights three key stages of development to achieve CQU's interim, 2030 target and 2050 'net zero' target:

- Stage 1 2024-2026: Direct reductions
- Stage 2: 2027-2030: Transition
- Stage 3: 2031-2050: Net zero Scope 1 and 2

Stage 1 - Direct reductions

The direct reductions stage is characterised by a period of investing in initiatives that directly reduce CQUs Scope 1 and Scope 2 emissions. It is near-term, immediate and focused. During this period CQU may choose to develop its Scope 3 inventory in preparation for incrementally addressing Scope 3 emissions reductions.

Stage 2 - Transition

The transition stage is defined by significant change.

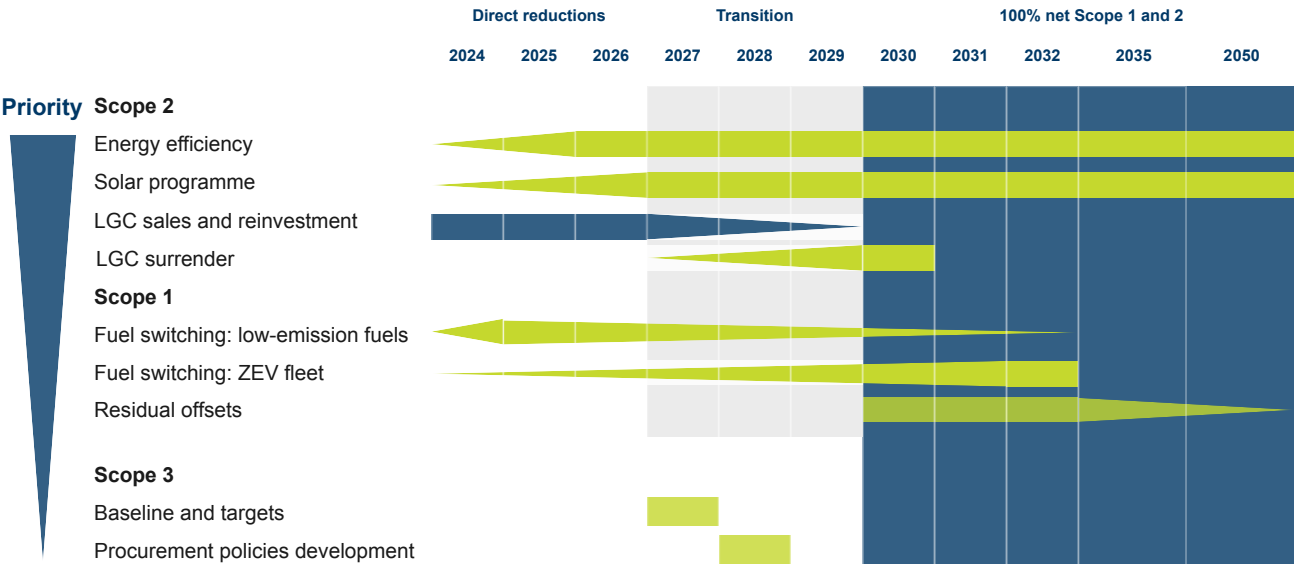
1. CQU will observe diminishing returns in direct emissions reductions for its electricity.
2. Emissions from grid supplied electricity will naturally be decreasing but will unlikely be zero emissions by 2030.
3. CQU's large market site electricity contract will expire in 2028 requiring CQU to decide what proportion of its supply should be renewable.
4. The RET will terminate in 2030 meaning LGCs may no longer be available beyond 2030 for offsetting residual emissions.
5. The transition to EVs will accelerate which will further reduce a portion of Scope 1 emissions yet increase electricity consumption (albeit a relatively small increase for CQU given transport energy is equivalent to approximately 1% of total current electricity).

During this period, CQU may choose to offset residual Scope 1 and 2 emissions by surrendering LGCs acquired through its large site electricity contract to achieve a desired emissions reduction target. The need for offsets will decrease over time as the grid naturally transitions to net zero.

Stages 3 - Net Zero

Stages 3 is focused on achieving net zero emissions for Scope 1 and 2 emissions by 2050.

Figure iii CQ University's emissions reduction strategy: Three stages 2024 - 2050



Governance, Monitoring and Reporting

This plan will be updated at least biannually until 2030. Supporting documentation such as the Decarbonisation Framework and Emissions and Actions Register will be reviewed annually and updated as required (see Section 06 Governance, Monitoring and Reporting for more detail). It is intended that an annual report be prepared to accompany this Plan with key features of the report including:

- total annual emissions by scope and emissions source,
- a comparison with the baseline year and targets,
- progress on decarbonisation initiatives, and
- updates to the decarbonisation action register.

Maintaining the Decarbonisation Planning System requires a significant amount of data and information from various internal stakeholders and interfaces. The data is collated and aggregated in a central data repository. The repository is used to calculate and report on emissions in accordance with the requirements of the Framework. The Action Register also requires regular updating to ensure annual reporting of progress against targets. In particular interfaces with the sustainability team and research centres will ensure appropriate data integrity for emissions related to specific research programs. Thus it is important for efficient and timely reporting that key stakeholders and data custodians are engaged regularly and early and understand the significance of the Decarbonisation Plan to CQU in terms of reporting on measures within the strategic plan as well as embodying their roles as "agents of profound social impact".

01 INTRODUCTION

Our planet is in our hands.

We recognise that we need to contribute positively to our world by embedding sustainability, enhancing our digital and physical campus footprint, and driving research and innovation to address the challenges of our time.

We are committed to advancing our stewardship to ensure a sustainable future for the University and, in turn, build sustainable regions through our presence and research that aligns with societal needs. We are focused on striking the right balance with our investment decisions to ensure a positive impact on the planet.



MEASURE OF SUCCESS

We will measure our reduction in carbon emissions by establishing a baseline and implementing systems and processes to monitor and report emissions, to ensure reductions are in line with the Australian Government target of net zero by 2050.

CQ University has already delivered tangible reductions in greenhouse gas emissions. This Decarbonisation Strategy recognises the significant work done to date and builds on this by:

- aligning with the current strategic plan,
- establishing a baseline for Scope 1 and Scope 2 emissions,
- identifying specific short- and long-term decarbonisation actions,
- setting aspirational intermediate targets that enable progress reporting towards achieving net zero by 2050.



02

STRATEGIC CONTEXT

CQ University recognises its important role as an agent of profound social impact.

CQ University's purpose and vision are encapsulated in its three pillars: people, planet, and partnerships.

The Strategic Plan 2024 - 2028 *We Change Lives* recognises that the University must play a role in the collective global pursuance of the [United Nations Sustainable Development Goals \(SDGs\)](#). As part of this, the new strategic plan has been designed in a way that seeks to embrace and acknowledge all 17 SDGs. It follows that the **reduction of carbon emissions** is identified in the Strategic Plan as a key measure to quantify progress towards attaining its sustainability goals.

The Decarbonisation Strategic Plan 2024 - 2028 underpins the carbon emissions reduction measure. It quantifies the carbon emissions reduction measures by establishing an emissions baseline and identifies key short-term and long-term actions that will drive the attainment of those targets.

Figure 1
CQ University's Strategic Plan 2024 - 2028 Measure 3 Reduction in carbon emissions

PILLARS	PEOPLE	PLANET	PARTNERSHIPS
Pillars capture the purpose and vision of CQUniversity.			
STRATEGIC GOALS FOCUS AREAS	STUDENTS STAFF SOCIETY	SUSTAINABILITY PLACE AND PRESENCE RESEARCH	FIRST NATIONS COMMITMENT STRATEGIC PARTNERSHIPS REGIONAL COMMITMENT GLOBAL REACH
Strategic goals define how we will achieve our vision.			
STRATEGIC PRIORITIES	» Access and Participation Assurance » Future Leaders » Augmented Online » Corporate Training Solutions » Student Experience Lifecycle » Professional Development » Contemporary Work Model » Service Excellence Culture	» Sustainability Framework » Optimising the Business Model » Campuses of the Future » Societal Needs Aligned Research » World-Standard Research Portfolio	» Reconciliation Action Plan » International Research Partnerships and Reputation » Lifetime Career Partnership » Engagement Blueprint » Global Operations
MEASURES	1. Student retention and satisfaction 2. Staff retention and satisfaction	3. Reduction in carbon emissions 4. Underlying operating surplus	5. Reconciliation Action Plan 6. Local and global research partnerships

03

EMISSIONS REDUCTION INITIATIVES TO DATE

CQ University has already made significant contributions to the environment and sustainability

CQUniversity has already made some significant sustainability achievements, including:

- Developed a Sustainability Policy and Framework in 2016 and reports annually with a Sustainability report.
- Ranked 83 (out of 1406 institutions) in 2022 Times Higher Education (THE) impact ratings for its overall contributions to the UNSDGs.
- Reduced energy usage by 36% against a target of 16% for the year (exceeding the reportable measure by 19.5%).
- Incorporated 200 kW of solar PV in new building projects since 2021.
- Designed and built the new School of Manufacturing in Gladstone and School of Mining in Rockhampton to meet five-star energy saving requirements.
- Continuing to replace lighting throughout buildings with LED lights to help provide additional energy savings and is also sourcing up to 50 per cent of its energy from renewable sources, with a view to increase this amount in the coming years.
- Implementing waste reduction initiatives including:
 - Diverting around 2.4 tonnes of food waste from landfill as a result of various initiatives
 - Sharing initiatives on campus to encourage re-use and re-purposing.



04

OUR EMISSIONS BASELINE

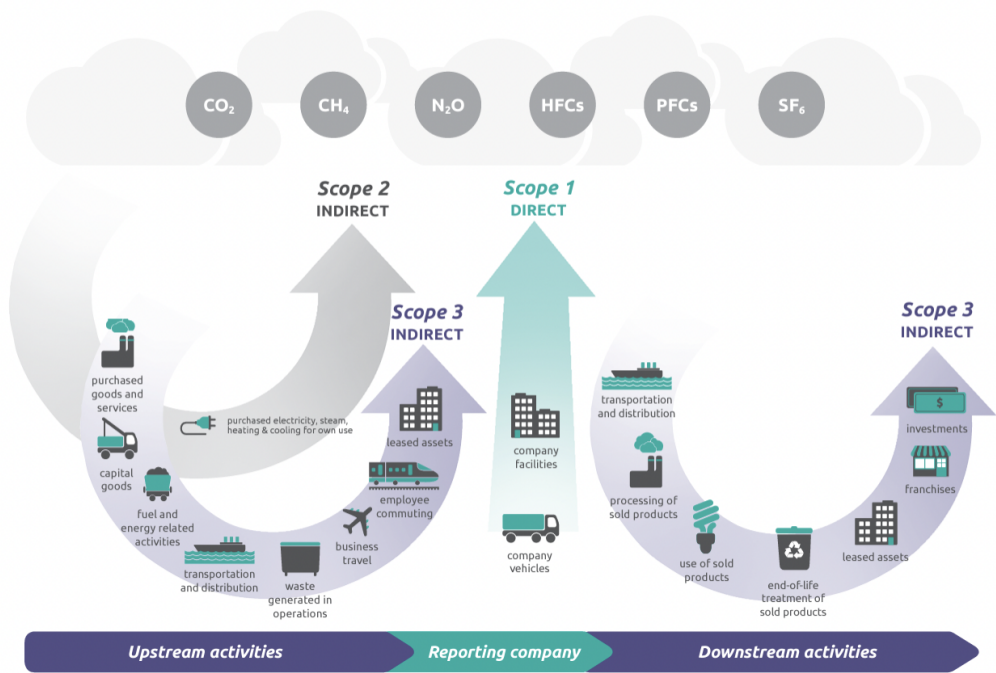
Our emissions boundary

To assist in differentiating between different emission sources, emissions are classified as either Scope 1, 2 or 3 as shown in Figure 2.

CQU has chosen to define its current emissions boundary as comprising Scope 1 and Scope 2 emissions (for sites and active corporate entities under its operational control in Australia) for the purpose of measuring and reporting against its current targets. The baseline year has been selected as 2021 as it represents the beginning of a period of increased data quality, follows the completion of a major air-conditioning program at CQU campuses, reflects the beginning of a period of step-change focus on energy and emissions and prevents excessive claims of reductions in emissions that have naturally occurred through greening of the grid.

This Plan also includes Scope 3 initiatives that can be undertaken to reduce Scope 3 emissions in advance of establishing the Scope 3 baseline.

Figure 2 GHG Protocol scope descriptions and emissions across the value chain



CQU's emissions boundary

- Scope 1 - Direct emissions**
Direct GHG emissions that occur from sources that are controlled or owned by CQU either at an individual site or facility level (such as natural gas) or aggregated corporately (such as vehicle fleet emissions).
- Scope 2 - Indirect emissions**
Greenhouse gas emissions released to the atmosphere from the indirect consumption of an energy commodity such as energy consumed from a grid such as electricity, district heating and district cooling.
- Scope 3 - Indirect emissions**
Indirect greenhouse gas emissions other than scope 2 emissions that are generated in the wider economy. They occur as a consequence of the activities of the university.

Scope 1 Direct emissions

Scope 1 emissions are described in the Greenhouse Gas (GHG) Protocol under four primary categories.

Generation of electricity, heat, or steam.
These emissions result from combustion of fuels in stationary sources, e.g., boilers, furnaces, turbines.

Transportation of materials, products, waste, and employees.
These emissions result from the combustion of fuels in company owned/controlled mobile combustion sources (e.g., trucks, trains, ships, airplanes, buses, and cars).

Fugitive emissions.
These emissions result from intentional or unintentional releases, e.g., equipment leaks from joints, seals, packing, and gaskets; methane emissions from coal mines and venting; hydrofluorocarbon (HFC) emissions during the use of refrigeration and air conditioning equipment; SF6 emissions during use of high voltage equipment and methane leakages from gas transport.

Physical or chemical processing.
Most of these emissions result from manufacture or processing of chemicals and materials, e.g., cement, aluminium, adipic acid, ammonia manufacture, and waste processing including waste water treatment. These processes include emissions from livestock including enteric fermentation and waste, use of fertilisers as well as Land Use, Land use change and forestry emissions.

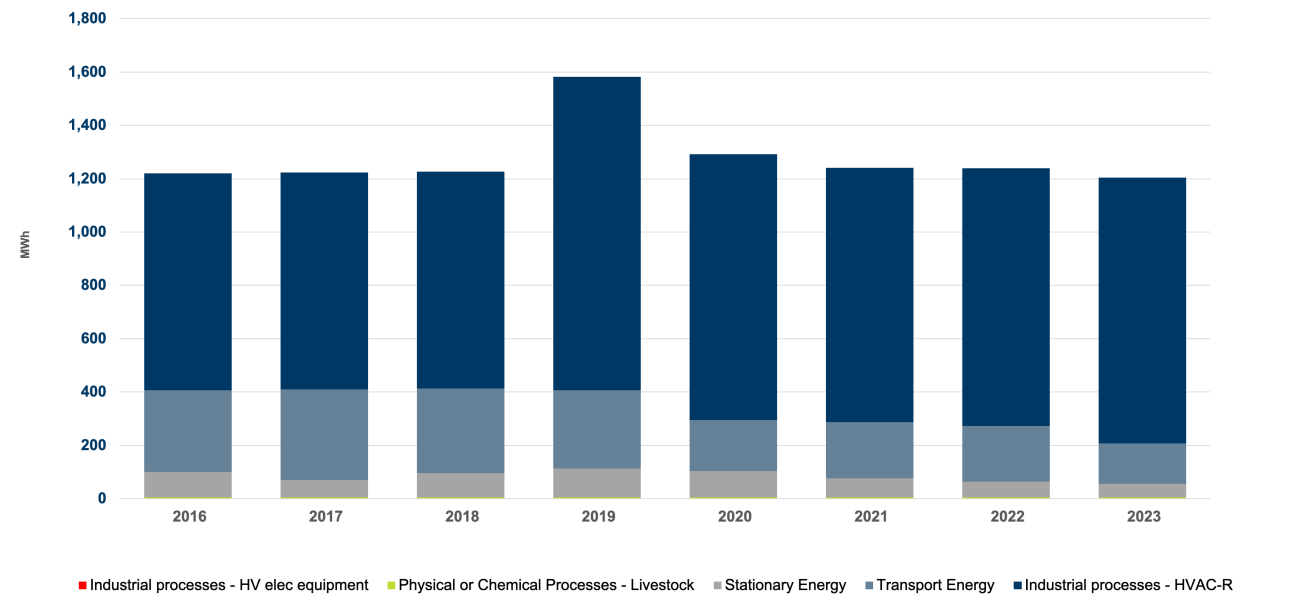
Table 1
Scope 1 emissions typical of an Australian University

GHG Protocol Category	Emissions source		Emissions activities	GHG emissions
Generation of energy	Gaseous fuels	Natural gas	Use in boilers, heaters and cooking equipment	CO2, N2O, CH4
		LPG	Water Heaters and Cooking Appliances. forklifts	CO2, N2O,CH4
	Liquid fuels	Diesel	On-site generators, site-based vehicles e.g. forklifts	CO2, N2O, CH4
	Solid fuels	Oils and greases	Consumption by energy generation equipment	CO2, N2O, CH4
		Biomass		
Transportation of materials and people	Liquid fuels	Petrol (gasoline)	University vehicles	CO2, N2O, CH4
		Diesel	University vehicles	CO2, N2O, CH4
		Ethanol	University vehicles	CO2, N2O, CH4
	Gaseous fuels	LPG	University vehicles	CO2, N2O, CH4
Fugitive emissions	HVAC-R		Air conditioning and refrigeration.	Various HFCs, PFCs
	HV electrical		On-site high voltage switchgear	SF6
Physical or chemical processes	Horticulture and agriculture		Research	CO2, N2O, CH4
	Livestock		Research	CO2, N2O, CH4
	Various research-based activities resulting in emissions (e.g. syngas from pyrolysis, methane from wastewater treatment)		Medical, agricultural, chemical engineering research	CO2, N2O, CH4, Other

Scope 1 Direct emissions

CQU's carbon inventory has been undertaken in accordance with a detailed Framework developed specifically for CQU to be consistent with the GHG Protocol, Climate Active Standards and National Greenhouse Gas Emissions Reporting Scheme (NGERS) as appropriate. Based on current emissions CQU doesn't trigger any site-specific or corporate energy consumption or emissions thresholds for reporting under NGERS.

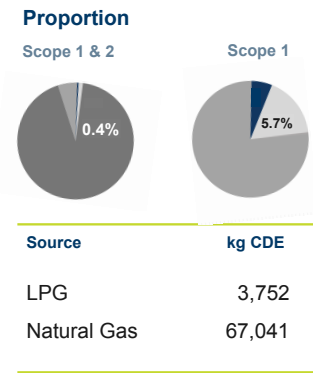
Figure 3
CQ University's Scope 1 emissions - 2016 to 2023



Generation of electricity, heat, or steam.
These emissions result from combustion of fuels in stationary sources, e.g., boilers, furnaces, turbines.

CQU's stationary energy emissions arise from consumption of natural gas, diesel and LPG from the use of onsite generators, water heating and cooking. Historic emissions data was based on primary data sourced from retailer invoices.

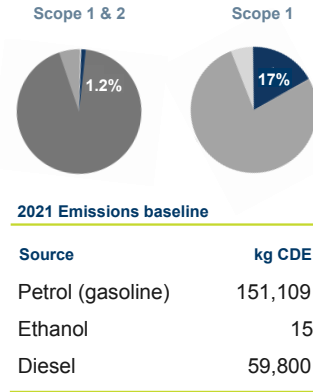
In 2021 these emissions totalled 71 tonnes which is approximately 7 % of CQU's total Scope 1 emissions and 0.4% of CQU's Scope 1 and 2 emissions combined.



Transportation of materials, products, waste, and employees.
These emissions result from the combustion of fuels in company owned/controlled mobile combustion sources (e.g., trucks, trains, ships, airplanes, buses, and cars).

CQU's transport energy emissions arise from consumption of petrol (gasoline), ethanol and diesel from the use of university vehicles and rental cars. Invoice data from CQU's corporate fuel provider has been used to measure emissions since 2016. Prior to 2019, the split between fuel types estimated using the average split between 2019 and 2023. Small quantities of fuel usage were obtained for plant and equipment and rental cars using credit card reconciliations for 2018-2020. The average of these years was used to estimate data for 2021 and 2022.

In 2021 these emissions totalled 211 tonnes which is approximately 21 % of CQU's total Scope 1 emissions and 1.2 % of CQU's Scope 1 and 2 emissions combined.



Scope 1 Direct emissions

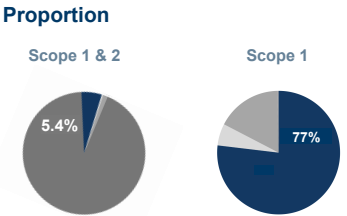
Fugitive emissions.
These emissions result from intentional or unintentional releases, e.g., equipment leaks from joints, seals, packing, and gaskets; methane emissions from coal mines and venting; hydrofluorocarbon (HFC) emissions during the use of refrigeration and air conditioning equipment; SF6 emissions during use of high voltage equipment and methane leakages from gas transport.

CQU's fugitive emissions arise from refrigerant leakage in its HVAC-R (heating, venting, air-conditioning and refrigeration) assets and SF6 leakage in its high voltage electrical equipment. The predominant sources are air-conditioning units which range in size from small, domestic-style, split system air-conditioners to large chillers. Measurement has been based on data from CQU's asset register since 2019. Assumed leakage rates have been based on relevant Climate Active categories for appropriate unit types.

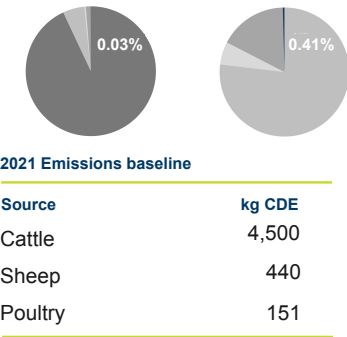
In 2021 CQU's refrigerant emissions totalled 953 tonnes per year which is approximately 75 % of CQU's total Scope 1 emissions and 4.1% of CQU's Scope 1 and 2 emissions combined. CQU's 2021 emissions of SF6 were 82 kilograms which is very small; approximately 0.01 % of CQU's total Scope 1 emissions and immaterial relative to CQU's Scope 1 and 2 emissions combined.

Physical or chemical processing.
Most of these emissions result from manufacture or processing of chemicals and materials, e.g., cement, aluminium, adipic acid, ammonia manufacture, and waste processing.

CQU operates research programs that involve management of (beef) cattle, sheep and poultry with various program durations and outcomes. Emissions have been based on head counts obtained from research teams in 2023 and are approximately 6 tonnes per year which is <0.5% of total emissions.



2021 Emissions baseline	
Source	kg CDE
R143a	768,672
HFC32	76,011
R134a	63,180
HCFC22	35,988
R410a	4,981
R407c	4,896
R1234ze	2
SF6	82



Refrigeration and SF6 emissions are relatively minor. Nevertheless, with global warming potentials (GWP) many thousand times higher than carbon dioxide (1500-4000 for refrigerants and 23600 for SF6), even small leaked quantities have the potential to dramatically increase carbon dioxide equivalent emissions. Moreover, reducing these emissions is quite challenging as leaks are inherent to the mechanical design of systems. The greatest influence is in alternative refrigerants that have lower GWP.

GWP of CQUs refrigerants and SF6

R143a	4800	840	15.7% p.a.	768,672
HFC32	677	3971	2.7% p.a.	76,011
R134a	1300	2430	2% p.a.	63,180
HCFC22	1760	272	1.7% p.a.	35,988
R410a	2,086	119	2% p.a.	4,981
R407c	1,774	138	2% p.a.	4,896
R1234ze	1	102	2% p.a.	2

Scope 2 Indirect emissions from a grid

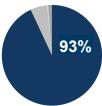
Electricity purchased from the grid
These emissions result from combustion of fuels in stationary sources, e.g., boilers, furnaces, turbines.

CQU's electricity purchases from the grid are the most significant contribution to total Scope 1 and 2 emissions noting that Scope 3 emissions are yet to be quantified.

In 2021 electricity emissions totalled 16,540 tonnes which is approximately 94 % of CQU's total Scope 1 and 2 emissions combined. The vast majority being consumed at CQU's Queensland campuses.

Proportion

Scope 1 & 2

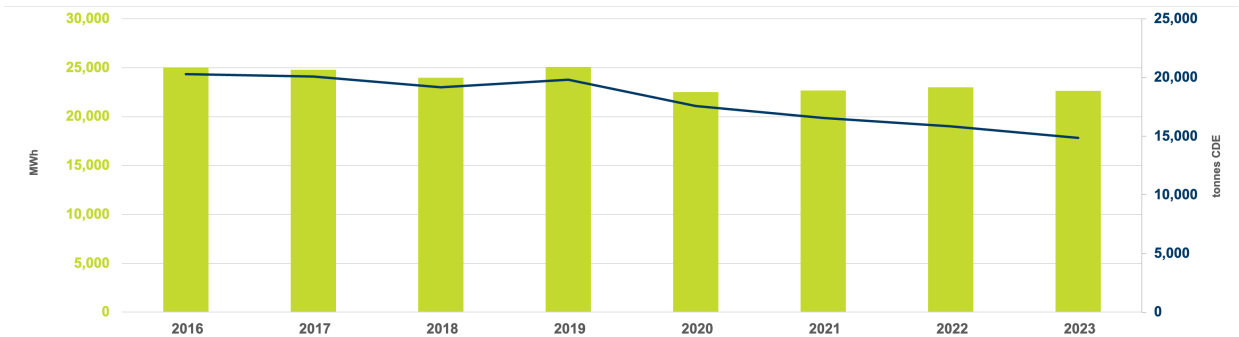


Emissions breakdown by State

Source	kg CDE
QLD	16,956,759
NSW	595,867
VIC	374,576
SA	67,870
WA	86,676

Figure 4
CQ University's Scope 2 emissions 2016 to 2023*

*market-based



CQU has elected to set its emissions reduction targets based on the **market-based method**. The **market-based method** calculates and organisation's electricity emissions in the context of its electricity *purchases*. It reports emissions according to an organisation's investments in different electricity products and markets, including from voluntary purchases of renewable electricity and mandatory schemes like the Renewable Energy Target. Table 2 presents the market based method applied to CQU's Scope 2 emissions from 2016 to 2023.

Table 2
CQ University's Scope 2 emissions market based calculations

Data Type	2016	2017	2018	2019	2020	2021	2022	2023
Total Grid kWh	25,045,614	24,796,368	23,970,045	25,059,781	22,519,294	22,661,774	22,987,289	22,643,367
Renewable Energy Target	12.75%	14.22%	16.06%	18.60%	19.31%	18.54%	18.64%	18.96%
LGCs surrendered	0	0	0	0	0	0	3242	0
Exported electricity	0	0	0	0	0	0	0	0
Residual Electricity	21,852,298	21,270,325	20,120,456	20,398,662	18,170,818	18,460,281	18,699,217	18,350,185
Emissions factors	0.928	0.944	0.953	0.971	0.967	0.896	0.846	0.81
Emissions - Market based	20,278,933	20,079,187	19,174,794	19,807,101	17,571,181	16,540,412	15,819,537	14,863,649
Behind-the-meter generation (small-scale)	0	0	0	0	0	0	0	246,375
Total Renewables	3,193,316	3,526,044	3,849,589	4,661,119	4,348,476	4,201,493	7,526,831	4,538,590

Scope 3 Indirect emissions from our value chain

CQU is yet to quantify its Scope 3 emissions. However, Table 1 identifies CQU's likely emissions under GHG Protocol categories (a detailed description of the categories is provided in Appendix 3). To appropriately identify and report its Scope 3 emissions, GHG Protocol requires value chain mapping to reveal emissions sources under each of the upstream, operational and downstream value chain categories.

Table 1 also highlights for which categories the GHG Protocol requires relevance tests ("must") and those that are recommended (should).

These categories are quite broad and not all are applicable to CQU. As a first step in investigating CQU's Scope 3 emissions, the categories have been benchmarked against Australian universities that have already achieved Climate Active certification and/or made public statements regarding emissions reduction plans. Emissions categories that are likely to be relevant for CQU are highlighted. Some are almost certain while others are possible and worthy of investigating in value mapping and data gathering for Scope 3 emissions.

Undertaking a value mapping and data gathering process for Scope 3 emissions is included in the decarbonisation action plan.

Table 3 CQ University's Indicative Scope 3 emissions GHG Protocol relevance test and peer based likelihood of emissions sources

Scope 3 Emission categories	GHG Protocol relevance test		Benchmarked likelihood of emissions being relevant
	Must	Should	
Purchased goods and services			
Capital goods			
Fuel-related and energy-related activities			
Upstream transportation and distribution			
Waste generated in operations			
Business travel			
Employee commuting			
Upstream leased assets			
Downstream transportation and distribution			
Processing of sold products			
Use of sold products			
End-of-life treatment of sold products			
Downstream leased assets			
Franchises			
Investments			

Likelihood

Certain/Almost certain

Probable/Possible

Unlikely

05

TAKING ACTION

Targeting Net Zero by 2050

Emissions reduction strategy and initiatives

An emissions reduction strategy has been developed to guide CQU as it works towards its emissions reduction targets. The targets have been set based on alignment with the Australian Government's target of net zero by 2050. An interim target has been set to achieve a 40% reduction in Scope 1 and Scope 2 emissions by 2030.

Initiatives identified in the emissions reduction strategy have been based on the following key principles:

- Apply a hierarchy of emissions reduction:
 - Target conservation principles such as avoidance of waste
 - Use resources more efficiently and avoid disposable or single-use items and packaging
 - Replace fossil fuels with renewable energy sources
 - Utilise offsets and Carbon Capture technology only for the most hard to abate emissions after all other initiatives have been completed.
- Investment Strategy:
 - Continue investing in conservation and efficiencies to reduce consumption of energy, leading to reduced capacity of on-site generation and storage required.
 - Staged investments in renewable energy and storage to reduce the potential for over-capitalisation.

A key criteria for including these initiatives is little to no cost impact and a material reduction in emissions, leading to no regrets for implementation. Nevertheless, the opportunities available for CQU to reduce Scope 1 and 2 emissions vary depending on the following:

- size of impact,
- cost of implementation,
- ease of implementation,
- speed of delivery, and
- quantifiability.

Stage 1 - Direct reductions 2024-2030



**A 40% reduction
in Scope 1 and 2 emissions
relative to our 2021 emissions baseline
by 2030***



Stage 2 - Net Zero 2030-2050



**A 100% reduction
in Scope 1 and 2 emissions relative to
our 2021 emissions baseline
by 2050***



*based on market-based method for Scope 2 emissions

Emissions Reduction Strategy: quantifying potential emissions

Many of the potential emissions reduction actions are able to be quantified. A number will require some further consideration and the measurement of existing emissions.

For example, the potential emissions reductions for a number of Scope 1 (Fuels) and Scope 2 (electricity) emissions have been quantified (see Table 2). In addition, a high level assessment of the ease with which they can be implemented has been undertaken. The initiatives have thus been prioritised for execution based on the combination of their unit cost of emissions, ease of implementation and overall scale of emissions reduction potential.

Scope 1: Some scope 1 emissions reductions have been quantified and some estimated based on the potential uptake of measures such as fuel efficiency initiatives and reduction of travel in CQU vehicles.

Some strategies are subject to further consideration of the University such as the rate that the existing vehicle fleet is replaced with Electric Vehicles and powered by renewable energy.

Scope 2: Many of the potential Scope 2 emissions reductions have been quantified as the initiatives have been identified in the energy audit. Some others such as measures to reduce air conditioning load will need further analysis to determine the potential emissions reductions.

Scope 3: Once Scope 3 emissions have been quantified, it will be possible to quantify the potential emissions reductions available from actions in the emissions reduction strategy. For example, once waste audits have been conducted, it will be possible to estimate the potential emissions reductions from waste initiatives.

Figure 5
Waterfall chart: CQ University's pathway to 40% emissions reduction by 2030

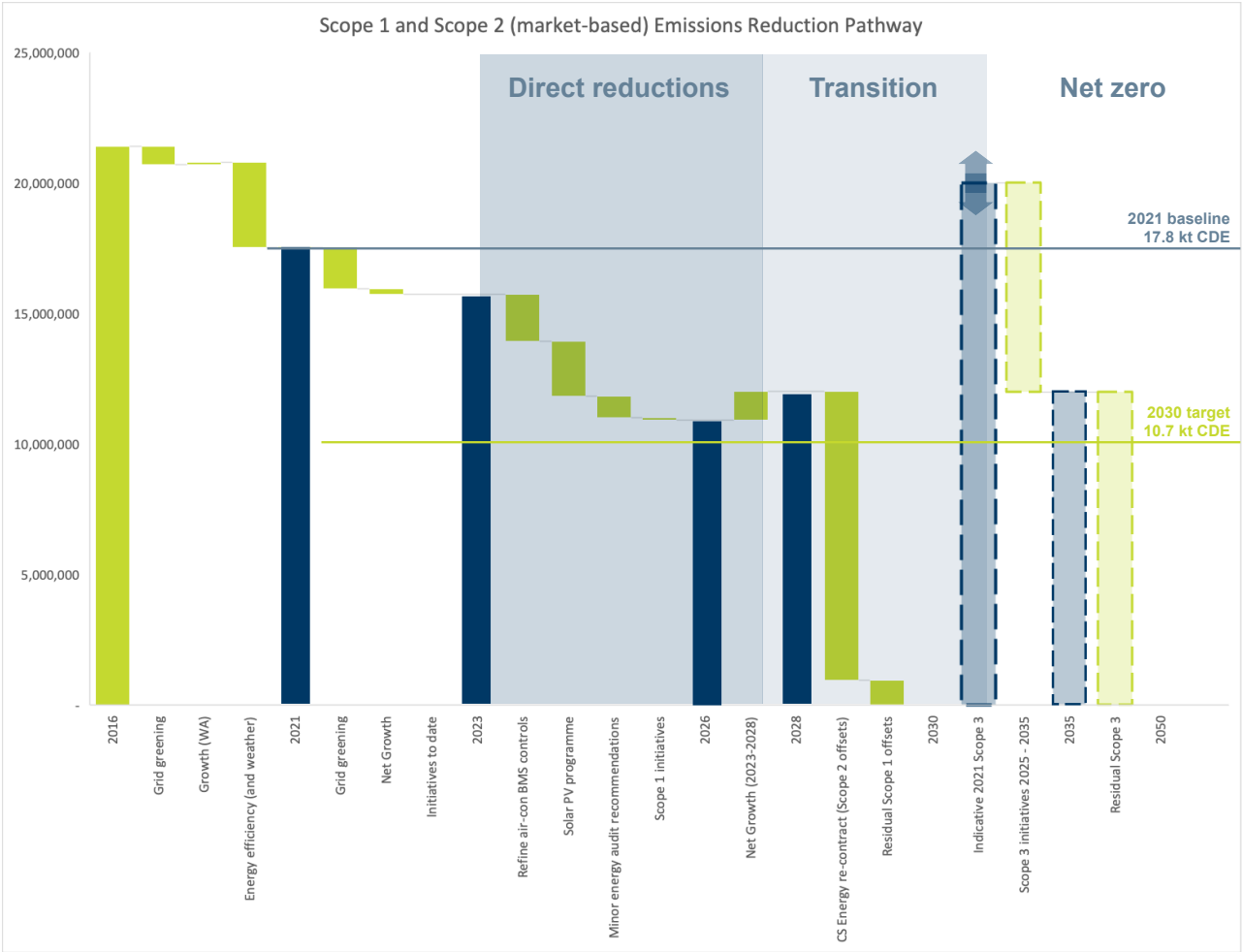


Table 4 CQ University's quantified emissions reductions initiatives

Quantified carbon reduction initiatives 2024 - 2030

	CO2-e reduction/(increase) t CO2-e	Cumulative emissions savings	% of 2021 baseline
2024 - 2025			
Reinstate air-con BMS controls	1.8	1.8	10.3%
Solar PV programme	1.5	3.3	18.9%
Minor energy audit recommendations	0.8	4.1	23.5%
Scope 1 initiatives	0.1	4.2	24.1%
2026 - 2027			
Net Growth	(0.9)	3.3	17.5%
2028 - 2030			
CS Energy re-contract (estimate)	10	13.3	84.2%
Residual Scope 1 and 2 offsets	1	14.3	100%

Figure 6 CQ University's quantified emissions reductions initiatives: Value-ease matrix

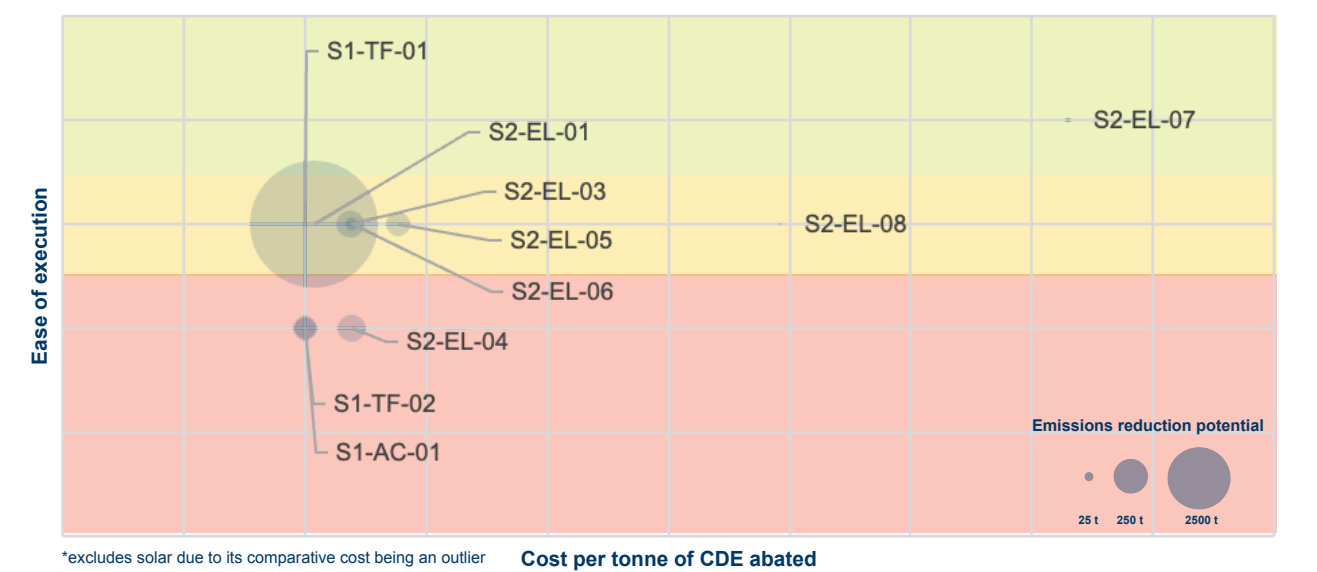


Table 5 CQ University's quantified emissions reductions initiatives largest to smallest

ID	Action	KPI/Targets	Time	Est. Cost	Ease of execution
S2-EL-01	Reinstate BMS time controls: Reestablish BMS communication networks and time controls.	Emissions savings: 1,800 t CO2-e p.a. Electricity savings: 2.5 GWh p.a. Cost savings: \$160,000 p.a.	2025	\$ 20,000	Moderately challenging
S2-EL-02	Reinvest energy savings in solar PV (each year)	Emissions savings: 1,500 t CO2-e Electricity savings: 1.4 GWh p.a. Cost savings: \$90,000 p.a.	2026	\$ 1,500,000	Moderately challenging
S2-EL-03	Computer shutdowns: Implement systems to turn off unoccupied computers.	Emissions savings: 266 t CO2-e p.a. Electricity savings: 350 MWh p.a. Cost savings: \$24,027	2025	\$ 5,000	Moderately challenging
S2-EL-04	Consolidate buildings and spaces: initiatives to increase the utilisation of spaces within university buildings.	Emissions savings: 260 t CO2-e Electricity savings: 350 MWh p.a. Cost savings: \$20,000	2026	\$ 5,000	Moderately challenging
S2-EL-05	Refine air-con time controls: Reinstate BMS control of air conditioning operating timers.	Emissions savings: 196 t CO2-e p.a. Electricity savings: 300 MWh p.a. Cost savings: \$17,000	2024	\$ 7,500	Moderately challenging
S2-EL-06	Conservatorium air-con manual control: Building Managers to switch off air conditioning systems when buildings are unoccupied.	Emissions savings: 52 t CO2-e p.a. Electricity savings: 70 MWh p.a. Cost savings: \$4,676 p.a.	2025	\$ 1,000	Moderately challenging
S2-EL-07	Replace RockCity mechanics workshop lights: LED High Bay Lighting Upgrades.	Emissions savings: 14 t CO2-e p.a. Electricity savings: Cost savings: \$1,215	2025	\$ 4,250	Moderately challenging
S2-EL-08	Rockhampton North library solar PV reconnection: Recommission the system to improve performance.	Emissions savings: 5 t CO2-e p.a. Electricity savings: 18 MWh pa Cost savings: \$457 p.a.	2025	\$ 1,000	Moderately challenging
S1-TF-01	Fuel switching: Immediate programme to encourage E10 and/or bio-diesel uptake for compatible vehicles	Emissions savings: 6.3 t CO2-e p.a.	2025		Moderately challenging
S1-TF-02	Fuel switching: Review scope for EV uptake based on appropriate vehicles and use cases. Develop fleet conversion prioritisation list and timeframes	Emissions savings: 210 t CO2-e p.a.	2035		Complex
S1-AC-01	Adopt good practice for HVAC-R asset management for refrigerant leaks	Emissions savings: 167 t CO2-e	2035		Complex

● Straightforward ● Moderately challenging ● Complex

Implementation strategy

An implementation strategy is presented in Figure 7. It highlights three key stages of development to achieve CQU's interim, 2030 target and 2050 'net zero' target:

- Stage 1 2024-2026: Direct reductions
- Stage 2: 2027-2030: Transition
- Stage 3: 2031-2050: Net zero Scope 1 and 2

Three stages, two targets

Stage 1 - Direct reductions

The direct reductions stage is characterised by a period of investing in initiatives that directly reduce CQUs Scope 1 and Scope 2 emissions. It is near-term, immediate and focused. During this period CQU may choose to develop its Scope 3 inventory in preparation for incrementally addressing Scope 3 emissions reductions.

Stage 2 - Transition

The transition stage is defined by significant change.

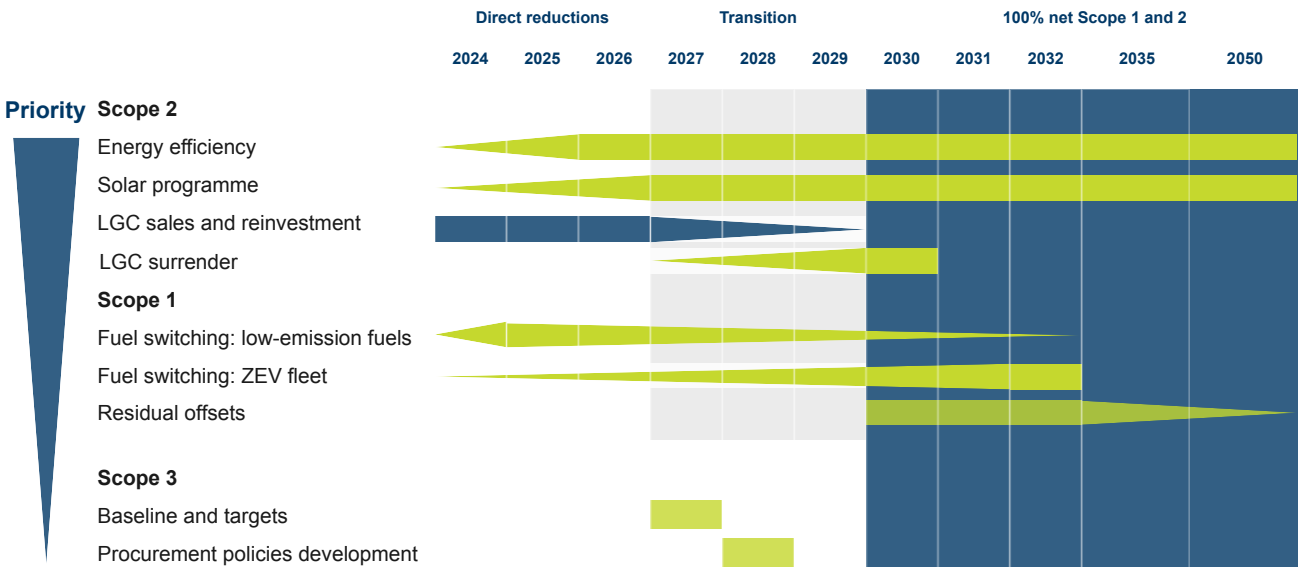
1. CQU will observe diminishing returns in direct emissions reductions for its electricity.
2. Emissions from grid supplied electricity will naturally be decreasing but will unlikely be zero emissions by 2030.
3. CQU's large market site electricity contract will expire in 2028 requiring CQU to decide what proportion of its supply should be renewable.
4. The RET will terminate in 2030 meaning LGCs may no longer be available beyond 2030 for offsetting residual emissions.
5. The transition to EVs will accelerate which will further reduce a portion of Scope 1 emissions yet increase electricity consumption (albeit a relatively small increase for CQU given transport energy is equivalent to approximately 1% of total current electricity).

During this period, CQU may choose to offset residual Scope 1 and 2 emissions by surrendering LGCs acquired through its large site electricity contract to achieve a desired emissions reduction target. The need for offsets will decrease over time as the grid naturally transitions to net zero.

Stages 3 - Net Zero

Stages 3 is focused on achieving net zero emissions for Scope 1 and 2 emissions by 2050.

Figure 7 CQ University's emissions reduction strategy: Three stages 2024 - 2050



Priority initiatives

Scope 2 priority 1 Energy efficiency

A suite of energy efficiency opportunities has the potential to reduce CQU's scope 2 emissions by as much as 35% compared with 2021 emissions levels. They are low-hanging fruit requiring limited capital. They generally relate to modifications to building management systems to reduce cooling loads. Some involve modifying technical parameters of HVAC such as duration and timing of operation. Others require modifying business operating parameters. As such, the difficulty of implementing individual initiatives ranges from moderately hard to relatively easy. Once implemented, they should provide enduring benefits beyond 2026.

Scope 2 priority 2 Solar programme

CQU has approximately 150 kW of rooftop solar installed. It generates in the order of 250 MWh of electricity per year. This reduces emissions by 220 tonnes of CDE based on the 2021 national residual mix emissions factor. This is equivalent to offsetting CQU's total transport fuels emissions in 2021 (210 kT CDE). Yet, there is potential for significantly more. Rooftop solar has the potential to deliver up to 25% of CQU's load subject to further feasibility to confirm site-specific conditions support the potential. It is envisaged that 2024 would see a desktop study undertaken to prioritise sites by value and impact. Following this, a rolling programme of site investigations would be conducted to confirm suitability and sizing and finalise individual site business cases for investment. The realised financial and emissions savings benefits would commence in the latter half of 2024 with full investment potential culminating in the end of the direction emissions reduction stage in 2026.

Scope 2 enabler LGC sales and re-investment

Integral to the strategy is the sale of LGCs acquired as part of CQU's large market site contract in Queensland with CS Energy. By selling LGCs and re-investing gains in the energy efficiency and solar programme, CQU is aligning its emissions reduction initiatives with the core principles of the GHG Protocol and Climate Active Standard. Current estimates indicate 6700 LGCs will be transferrable to CQU in calendar years 2024-2028 under CQU's contract with CS Energy. These LGCs have a market rate of \$300 k based on the current forward LGC price of \$48/certificate for calendar year 2024. With the solar programme having the potential investment of approximately \$1m per year over three years, the LGC sale strategy liberates 30% of the funding required. This will provide emissions reduction benefits for 20 years or more.

Scope 1 fuel switching: E10

The opportunity to switch from various unleaded petrol blends (standard, premium, ultra-premium etc.) to E10 is seen as an immediate quick win. Only a small amount of E10 is being purchased by CQU's fleet users leaving significant potential for further immediate benefits. The potential benefit is only minor but the vehicle fleet transition to EVs is envisaged as a medium-term slow burn thus the E10 switch has potential to raise awareness within the CQU community that it is within the capacity of each individual to make a difference to CQU's carbon footprint.

Scope 1 fuel switching: ZEV fleet transition

The switch to ZEVs (zero emissions vehicles) is seemingly inevitable. However, the speed of the transition is highly dependent on market factors and stakeholder appetite. Accordingly, the immediate initiative is to undertake a desktop study to identify and categorise vehicle use cases and prioritise trials of various low emission and zero emission vehicle types and fuels including PHEV (plug-in hybrid electric vehicles), BEV (battery electric vehicles), FCEV (fuel cell electric vehicles including hydrogen) vehicles based on vehicles most likely to experience improved performance (as determined by the use case) thereby garnering support with early adopters. As the market offers more vehicle types at competitive total cost of ownership the fleet transition can accelerate. Integral to the ZEV fleet transition is the provision of EV charging for staff, students, and visitors. This has potential to reduce not only direct Scope 1 emissions but Scope 3 emissions too. The full effect of ZEVs on operational emissions is expected to occur beyond 2030.

Scope 1 HVAC-R refrigerant leakage

To accurately report HVAC and refrigeration fugitive emissions requires accurate records of refrigerant usage, leak rates, and equipment maintenance and that any refrigerant leakage is detected and repaired as soon as possible. Reducing these emissions will initially be through actions to repair and prevent leaks, and then to procure appliances that have lower leakage rates and refrigerant gases with lower Global Warming Potential (GWP).

Similarly with high voltage electrical systems, Scope 1 emissions arise from leakage of insulating gases. Reducing these emissions will initially be through actions to repair and prevent leaks, and then to procure appliances that have lower leakage rates and gases with lower GWP.

Scope 3 Enabling actions – Establish baseline and targets

In parallel with direct reductions of Scope 2 emissions, CQU can undertake value stream mapping and peer benchmarking to identify its Scope 3 emissions boundary and baseline emissions. This process will inform the development of detailed, quantifiable Scope 3 emissions reductions actions. Notwithstanding the need for the value mapping process, the indicative Scope 3 emissions reduction 'soft target' is to seek reductions from CQU's value chain that are commensurate with its own Scope 1 and 2 direct reductions i.e. nominally 40%.

Scope 3 Enabling actions – Procurement strategies and policies

Following the calculation of baseline emissions, procurement policies will need to be developed before material emissions reductions are able to be observed.

Scope 3 - Phase 1 Low hanging fruit

The Scope 3 emissions reductions are expected to occur over a longer period than the Scope 1 and 2 direct reductions and offsets. Accordingly, the plan contemplates a first phase of low-hanging fruit delivering in the order of 20% reduction.

Scope 3 - Phase 2 harder to abate emissions

Phase 2 of the scope 3 direct emissions reductions initiatives will target the remaining 20% to achieve a total 40% reduction in scope 3 emissions. This is commensurate with CQU's own scope 1 and 2 direct emissions reductions.

Incremental initiatives

Emissions Reduction Strategy: General

It is important to note that activities to reduce emissions can commence even before the emissions inventory has been completed. For example, initiatives to reduce emissions from staff commuting can be designed and implemented prior to the Scope 3 inventory being completed in the same way that CQU has already made an impact with innovative waste management initiatives.

Scope 1 - Stationary energy - Diesel and Gas

Over time the University may consider transitioning appliances over to electric equipment such as heat pump water heating and electric cooking. Consideration could also be given to replacing generators with Solar PV systems and batteries.

Scope 1 - Transport energy - Petrol and diesel

In addition to switching to an ethanol blend fuel, initiatives such as establishing an eco-driving campaign for the university will contribute to emissions reduction regardless of the fuel mix.

Over time the University may consider transitioning the vehicle fleet to electric vehicles which can be charged from the grid that is greening rapidly and will ultimately be 100% renewable. On site renewable electricity can help accelerate the decarbonisation of CQUs fleet.

Scope 2 - Electricity

The emissions factor of scope 2 emissions is gradually decreasing with the increasing penetration of renewable energy in the grid. The grid may eventually supply only carbon-neutral electricity as the proportion of renewable energy generation approaches 100%.

Scope 2 emissions will also be reduced with the implementation of on-site renewable energy generation such as solar photovoltaic systems (Solar PV).

In addition to the quantified Scope 2 initiatives, a number of initiatives were identified that relate to the operation and/or utilisation of buildings and using control technologies to manage lighting and cooling systems.

Consider adopting a minimum building efficiency rating for major projects such as renovations and new construction projects. Incorporate sustainable design principles to ensure solar orientation, natural ventilation and lighting is maximised. This will assist in reducing Scope 2 emissions through reduced on site electricity use.

Scope 3 - Supply Chain Emissions

A key component of the Decarbonisation Framework is to quantify Scope 3 emissions.

A number of emissions reduction activities have been identified which will reduce Scope 3 emissions and can be commenced prior to the quantification of emissions.

Scope 3 emissions vary significantly and accordingly

- reducing all forms of staff, student and business travel including commuting in favour of teleconferencing, working from home and other innovations
- facilitating greater use of low-carbon transport for travel including active travel, public transport and low-emissions vehicles
- reviewing procurement to improve the efficiency of materials usage, reducing single-use items, and purchasing items that are carbon neutral or with low embodied carbon, such as for renovations and new construction projects, office supplies, copy paper.
- reducing waste to landfill through measures such as reducing the amount of single-use items, increasing recycling rates and diverting organic waste to composting.

A coordinated approach and education of staff, students and suppliers will be required to implement these measures. Importantly, implementation of these measures can commence before the Scope 3 emissions inventory has been completed.

The University is well positioned to influence emissions beyond its inventory through further research and teaching of emissions reduction such as:

- further incorporation of emissions reduction, resilience and climate transition into research and teachings.
- monitoring and conducting research into from the Universities' emissions reduction activities to increase the likelihood of success and publish research outcomes which will assist others in successful decarbonisation.

Threats to achieving our targets

Growth

CQU has experienced significant growth to various degrees, in student numbers, gross floor area (GFA) under management, and geographic locations. Continued growth may increase overall GHG emissions if it is not managed with the commensurate carbon footprint in mind. Facilities planning has estimated that CQU's GFA will fluctuate between 2024 and 2030 with an overall 3% net reduction. This should help contribute to lower emissions if the emissions intensity of GFA is maintained or reduced. However, this is highly contingent on consolidation and divestment of assets given an ambitious greenfield development program. Approximately 27,000 sqm of GFA will be added and 30,000 removed which equates to approximately 15% of current GFA. If new builds are approved and existing leased and owned assets are not consolidated then the total heating and cooling emissions may increase by as much as 15% on 2021 levels. Given electricity consumption and HVAC-R leakage account for 99% of CQU's Scope 1 and 2 emissions building planning has the potential to dramatically reduce or increase emissions.

Community engagement activities

CQU's cultural identity places emphasis on community engagement and outreach. Future initiatives such as EV charging for university guests and activating under-utilised lease spaces can deliver positive impacts for CQU and its stakeholders. Nevertheless, it is important that the commercial arrangements that facilitate such initiatives contemplate the impact on CQU's GHG emissions and are adjusted appropriately to enable CQU to deliver its emissions reduction targets.

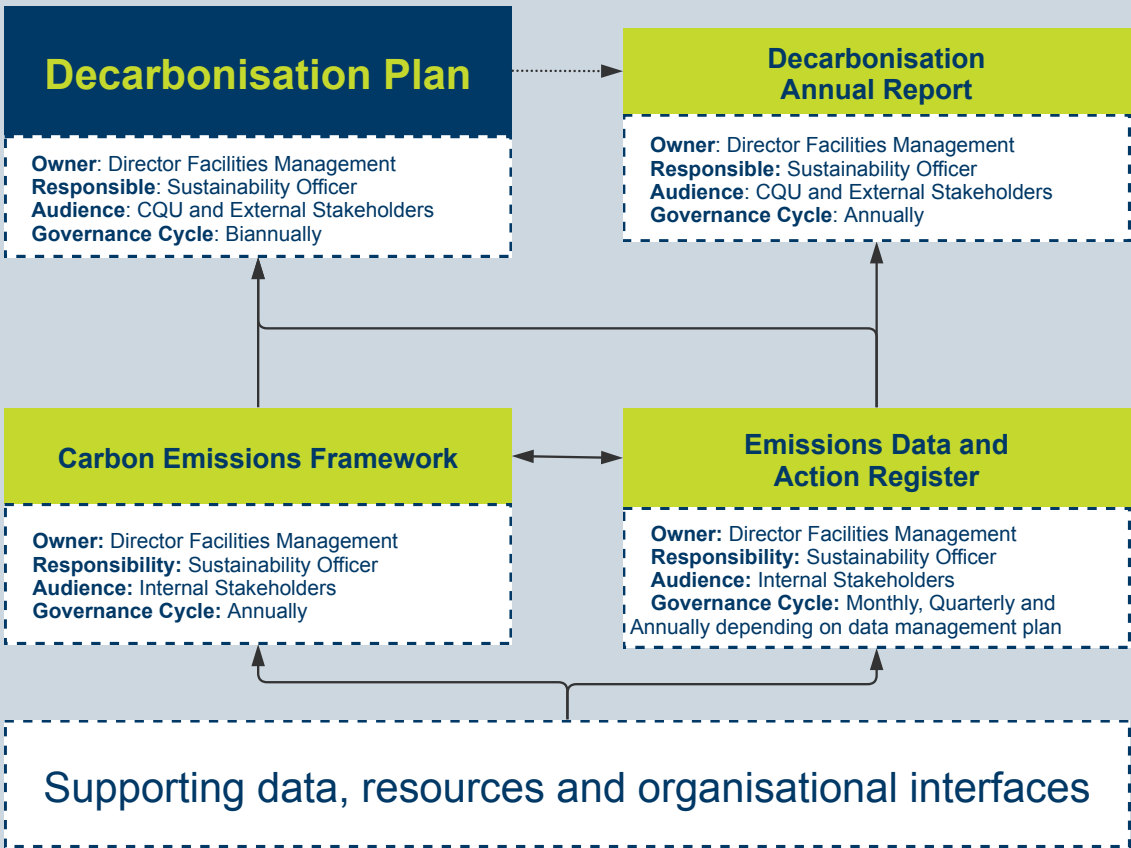
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GOVERNANCE, MONITORING AND REPORTING

CQU has developed detailed decarbonisation planning procedures and process drawing on several guidelines and protocols including the international greenhouse gas (GHG) protocol, Australia’s Climate Active Standard and the National Greenhouse Emissions Reporting Scheme (NGERS).

The Decarbonisation Strategic Plan, Annual Decarbonisation Report, Decarbonisation Framework, and Emissions Data and Action Register are owned, prepared and updated by CQUs Facilities Management Directorate. Ongoing quality management of data is paramount to a credible emissions reporting plan. Key interfaces with internal stakeholders such as the sustainability team will be important to ensure data such as research-specific emissions are captured accurately and tested for relevance with respect to reporting.

Figure 8
CQ University's Decarbonisation Planning process documents, relationship, governance and reporting cycles



Decarbonisation Framework

The framework underpins this Decarbonisation Strategic Plan and is intended to be a living document that provides a record of CQU's approach to identifying and measuring its carbon inventory. Importantly, the framework is not only fit for CQU's current needs, it also forms a foundation for future development that CQU may choose to adopt, such as;

- extending its emissions measurement and reporting to include Scope 3 emissions, and/or
- certification under a scheme such as Climate Active.

In doing so, it provides the necessary detail expected of the GHG Protocol, Climate Active Standards and NGERS for:

- defining its emissions boundary,
- identifying and managing data requirements,
- establishing a baseline year and triggers for re-baselining,
- measuring and reporting emissions,
- principles for prioritising decarbonisation actions,
- recording actions and progress towards targets, and
- governance including assurance and auditing.

The framework is intended to be updated annually. By doing so it will capture changes to CQU's carbon inventory resulting from:

- changes in emissions boundary that may occur due to acquisitions or divestments,
- changes to operations that alter control and/or influence over emissions,
- the need, if any, to re-baseline,
- changes in emissions intensity,
- reduction in emissions due to decarbonisation initiatives.

Decarbonisation Annual Report

By updating the framework annually, CQU will have the appropriate robustness in its processes to provide an annual decarbonisation report that includes:

- total annual emissions by scope and emissions source,
- a comparison with the baseline year and targets,
- progress on decarbonisation initiatives, and
- updates to the decarbonisation action register.

Emissions Data and Action Register

Updating the Framework requires a significant amount of data and information from various internal stakeholders and interfaces. The data is collated and aggregated in a central data repository. The repository is used to calculate and report on emissions in accordance with the requirements of the framework. The Action Register also requires regular updating to ensure annual reporting of progress against targets.

Organisational interfaces

Updating the Framework requires a significant amount of data and information from various internal stakeholders and interfaces. The data is collated and aggregated in a central data repository. The repository is used to calculate and report on emissions in accordance with the requirements of the framework. The Action Register also requires regular updating to ensure annual reporting of progress against targets. In particular interfaces with the sustainability team and research centres will ensure appropriate data integrity for emissions related to specific research programs.

It is important for efficient and timely reporting that key stakeholders and data custodians are engaged regularly and early and understand the significance of the Decarbonisation Plan to CQU in terms of reporting on measures within the strategic plan as well as embodying their roles as **"agents of profound social impact"**.

Assurance

Every effort is made by the Directorate of Facilities to capture relevant emissions activities and sources and to accurately track, estimate and manage emissions and emissions reduction initiatives in accordance with the decarbonisation planning system. Nevertheless, it is important that independent verification is undertaken from time to time to not only assure integrity of the process and outcomes but to identify opportunities for improvement. Accordingly, an internal audit will be conducted biannually in conjunction with an update to this Plan.



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