100% renewables

WESTERN SYDNEY UNIVERSITY

Western Sydney University

CARBON NEUTRALITY IMPLEMENTATION PLAN

Final

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1 Executive summary

100% Renewables was engaged by WSU to develop a carbon neutrality implementation plan to provide guidance for the roll out of carbon reduction initiatives. This plan supports the University's strategic plan (*Sustaining Success, 2021–2026 Strategic Plan*).

This implementation plan was developed in consultation with representatives of the University from the Office of Estate and Commercial (members of the environmental sustainability team and the infrastructure services team).

The development of this plan builds on two key initiatives that WSU has implemented. Firstly, WSU's commitment to the development of 5-Star campuses in line with the GBCA's Green Star standard has already yielded significant verified benefits at both Liverpool and Parramatta CBD campuses. Building on this to progress to the development of 6-Star Green Star and potentially net zero emissions campuses will drive down WSU's future energy demand. Secondly, by entering into an electricity supply agreement from 1 July 2021 that includes the purchase of 100% GreenPower®, WSU's largest emissions source is reduced to zero.

A key overarching finding of this work is that, in addition to purchasing GreenPower® and developing low carbon buildings, by investing in cost-effective on-campus initiatives like efficiency, electric vehicles and solar, and by working to decarbonise WSU's supply chain emissions with key suppliers, WSU can utilise cost savings to purchase carbon offsets to be carbon neutral by as early as 2023. As well as being a financially viable strategy this approach will enhance WSU's reputation and can help it sustain or improve it's THE impact ranking.

This plan sets out how WSU can implement these further on-campus initiatives to reach net zero emissions in the short term, including cost-effective onsite solar PV and energy efficiency, electrification of the leased vehicle fleet, sustainable procurement, and the purchase of carbon offsets.

To frame the implementation plan, an estimate of the University's carbon footprint in 2019[1] was produced following the Climate Active certification guidelines. 100% Renewables then mapped eight pathways to carbon neutrality reflecting the following factors:

- the level of initial and recurrent funding, based on three scenarios provided by the University
- the ability to re-invest savings generated by emissions reduction initiatives
- the implementation of a program of work and the prioritisation of various types of emissions reduction initiatives, and
- the year when WSU achieves carbon neutrality, in 2023 or in 2026

The estimated carbon footprint of the University highlights the weight of emissions from electricity use, representing 39% of the total footprint, followed by emissions associated with the University's capital works program (22%).

In line with Climate Active guidelines the boundaries of WSU's carbon footprint includes a range of emission sources from the University's value chain, such as water consumption, business services, air travel and employee commute. Benchmarking of carbon footprint boundaries shows that other Australian Universities are following the same path of including a broader number of emission sources

[1] The most recent full year pre-Covid

in their carbon footprint. Figure 1 provides a visual of what should be included in a Climate Active reporting boundary. Altogether emissions from WSU's value chain (excluding capital works) represent 35% of its footprint.

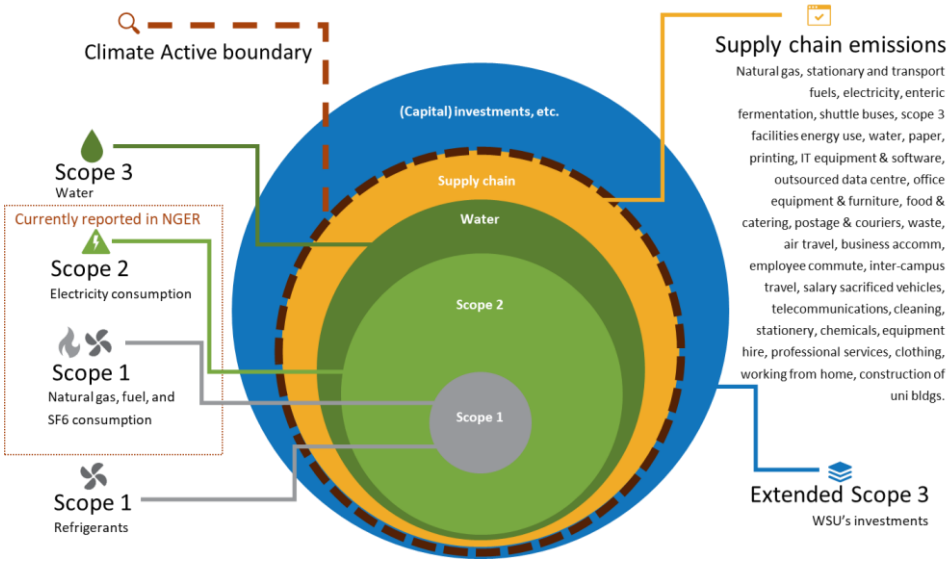


FIGURE 1: EXTENDING THE RANGE OF CURRENTLY REPORTED EMISSION SOURCES

Scope 1 emissions (direct greenhouse gas emissions such as gas and fuel use) make up the remaining 4% of the University's footprint. Taking into account the evolution of the physical footprint of WSU, i.e. new opening of 5-Star or better vertical campuses and closure of older campuses, and the impact of grid decarbonisation on electricity emissions, a profile of the University's emissions in a Business-As-Usual (BAU) scenario was defined, as illustrated in Figure 2.

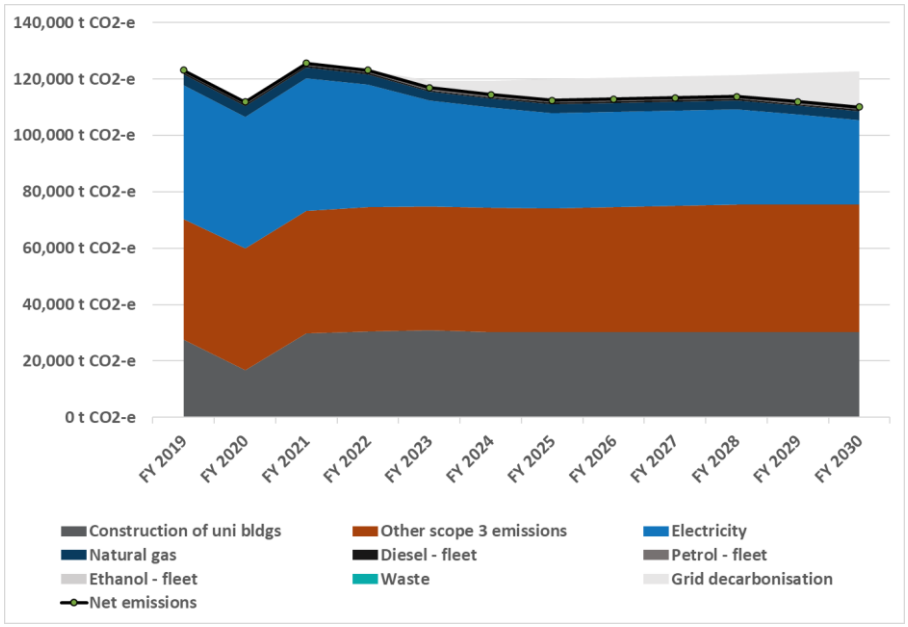


FIGURE 2: BUSINESS AS USUAL CARBON FOOTPRINT FOR WESTERN SYDNEY UNIVERSITY

Against this BAU profile, we modelled different pathways to achieve carbon neutrality. As an example, Figure 3 represents the pathway for carbon neutrality by 2023 under Scenario 2 which combines funding from an annual capital budget of $1,500,000 from 2022 to 2026 and one-off $4,000,000 funding from income generating initiatives such as biodiversity credits in 2022.

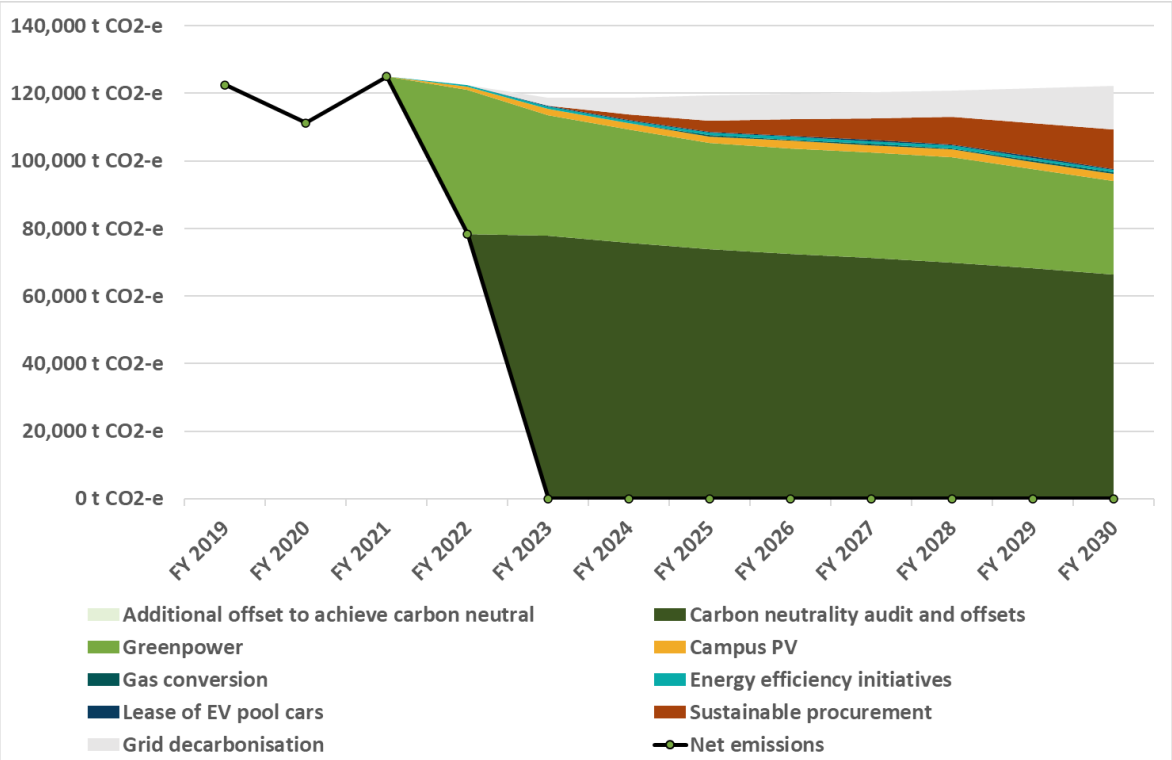


FIGURE 3: SCENARIO 2B - EMISSIONS ROADMAP TO CARBON NEUTRALITY FROM 2023

In this scenario 2B, and as shown in Table 2 below, the University would have to start purchasing carbon offsets from 2023 onward to achieve carbon neutrality.

It is estimated that the purchase by WSU of carbon offsets that are sourced from both Australia and overseas (20:80 mix) will incur an average annual cost of $331,185, starting at $359,000 in 2023 and declining to $305,285 by 2030 as emissions from on-campus initiatives, supply chain optimisation and grid decarbonisation lower the requirement for offset purchases to maintain carbon neutrality.

At the same time, the average annual cost savings in this scenario resulting from on-campus initiatives like efficiency, electric vehicles and solar PV would be $919,211, starting at $422,754 in 2023 and reaching $1,243,623 in 2030. As well as paying off the capital invested, these savings can be used to fund the purchase of carbon offsets.

For all eight scenarios that were modelled, the cost savings generated will more than compensate for the cost of carbon offsets while delivering a reasonable financial return on investment to WSU.

TABLE 1: ANNUAL COST SAVINGS AND COST OF CARBON OFFSET PURCHASES FOR EACH SCENARIO UP TO 2030

Carbon neutral in 2026

Carbon offset purchase	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029	FY 2030
Scenario 1A	$0	$0	$0	$0	$345,000	$331,371	$325,517	$317,328	$308,958
Scenario 2A 0%	$0	$0	$0	$0	$333,000	$327,424	$321,570	$313,381	$305,012
Scenario 2A 50%	$0	$0	$0	$0	$332,000	$326,263	$320,409	$312,220	$303,851
Scenario 3A	$0	$0	$0	$0	$331,000	$325,491	$319,637	$311,448	$303,078

Annual savings	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029	FY 2030
Scenario 1A	$0	$165,000	$367,500	$570,000	$772,500	$925,833	$925,833	$925,833	$925,833
Scenario 2A 0%	$0	$422,754	$878,841	$1,049,565	$1,220,290	$1,372,319	$1,372,319	$1,372,319	$1,372,319
Scenario 2A 50%	$0	$211,377	$463,512	$608,169	$768,517	$1,611,367	$1,611,367	$1,611,367	$1,611,367
Scenario 3A	$0	$422,754	$878,841	$1,334,928	$1,791,014	$1,943,043	$1,943,043	$1,943,043	$1,943,043

Carbon neutral in 2023

Carbon offset purchase	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029	FY 2030
Scenario 1B	$0	$361,000	$351,000	$343,000	$339,000	$331,371	$325,517	$317,328	$308,958
Scenario 2B 0%	$0	$359,000	$348,000	$340,000	$334,000	$327,697	$321,843	$313,655	$305,285
Scenario 2B 50%	$0	$359,000	$348,000	$339,000	$333,000	$326,609	$320,755	$312,566	$304,197
Scenario 3B	$0	$360,000	$348,000	$338,000	$331,000	$326,085	$320,231	$312,042	$303,673

Annual savings	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029	FY 2030
Scenario 1B	$0	$165,000	$324,000	$484,667	$646,667	$801,000	$801,000	$801,000	$801,000
Scenario 2B 0%	$0	$422,754	$825,507	$958,551	$1,091,594	$1,243,623	$1,243,623	$1,243,623	$1,243,623
Scenario 2B 50%	$0	$211,377	$446,845	$570,884	$699,358	$1,463,570	$1,463,570	$1,463,570	$1,463,570
Scenario 3B	$0	$422,754	$828,841	$1,236,928	$1,646,681	$1,798,710	$1,798,710	$1,798,710	$1,798,710

The modelling of the potential pathways to carbon neutrality leads to the following conclusions and implications for the University.

- The purchase of GreenPower® is the single most efficient initiative to quickly reduce emissions considering that electricity represents close to 40% of the University's carbon footprint.
- WSU's commitment to achieving at least 5-Star and potentially 6-Star new constructions under the GBCA Green Star building certification is one of major emissions reduction levers available.
- Other carbon reduction initiatives such as solar PV, electrification of vehicles and sustainable procurement are necessary to demonstrate a commitment to absolute carbon emissions reduction. They will require a longer-term roll-out and their impact will take time to realise.
- As such the purchase of carbon offsets is necessary to achieve carbon neutrality in the short to medium term. This can be funded from cost savings achieved from efficiency, electric vehicle and solar PV on-campus initiatives while still delivering a financial return to WSU.
- Achieving carbon neutrality in 2023 rather than 2026 will keep WSU amongst leading universities and can sustain or enhance a high Times Higher Education (THE) impact ranking. An earlier achievement date of carbon neutrality will bring significant reputational benefits to the University.

Table 2 below summarises the cumulative outcome of the eight modelled scenarios at 2030, in emissions reduction and financial terms. It illustrates how each of the scenario factors impact on overall carbon emissions reduction. Looking at scenario 2B we see the total cumulative cost of offsets from 2023 to 2030 is higher by 66% compared to scenario 2A which mobilises the same funding but achieves carbon neutrality by 2026 only. We can also see that increased funding in scenario 3B leads

to significant increase in savings while continuing to demonstrate the commitment of the university to reduce emissions.

It is important to note as well that while the modelling stops at 2030, the savings will continue to be delivered on an ongoing basis for the expected life of implemented measures (for example solar PV systems will typically last for 25 years or more). Hence investments made early, coupled with reinvestments managed in a revolving fund have the potential to establish a strong positive financial position supporting the efforts of the University to reduce emissions.

TABLE 2: CUMULATIVE OUTCOME OF EACH PATHWAY SCENARIO IN 2030

	Carbon neutral in 2026			
	Scenario 1A Capital budget only, no savings reinvested	Scenario 2A 0% Capital budget and IGC, no savings reinvested	Scenario 2A 50% Capital budget and IGC, 50% savings reinvested	Scenario 3A Capital budget and recurrent IGC, no savings reinvested
Total emissions reductions from onsite initiatives to 2030	65,929 t CO2-e	77,882 t CO2-e	83,138 t CO2-e	88,922 t CO2-e
Total emissions reductions from GreenPower® to 2030	296,626 t CO2-e	291,514 t CO2-e	287,837 t CO2-e	283,206 t CO2-e
Total emissions reduction from carbon offsets purchased 2026-2030	353,951 t CO2-e	347,910 t CO2-e	346,684 t CO2-e	345,794 t CO2-e
Total cost of carbon offsets purchased 2026-2030	$1,628,173	$1,600,388	$1,594,744	$1,590,653
Total investment in initiatives (excl offsets, GreenPower®)	$7,155,000	$11,167,000	$12,953,725	$15,169,000
Total net cost savings achieved by 2030	$5,578,333	$9,060,725	$8,497,043	$12,199,710

	Carbon neutral in 2023			
	Scenario 1B Capital budget only, no savings reinvested	Scenario 2B 0% Capital budget and IGC, no savings reinvested	Scenario 2B 50% Capital budget and IGC, 50% savings reinvested	Scenario 3B Capital budget and recurrent IGC, no savings reinvested
Total emissions reductions from onsite initiatives to 2030	62,036 t CO2-e	74,979 t CO2-e	79,544 t CO2-e	85,720 t CO2-e
Total emissions reductions from GreenPower® to 2030	300,520 t CO2-e	293,999 t CO2-e	290,806 t CO2-e	285,504 t CO2-e
Total emissions reduction from carbon offsets purchased 2023-2030	581,994 t CO2-e	575,974 t CO2-e	574,593 t CO2-e	573,702 t CO2-e
Total cost of carbon offsets purchased 2023-2030	$2,677,173	$2,649,481	$2,643,126	$2,639,031
Total investment in initiatives (excl offsets, GreenPower®)	$6,106,000	$10,119,000	$11,770,203	$14,123,000
Total net cost savings achieved by 2030	$4,824,333	$8,272,899	$7,782,744	$11,330,043

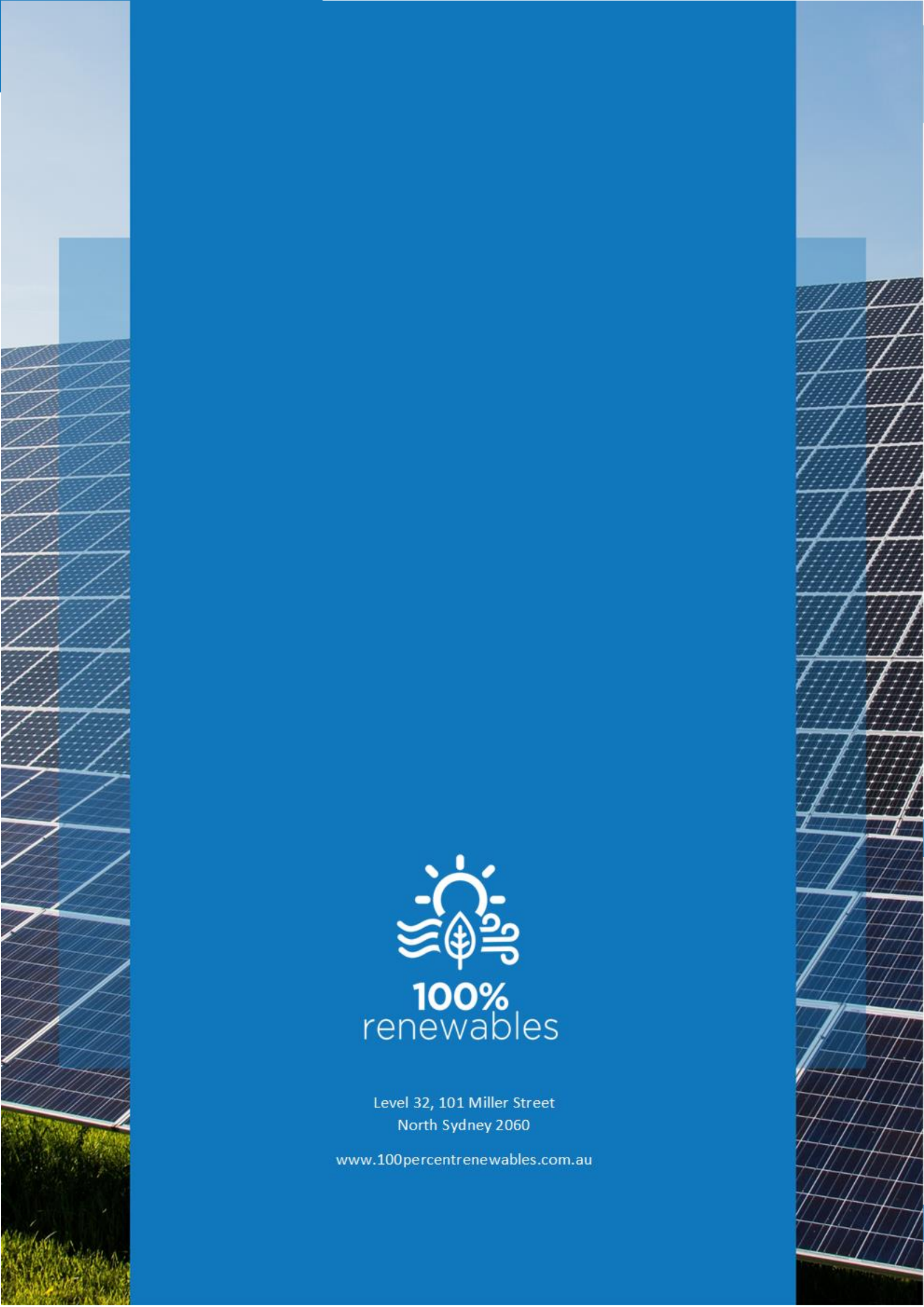
1.1 Recommended next steps

With significant reputational benefits from achieving carbon neutrality, potentially enhanced by delivering this outcome in the short term, and with cost effective carbon reduction opportunities available to WSU, there is a strong case for early action. A key pre-requisite to attaining carbon neutrality is having the ability to measure and estimate emissions using a credible framework.

Given this, it is recommended that the University progresses towards Climate Active certification, the accepted standard for achieving carbon neutrality in Australia. This will include:

- Developing a data management strategy that builds on existing emissions reporting, and offsetting WSU's emissions through a Climate Active accredited auditor and broker
- Preparing during 2021 and 2022 under auditor's advice for accreditation processes in 2023 if an accelerated target date for carbon neutrality is chosen.

In the meantime, WSU should continue to roll out and accelerate on-site efficiency, electric vehicle and solar PV initiatives and seek opportunities to reduce supply chain emissions through sustainable procurement. It is recommended that a program of work over several years be developed that can be funded from capital allocations as well as from income generating initiatives such as biodiversity credits.



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