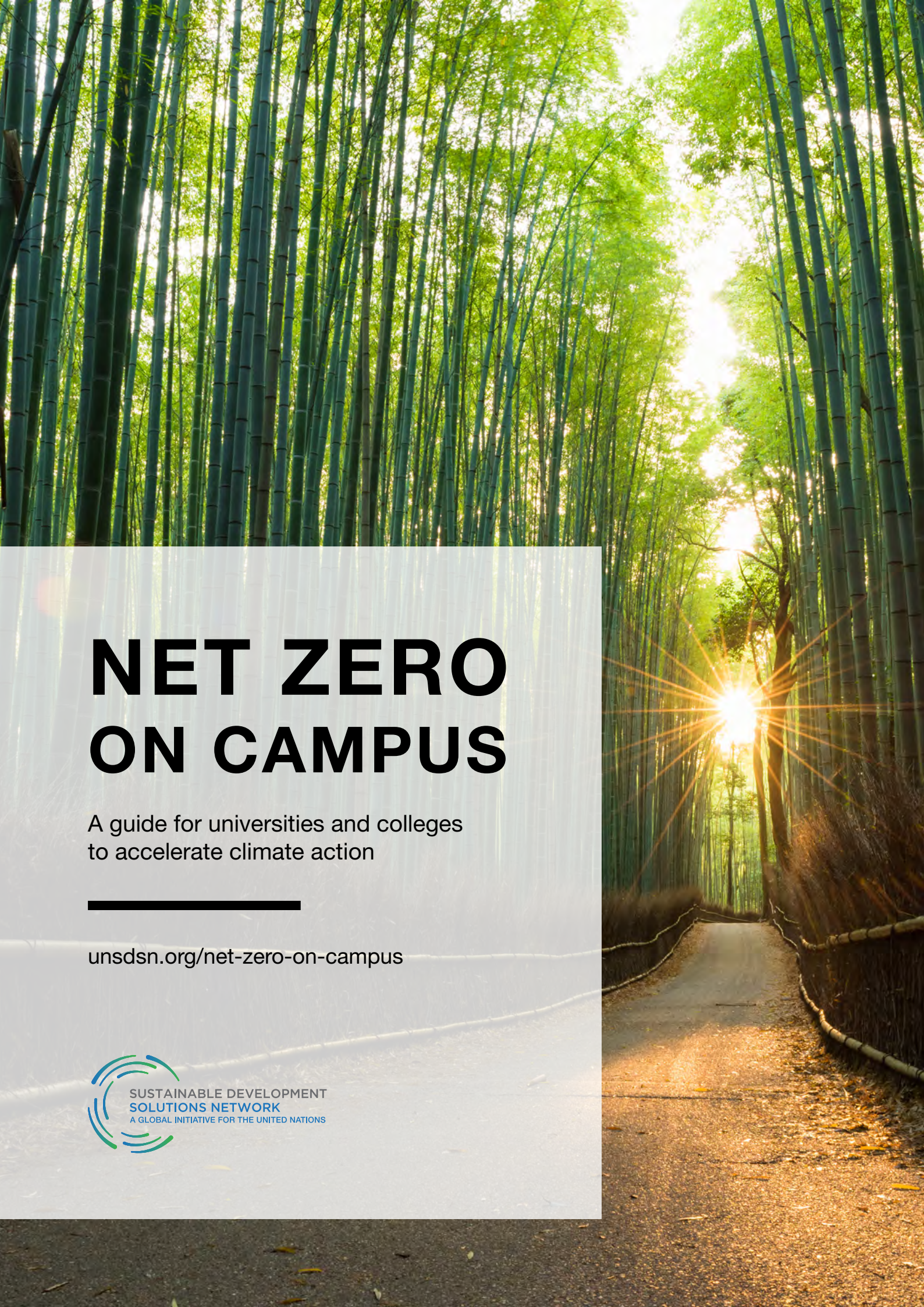

NET ZERO ON CAMPUS

A guide for universities and colleges to accelerate climate action

unsdsn.org/net-zero-on-campus

SUSTAINABLE DEVELOPMENT SOLUTIONS NETWORK
A GLOBAL INITIATIVE FOR THE UNITED NATIONS

The full Guide is available at https://www.unsdsn.org/net-zero-on-campus. Please send questions via email to media@unsdsn.org.

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Please consider the environment before printing.

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Disclaimer

The Net Zero on Campus Guide was written by Climateworks Centre, with inputs and support from United Nations Sustainable Development Solutions Network (SDSN), Monash University and the University Advisory Panel convened by SDSN. Any views expressed in this report do not necessarily reflect the views of SDSN or university contributors.

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Acknowledgement of Country

The authors of this guide would like to acknowledge and pay respect to the Traditional Elders and Leaders of lands across which the Net Zero on Campus Guide is distributed around the world.

In the spirit of reconciliation, Climateworks Centre and Monash University would also like to acknowledge the Traditional Custodians of Country throughout Australia and their connections to land, sea and community. We pay respect to the people of the Kulin nation on which this guide was written and pay our respects to their Elders past and present and extend that respect to all Aboriginal and Torres Strait Islander peoples today.

ACKNOWLEDGEMENTS

The United Nations Sustainable Development Solutions Network (SDSN) mobilises global scientific and technological expertise to promote practical solutions for sustainable development, including the implementation of the Sustainable Development Goals (SDGs) and the Paris Agreement. As of 2022, SDSN's global network of top-tier knowledge-generating institutions encompasses over 1,700 members in 50 networks across 137 countries. For more information, please visit unsdsn.org.

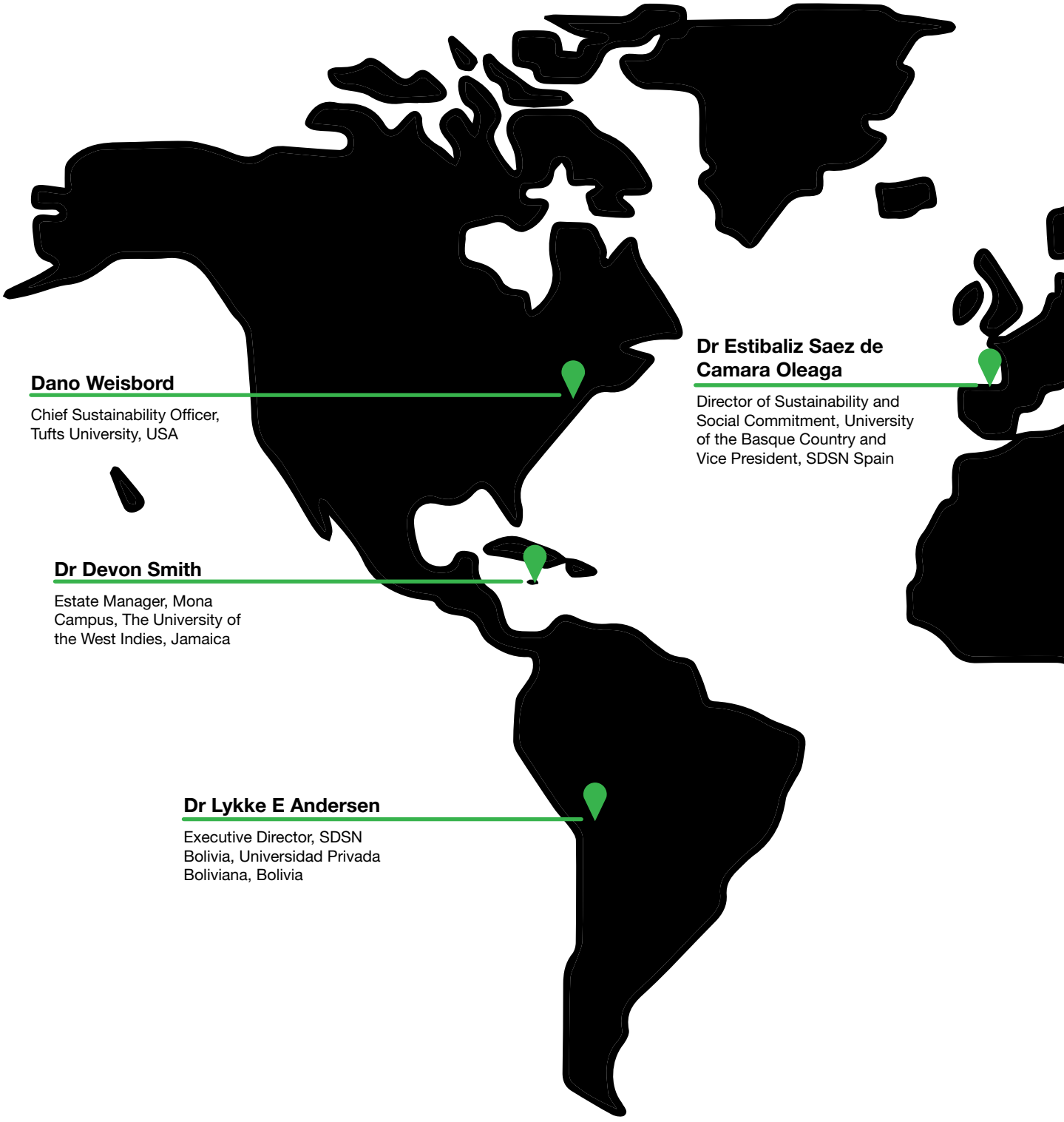
Climateworks Centre bridges research and action, to achieve the system-level transitions required to reach net zero emissions across Australia, Southeast Asia and the Pacific. Climateworks acts as trusted advisers, creating evidence-based solutions and influencing decision-makers to reduce emissions at scale. Co-founded by the Myer Foundation and Monash University in 2009, Climateworks is an independent non-profit working within the Monash Sustainable Development Institute. To learn more about this work, visit climateworkscentre.org.

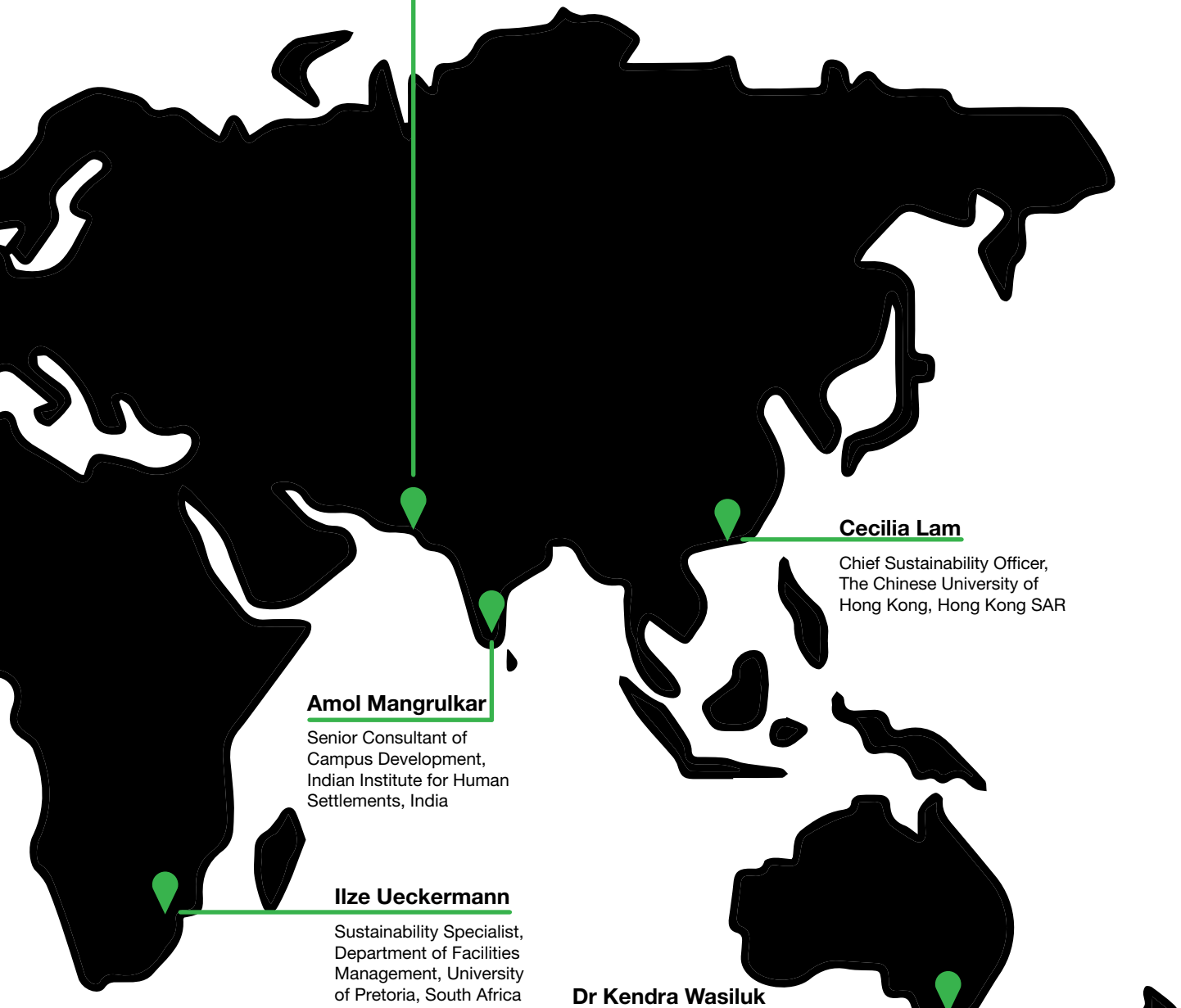
Monash is an impact-focused, global university, delivering education and research excellence in Australia and across the Asia-Pacific. The university is making a positive impact on today's global challenges – through supporting climate change mitigation, the easing of geopolitical insecurity and through fostering healthy communities. The Monash Energy Institute brings top minds in energy together to accelerate the transition towards a sustainable energy future through impactful interdisciplinary research and education programs for Monash University and its trusted partners.

We also wish to acknowledge and thank our partners, the Race to Zero for Universities and Colleges and Second Nature. We are especially grateful to Fiona Goodwin, CEO, EAUC, Secretariat of Race to Zero for Universities and Colleges for her support.

University Advisory Panel

We are grateful for the ongoing support of our global university advisors who have shared their region-specific knowledge and expertise on decarbonisation issues and opportunities facing university campuses. We look forward to continuing to work with these advisors as this initiative develops.





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INTRODUCTION

As the risks and impacts of climate change become more visible every year, the call for net zero emissions is no longer restricted to country-level commitments. It has become equally important for non-state actors, like businesses and other institutions, to build pathways towards net zero by mid-century or sooner.

Universities and colleges are keepers and transmitters of knowledge for the next generation and are definitionally bound to implement future-thinking strategies. As such, institutions of higher education have the unique opportunity to not only build strategies to reduce operational emissions, but to also champion climate research, knowledge, and action in the wider community.

To enable these transitions in the higher education sector, this guide has been developed as an accessible toolbox for sustainability and facility managers at universities and colleges. While acknowledging that each educational institution operates within its own unique context, this guide provides a wide range of resources that are relevant at different stages of the decarbonisation journey.

The focus of this guide is on reducing emissions from campus operations, i.e. on decarbonisation initiatives across energy-consumption, mobility options, buildings, waste management, and value chains. Relevant resources are highlighted in the accompanying website and will be regularly updated to reflect the latest innovations and initiatives undertaken by universities and colleges across the world.

The diversity of experiences in climate change vulnerability, mitigation and adaptation is acknowledged, with key inputs from our global University Advisory Panel, thus informing the development of this guide and the accompanying online toolkit. The guide and online toolkit are not intended to be exhaustive or comprehensive, and instead, aim to serve as a starting point for universities and colleges worldwide. The online toolkit contains resources and case studies that are applicable to institutions of different geographies, scales, and decarbonisation experiences to account for their various needs and challenges.

Several net zero university guidelines and frameworks have been used to inform this guide, in particular the early work done by 'Cool Campus! A How-To Guide for College and University Climate Action Planning (2009)', resources from the UNFCCC Race To Zero, Second Nature, and The Alliance for Sustainability Leadership in Education (EAUC). This guide also references standards and frameworks used in corporate net zero planning including the Science-Based Targets Initiative (SBTi) and reports from the Climateworks Centre.

Experienced sustainability professionals can also use this as an opportunity to connect with a larger community of practice and to share best practices.

We invite universities and colleges to contribute to the database by sharing their own successful net zero initiatives and resources with the global community.

This guide and its accompanying website will hopefully provide support for universities and colleges as global agents of change.

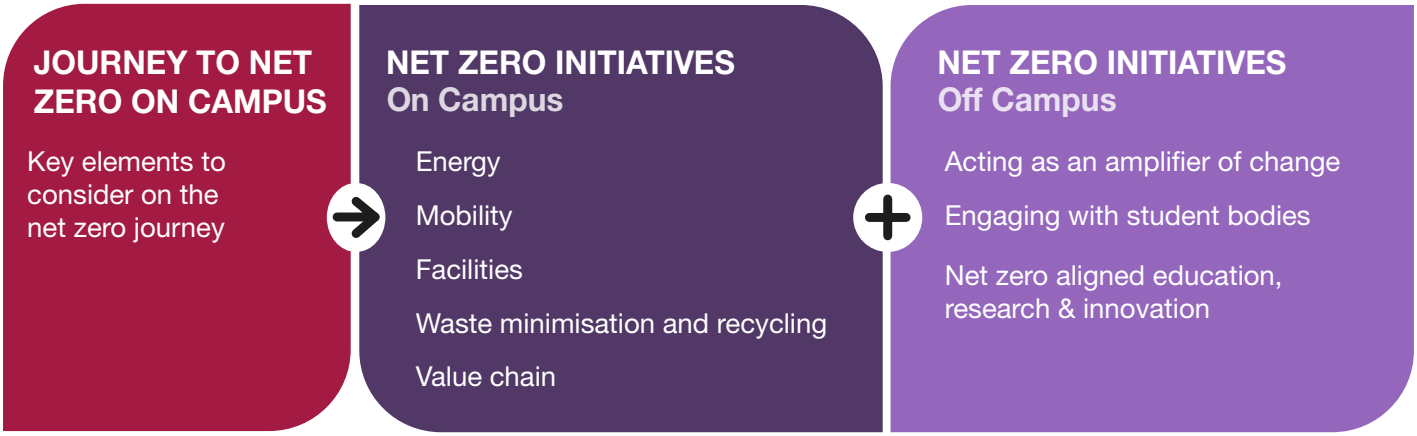


Figure 1. Structure of the net zero on campus guide

VISIT THE WEBSITE

This guide is accompanied by a website, a living database of resources that will feature case studies, networks, tools, and initiatives to illustrate how university and college campuses around the globe are approaching net zero.

MESSAGE FROM MARIA CORTÉS PUCH


María Cortés Puch

With over 1,700 university and research institution members in 50 national and regional networks worldwide, the UN Sustainable Development Solutions Network (SDSN) has created an ecosystem of thought leadership to accelerate progress on sustainable development and climate change.

We have seen the impact of this network in several instances, for example, by leading a multi-party Sustainable Development Goals (SDGs) group in national parliaments, advising governments on how to align recovery strategies to the SDGs, and working with cities on decarbonisation strategies through innovative partnerships between universities and their cities.

More than 1,000 colleges and universities have committed to reaching net zero emissions around the world and it is crucial to share lessons and resources to provide these institutions with the support they need to decarbonise their campuses by mid-century or sooner.

Recognising that decarbonisation is not a uniform, one-size-fits-all process, SDSN, the Climateworks Centre, and Monash University have come together to develop this guide and the accompanying online toolkit, building on the shared experience and lessons learned from partner universities worldwide.

The guide was designed to be suitable for academic institutions of different sizes and regions, as well as at different stages of their decarbonisation journey – ranging from those that find themselves in the pre-commitment stage to those that are ready for implementation and are piloting projects and solutions.

We offer this guide with the great hope that it will prove useful to colleges and universities around the world in their efforts to combat climate change. Further, we hope that these experiences can then be shared and expanded beyond academia to help local towns, cities, and countries in meeting their climate commitments.

Users of this resource can expect to gain inspiration, ideas, and recommendations for decarbonising campus operations and facilities.

The accompanying online toolkit builds on frameworks and tools developed by universities at the forefront of taking climate action. It also points users to other resources that may be helpful to their specific circumstances.

Finally, we hope that this guide and toolkit can enable institutions to reach net zero, while also creating new communities of practice among them.

María Cortés Puch

Vice President of Networks
Sustainable Development Solutions Network

MESSAGE FROM JOHN THWAITES


Prof John Thwaites

Universities and other higher education institutions have a key role to play in the global transformation to net zero emissions.

They are often substantial greenhouse gas emitters themselves, as they oversee large communities of staff, students and contractors. Their campuses can function like small cities. Communities expect universities to be responsible citizens, and students are calling for stronger climate action by their universities.

As natural testing bed sfor innovative climate initiatives, universities acting as ‘living labs’ can lead to community-wide solutions. Universities have a unique position of trust in the community and by setting an example they can amplify the change needed for a safe climate.

Many universities are now committing to net zero emissions but need help in understanding what to do in practice. This guide aims to provide that help and to set up a global ‘community of practice’ to share knowledge about the net zero journey.

The guide does not purport to contain all possible climate solutions. Rather it sets a framework for action across five areas of campus management and is accompanied by a website which is a living database of resources that universities can add to.

But this is just the start. We look forward to universities all around the world contributing to this resource so we can learn from each other in this critical Decade of Action.

Professor John Thwaites AM

Chair, SDSN Association Inc
Chair, Climateworks Centre and
Monash Sustainable Development Institute
Monash University

UNDERSTANDING NET ZERO

A critical mission for universities and colleges

What is net zero?

Net zero broadly refers to a state in which the greenhouse gases going into the atmosphere are balanced by their active removal[1]. However, given the amount of greenhouse gases that have accumulated over the last two centuries of human activity and the continued depletion of the global carbon budget, merely balancing emissions will not be sufficient and must be accompanied by efforts to reduce the generation of emissions.

To learn more about climate change and greenhouse gases, see resources on page 90

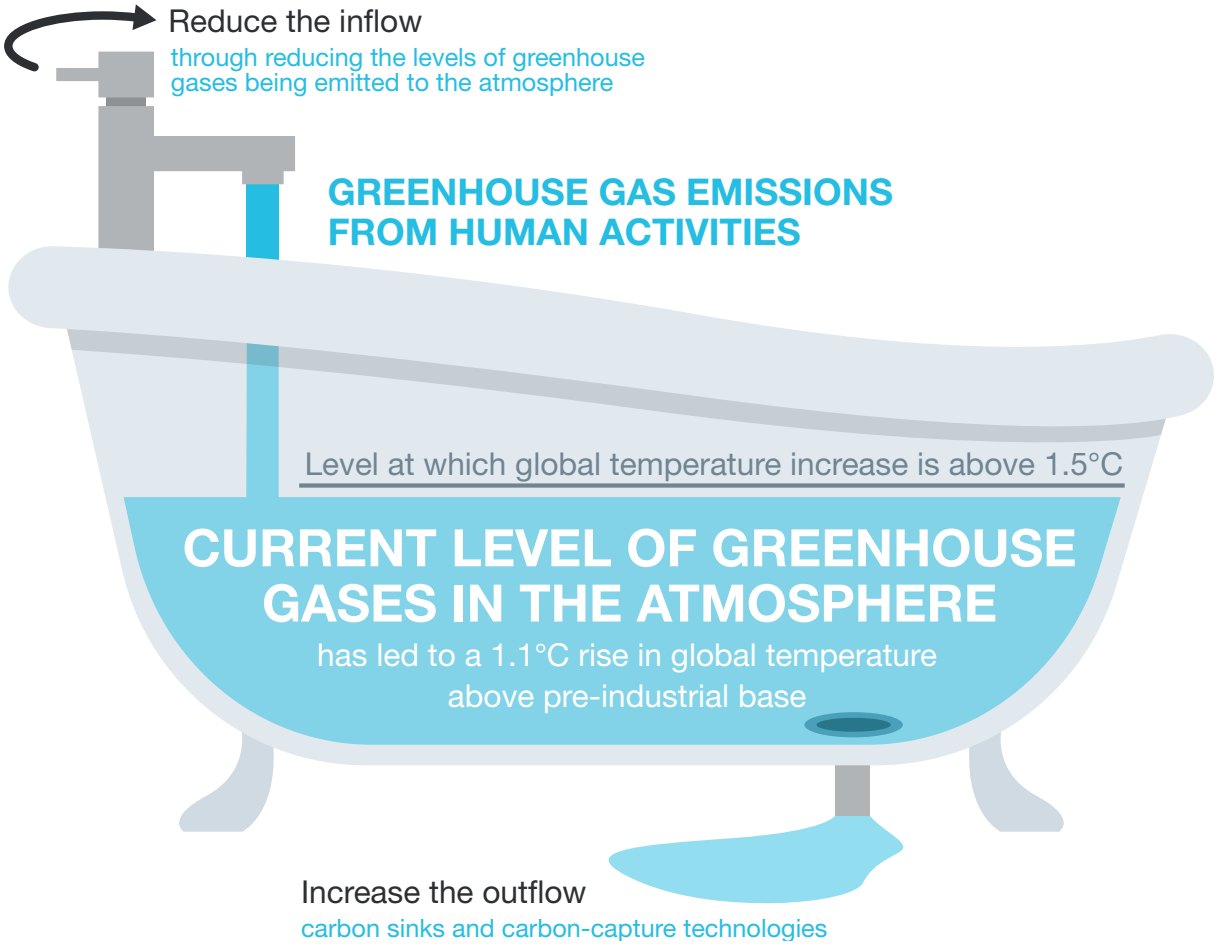


Figure 2. The key objective of net zero is to reduce the amount of greenhouse gases in the atmosphere by reducing emissions (equivalent to reducing the tap inflow), and removing the amount that is already present (making sure the outflow drain is open).

Why net zero matters

The current pace of anthropogenic greenhouse gas emissions have caused an unprecedented rise in temperature from pre-industrial levels. Many regions of the world are experiencing extremes in temperature and precipitation, global sea-level rise, changes in biodiversity and ecosystems including species loss and extinction[2].

The irreversible consequences of such changes are severe for current and future generations, with increased climate-related risks to health, livelihoods, food and water security, human security and economic growth[2].

In order to avoid the worst impacts, scientific modelling shows that the rise in average global temperatures must be limited to 1.5°C above pre-industrial levels[2]. In other words, a livable planet requires worldwide emissions of carbon dioxide to halve by 2030 relative to 2010 level, and to be net zero by 2050[3]. It also requires a deep reduction in other greenhouse gases[4].

The historic Paris Agreement signed by 193 countries set the long-term goals of substantially reducing global greenhouse gas emissions to limit the global temperature increase in this century to 2°C while pursuing efforts to limit the increase even further to 1.5°C.

Following this, a number of non-state actors like businesses, universities, healthcare institutions and financial institutions[5] have made net zero commitments. These commitments involve complex systemic change, and the non-state actors must be prepared to prioritise deep reductions in value-chain emissions, report publicly on their progress and engage actively with other stakeholders to ensure just and equitable transitions[6].

Emissions reductions also need to be more ambitious, as current pledges continue to lead the world towards a temperature change higher than 1.5°C warming[7]; an outcome that would be catastrophic for the most vulnerable regions, communities and species worldwide.

To learn more about the climate impacts and national commitments, see resources on page 91

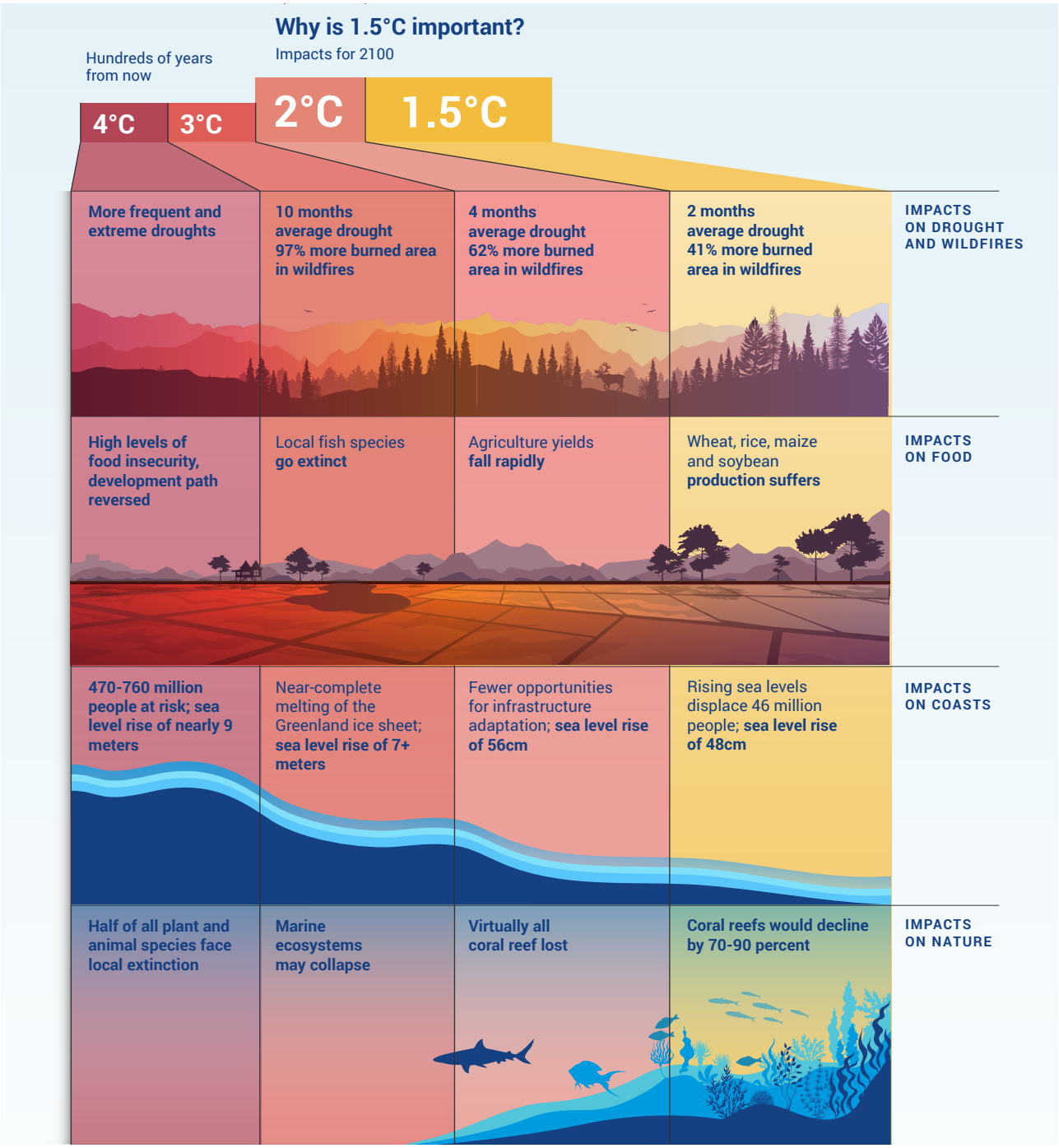


Figure 3. There would be a severe escalation of impacts if the world were to warm above 1.5°C.
Source: United Nations Environment Programme 2021b[8]

Universities and colleges are critical enablers of change

Universities and colleges can drive systemic change in climate change mitigation and adaptation through multiple pathways.

As seen in Figure 4, institutions of higher education have five key modalities of action – teaching, research, providing service and building partnerships with the wider community, enabling platforms for public debate and deliberations, and finally, managing their own campus operations[9].

Each of these core functions lead to multiple pathways of influencing and transforming socio-economic systems. By successfully leveraging their core strengths, and using their ability to live-test innovations at scale, universities and colleges can become instruments of change and leadership.

It is this potential that makes the role of universities and colleges in addressing climate change especially important and unique.

To learn more about how universities across the world are implementing climate action, see resources on page 91

Having a Net Zero Plan (NZP) allows the [University of West Indies] UWI to lead Jamaica and the Caribbean with moral surety in not just carbon usage and energy footprint reduction but also as the pre-eminent institution on climate action thought leadership. It is an opportunity to engage our colleagues, and communities to strengthen ties and improve not just the environment but social relationships. From the bottom line, an NZP can also result in reduced operational costs while being a living laboratory to demonstrate new research and technologies.

– Dr Devon Smith, Estate Manager (Mona Campus), The University of the West Indies, Jamaica

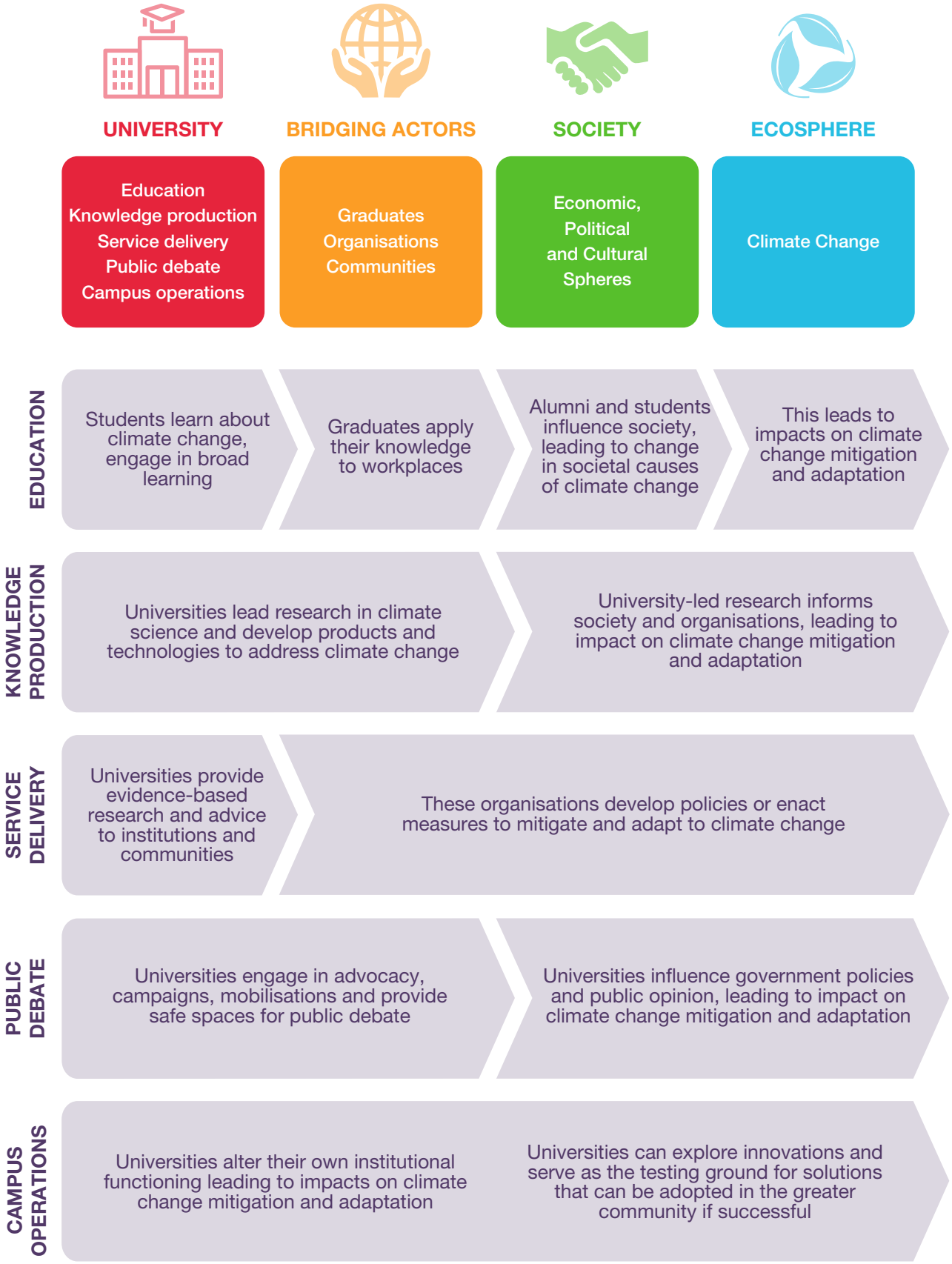


Figure 4. A framework that explains how universities can enable systemic change in climate change mitigation and adaptation. Source with slight modifications: McCowan (2020)[9]

JOURNEY TO NET ZERO ON CAMPUS

How to mobilise climate actions on campus

A net zero plan is an ambitious but necessary commitment by universities and colleges to reduce greenhouse gas emissions to reach a 1.5°C world. It comprises direct on campus actions, as well as enabling actions such as building climate leadership and governance, driving research and knowledge exchange, and using education and curriculum along with community mobilisation to drive climate action[10].

This guide offers a wide spectrum of on campus initiatives that can be a part of a university or college's journey towards net zero. Before taking the leap, it is important to consider the key principles and stages of a pathway towards net zero.

The following section describes high-level principles, rather than an exhaustive list. These can be used as a foundation for mapping the journey and addressing some common challenges as the campus transitions to net zero.

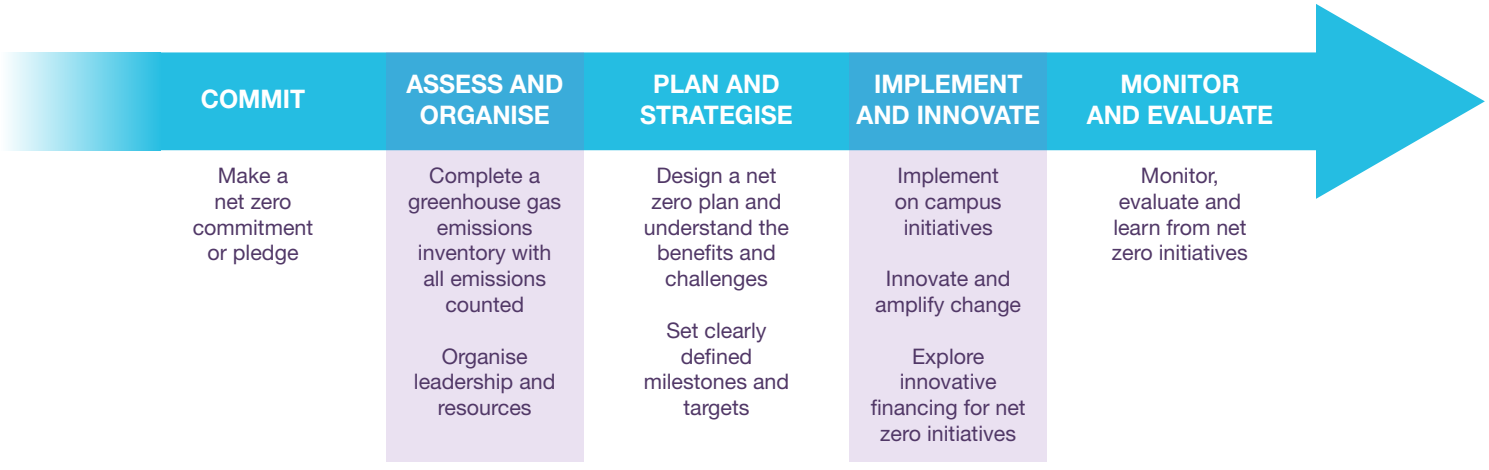


Figure 5. The net zero journey with principles to consider at each stage of the journey

Commit

Make a net zero commitment or pledge

As with any journey, the first step of a net zero plan is to make a commitment. Many of the world's leading universities and colleges have done this by signing up with the United Nations Race To Zero initiative.

Making public commitments to decarbonise i.e. reduce carbon emissions, is an important signal of intent and helps to bring higher collaboration amongst stakeholders.

Do you want to join the Race To Zero? Click here to sign up to the UNFCCC Race To Zero for universities and institutions of higher education.

Assess and organise

Complete a detailed greenhouse gas inventory

The key objective of a comprehensive net zero plan is to reduce all greenhouse gas emissions. Thus the university or college must have an understanding of not only their operational emissions, but also of the emissions that occur along the value chain of products or services used by it. The emissions that are directly tied to the university or college's operations and energy consumption are classified as scope 1 or scope 2 emissions.

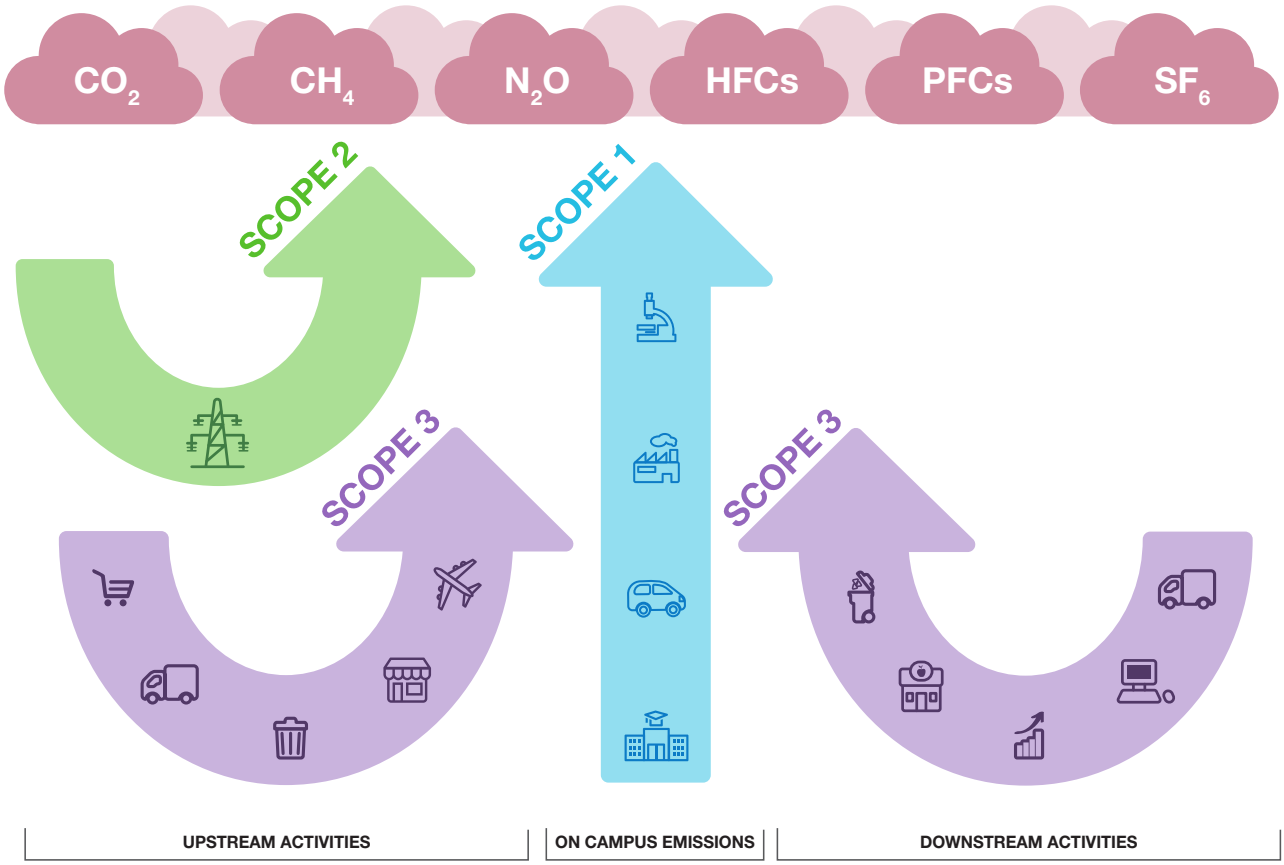
- Scope 1 covers all direct emissions from university-owned assets such as emissions from university vehicles, while scope 2 emissions are tied to the generation of purchased electricity.
- All other indirect emissions that occur further up or down the value chain are considered scope 3.

Despite its significance, scope 3 emissions can be difficult to assess and lie outside the institution's direct management or operational control. However, universities and colleges can make a difference by focusing on their most significant scope 3 emissions; often these are related to commuter and business travel, their purchases, waste management and their investments in the fossil fuel industry.

Options for conducting a university-wide emissions inventory:

- ☐ Use faculty and students to build an inhouse tool using accessible software.
- ☐ Use free greenhouse gas calculation tools, however, these will need a degree of customisation. Find some of these open source services on our website directory.
- ☐ Use the services of a professional team to undertake a comprehensive emissions inventory that is aligned to relevant national or international regulations.

Assess and organise



LEGEND:

- Labs – energy and waste
- Direct fuel combustion on campus (e.g. gas)
- University vehicles
- Construction of university buildings
- Purchased energy for lighting, heating and cooling of campus facilities
- Purchased goods and services such as books or electronic devices
- Upstream and downstream transportation and distribution of goods and services used by the university
- Waste generated in upstream operations
- Building materials and construction
- Staff and faculty business travel for the university and commutes to campus
- University-generated waste
- Franchises
- Investments
- Sold products

Figure 6. A broad representation of sources of scope 1, 2 and 3 emissions at a university or college. Adapted from WBCSD & WRI (n.d)[11]

To learn more about scope 1,2,3 emissions, or tools for completing a greenhouse gas inventory see resources on page 92

Organise leadership and resources

Institutional and operational structures such as governing bodies, working groups and processes are critical in preparing and implementing a university or college's net zero plan, driving transparency, accountability, and stakeholder participation[12].

To learn more about how universities are building institutional structures to support their climate action plan, see resources on page 93

> *The climate agenda is a cross-cutting agenda for any organization as complex as a university. Hence, it demands horizontal engagement across departments, and as a new way of working requiring lots of time and dedication for coordination and encouragement. I have found it important to ensure that allied thinkers are recognized and appreciated for their contribution, while slowly ensuring that the climate agenda becomes intrinsic rather than additional to the department's core priorities.*
>
> **– Miriam Kugele, Global Senior Manager, Environment and Sustainability, Aga Khan University, Pakistan**

Questions to ask when seeking to embed net zero in a university or college's institution and governance:

- ☐ Is there a commitment towards net zero from the senior-most governing bodies and representatives?
- ☐ Is there a dedicated climate or sustainability team focused on reaching a net zero goal?
- ☐ Have crucial stakeholders been identified?
- ☐ Do the stakeholders have channels of collaborating to build just and equitable net zero initiatives?
- ☐ Is net zero included in the institution's strategic plan, master plans and campus policies?
- ☐ Do departments within the institution have channels of collaboration to work on net zero initiatives?
- ☐ Do financial and emissions-related metrics exist with a clear monitoring, evaluation and learning plan?
- ☐ Is there a dedicated operational or investment budget with clarity in how net zero initiatives will be financed over the long term?
- ☐ Do processes of accountability and governance cover net zero initiatives?
- ☐ Do performance development and goals of staff and faculty include goals related to the net zero initiative?
- ☐ Are students involved with campus net zero initiatives, with the university leveraging and actively supporting their ideas and innovations?
- ☐ Are there partnerships which can be leveraged with other institutions including universities and local government representatives?

Plan and strategise

Design a net zero plan and understand the benefits and challenges

A long-term net zero plan or strategy is required to take the university from business as usual, to a net zero university. This plan will be the guiding document or strategy along the journey. It is therefore important that it is carefully crafted and builds in solutions to hurdles that may be encountered along the way. Two common barriers include ensuring the net zero focused projects are financially viable and that there is enough support from within the university to drive change.

The University Advisory Panel for this project has identified common challenges and barriers to implementing net zero initiatives. Whilst there is no one-size-fits-all solution, ensuring the support and structures are in place to drive change is a key step in the net zero process.

It is important to carefully consider the university context, and to build in solutions to common challenges within the overarching net zero plan.

Some of the key challenges and barriers which may be faced at different stages of the net zero journey include:

- difficulty in financing or resourcing initiatives
- complicated institutional structure and management
- lack of agency beyond institutional boundaries
- lack of leadership or high-level buy-in
- lack of bottom-up buy-in
- complex political barriers
- lack of staff capacity across the university
- lack of organisational structure
- difficulty in scaling solutions or implementing in required timeframes
- difficulty in sourcing equipment in low- and middle-income countries (LMICs)
- lack of data and training.

> *A good plan speaks to the mission and identity of the institution that developed it. It is easier to implement a plan that the university community sees as valuable.*
>
> **– Dano Weisbord, Chief Sustainability Officer, Tufts University, USA**

Key considerations for mapping a university or college net zero plan or strategy:

- ☐ Define the boundaries of the university or college, including whether a single campus or multiple campuses are covered by net zero plans.
- ☐ Ensure that core university or college activities within the defined boundary are covered.
- ☐ Evaluate the financing options available for net zero initiatives, including building the case for funding.
- ☐ Evaluate the financial, reputational, legal and market risks of not having a net zero plan. This includes ensuring relevant regulations on climate change and net zero are considered.
- ☐ Ensure the plan receives buy-in from all relevant stakeholders, especially from university leadership and decision-makers.

Plan and strategise

Benefits and costs involved in a net zero plan

The life-time costs and benefits of net zero initiatives are typically considered in financial terms. At the same time, benefits can be non-financial, such as improved health of communities, better climate resilience of the university or college's operations, local air quality improvements, and reputational benefits.

By quantifying these benefits, net zero initiatives have greater likelihood of support and buy-in from key stakeholders.

To learn more about evaluating the costs and benefits of net zero initiatives, see resources on page 93

> *The quantitative measure is the reduction of CO_2 emissions for which the institution is directly responsible. However, this metric has little to do with our success as an educational institution. To that end, the number and results of curricular projects and/or research that utilize or advance the design, construction and implementation of our net zero plan are a critical measure.*
>
> **– Dano Weisbord, Chief Sustainability Officer, Tufts University, USA**

Tips for increasing the financial viability of net zero projects:

- ☐ Consider using a shadow carbon price in financial evaluations of projects in line with international standards.
- ☐ Explore green financing options for net zero projects, including green bonds and green loans which may provide additional benefits to a standard loan type.
- ☐ Discuss and develop internal processes with the finance team to qualify some of the long-term benefits of net zero initiatives.
- ☐ Negotiate with vendors and re-evaluate existing arrangements to reflect revised net zero vision and project requirements.

Table 1. A broad list of climate change related financial impacts and non-financial benefits that could be relevant to universities and colleges

TYPE First three columns of this table adapted with minor changes from Table 2, TCFD (2017)[13]	**CLIMATE-RELATED OPPORTUNITIES**	**POTENTIAL FINANCIAL IMPACTS**	**POTENTIAL NON-FINANCIAL BENEFITS** Adapted with minor changes from Climate Interactive (n.d)[14]
Resource efficiency	• Use of more efficient modes of transport • Reusing, recycling and waste reduction of water, energy and other materials on campus • Shifting to more efficient buildings and site infrastructure	• Reduced operating costs through efficiency gains and cost reductions • Increased value of fixed assets (e.g. highly rated energy efficient buildings) • Reduced exposure to liabilities related to health and safety	• Improved health and safety of staff, faculty and students
Energy source	• Use of lower-emissions, or preferably renewable sources of energy • Use of supportive policy incentives • Use of new technologies • Participation in carbon markets • Shift toward decentralised energy generation	• Reduced operational costs (e.g. through use of lowest cost abatement) • Reduced exposure to future fossil fuel price increases • Reduced exposure to GHG emissions and therefore less sensitivity to changes in cost of carbon • Returns on investment in developing low-emissions technology • Increased capital availability	• Access to reliable sources of energy and energy-security • Creation of green jobs
Products and services	• Research and innovation on climate change, mitigation and adaptation • Implement university-wide recycling and waste management programs	• Increased revenue through new solutions to adaptation needs • Better competitive position and reputational benefits • Reduced cost of waste disposal	• Building connections and knowledge for the community • Leadership and influence in community and amongst peers • Building economies of scale for local communities to participate in recycling programs
Markets	• Access to new markets (e.g. partnerships for climate research) • Use of public-sector incentives • Leverage internal and external audiences of a university as stakeholders and change-makers	• Increased revenues through access to new and emerging markets (e.g. partnerships with governments, development banks) • Increased diversification of financial assets (e.g. green bonds and infrastructure, endowments, ect.) • Better competitive position and reputational benefits	• Building networks, alliances and partnerships • Leadership and influence in community and amongst peers • Reputational benefits
Resilience	• Participation in renewable energy programs and adoption of energy efficiency measures • Resource substitutes/ diversification	• Increased market valuation through resilience planning (e.g. infrastructure, land, buildings) • Increased reliability of supply chain and ability to operate under various conditions • Increased revenue through research and education related to building climate-resilience	• Building resilience to survive disruptions • Building resilience of communities to survive disruptions in resource access

Plan and strategise

Set clearly defined milestones and targets

A net zero plan must have multi-year targets and milestones to be achieved. This allows for regular monitoring of progress to ensure the university is on track to meet the end goal of net zero.

Science-based targets (SBTs) are greenhouse gas reduction goals aligned with the latest climate science that describes what is needed to achieve a specific goal, for example a 1.5 degree world.

These targets are typically a mix of science-based absolute emissions reductions across all scopes of greenhouse gases, combined with considerations of the university's long-term goals and its ability to manage resources and capabilities.

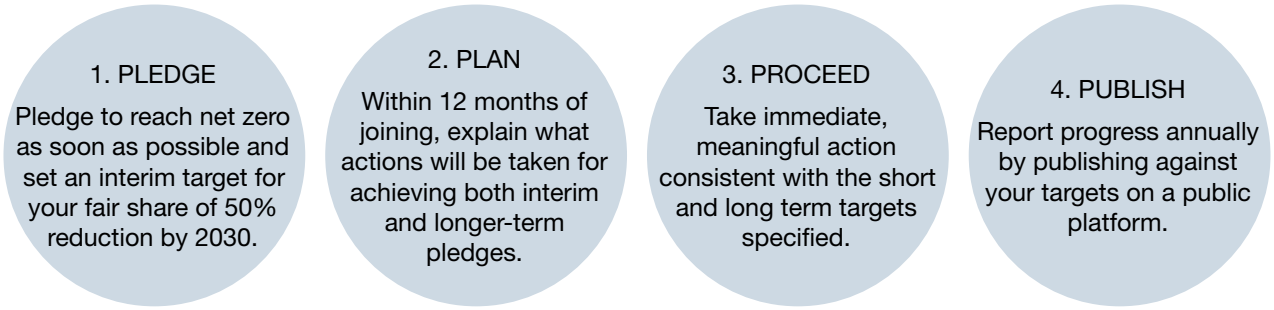


Figure 7. Interim targets are part of the minimum criteria required for participation in the Race to Zero campaign

Best practice for setting emissions targets:

- ☐ A critical starting point is identifying a valid base year. This should be a year that is representative of the institution's typical emissions profile and that has verifiable scope 1, 2, and 3 emissions[15].
- ☐ Define the boundaries of the university or college to ensure that all significant campuses and activities are covered.
- ☐ Net zero plans should include medium-term targets that track progress and mark major milestones such as halving emissions from the base year by 2030, if not earlier[16]. These medium-term, or interim, targets also enable the timely review of the performance against the latest developments in climate change mitigation and adaptation.
- ☐ Reducing scope 1 and 2 emissions are key milestones that need to be achieved in the early to mid-term, as scope 3 emissions typically need longer timelines.
- ☐ It is highly recommended that initiatives consisting of offsets and carbon-capture technologies are only used for the hardest to abate emissions and after all other initiatives have been implemented.

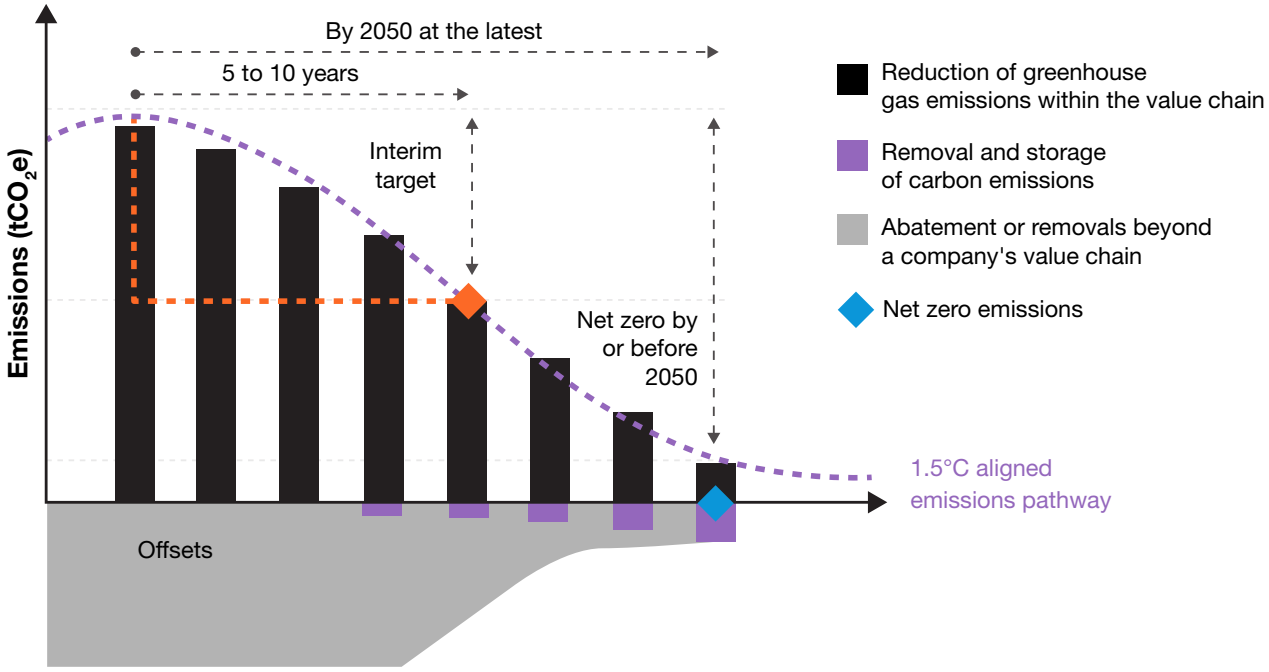


Figure 8. Key elements of setting targets and interim targets using a science-based pathway towards net zero. Adapted from SBTi (2021)[17]

The importance of a [net zero] plan also manifests in garnering interest and trust that our commitments are serious. With a detailed emissions baseline, life-time costing for major renewable energy and efficiency measures, as well as detailed consideration of other aspects, for the first time we can prove that mitigation is doable, necessary and good business – for the planet, for people, and for institutional pockets.

– Miriam Kugele, Global Senior Manager, Environment and Sustainability, Aga Khan University, Pakistan

To learn more about setting targets for net zero see resources on page 94

Implement and innovate

Implement on campus initiatives

This guide includes a separate and richly detailed section to cover the implementation of university specific on campus initiatives, which are central to this document.

The section covers five broad action areas and has multiple initiatives that cover the five key sources of emissions:

1. Energy
2. Mobility
3. Facilities
4. Waste minimisation and recycling
5. Value chain emissions

See Implementing net zero on campus for more information on the types of initiatives required for a net zero campus.

Innovate and amplify change

The list of campus initiatives included in this guide form a starting point for a net zero campus. A university or college can play a leading role in taking net zero initiatives and concepts beyond campus by amplifying its success stories, and driving knowledge and research in climate change.

Universities and colleges are uniquely positioned to contribute to research and development of net zero initiatives, translating the knowledge and lessons learned before implementing them into the community.

This guide has detailed the innovation and amplification of change in the following sections: Act as an amplifier of change, Engage with student bodies and Encourage net zero aligned education, research and innovation.

Explore innovative financing for net zero initiatives

The UN Intergovernmental Panel on Climate Change estimates that between US$1.6–3.8 trillion is required annually to avoid warming exceeding 1.5 °C. Yet, in 2019-20, flows of climate-related finance only approximated US$600 billion[18].

Unsurprisingly, financing of net zero action plans has been identified as a key challenge by universities and colleges. It is particularly difficult for universities and colleges in climate-vulnerable regions to raise funds.

This calls for the set-up of a robust finance team to identify and evaluate innovative financing solutions. The financing solutions pioneered by leading universities and colleges can also be used as financing benchmarks. Some of the key financing options for net zero projects are listed on page 26.

One of the first challenges that any university will face in decarbonizing operations is related to available finances. Even though many of the measures we have identified in our decarbonization plan at [Aga Khan University] AKU have a payback period of less than 4 years, and the agenda has full support from the leadership, at a time of global financial crunch, it is still an uphill battle to ensure that funds for measures such as energy efficiency and retrofits are prioritized. We are now working collaboratively and creatively to identify new sources of funding, such as from environmentally-minded organizations and donors. Another important learning is to ring-fence savings from initial decarbonization measures in order to reinvest in further measures.

– Miriam Kugele, Global Senior Manager, Environment and Sustainability, Aga Khan University, Pakistan

Table 2. Financing options for climate-related projects

FINANCING OPTION	DESCRIPTION	EXAMPLE
Power Purchase Agreements (PPA's)	• Power Purchase Agreements (PPAs) are mid to long-term contracts with utility companies that enable the financing of renewable energy systems without access to the capital outlay. • Electricity is sold at an agreed rate, and the PPA partner owns, operates and maintains the renewable energy source. The installation could be on or off campus.	• As early as 2015, universities across the US had facilitated over 100 megawatts (MW) of solar power through PPAs[19] • Monash University and ARENA PPA to install a microgrid
Green Revolving Funds (GRFs)	• A GRF is an internal fund that provides financing to parties within an organisation to implement energy efficiency, renewable energy, and other sustainability projects that generate cost savings. These savings are re-deployed back into the GRF[20]. • This fundamental principle of GRFs can be applied on any of the other funding mechanisms used by the university or college.	• Harvard University's Green Loan Fund
Grants, Schemes and Loans from public, private or not-for-profit sector	• These are the more traditional ways of financing initiatives and climate research. • Loans from development banks in particular are an option for universities and colleges in the global south.	• Deferred Engineering-Procurement-Construction (EPC) loan obtained by Aga Khan University
Green bonds	• Green bonds are issued by governments or corporations to raise capital to finance climate-action projects[21].	• University of Tasmania to finance a new low-carbon campus • Monash University Climate Bond

FINANCING OPTION	DESCRIPTION	EXAMPLE
Endowments	• This is an option open to universities and colleges with large cumulative capital. In addition to external investments, these funds can also act as an 'internal bank' and provide financial support to climate change-related research and net zero campus initiatives. • The best performing endowment funds have a long investment horizon, with extremely innovative investment structures[22].	• Cambridge University Endowment Fund
Alumni	• This is an option for universities and colleges with well-established alumni networks that can raise funds for net zero on campus initiatives. Alumni donations can contribute to existing funds or provide seed capital for new net zero initiatives.	• The University of Queensland Australia has an alumni network that supports sustainability initiatives and research
Student fees or Campus Green Funds	• Charging small 'fees' to students to fund sustainability initiatives that are mostly student-administered. • This can be a highly engaging way to fund student-designed, and managed, net zero initiatives on campus.	• The Green Initiative Fund, University of Berkeley
Offset credits and carbon markets	• Universities can generate carbon credits through carbon-reducing activities and sell these in carbon-markets through a mediator. The funds generated are re-deployed into climate action projects on campus. • This could be a viable option for universities that own large tracts of land that sequester carbon in soil and trees[23].	• Ball State University partnered with Chevrolet's offset programme

To learn more about these financial options, see resources on page 95-96

Monitor and evaluate

Monitor, evaluate and learn from net zero initiatives

The journey to a net zero campus is a continuous cycle of improvement. This process includes both assessing the existing net zero initiatives on campus and a review of the current context. This evaluation would consider not only changes to the campus context, but external changes in net zero technology and research.

As with any other project, net zero initiatives on campus require periodic review and transparent evaluation. Regular reviews ensure that net zero initiatives adapt and leverage new developments in climate science, the regulatory environment and innovation in finance and technology. Reviewing university or college progress towards net zero will also bring in more accountability and transparency of action.

To learn more measures for monitoring and evaluation, see resources on page 96

Key considerations for net zero evaluations:

- ☐ Has the climate commitment been allocated to a specific department, school or working group and what agency do they have on decisions and reviews?
- ☐ What are the key monitoring and evaluation indicators (both financial and non-financial) and are there mechanisms for tracking this data over time?
- ☐ How often will the initiatives be reviewed and why?
- ☐ Who is engaged in data collection, analysis, decision making and communication?
- ☐ Has there been consideration for an external evaluation process to ensure a robust and unbiased review of progress?
- ☐ What consequences or processes will be put in place in the event that goals are not met or must be recalibrated?
- ☐ Will savings from implementing net zero initiatives be used in further decarbonisation initiatives?
- ☐ How will key stakeholders be engaged? How will the stakeholders be involved in co-designing these initiatives?
- ☐ How is net zero embedded in performance evaluation of senior leaders and relevant staff?

IMPLEMENTING NET ZERO ON CAMPUS

Best practices and resources to implement net zero campus initiatives

This section of the guide addresses how practical initiatives to reduce emissions can be implemented on campus, from reducing energy demand, to electrification of vehicle fleets and planning for a circular economy, among others.

In most universities or colleges, the biggest source of emissions is the consumption of fossil fuel-based energy, followed by mobility. Most of the initiatives presented in this guide address these key categories.

However, emissions arising from other sources such as facilities, waste management and procurement have also been covered. It is important to note that emissions across the whole spectrum are to be addressed to achieve a net zero campus.

This section also includes initiatives outside campus boundaries.

Campus management areas for net zero action:

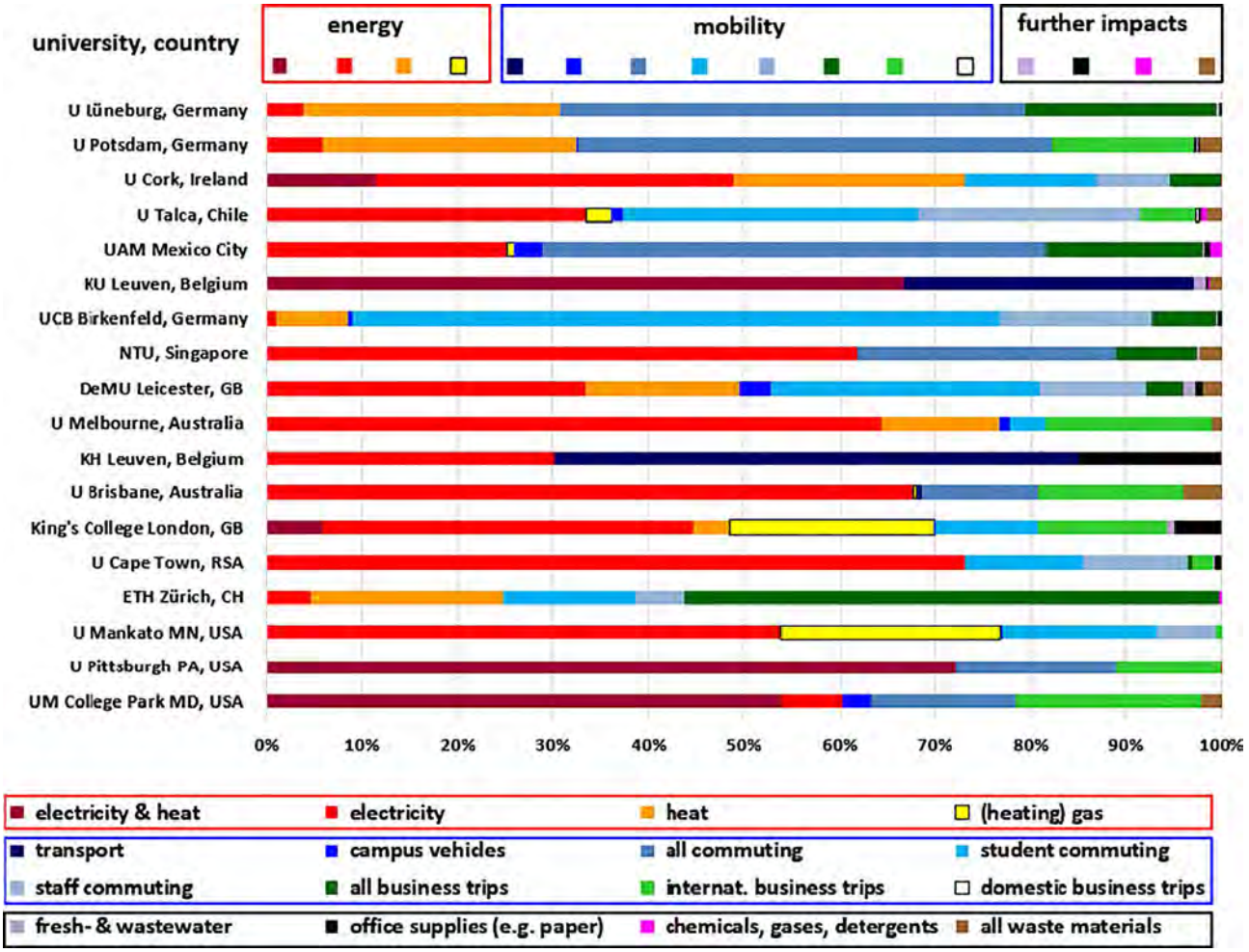


Figure 9. Distribution pattern of partial carbon emission impacts at eighteen universities: energy consumption (red/orange/yellow), mobility impacts (blue/green/white), and other impacts. Source: Helmers et al. (2021)[24]

The net zero initiatives detailed in this guide are categorised into six action areas related to campus management and operations.

The guide starts with initiatives relating to the large emission sources of energy and mobility, followed by initiatives for on campus facilities, waste and recycling and the universities value chain. A sixth category which discusses initiatives outside of the campus scope – beyond campus operations – is also included.

The initiatives discussed in this guide are illustrated by case studies from global universities and colleges.

An up-to-date library of case studies is published on the website.

As the web resource adapts, further case studies, resources, and tools will be provided for a range of audiences.

We invite you to contribute to this collaborative resource. Visit the website to submit your institution's net zero resources and initiatives.

ENERGY

1. Reduce campus energy demand

- Implementing energy conservation programs
- Driving energy efficiency
- Using energy management systems and smart appliances

2. Replace fossil fuel dependent appliances

- Replacing fossil fuels with electricity for campus (electrification)
- Transitioning away from gas
- Future proofing for alternative fuels and technologies that are currently not commercially available or scalable

3. Establish campus microgrids

- Building onsite renewable energy (campus or precinct microgrids)
- Installing battery energy storage
- Digitalisation and smart grids

4. Source renewable energy

- Implementing renewable energy purchase agreements
- Creating demand for renewable energy supply in the local grid

MOBILITY

5. Encourage sustainable commuter travel

- Implementing bike-share programs with end-of-trip facilities
- Lobbying for better public transport or active transport facilities to campus
- Building enabling infrastructure for walking and cycling within campus
- Giving incentives for sustainable travel
- Reduce the need for staff and students to travel to campus (work from home / virtual attendance where feasible)
- Charging for private vehicle usage on campus

6. Transition to a zero emissions vehicle fleet

- Transitioning own fleet vehicles to electric vehicles
- Building car-share policies and schemes
- Enabling access to renewable energy or biofuels

7. Implement sustainable business travel

- Encouraging virtual meetings/conferences
- Encouraging public modes when available
- Using airline carbon offsets as a last resort

FACILITIES

8. Replace energy intensive equipment

- Upgrading Heating, Ventilation and Air Conditioning (HVAC), lighting and other energy-consuming systems
- Replacing gas with electricity

9. Retrofit campus buildings

- Installing smart HVAC systems
- Building shared office and low footprint spaces for work and study
- Retrofitting existing building stock to increase energy efficiency

10. Construct new sustainable buildings

- Incorporating sustainable building practices and policies
- Reusing existing buildings and materials to reduce building waste
- Including green infrastructure/green spaces on campus

Figure 10. Six action areas for net zero on campus

WASTE MINIMISATION AND RECYCLING

11. Participate in a circular economy

- Reviewing waste contracts
- Encouraging behaviour change programs to support initiatives
- Assessing and replacing single use materials

12. Implement material recovery on campus

- Share schemes and networks for wasterecovery/donations
- Composting schemes

VALUE CHAIN

13. Implement sustainable procurement practices

- Providing policies and guidelines on the procurement of environmentally friendly products that are made locally, with post-consumer recycled content, recyclable, energy efficient, and bio-based products
- Influencing suppliers to reduce emissions

14. Purchase offsets

- Using verified carbon offsets or carbon credits to offset residual emissions that can't currently be abated
- Using offsets in parallel with emissions reduction initiatives without replacing opportunities for actual emissions reduction on campus

BEYOND CAMPUS OPERATION

15. Act as an amplifier of change

- Magnifying knowledge and expertise to influence change
- Acting as living labs
- Testing solutions at scale on campus and in local communities
- Convening and connecting key stakeholders

16. Engage with student bodies

- Embedding student engagement in decarbonisation initiatives
- Enabling student-led sustainability leadership groups
- Supporting student-led initiatives and innovation on campus

17. Encourage net zero aligned education, research and innovation

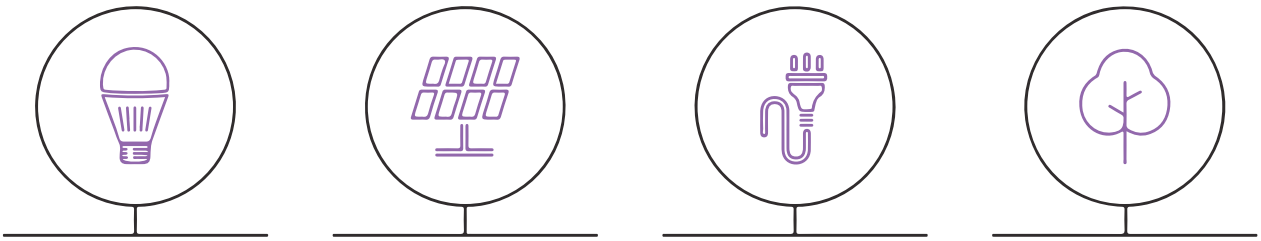
- Providing meaningful experiential learning opportunities for students
- Supporting research and innovation from staff and students in the university and external contexts

ENERGY

As universities and colleges are used for working, studying, teaching and in some cases living, they consume significant energy to power lighting, technology, appliances, hot water and water supply, and space heating or cooling. Electricity generated from fossil fuels is generally the primary source of university emissions. Emissions associated with energy can be lowered by reducing the total energy demand of the campus. Emissions from electricity generation will also be determined by the speed of the transition to renewable sources, either by the university, or the regional power providers.

Universities and colleges can contribute to accelerating their energy transition by reducing their energy demand, electrifying operations and supporting renewable energy generation. Universities can work with utility providers to install campus microgrids or host smart grid technology. For smaller institutions where a microgrid may not be possible, institutions can also ensure their power purchase plans include renewable energy.

The 4 Pillars of Decarbonisation framework recommends four different approaches to reduce carbon emissions. The first is to start with avoiding and reducing the use of energy from fossil fuels, the second approach is by shifting to renewable energy. When the grid is powered by renewable energy further electrification from non renewable fuel sources is recommended. The final pillar is to reduce non-energy emissions through carbon capture and offsets, after efforts across the other three pillars have been exhausted.



Energy waste reduction, including through energy efficiency and a shift away from energy-intensive products and services

100% renewable electricity

Electrification and a shift away from fossic fuels to zero- or near-zero emissions

Non-energy emissions reductions, offsetting, fuel switching, and others

Figure 11. 4 Pillars of Decarbonisation. Source: Climateworks Centre (2020)[25]

1. Reduce campus energy demand

Reducing energy use and improving energy efficiency of university and college campuses should be one of the early actions to implement in a net zero plan.

Reducing energy demand also covers improving energy efficiency, such as retrofitting campus infrastructure to be more energy efficient. As well as a whole suite of 'green campus' initiatives such as, sustainable transport, demand response options, or switching to less energy intensive equipment.

Whilst energy saving measures should be paired with sourcing energy from renewable sources, alone they can be a cost effective way to reduce the overall energy demand of a university.

To learn more about reducing energy demand on campus, see resources on page 97

BENEFITS:

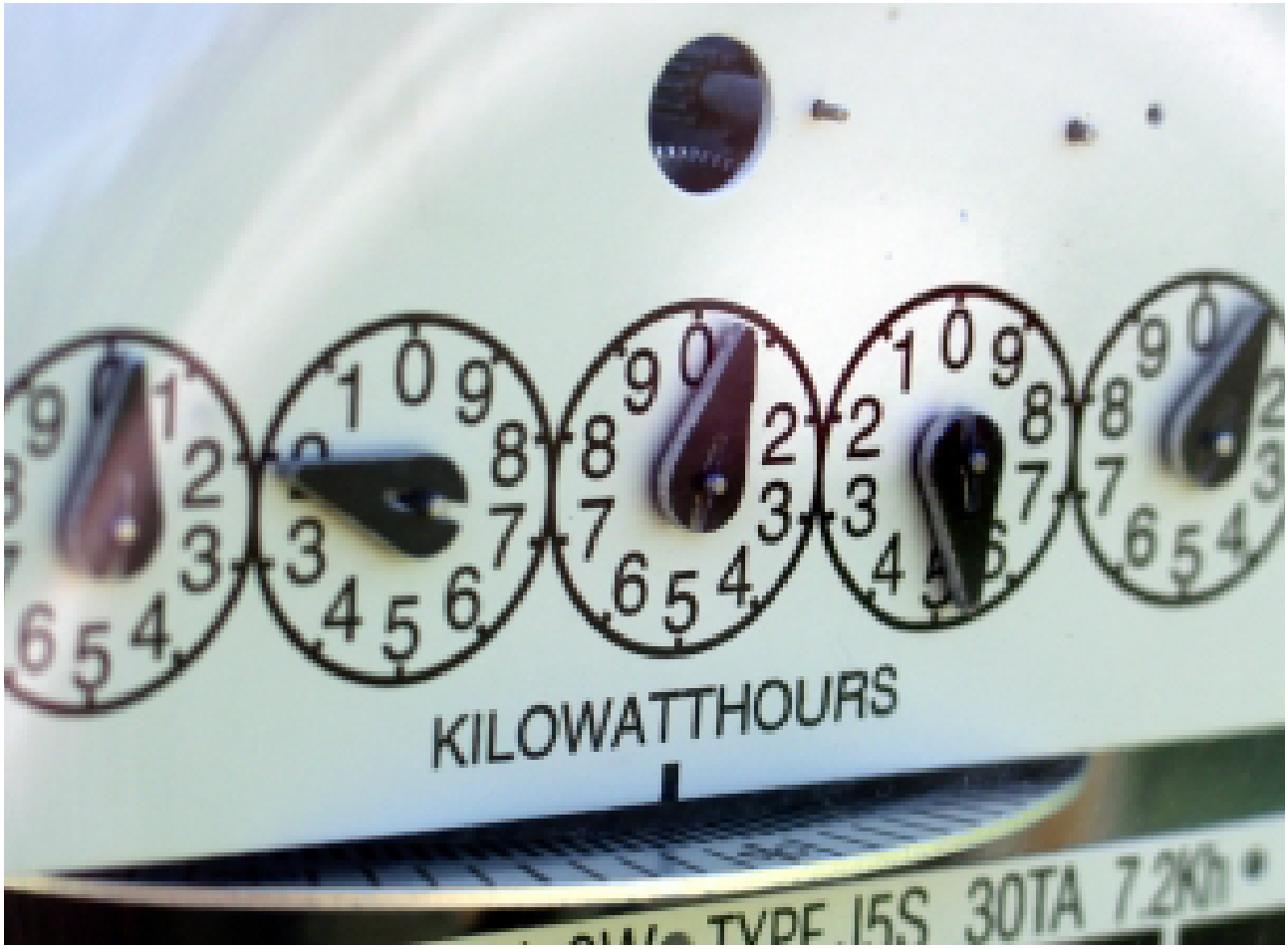
- targets key source of scope 1 and/or scope 2 emissions
- resource-conservation
- energy-security for the university or college and community
- immediate as well as long-term financial savings
- overall community benefits including cleaner air, climate change adaptation and mitigation.

CHALLENGES:

- resistance to change, both at systemic and individual level
- inability to recognise long-term financial benefits
- lack of financing for up-front costs
- non-availability of energy-efficient alternatives (especially in LMICs)
- lack of data
- skills and capacity within the university or college.

MEASURING IMPACT:

- reduced emissions (CO_2e)
- reduced energy consumption (kWh)
- cost savings (reduction in electricity and/or fuel costs)
- flattened energy consumption patterns.



How to reduce the energy consumption of a university or college:

- ☐ Switch to LED lighting, use equipment with energy efficiency ratings, minimise Heating Ventilation and Air Conditioning (HVAC) run times.
- ☐ Utilise smart and automated technological solutions to improve energy efficiency. This could include mobilising the 'Internet of Things' through power saving fixtures, metres, appliances or equipment, installing occupancy sensors or even utilising district energy sources.
- ☐ Reduce energy demand by encouraging behaviour change (turning off lights when not in use, avoiding overuse of heating and cooling, shutting down computers).
- ☐ Use energy management systems to manage demand.
- ☐ Install demand response programs and coupling of solutions such as renewable energy programs and electric vehicle recharging.
- ☐ Involve students and staff to implement energy saving initiatives and campaigns (campaigns can be run between floors of a building, academics can bring their expertise into facilities data analysis, etc).
- ☐ Explore innovative solutions such as altering the academic calendar, as adjusting semester dates to fit working days with milder seasons could reduce energy requirements. Similarly, reducing the number of operational days for campus facilities could improve energy use and efficiency.

2. Replace fossil fuel dependent appliances

Appliances that currently use fossil fuels (such as natural gas in developed regions, or diesel used in the global south) emit large quantities of scope 1 emissions.

To reduce these emissions and safeguard against higher energy costs in the future, universities and colleges will need to transition to low-carbon sources of energy and electrify their heating and lighting appliances.

Although the electrification of equipment will incur replacement costs, these can be counterbalanced by lower operating costs; especially if renewable energy is used. For example, not transitioning out of natural gas would mean that the university or college would have to purchase offsets to get to net zero, which will come at a cost.

To learn more about heat pumps and replacing on campus fossil fuel infrastructure, see resources on page 98

BENEFITS:

- targets key source of scope 1 and/or 2 emissions
- resource-conservation
- building energy-security for the university or college and community
- immediate as well as long-term financial savings
- overall community benefits including cleaner air, climate change adaptation and mitigation.

CHALLENGES:

- lack of alternatives to fossil fuels (especially in LMICs)
- ensuring reliable supply chains of new fuels or equipment
- resistance to change, both at systemic and individual levels
- inability to recognise long-term financial benefits
- lack of financing for up-front costs
- lack of data
- skills and capacity within the university or college.

MEASURING IMPACT:

- reduced emissions (CO_2e)
- reduced energy consumption (kWh)
- cost savings (reduction in electricity and/or fuel costs)
- return on initial investment (reduced energy costs)
- reduced emissions intensity of energy sources.

How to transition away from fossil fuels:

- ☐ Implement energy reduction initiatives first to reduce the scale of the transition required.
- ☐ Use heat pumps instead of natural gas.
- ☐ Ensure that the electricity used is sourced from renewable energy.
- ☐ Where renewable energy is not viable, consider fuel switching to less carbon-intensive fossil fuels. Biogas from campus organic waste can be an affordable source of energy for many parts of the world.
- ☐ Hydrogen may also be a viable fuel source. If making the switch to hydrogen, it's important to ensure adequate supplies of 'green' hydrogen (produced with renewable energy).

3. Establish campus (or precinct) microgrids

Establishing a microgrid is an option for sourcing renewable energy if renewable sources are not already available in the local energy grid.

A microgrid is an energy system that serves a specific geographical footprint, such as a university or college campus. A microgrid may be partnered with surrounding land uses to provide benefits to the wider community.

Typically, a microgrid consists of renewable energy generation (such as solar, wind or geothermal), energy storage and a smart grid. The smart grid controls when and how the energy is used across the campus. Often, it is paired with load management, ensuring that energy intensive appliances and equipment are only used when the grid is generating electricity.

To learn more about this microgrids, see resources on page 98

BENEFITS:

- targets key source of scope 1 and/or 2 emissions
- puts the energy user in control of energy affordability, reliability and sustainability
- resource-conservation
- building energy-security for the university or college and community
- immediate as well as long-term financial savings
- exploring new revenue streams
- meet regulatory obligations
- forecasting and managing energy demand
- engage with staff and students
- share learnings with the wider community
- overall community benefits including cleaner air, climate change adaptation and mitigation
- skill development and creating jobs in the community.

CHALLENGES:

- lack of financing for up-front costs
- skills and capacity of the local workforce to establish renewable energy technology
- replacing existing infrastructure on campus
- space constraints on campus
- regulatory and legal environment
- lack of high level buy-in
- local energy grid capacity limitations.

MEASURING IMPACT:

- reduced emissions (CO_2e)
- reduced energy consumption (kWh)
- cost savings (reduction in electricity and/or fuel costs)
- return on initial investment (reduced energy costs)
- increased revenue (from selling energy to the grid)
- Increased stability in energy supply.

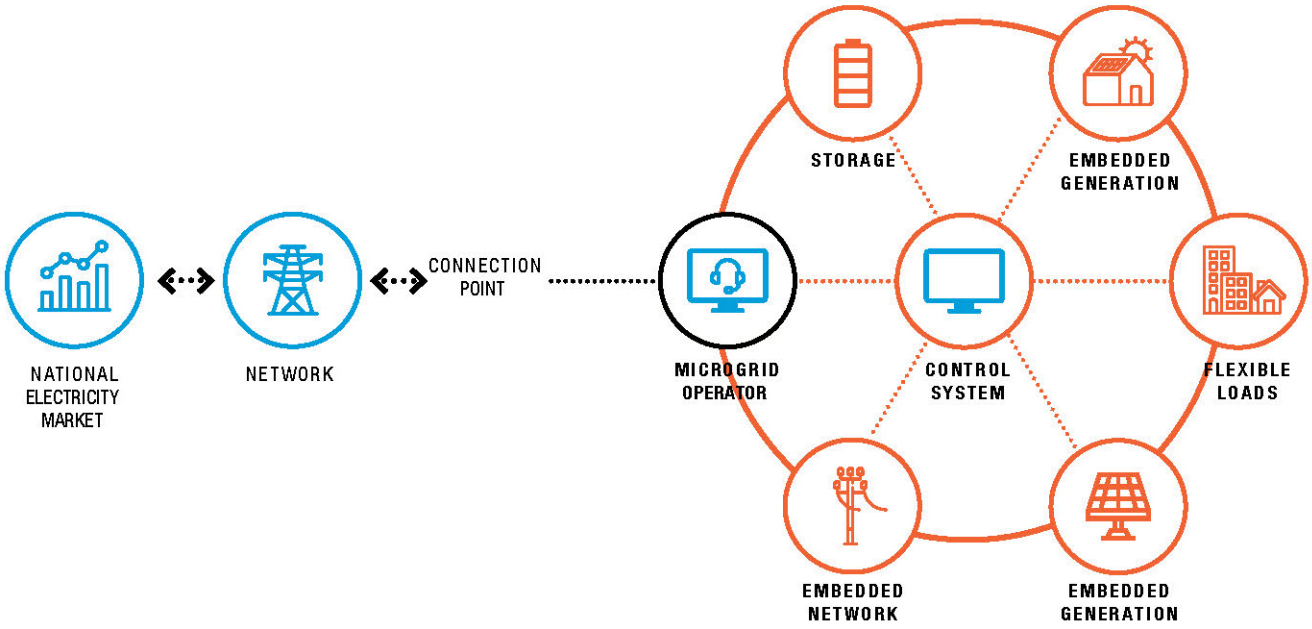


Figure 12. Components of a microgrid system. Source: Monash University (2019)[26]

A microgrid is a complex system which involves many parties: the energy consumers (such as a university), operators and managers of both the microgrid and local electricity network, and energy retailers. All of these parties will play some role in the set up and operation of a microgrid.

Once operational, it is important to balance the dependency on the main grid and ensure costs are minimised by effectively mobilising the interactions between the microgrid and main grid. A 'smart grid' will use two way communication between these two systems to optimise and respond quickly to changing costs, energy production, and demand.

What to consider in establishing a microgrid:

Adapted with some modifications from Monash University (2019)[27]

- ☐ What regulatory, market or other barriers and opportunities exist?
- ☐ Are there other economic, social or environmental benefits of the microgrid?
- ☐ Who are the important partners and stakeholders for the success of the microgrid?
- ☐ What arrangements (including contractual) with partners including retailers and networks can be made to enable the delivery of benefits?
- ☐ What safety issues need to be considered? This includes cybersecurity features.
- ☐ What infrastructure is required on campus and at the individual building level to establish a microgrid?

4. Source renewable energy

Transitioning to renewable energy can reduce scope 1 and 2 emissions substantially. Coupled with energy conservation programs, renewable energy presents substantial financial benefits and is one of the most impactful initiatives towards net zero.

At the same time, renewable energy does involve high upfront costs that are difficult to finance for most universities and colleges. Fortunately, with greater integration of renewable energy into national grids, many universities and colleges can explore new ways to procure renewable energy.

To learn more about this renewable energy and PPAs, see resources on page 98

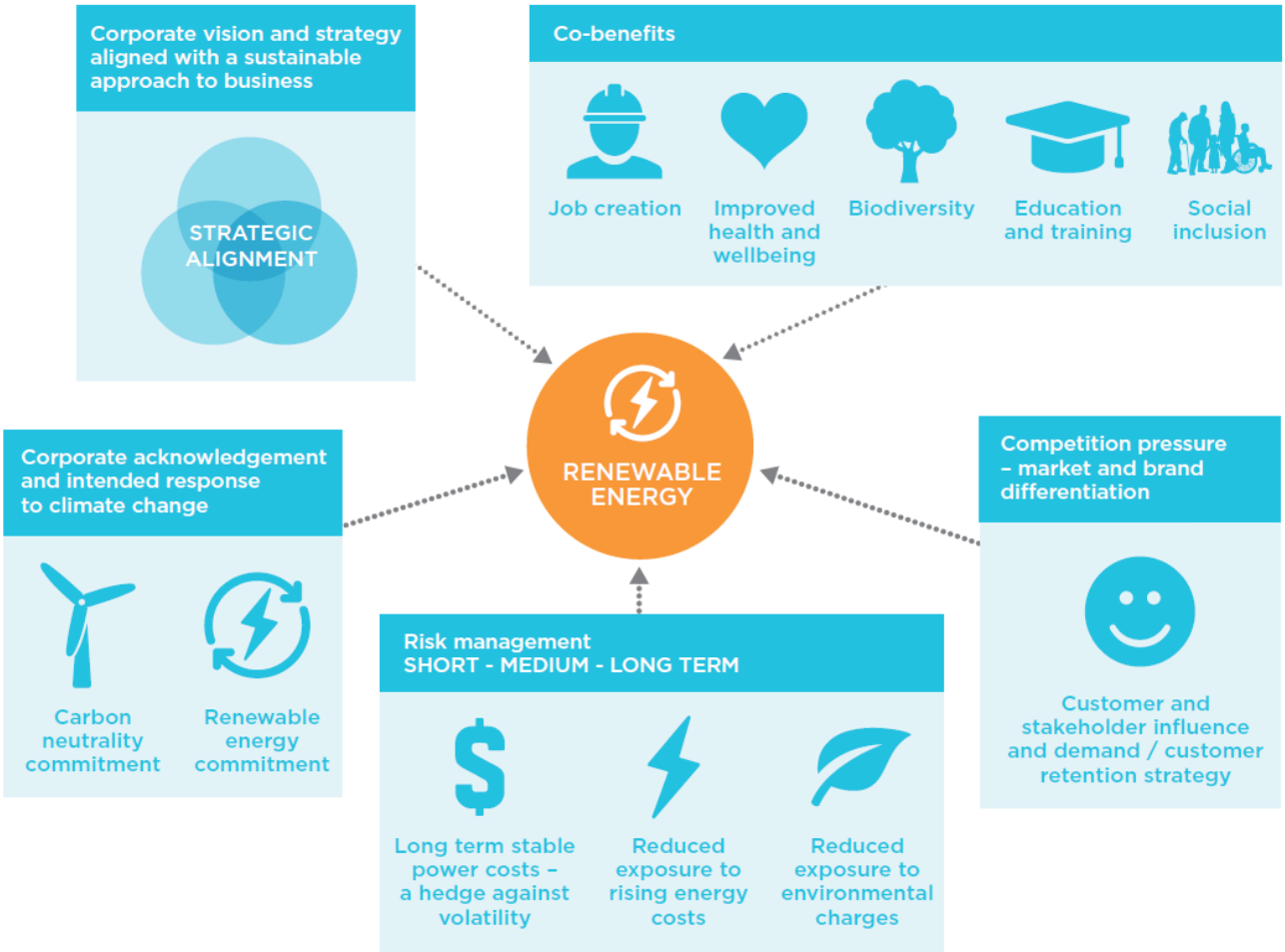


Figure 13. A visual summary of the drivers of renewable energy. Source: MREP (n.d)[28]

Opportunities for transitioning to renewable energy:

- ☐ Purchase a green electricity plan (or similar) through an energy retailer. It is to be noted that not all green retailers are equal. Some retailers purchase offsets or certificates while others directly produce green electricity.
- ☐ Consider options such as a Power Purchase Agreement (PPA). This is a third-party owned and operated source of renewable energy (e.g. an offsite solar farm), with whom the institution signs a long-term contract. Universities can also partner with other universities or local governments to establish a PPA, providing more substantial opportunities for investment.
- ☐ Install renewable energy infrastructure on campus (e.g. rooftop solar panels, biomass units). Look at innovative financing methods which will help to provide crucial funding for such projects.

WHAT ENERGY SOURCES ARE 'RENEWABLE'?

SOLAR ENERGY

Sunlight is converted into energy through solar photovoltaics

WIND POWER

Onshore wind, and increasingly offshore wind turbines, convert the dynamic power of wind into energy

HYDROELECTRICITY

One of the oldest renewable energy technologies that harnesses the energy in water-flow

GEOTHERMAL ENERGY

Energy harnessed from the heat in the crust of the earth

BIOMASS

A broad range of energy sourced from organic material (biomass) and includes biofuels, solid bioenergy and biogas. Organic material is either harvested or sourced as a by-product for use as fuel (e.g. waste to energy)

Figure 14. Types of renewable energy generation

BENEFITS:

- targets key source of scope 2 emissions
- builds energy-security for the university or college and community
- immediate as well as long-term financial savings
- engage with staff and students
- share learnings with the communities
- overall community benefits including cleaner air, climate change adaptation and mitigation
- contribute to a market for renewable energy.

CHALLENGES:

- lack of financing for up-front costs
- skills and capacity within the university or college
- regulatory and legal environment
- lack of high level buy-in.

MEASURING IMPACT:

- reduced emissions (CO2e)
- reduced energy consumption (kWh)
- cost savings (reduction in electricity and/or fuel costs)
- Increased stability in energy supply.


ECO BUS

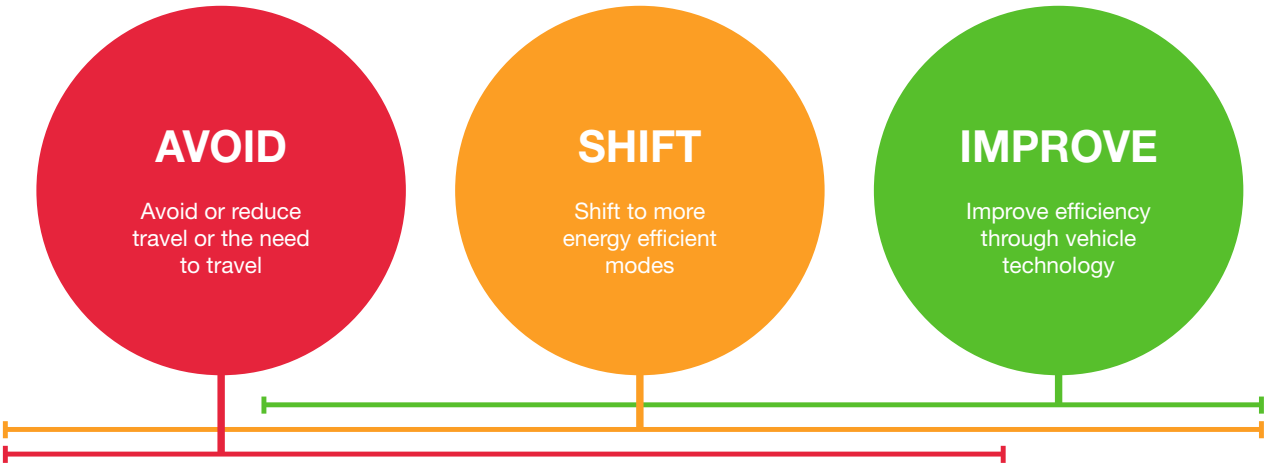
MOBILITY

As most modern means of transportation rely on fossil fuels, addressing modes of travel to and from campus will be critical in reaching net zero emissions.

Emissions related to mobility and transport can be scope 1 (for university-owned vehicles) or scope 3 (for all other forms of transport).

Implementing sustainable transport behaviours in students may have the benefit of following them through life. This could lead to emissions reduction long after they graduate.

Just as in reducing emissions from energy, the 'Avoid-Shift-Improve' framework is a useful way of identifying opportunities to reduce emissions associated with mobility and transport.The following initiatives follow the framework by first avoiding the need to use fossil fuel based transport, then shifting to more energy efficient modes followed by improving current modes of transport.



PLANNING	REGULATORY	ECONOMIC	INFORMATION	INVESTMENT
House students on campus, provide public transport and active transport options.	Schedule online classes and seminars, change parking policies and incentives, change business travel policies and reduce the need for academics to travel.	Use financial incentives (parking fees, staff subsidies, etc) to reduce reliance on private vehicles, use financial incentives to encourage options like walking, cycling or mass public transport.	Promote net zero mobility options through student and staff campaigns, marketing schemes or co-operative agreements.	Improve university fleet vehicle efficiency by transitioning to electric vehicles (which are powered by renewable energy), provide charging bays for staff and student vehicles.

Figure 15. The Avoid-Shift-Improve framework[29]

5. Encourage sustainable commuter travel

Sustainable travel modes to and from the university or college campus should be prioritised to reduce reliance on private vehicles. Whilst the trend is towards an electric vehicle future, reducing the need for private vehicles on campus will also help to reduce mobility-related emissions. Apart from emissions reduction, sustainable transport modes also provide the benefit of reducing congestion, air pollution and road safety hazards within and beyond the campus.

While walking and cycling can be encouraged by providing simple, safe and enjoyable infrastructure within the campus, sustainable commuter travel also requires integrating campus accessibility with external public transport services.

To learn more about this sustainable commuter travel for campuses and cycling programs, see resources on page 99

BENEFITS:

- targets scope 3 emissions
- engage with staff and students
- share learnings with the communities
- overall community benefits including cleaner air, health and well-being.

CHALLENGES:

- finding alternative, safe and sustainable modes of transportation
- difficulty in measuring emissions
- trade-offs with time and opportunities
- existing infrastructure on campus and provision of new infrastructure
- resistance to change, both at systemic and individual level
- lack of policy and institutional support
- provision of new transport modes by city municipalities or local governing body.

MEASURING IMPACT:

- reduced emissions (CO_2e)
- changed travel patterns (mode share increased to active transport and public transport)
- less parking spaces required
- decreased congestion and improved safety.

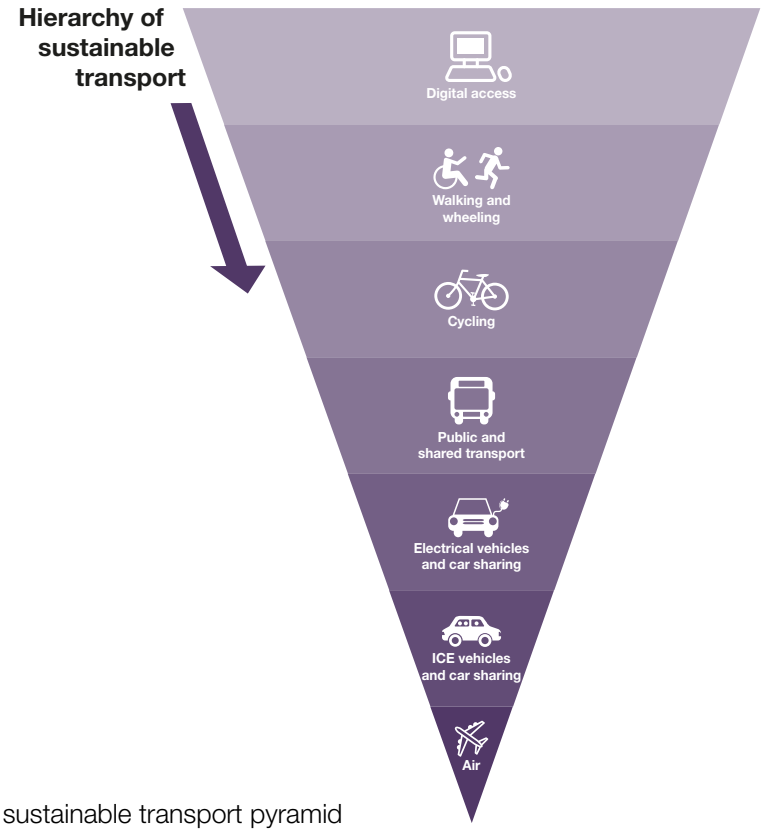


Figure 16. The sustainable transport pyramid

How to switch to sustainable transport:

- ☐ Reduce the need for staff and students to travel to campus:
  - ○ Allow flexibility in class schedules to reduce the number of days when classes are held.
  - ○ Facilitate high quality virtual learning opportunities.
  - ○ Consider changing start times to reduce travel during peak hours.
- ☐ Facilitate high quality public transport options:
  - ○ Work with transport providers to provide fast and regular public transport options to campus.
  - ○ Subsidise staff and student transport fares or negotiate student rates with transport operators if they do not currently exist.
  - ○ Ensure security and infrastructure to facilitate safe and easy access to public transport stops.
  - ○ Introduce an electric campus shuttle for larger campuses.
  - ○ Encourage a low or zero emission campus by reducing high-emissions vehicle access (including servicing and delivery vehicles).
  - ○ Improve walking and cycling infrastructure across the campus.
- ☐ Create a mix of separated walking and cycling paths to allow safe and efficient journeys across campus:
  - ○ Provide secure bike parking and end-of-trip facilities in each new building, and current buildings, where possible.
  - ○ Implement bike share programs on campus.
  - ○ Host bike maintenance and cycle learning workshops and tools to encourage cycling to campus.
  - ○ Encourage car sharing/pooling by facilitating these connections or by giving financial incentives (reduced parking fees).

6. Transition to a zero emissions vehicle fleet

Shifting to fossil fuel alternatives is the second stage of reducing mobility-related emissions. Universities and colleges that have transitioned to renewable energy are in the best position to replace fossil fuel cars with zero emissions vehicle (ZEVs).

ZEVs include vehicles that use electricity, hydrogen or biofuels across a range of options from two-wheelers, light passenger vehicles and increasingly, to larger vehicles like buses and trucks.

Depending on the region, universities and individuals may have access to a wide range of electric (or zero emission) vehicles. In many parts of the world, access to a variety of vehicle types is limited. Universities can work with suppliers and governments to increase the supply of a range of electric vehicles that meet the regions' and universities' needs.

While transitioning a university or college fleet to ZEVs can have high upfront costs, these are often recouped through low maintenance and general running costs. At the same time, it is critical to consider other impacts of ZEVs including downstream battery-disposal and the lifecycle carbon footprint of these vehicles.

To learn more about transitioning to zero emission vehicles, see resources on page 99

BENEFITS:

- targets scope 1 emissions
- resource-conservation
- financial savings
- engage with staff and students
- provide facilities for staff and students
- overall community benefits including cleaner air, health and well-being.

CHALLENGES:

- lack of financing for up-front costs and writing off current assets
- electricity from non-renewable sources
- provision of charging infrastructure on campus
- access to affordable alternatives.

MEASURING IMPACT:

- reduced emissions (CO_2e)
- cost savings (reduction in fuel costs)
- improved local air quality and reduced noise.

Prepare your campus for an electric vehicle fleet:

Adapted with modifications from US DoE (n.d)[30]

- ☐ Evaluate the need for a dedicated vehicle fleet – including assessing its current and future driving requirements.
- ☐ Explore existing regulations and policies, including any incentives available for electric vehicles in your region.
- ☐ Determine which vehicles are suitable for specific needs (e.g. driving distances, size of vehicle).
- ☐ Identify and negotiate with vehicle providers and understand charging and maintenance needs.
- ☐ Ensure the chosen vehicle fits into constraints such as cost, time for delivery, local servicing, power requirements, etc. (vehicles can be procured over time to reduce initial investment needs).
- ☐ Ensure charging infrastructure is adequate within campus. Consider if renewable energy can be installed on campus to power charging infrastructure.
- ☐ Decide on the charging process and understand infrastructure and policy requirements (if applicable).
- ☐ Understand connection implications with the grid and work with the power supplier to mitigate constraints and provide necessary upgrades.
- ☐ Decide on if (and how) you will meter energy usage and recoup costs if the chargers are available to all.
- ☐ Establish an electric vehicle transition plan which details the logistics of the vehicles and charger.
- ☐ Update policies, maintenance and training plans to ensure they are suitable for the new vehicle(s).
- ☐ Promote sustainable transport and EV ownership to university staff through staff finance packaging (novated leases, salary sacrificing, etc).

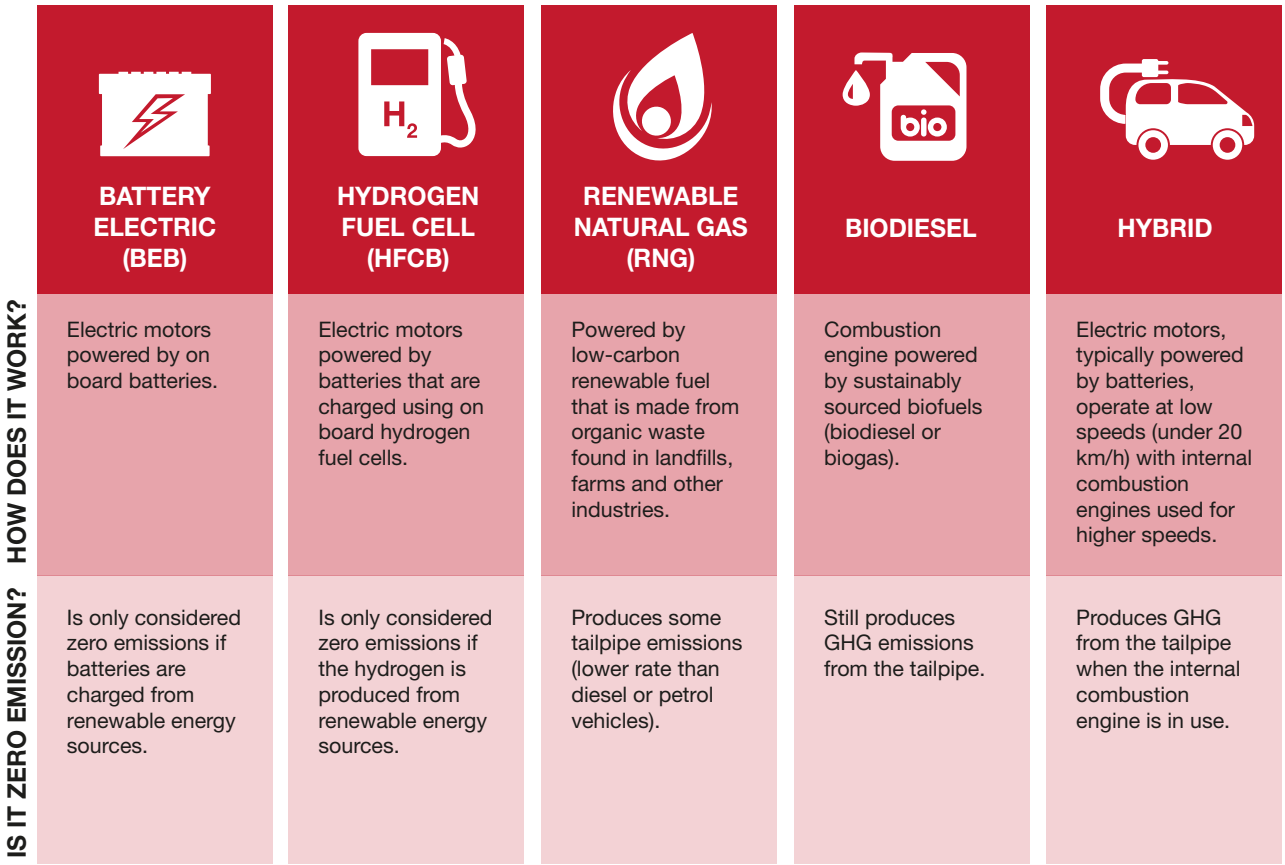


Figure 17. An overview of different types of zero (or low) emission vehicles

7. Implement sustainable business travel

For university or college-related air-travel, using carbon credits to offset carbon emissions is not enough. Airlines often include the option to purchase offsets for flights, however the transparency of these offsets is often difficult to trace. Instead of relying on offsets, universities and colleges will need to build sustainable business travel policies in conjunction with academic staff.

At its simplest, these policies should follow the hierarchy of sustainable transport modes, i.e. avoiding business travel where possible, shifting to alternative, low-emissions, safe and affordable forms of transport or improving the carbon footprint per activity ratio. This may require discussions with staff and faculty around travel requirements and expectations. Promotion pathways should not be reliant on emissions-intensive travel, and policies on conference travel should be updated to reflect a net zero focused travel policy.

To learn more about implementing sustainable business travel, see resources on page 99

BENEFITS:

- targets scope 3 emissions
- resource-conservation
- financial savings
- overall community benefits including cleaner air, health and well-being
- avoided travel for the individual.

CHALLENGES:

- finding alternative, safe and sustainable modes of transportation
- difficulty in measuring emissions
- trade-offs with time and opportunities
- resistance to change, both at systemic and individual level
- academic performance is often heavily reliant on attendance at conferences and academic events.

MEASURING IMPACT:

- reduced emissions (CO_2e)
- cost savings (reduction in travel costs)
- reduced staff business travel (total km)
- decreased emission intensity of business travel (CO_2e/km).

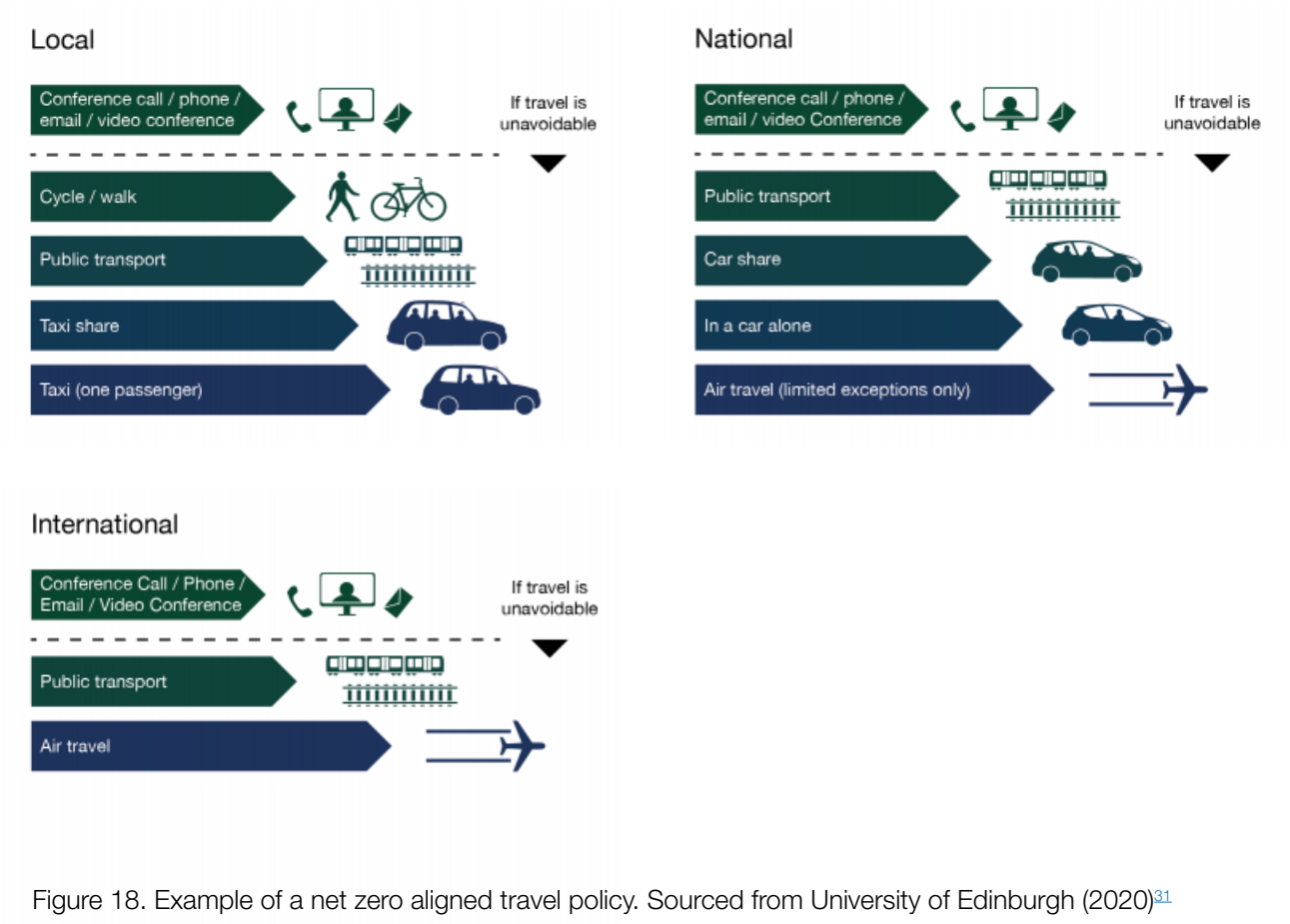


Figure 18. Example of a net zero aligned travel policy. Sourced from University of Edinburgh (2020)[31]

What to consider in a sustainability focused travel policy:

- ☐ Provide resources and tools to encourage virtual collaboration and reduce the need to travel.
- ☐ Quantify carbon emissions associated with each travel option for easier comparison with low carbon travel.
- ☐ Discourage short trips (one and two day trips) and trips with more than the necessary number of attendees.
- ☐ Encourage lower carbon emissions choices for travel deemed essential:
  - ○ Use trains where available instead of flying.
  - ○ If flying is necessary, elect to fly on newer aircraft and direct flights if possible.
  - ○ Prefer economy class travel over business class travel.
  - ○ Use public transport instead of rental vehicles or taxis once at the destination.
  - ○ If you need to hire a vehicle, opt for an electric vehicle where possible.
- ☐ Offsets to be purchased as the final option, once all other measures have been considered.

FACILITIES

Universities and colleges typically own and manage large stocks of buildings and facilities. These include buildings and infrastructure for working, education, laboratories, residential buildings, and recreational buildings including theatres and sports complexes.

Building stocks are significant sources of carbon emissions because of the energy they consume, and the use of materials with a high carbon footprint. Facility operations also generate waste that releases emissions in landfills.

This section covers emissions reduction initiatives that play a critical role in achieving net zero buildings and facilities. The emissions reduction comes from reducing the energy demand of the building as well as reducing the emissions associated with building materials and waste.

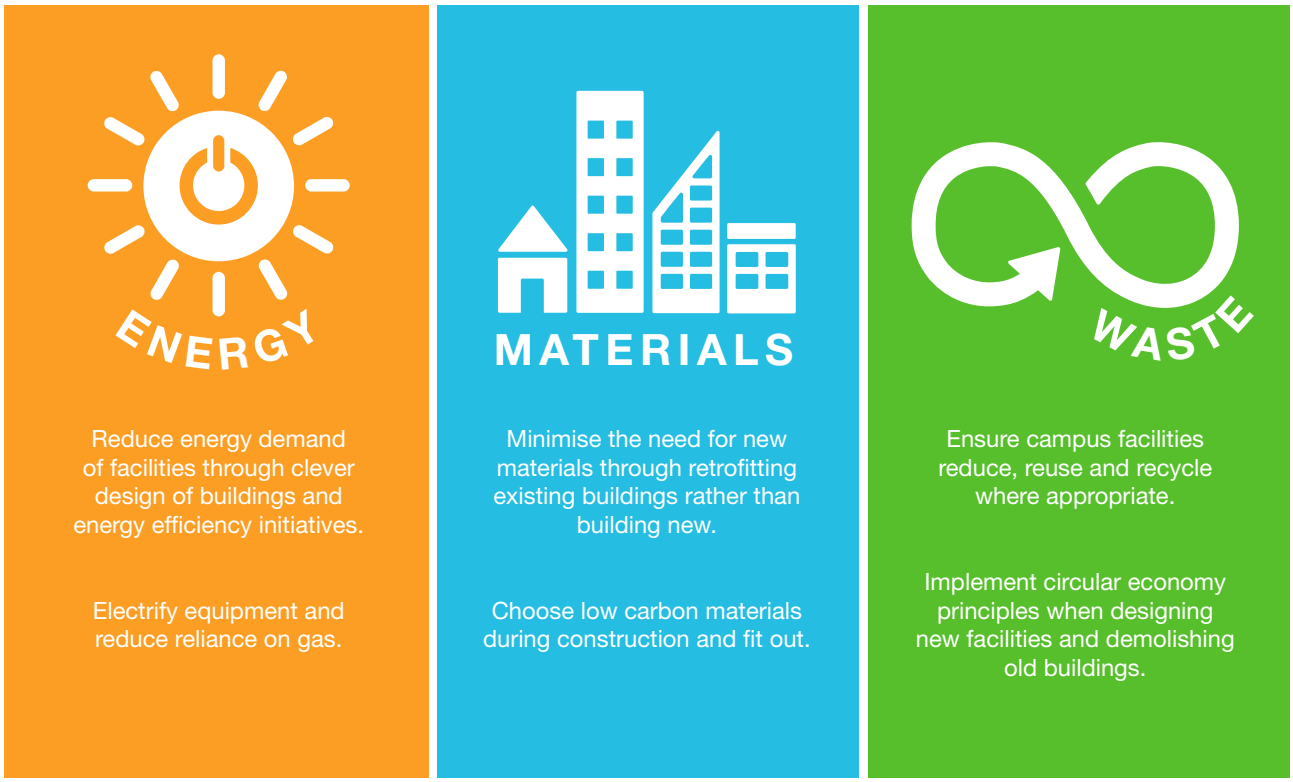


Figure 19. Opportunities for decreasing emissions associated with campus facilities

8. Replace carbon and energy intensive equipment

Universities and colleges can reduce their energy demand immediately by replacing energy intensive equipment with more efficient options.

This includes upgrading heating, ventilating and air-conditioner (HVAC) systems and lighting, as well as computing and laboratory equipment. The scale of these opportunities depends on the types of equipment/facilities present on campus. This initiative also includes keeping equipment and appliances well maintained to avoid energy loss in the system.

To learn more about this initiative, see resources on page 100

BENEFITS:

- targets scope 1 and 2 emissions
- resource-conservation
- building energy-security for the university or college and community
- financial savings
- engage with staff and students
- share learnings with the communities
- overall community benefits including cleaner air, health and well-being.

CHALLENGES:

- finding accessible alternatives
- lack of financing for up-front costs
- integrating with existing infrastructure on campus
- lack of data
- skills and capacity within the university or college.

MEASURING IMPACT:

- reduced emissions (CO_2e)
- reduced energy consumption (kWh)
- cost savings (reduction in electricity and/or fuel costs)
- return on initial investment (reduced energy costs)
- increased comfort (natural lighting, ventilation, temperature regulation).

> *In LMICs [Low and Middle Income Countries], the availability, access, and affordability of cleaner and more efficient technology continues to be limited. For example, the better refrigerant gas for air conditioning called R32 is not widely available in Pakistan. This means we have been intensively working with suppliers to pave the way.*
>
> **– Miriam Kugele, Global Senior Manager, Environment and Sustainability, Aga Khan University, Pakistan**

How to reduce energy demand by replacing emissions intensive equipment:

- ☐ Upgrade HVAC systems:
  - Replace older HVAC systems with more energy efficient systems.
  - Remove gas heating and replace it with electric or passive heating solutions.
  - Install smart technologies capable of detecting and predicting occupancy, in turn managing energy needs.
  - Create policies that minimise HVAC use, whilst still allowing productive campus operations.
  - Include use of thermal insulation in building systems to minimise HVAC use.
- ☐ Replace existing lighting with energy efficient alternatives:
  - Design of fenestration / windows in buildings to allow maximum use of natural daylight without glare.
  - Change incandescent light bulbs to more energy efficient LEDs.
  - Install motion sensored lighting and create policies ensuring lights are turned off when buildings are not in use.
- ☐ Procure energy efficient equipment and appliances:
  - When upgrading equipment, ensure the most energy efficient options are chosen, where possible.
  - Explore options for sharing equipment before purchasing additional equipment.

9. Retrofit campus buildings

Retrofitting in the context of net zero involves upgrades or improvements to the building to reduce its emissions profile.

Usually this focuses on improving the energy performance of the building. By reducing stress on the electricity network, offering bill savings, supporting a least-cost pathway to a zero carbon campus, and improving the comfort for staff and students, improved energy performance can present a win-win opportunity for the university.

While retrofitting can be completed as a stand-alone project, it can also be combined with a wider repurposing of the existing building. Existing buildings can be adapted to enhance their relevance to the modern work environment whilst also contributing to net zero targets. There may also be opportunities to share facilities or repurpose existing facilities to benefit the wider community.

Often simple and relatively cheap alterations to a building can deliver large energy savings which contribute to a campuses' net zero transition. With the recent rise of virtual working and learning, there may be opportunities for a wider repurpose and retrofit program which is a sustainable way for campuses to adapt old buildings to new needs and purposes.

To learn more about what to consider for retrofitting projects, see resources on page 100

BENEFITS:

- targets scope 1, 2 and/or 3 emissions
- resource-conservation
- building climate-change resilience for the university or college and community
- increased comfort of the campus facilities through improved heating, cooling, ventilation and/or lighting
- engage with staff and students
- share learnings with the communities
- skill development and creating jobs in the community.

CHALLENGES:

- difficulty in measuring emissions
- building may need to be unoccupied to retrofit
- financing for up-front costs
- existing infrastructure on campus
- finding accessible alternatives for construction material and technology
- resistance to change, both at systemic and individual level
- skills and capacity within the university or college.

MEASURING IMPACT:

- reduced emissions (CO_2e)
- reduced energy consumption (kWh)
- cost savings (reduction in electricity and/or fuel costs)
- return on initial investment (reduced energy costs)
- increased comfort (natural lighting, ventilation, temperature regulation).

Examples of retrofitting campus buildings to enhance their net zero potential:

- ☐ Reduce the energy demand for heating and cooling the building by adding insulation, or double glazed windows or by providing appropriate shading.
- ☐ Upgrade heating, cooling and lighting appliances to be more energy efficient.
- ☐ Investigate potential savings by using natural lighting via skylights or other measures in classrooms and work-spaces.
- ☐ Repurpose the space from standalone offices into open plan, flexible work environments. This allows more adaptable use, as well as decreasing the energy needs of the space.
- ☐ Integrate renewable energy systems into the building. Examples include installing rooftop solar panels that are connected either to a battery storage system or feed back into the electricity grid.

10. Construct new sustainable buildings

Before beginning a new construction project, options to repurpose or retrofit existing buildings should be explored. Repurposing or utilising joint facilities reduces the demand for building materials with high carbon intensity. There may also be opportunities to share facilities or co-build facilities to benefit the wider community.

If a new construction is unavoidable, universities and colleges can apply principles of sustainability to align with net zero goals and university operations. Using reputable green building certification programs and design standards is highly recommended for long term financial savings and enhanced resilience to climate change.

Some considerations for new construction can be:

EMBEDDING ENERGY-EFFICIENCY THROUGH PASSIVE DESIGNING

When constructing new campus buildings, universities and colleges should strive to incorporate passive design principles to create facilities which result in a very low energy demand. Passive design buildings achieve exceptional energy efficiency and superior thermal comfort. It is generally considered the most rigorous voluntary, energy and thermal-standard based standard in the design and construction industry today, resulting in buildings that consume 90% less heating and cooling energy than conventional buildings. Applicable to almost any building type or design, the Passive House (Passivhaus) high performance building standard is internationally recognised, science-based and proven[32].

CONSCIOUSLY CHOOSING LOW CARBON MATERIALS

Conventional building materials such as steel and concrete have a very high carbon footprint. This embodied carbon consists of all the emissions associated with the life-cycle of the building construction material; from emissions at the point of extraction, manufacture, transportation, installation on site, as well as operational and end-of-life emissions.

Decreasing the embodied carbon emissions can be achieved through sourcing local materials, using recycled materials (example: rebar with recycled steel content), opting for sustainable timber buildings or using alternative, low-carbon building products (e.g. concrete with fly ash).

The use of low embodied-carbon materials needs skilled professionals and workers. Thus, skill development activities may also be promoted through universities.

ENSURING GREEN LANDSCAPING IS A KEY DESIGN FEATURE

When considering a new build on campus, incorporate aspects of the surrounding, and climate-suitable landscape. Ensuring that native flora (forests, shrubs and grasslands) as well as geographical features (catchment areas and seasonal streams) are preserved and actively incorporated, protects biodiversity and enhances natural carbon sinks on the campus.

Incorporating urban greenery (e.g. green walls/roof) can also help improve building performance, driving down energy demand. Another benefit is reducing the heat island effect on campus.

Incorporating these elements can also create opportunities to engage with research and local communities.

To learn more about passive house design see resources on page 100

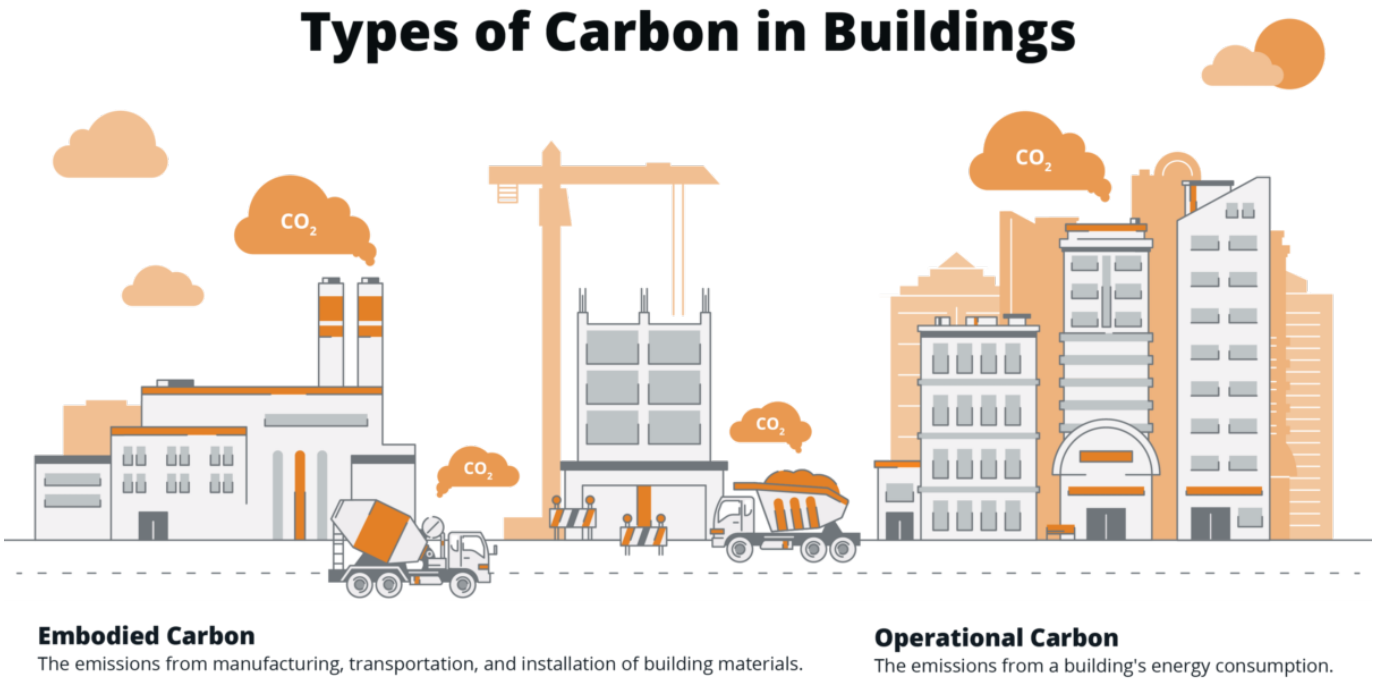


Figure 20. Types of carbon in buildings. Source: Carbon Cure (n.d.)[33]

BENEFITS:

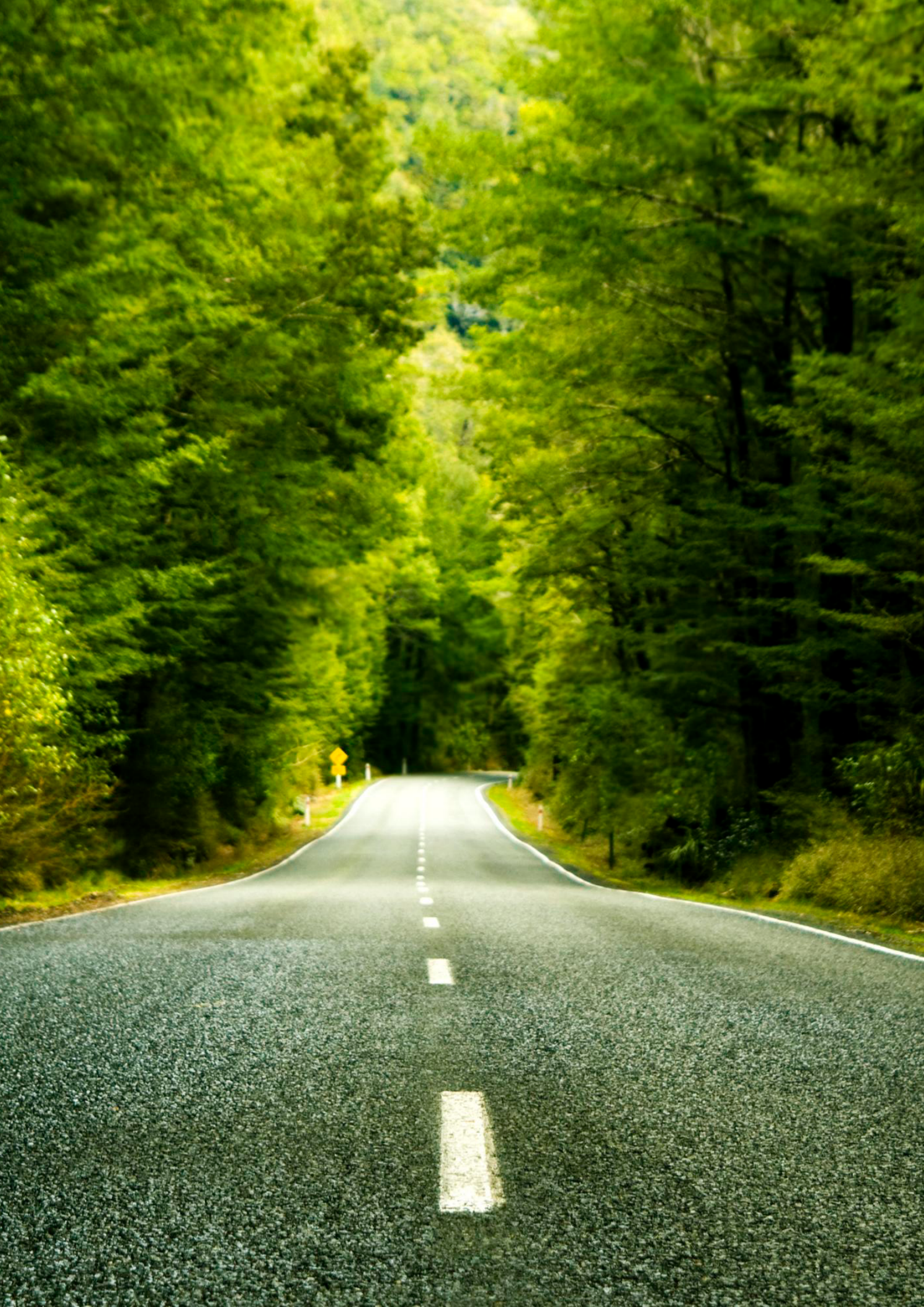
- targets scope 1, 2 and 3 emissions
- resource-conservation
- building climate-change resilience for the university or college and community
- engage with staff and students
- share learnings with the communities, increased engagement
- skill development and creating jobs in the community.

CHALLENGES:

- difficulty in measuring emissions
- financing for up-front costs
- existing infrastructure on campus
- finding accessible alternatives for construction material and technology
- resistance to change, both at systemic and individual level
- skills and capacity within the university or college
- skills and capacity from the local workforce to construct facilities with new materials.

MEASURING IMPACT:

- reduced emissions (CO2e)
- reduced energy consumption (kWh)
- increased comfort (natural lighting, ventilation, temperature regulation)
- reduced emissions intensity of building materials.



WASTE MINIMISATION AND RECYCLING

Waste is generated at a university or college when a material or output offers no further use to the generator. It is crucial to note that material defined as waste by one sector is often a crucial input to another. The waste that finally gets sent to landfill or incineration as well as into other uses is responsible for campus-related scope 3 emissions.

Reducing emissions from waste can be difficult to control, however it can be substantially reduced by following the waste hierarchy of avoiding products and processes that generate waste, reducing the amount of material wasted, and by reusing and recycling materials within campus operations.

As carbon capture and waste-to-energy options are not currently scalable in most parts of the world, the onus still lies with waste-generators to reduce the amount of waste material they produce.

Figure 21. Waste hierarchy seeks to reduce, reuse and recycle materials before sending them to landfill or incineration

HOW WASTE GENERATES SCOPE 3 EMISSIONS

Emissions from landfills:

The process of anaerobic decomposition at landfills produces methane and carbon dioxide which are potent greenhouse gases. Over a hundred year horizon, methane has 25 times greater global warming potential than carbon dioxide. Reducing waste emissions can start with universities and colleges separating organic waste from other materials and diverting this to compost pits.

Emissions from incineration:

Legal incinerators as well as illegal waste burning generates heat and toxic fumes. Not only are greenhouse gases generated during the process of incineration, in many parts of the world it adds to air-pollution and reduces the quality of human life.

11. Plan for a circular economy

The circular economy concept advocates a change from the currently linear processes of an economy where materials are extracted, used to make products and eventually discarded as waste.

In a circular economy, there is an emphasis on eliminating waste and pollution, circulating products and materials at their highest value and regenerating nature[34].

To learn more about building a circular economy on campus, see resources on page 100-101

BENEFITS:

- targets scope 3 emissions
- cost savings
- resource-conservation
- building climate-change resilience for the university or college and community
- engage with staff and students
- share learnings with the communities
- skill development and creating jobs in the community.

CHALLENGES:

- difficulty in measuring emissions
- building commercially scalable supply chains that support the circular economy
- resistance to change, both at systemic and individual level
- lack of policy and institutional support.

MEASURING IMPACT:

- reduced emissions (CO2e)
- decreased waste generated to landfill (tonnes)
- increased material reuse.

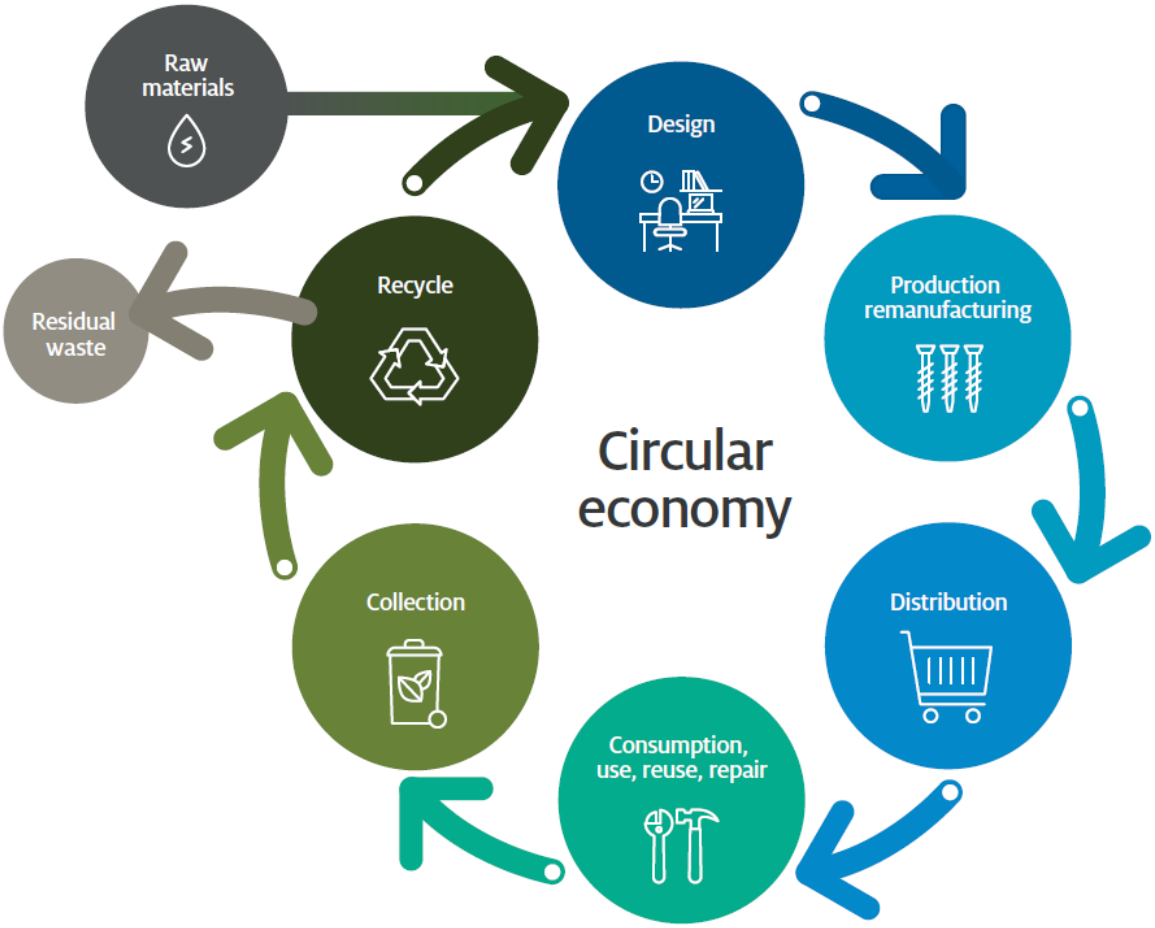


Figure 22. A circular economy increases material circulation within the economy for as long as economically and functionally possible. Source: Department of Agriculture, Water and Environment (2021)[35]

How to embed a circular economy on campus:

- ☐ Circular economy initiatives on campus can include material recovery, responsible procurement or diverting waste material from landfill.
- ☐ Circular business models initiated by staff, students or the local community can be incubated on campus (swap shops, selling campus furniture at discounted rates, donating old books and clothes, renting machinery and tools).
- ☐ Universities and colleges can influence wider society through behaviour change and by shaping attitudes towards waste and consumption.
- ☐ Engaging students through research and educational curriculum to design out waste from campus activities.

12. Implement material recovery on campus

Universities and colleges should aim to eliminate waste on campus through reduce, reuse and recycle initiatives. Material recovery is a key concept of a circular economy.

Universities will need to understand the recycling opportunities available in their region and champion new and innovative ways to increase reuse and recycled content on campus.

Recycling is more than putting a plastic bottle or cardboard box into a different container to be diverted from landfill. Recycling also means finding partnerships or new uses for old products, such as by donating old technology to schools or food to a foodbank.

A zero waste movement is also gaining momentum in many regions. This movement stretches beyond good recycling practices, to include sustainable procurement of goods and services that avoid the waste in the first instance.

Key strategies include diverting the majority of waste into multiple waste streams away from the landfill, such as reuse markets, commingled waste, supplier take-back of materials, and on-site reuse. Creating waste management plans (including for construction and demolition waste) that identify waste diversion streams, goals, and destinations can also help implement circular economy and material recovery efforts on campus.

To learn more about this initiative, see resources on page 101

BENEFITS:

- targets scope 3 emissions
- cost savings
- resource-conservation
- building climate-change resilience for the university or college and community
- engage with staff and students
- share learnings with the communities
- skill development and creating jobs in the community.

CHALLENGES:

- difficulty in measuring emissions
- resistance to change, both at systemic and individual level
- existing infrastructure on campus
- financing for up-front costs
- finding providers of alternative end-of-life services (e.g. recycling plants).

MEASURING IMPACT:

- reduced emissions (CO_2e)
- decreased waste generated to landfill (tonnes)
- decreased proportion of waste to landfill (proportion of total waste)
- cost savings (reduction in costs of waste disposal).

How to limit waste on campus[36]:

- ☐ **Maximise source separation:** Ensure the university provides adequate education and facilities to ensure the retrieval of materials that can be reused, recycled or composted.
- ☐ **Prevent food waste:** Food waste can be reduced with the right training, incentives and procurement policies. Source university catering from suppliers who reduce food packaging to limit waste to landfill. Ensure excess food is able to be distributed to student groups or communities in need.
- ☐ **Empower student organisations:** Encourage and empower organisations to set up a food pantry which collects leftover non-perishable food or a food alert system to direct students and staff to events with leftover food. These systems can also be applied to distributing supplies other than food. There are opportunities to educate students (and staff) on the impact of different kinds of food and therefore influencing behaviour change. An example is student led 'meatless Monday's' to educate on the impact of animal products on carbon emissions.
- ☐ **Separate collection of organics:** After applying a reuse system as suggested above, ensure any organic materials are properly collected and diverted from landfill. Organic waste sitting in landfills emits high volumes of methane, a GHG 25 times more potent than CO_2. There may be opportunities to compost organic waste directly on campus, or alternatively, to partner with off campus services.
- ☐ **Encourage reuse:** Support the roll-out of refillable systems for beverages and other reuse systems. Ensure university vendors follow suit. Support second-hand shops, repair cafes, waste processing units and other zero-waste initiatives. Apply the mantra 'one person's trash is another person's treasure'.
- ☐ **Show leadership:** Promote and share waste minimisation initiatives with the wider community. Influence waste management partnerships or student organisations to expand their initiatives to act outside of the university context. If the university is able to tackle their waste outputs and reduce, reuse and recycle effectively, then these learnings and impacts can be transferred to the wider community.

VALUE CHAIN

13. Implement sustainable procurement practices

Sustainable purchasing policies targets operational emissions as well as emissions from a product's upstream value-chain. This covers the wide range of equipment and supplies used by a university or a college, from educational material, to larger equipment used in labs, residential quarters and for general campus use. Comprehensive supplier policies should also cover service providers, such as campus security, or agencies. Procurement policies can also be adapted to university tenants, lessees and campus-retailers who use the institution's assets.

Most universities and colleges will have an existing supplier policy that can be updated to cover net zero principles, such as preferring suppliers who use renewable energy or renewable material or suppliers with established waste management practices. Sustainable purchasing policies that also cover emissions ensure that universities and colleges work with an audited list of sustainability-aligned vendors or suppliers.

By purchasing from suppliers who share the same net zero values, institutions create a reinforcing loop by amplifying net zero ambitions across the supply chain.

Although this is a challenging initiative with a limited number of net zero aligned suppliers and low transparency of supply chains, it is critical for universities and colleges to communicate their expectations of their partners.

To learn more about supplier engagement and procurement policies, see resources on page 102

BENEFITS:

- targets scope 1 and 3 emissions
- cost savings
- resource-conservation
- sharing and enforcing net zero values with other businesses
- building climate-change resilience for the university or college and community
- share learnings with the communities.

CHALLENGES:

- difficulty in measuring emissions
- identifying suitable partners in the supply chain
- influencing change from existing suppliers
- resistance to change, both at systemic and individual level.

MEASURING IMPACT:

- reduced emissions (CO_2e)
- increased proportion of locally sourced products
- increased visibility over supply chains.

What to consider for sustainable procurement practices:

- ☐ Use the greenhouse gas inventory to identify the products or services with a high emissions value-chain.
- ☐ Internal life-cycle assessments can identify products that have high extraction, energy, transportation, operational and end-of-life related emissions.
- ☐ Combine net zero requirements with other sustainability related impacts on the environment and society to assess suppliers and vendors.
- ☐ Partner with key suppliers to build better processes and achieve key requirements.
- ☐ Network with industry and customer groups to build lobby groups.
- ☐ Identify and emphasise standards and certifications to aid supplier assessment.

SUPPLY CHAIN

Net zero considerations

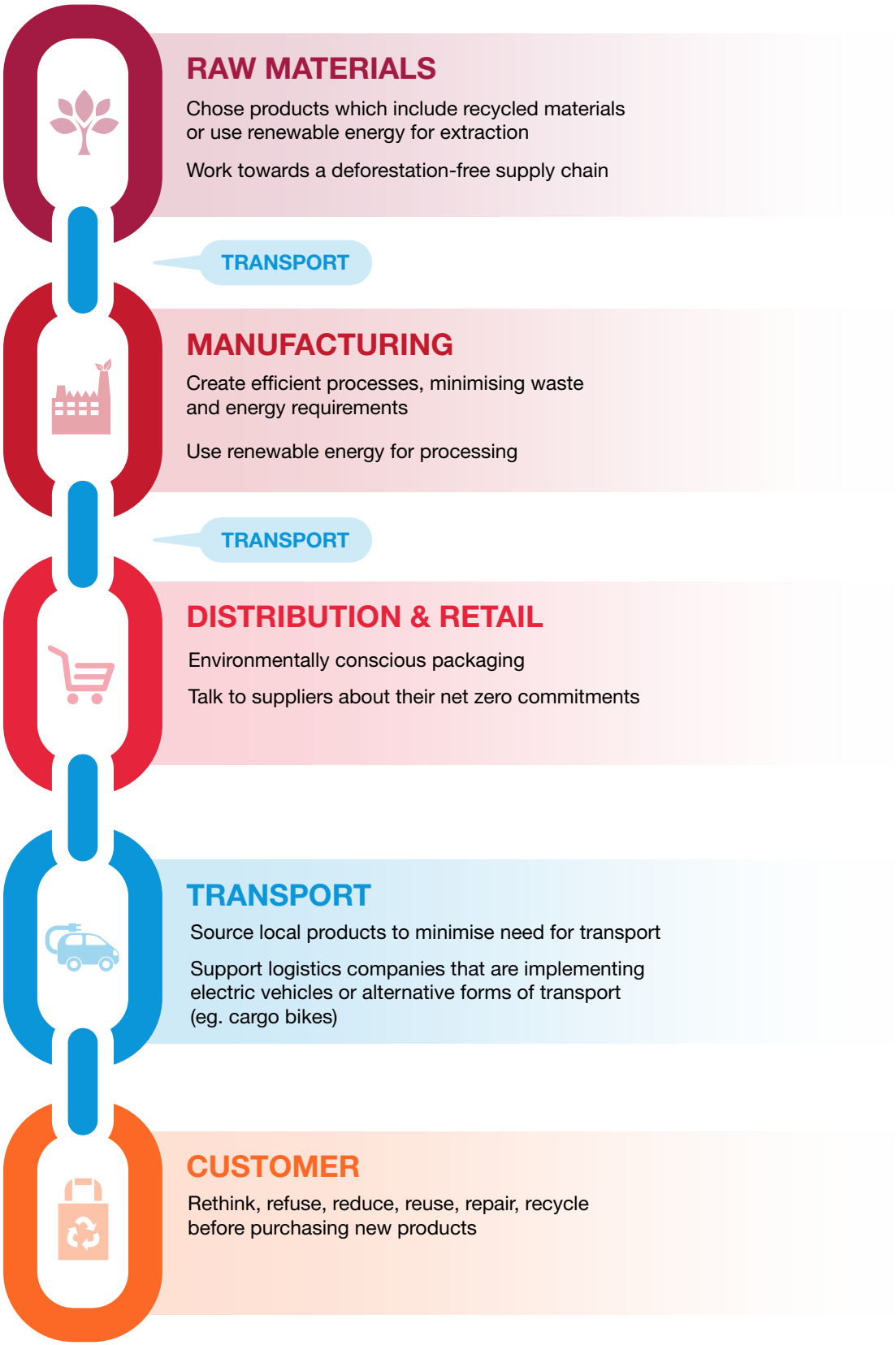


Figure 23. What to look for in a net zero aligned supply chain

14. Purchasing offsets

Compensatory-action carbon credits, or offsets can be used to improve net zero plans by reducing hard-to-abate emissions. These are emissions that are commercially prohibitive and difficult to remove with current technologies, for example emissions related to business travel aviation.

Certified carbon credits are generated through the financing of climate-friendly action, such as investing in reforestation or renewable energy projects in other parts of the world. Given the potential for double-counting, generating credits that have no additional value, and existence of spurious credits, universities and colleges should only purchase certified and valid offsets.

However, net zero plans that rely substantially on offsets risk being ineffective in achieving substantive emissions reductions and achieving climate goals. Therefore, offsets should only be considered after exploring all other initiatives and should only cover the hard-to-abate, residual emissions.

To learn more about purchasing offsets, see resources on page 102

Principles to apply when considering offsets:

- ☐ Offsets should only be considered in conjunction with reducing emissions through other initiatives.
- ☐ Offsets can be used to reduce emissions from sectors which are lacking other viable reduction options.
- ☐ Consider offsets which are local to the university to provide opportunities for education and collaboration.
- ☐ Use high quality, certified offsets that are verifiable, long-term, and transparent.
- ☐ Check for offsets that are additional to business as usual, i.e. the underlying carbon reduction or removing activity would not have occurred otherwise.
- ☐ Offsets should have a low risk of being undone. For example, a forest should not be destroyed after it has been sold as an offset.
- ☐ Ensure the offset is ethical and sustainable and does not negatively impact indigenous or marginalised communities. Examples of this occurring is when the land available for offsets is exploited for profits which leaves the inhabitants of the land vulnerable to food shortages and eviction.
- ☐ Ensure transparent disclosures of current emissions, accounting practices and targets to reach net zero.

BENEFITS:

- targets hard to abate emissions
- can reduce a greater share of emissions earlier.

CHALLENGES:

- ethical and valid use of offsets
- sourcing certified offsets.

MEASURING IMPACT:

- transparent and verifiable carbon offset impacts.


BE A PART OF
THE SOLUTION,
NOT PART OF
THE POLLUTON!
THERE IS
NO
PLANET
B.

BEYOND CAMPUS OPERATIONS

This guide has focused on initiatives that can be implemented within campus operations to drive down emissions and help to meet a university or college's net zero commitments.

Whilst university and college campuses continue implementing net zero initiatives within their campus footprint, it is important to explore opportunities to create wider, systemic change throughout the community.

A university is in a unique position to influence and reduce emissions in other ways:

Amplifying change: Universities can use their partnerships and reputation to encourage and incentivise emissions reduction across the broader community. Initiatives discussed in this guide can be tested on campus before being projected to the surrounding community.

Engaging students: Students play a key role in developing bottom-up initiatives and bring their passion, energy and innovation to strengthen emissions reduction projects. Students are also able to take their learned behaviours and expertise in decarbonisation through to the workforce and their communities.

Building knowledge, research and innovation: Universities play a key role in fostering the innovation needed to address decarbonisation via contributions to fundamental research, combining existing knowledge, education and training of engaged citizens and the next generation of leaders, creating space for open exploration of ideas, and through community involvement.

The following section focuses on other aspects of climate action that are necessary for a university to consider in amplifying its role as a net zero commited university.

16. Act as an amplifier of change

There are opportunities for universities and colleges to implement behaviour change within their populations and to partner with private and public operators to influence change. Net zero initiatives open opportunities for universities and colleges to amplify their knowledge and expertise in the technological, social and policy-making spheres of the wider community.

Universities and colleges can act as living labs, testing solutions at scale within campus precincts. These learnings, behaviours and innovations can then be deployed to create a snowball effect through the wider community.

Equally important is the education and research on climate change and adaptation that is driven by universities and colleges. As respected thought leaders with the ability to engage various stakeholders, universities and colleges are uniquely positioned to be agents of positive social change in their local communities. It is important to involve stakeholders along the journey to co-create net zero initiatives and ensure that these impacts are positive and co-beneficial.

Climate change adaptation and mitigation can also be amplified through university and college-led alliances of best practices. These networks reflect the urgency of pooling resources in knowledge-building, and the scope for universities and colleges to show leadership in decarbonisation. Sharing best practices and tools through global communities of practice allows universities at the forefront of climate action to support those who are just beginning to decarbonise their campuses.

To learn more about university led alliances for climate change, see resources on page 103-104

BENEFITS:

- leadership in community, influencing policies and societal behaviour regarding climate change
- building the brand and reputation of the university or college
- skill development and creating jobs in the community.

CHALLENGES:

- resistance to change, both at systemic and individual level
- avoiding green-washing (initiatives that are heavily promoted but that do not make significant impact on climate change mitigation or adaptation).

MEASURING IMPACT:

- overall emissions reduced in units of carbon dioxide equivalent (tCO_2e)
- member of climate change alliances and pledges to net zero
- curriculum, research and innovations that focus on climate change.

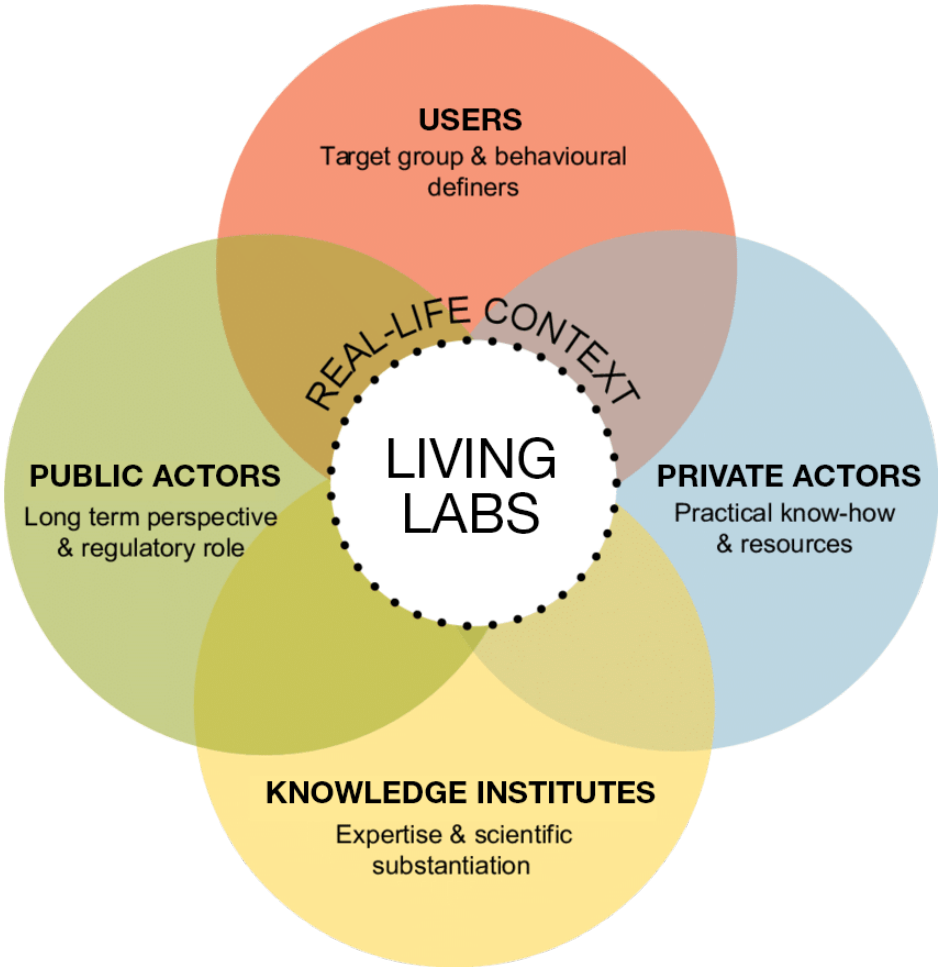


Figure 24. Living lab participants. Source: Amsterdam Institute for Advanced Metropolitan Solutions (2017)[37]

A good net zero plan should be more than a simple carbon accounting exercise. If a net zero plan can point researchers and students (who might be future policy makers) in the right direction, towards detecting and fixing perverse incentives, modifying counterproductive laws, and redirecting public and private investments, then impacts could potentially reach far below net zero.

– Dr Lykke E. Andersen, Executive Director of SDSN Bolivia, Universidad Privada Boliviana, Bolivia

At The Chinese University of Hong Kong (CUHK), we are deeply aware of the climate emergency, and have no intention of waiting on events. Potential net zero solutions can be tested on the CUHK campus and scaled for application in the wider community, or they may lend insight to other initiatives elsewhere.

– Cecilia Lam, Chief Sustainability Officer, The Chinese University of Hong Kong, Hong Kong SAR

17. Engage with student bodies

Making up the majority of university and college populations and as the principal consumers of their services, students can be significant agents of change for climate action. Students play a key role in developing bottom-up initiatives, which are needed to achieve systems-wide decarbonisation on campus.

Their participation in campus decarbonisation efforts can also foster their professional development, and thus, students' ability to further contribute to an institution's wider objectives.

Institutions can provide meaningful experiential learning for students through research, placements, and projects that make a positive impact. Campus decarbonisation projects can be designed, operated, and monitored by students under faculty supervision.

Such student-led initiatives include:

- energy consumption competitions
- climate ambassador groups that promote sustainable living on campus through activities and campaigns
- creating a personal climate pledge for students, faculty, and staff
- including climate literacy training in the orientation/ induction program of new students.

Campus decarbonisation projects can also be carried out via student-faculty-facilities teams that ensure collaboration across stakeholder groups. Such collaborations allow students to work on more sophisticated projects, such as renewable energy infrastructure deployment and campus planning efforts under the guidance of different departments. Students can support the coordination of these activities across teams, conduct research and outreach, and provide student perspectives.

To learn more about student engagement, see resources on page 105

How to institutionally embed student engagement in campus decarbonisation efforts to ensure durability:

- ☐ **Integrate student engagement within existing networks and student requirements to lower barriers to participation:** allow students to collaborate in climate action as part of their studies, develop climate student organisations, initiate service-learning and community service activities for students related to climate, and conduct greenhouse gas inventories or campus environmental audits as class projects.
- ☐ **Integrate student engagement into institutional governance arrangements:** invite student sustainability leaders to present at board and committee meetings, invite students to fully participate in campus sustainability committees (including climate action plan working groups), offer student employee positions in sustainability and other offices, create student government climate groups, create student sustainability coordinator positions that facilitate collaborations between administration, faculty, staff, and student organisations.
- ☐ **Provide financial support to student-led initiatives:** grant funds for innovative student projects that contribute to the institution's commitment to climate, host smart climate solutions competitions, provide funding via a sustainability office or the student government budget.

BENEFITS:

- leadership in community, influencing policies and societal behaviour regarding climate change
- building the brand and reputation of the university or college
- skill development and creating jobs in the community.

CHALLENGES:

- resistance to building collaborative and equal partnerships with students
- avoiding green-washing (initiatives that are heavily promoted but that do not make significant impact on climate change mitigation or adaptation).

MEASURING IMPACT:

- overall emissions reduced in units of carbon dioxide equivalent (tCO_2e)
- involvement of students in campus initiatives
- financing of student-led and designed initiatives.

The campus site will provide a unique opportunity for students and learners to test and experiment innovative systems and technologies for sustainable urban transformation. The learners could also be involved at various stages of design development, implementation, and operations and maintenance to get acquainted with the processes and outcomes of campus decarbonisation efforts which will help them to practice these principles in future practice. This will enable the scaling up of innovative net zero initiatives through research, capacity building and practice initiatives.

– Amol Mangrulkar, Senior Consultant of Campus Development, Indian Institute for Human Settlements, India

Students form the important backbone to the university and spend most of their time at the university, ultimately remaining as the direct client. It is important that they stay informed and involved to ensure the success of the decarbonisation efforts. Our students start out in their first and second year with compulsory community work, which then over time motivates the students to use their own initiatives and new knowledge in terms of sustainability to change the communities. However, it does not stop there, the students also take their knowledge back to their homes and this has a further positive effect on those communities.

– Ilze Ueckermann, Sustainability Specialist, Department of Facilities Management, University of Pretoria, South Africa

18. Encourage net zero aligned education, research and innovation

Universities and colleges around the world can play a critical role in developing advanced curricula, programs, capacity building, and opportunities for interdisciplinary collaboration to support a deeper learning on climate change among students, and by extension, society[38].

Forward-looking institutions have recognised their critical role in climate change research and education, but often in their own regional context. These leading universities and colleges can continue to expand their vision by supporting and uplifting efforts from universities across regions that are being most-affected by climate change.

To learn more about this encouraging net zero aligned education and research, see resources on page 105

BENEFITS:

- leadership in community, influencing policies and societal behaviour regarding climate change
- building the brand and reputation of the university or college
- skill development and creating jobs in the community
- access to grants and new funding opportunities
- development of new and applicable research papers to build personal and institutional reputation.

CHALLENGES:

- skills and capability of the faculty
- resistance to change, both at systemic and individual level
- sustainability research often requires an interdisciplinary approach which can be difficult to organise and finance.

MEASURING IMPACT:

- curriculum, research and innovations that focus on climate change
- recognition of university or college-generated knowledge and research.

> *The climate crisis has no room for silos. Universities, as educators of future leaders in climate solutions for our planet, must undertake greater social responsibility to contribute to decarbonization by leveraging our research and education as well as fostering a responsible culture to limit our carbon footprint.*
>
> **– Cecilia Lam, Chief Sustainability Officer,**
> **The Chinese University of Hong Kong, Hong Kong SAR**

How to approach climate aligned education, research and innovation:

Based, with minor additions, on Filho et al (2021)[38]

- ☐ Build accredited teaching programs at all levels of studies and research activities.
- ☐ Develop training events focused on staff and/or students.
- ☐ Lead public initiatives to communicate climate change science mitigation and adaptation with the wider community.
- ☐ Work with state and private sector to build evidence-based policy and innovation centres.

Table 3. How universities are handling climate change education. Source Filho et. al (2021)[38]

UNIVERSITY	EXAMPLE	APPROACH USED	AUDIENCE
Hamburg University of Applied Sciences	Research and Technology Transfer Sustainability and Climate Change Management	• Training on climate change • Editing book series on climate change	• Over 3.000 academic staff • Over 15 books
University of British Columbia	Climate Action Plan 2030—CAP 2030; and research	• Engagement of staff and students in the actions conducted in the Climate Action Plan 2030—CAP 2030, various post-graduate theses	• Staff and students
University of Toronto	Climate Change Policy and Practice	• Life-learning program course	• Students and participants in life-learning program
University of Campinas	Diversified actions	• Courses in undergraduate and graduate programs, research (various post-graduate theses, research centre)	• Students, researchers
University of Colombo	Diversified actions	• Courses, postgraduate program on 'Climate Change and Environmental Management', campus management (waste management and carbon footprint reduction), various undergraduate and postgraduate theses, conferences	• University community including students, public
Nottingham Trent University	Carbon Literacy Training' and online course 'Sustainability in Practice (SiP) Certificate'	• Training; co-curricular online module	• 250 students and 120 staff • SiP offered to all 34,000 students online, 6233 completions to date
KTH Royal Institute of Technology	Diversified actions	• Engagement of staff and training of academic staff (to integrate sustainability into education). Climate education integrated in all educational programs	• Staff and students • Divestment towards stakeholders with anti-climate change activities
Massachusetts Institute of Technology	Fossil fuel divestment days	• Divestment	• Administration and students
University of Latvia	Diversified actions	• Courses, various post-graduate theses, conference (in progress)	• More than 500 students in one of the courses, researchers • Working on climate-change legislative
University Fernando Pessoa	Diversified actions	• PhD program in Earth Sciences, research, various post-graduate theses, and conferences	• Students and researchers
University of Fort Hare	Research centre 'Risk and Vulnerability Science Centre'	• Research, workshops, various post-graduate theses	• Researchers and rural and local communities
Indian Institute of Technology Roorkee	Research on SDGs (20 theses focusing on climate change)	• Research, various post-graduate theses	• Researchers

AFTERWORD

Universities and colleges around the world must continue developing advanced curricula, capacity building, initiatives, and opportunities for interdisciplinary collaboration.

Collaboration is crucial to accelerate the decarbonisation efforts needed to achieve net zero by mid-century, or sooner.

While the journey to net zero will be unique for each institution, this guide, the accompanying online toolkit, and the global community of practice generated through this initiative will support universities and colleges worldwide as they continue decarbonising their operations and leveraging their strengths as global agents of change during this critical Decade of Action.

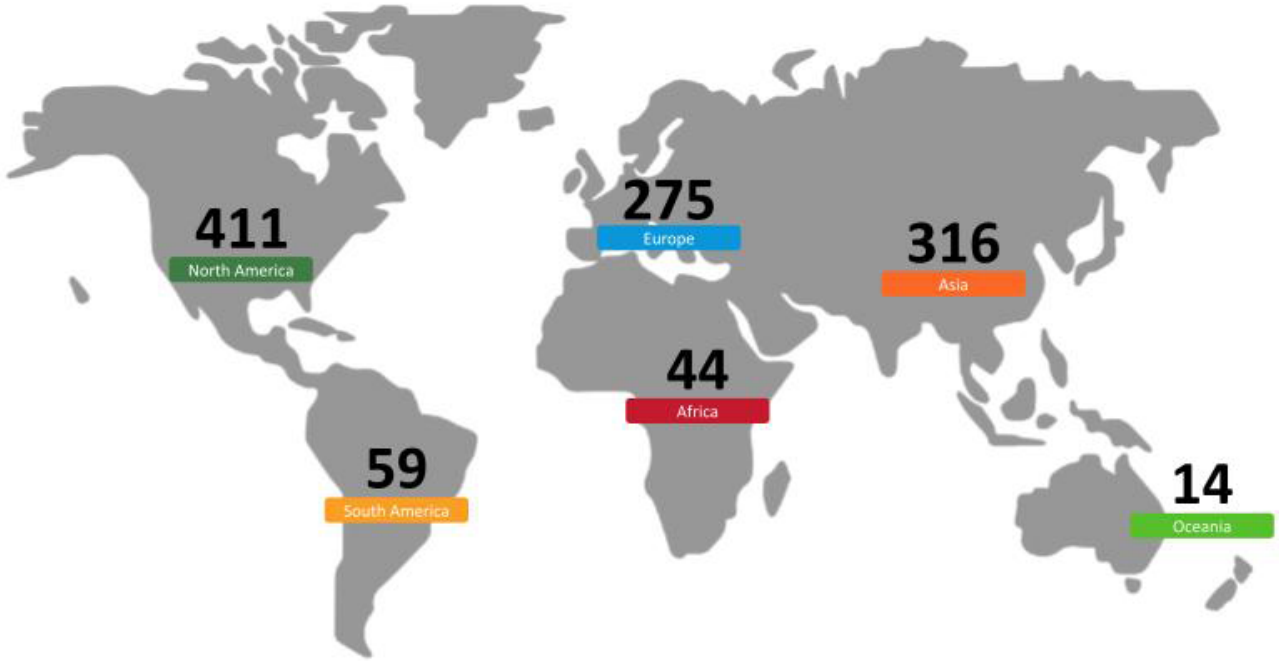


Figure 25. Signatories of Race to Zero in 2022: number of universities with a net zero target prior to 2050[6]

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RESOURCES

The website also includes all of the resources listed in this section.

LEGEND

RESOURCE

Publisher / owner

How will this resource help you transition to a net zero campus?

NET ZERO EXPERIENCE REQUIRED

Starter

A university or college that is either at the pre-commitment stage or has recently made a commitment to net zero, and is yet to implement initiatives.

Proficient

A university or college that has taken the initial steps of transitioning to net zero and has a long term plan or strategy in place.

Advanced

A university or college that shows leadership in research and innovation in climate change and has implemented net zero initiatives on campus.

WHAT IS NET ZERO

CLIMATE SCIENCE, RISK AND SOLUTIONS

MIT

An interactive website that summarises the evidence for human-caused climate change and discusses the risks and uncertainties.

Starter

Proficient

Advanced

EDUCATIONAL RESOURCES ON CLIMATE ACTION

Sustainable Development Solutions Network (SDSN) 2017

Free educational resources from the world's leading experts on sustainable development.

Starter

Proficient

Advanced

WHY NET ZERO MATTERS

CLIMATE CHANGE 2022: IMPACTS, ADAPTATION AND VULNERABILITY

Intergovernmental Panel on Climate Change (IPCC) 2022

Learn more about the impacts of climate change on nature and society.

Starter

Proficient

Advanced

THE PARIS AGREEMENT

United Nations Framework Convention on Climate Change

Learn more about the global commitment to limit warming to well below 2°C, preferably 1.5°C.

Starter

COUNTRY LEVEL OVERVIEW OF TARGETS

Climate Action Tracker

Learn more about country-level commitments based on the Paris Agreement.

Starter

Proficient

Advanced

EMISSIONS GAP REPORT 2021

United Nations Environment Programme (UNEP)

An annual series that provides an overview of the difference between where greenhouse emissions are predicted to be in 2030 and where they should be to avert the worst impacts of climate change.

Proficient

Advanced

SIGN UP TO RACE TO ZERO

Race to zero

Sign up to the global campaign to rally leadership and action in the education sector.

Starter

Proficient

Advanced

UNIVERSITIES AND COLLEGES, CRITICAL ENABLERS OF CHANGE

GETTING STARTED WITH THE SDGS IN UNIVERSITIES

Sustainable Development Solutions Network (SDSN) 2017

This Guide outlines general concepts, steps and examples to help tailor an approach towards the Sustainable Development Goals.

Starter

Proficient

Advanced

IMPACT RANKINGS 2021: CLIMATE ACTION

Times Higher Education (THE)

See how global universities are ranked for their research on climate change, their use of energy and their preparations for dealing with the consequences of climate change.

Starter

Proficient

Advanced

COMPLETE A GREENHOUSE GAS EMISSIONS INVENTORY WITH ALL EMISSIONS COUNTED

SCOPE 1,2, AND 3 EXPLAINED	THE GREENHOUSE GAS PROTOCOL	CORPORATE VALUE CHAIN (SCOPE 3) ACCOUNTING AND REPORTING STANDARD	SIMPLIFIED GHG EMISSIONS CALCULATOR	HOME | SIMAP (UNHSIMAP.ORG)	METHOD FOR CONDUCTING A GREENHOUSE GAS EMISSIONS INVENTORY FOR COLLEGES AND UNIVERSITIES	GLOBAL FOSSIL FUELS DIVESTMENT COMMITMENTS DATABASE
Climate Now, 2022	World Resources Institute (WRI), World Business Council for Sustainable Development (WBCSD)	WRI, WBCSD	US Environmental Protection Agency	UNH Sustainability Institute	Tufts University, 2002	Stand.earth and 350.org
Learn more about Scope 1,2, 3 emissions.	A corporate reporting and accounting standard. Standards and guidance for companies and other types of organisations preparing a GHG emissions inventory.	Standard for preparing and reporting on indirect emissions from value-chain activities.	A free and simplified calculation tool to help small business and low emitter organisations estimate their GHG inventory.	Access a subscription-based tool for carbon and nitrogen inventory accounting.	A guidance for academic institutions seeking to quickly and inexpensively create a GHG emissions inventory of their operations.	A comprehensive database of fossil fuel divestment commitments made by institutions (including universities) globally.
Starter	Starter		Starter		Starter	
Proficient	Proficient	Proficient	Proficient		Proficient	Proficient
	Advanced	Advanced		Advanced		Advanced

ORGANISE LEADERSHIP AND RESOURCES

COOL CAMPUS! A HOW-TO GUIDE FOR COLLEGE AND UNIVERSITY CLIMATE ACTION PLANNING

Association for the Advancement of Sustainability in Higher education (AASHE) 2009

An early but still relevant guide to building climate action plans.

Starter

ORGANISING FOR ACTION

Second Nature

A section from Second Nature's Signatory Handbook that focuses on building leadership and institutional structures for preparing and implementing a climate action plan.

Starter

Proficient

Advanced

MAPPING A PATHWAY TO LOW-CARBON CAMPUSES

Rocky Mountain Institute (RMI)

A guide focusing on the role of people, policies, and planning for campus net zero initiatives.

Starter

Proficient

USING AN EXISTING ORGANISATIONAL RESILIENCE FRAMEWORK TO DEVELOP A CLIMATE CHANGE ADAPTATION PLAN

EAUC, HebCoN, AECOM 2019

A guide on using existing organisational resilience expertise, processes and governance to build climate action plans.

Starter

Proficient

Advanced

BENEFITS AND COSTS INVOLVED IN A NET ZERO PLAN

MAKING THE BUSINESS CASE FOR SUSTAINABILITY

EAUC

A guide to building compelling business cases to support climate action at the university.

Starter

Proficient

CLIMATE-RELATED RISKS, OPPORTUNITIES, AND FINANCIAL IMPACTS

TCFD

Recommendations to evaluate and disclose climate-related risks and opportunities.

Starter

Proficient

Advanced

THE FRAMEWORK FOR LONG-TERM, WHOLE-SYSTEM, EQUITY-BASED REFLECTION (FLOWER)

Climate Interactive

A tool for evaluating potential co-benefits of climate actions and policies.

Starter

Proficient

Advanced

SET CLEARLY DEFINED MILESTONES AND TARGETS

SBTI CORPORATE NET ZERO STANDARD

Science Based Targets Initiative (SBTi)

Learn about how to set science-based targets. Although this document is intended for large corporates, the principles can apply to universities.

Starter

Proficient

Advanced

E-LEARNING COURSE 'SETTING SCIENCE-BASED TARGETS'

United Nations Global Compact

This e-learning course will guide you in the process of setting a science-based target in support of a net-zero future.

Starter

E-LEARNING COURSE 'THE NET ZERO STANDARD

United Nations Global Compact & the Science-Based Initiative

An interactive e-learning course on the net zero standard.

Starter

1.5 C NATIONAL PATHWAY EXPLORER

Climate Analytics

Learn more about country-level decarbonisation pathways. Although not targeted at universities, this gives context to regional plans to decarbonise transport, power, industry and buildings.

Starter

Proficient

Advanced

EXPLORE INNOVATIVE FINANCING FOR NET ZERO INITIATIVES

FINANCING, INTRODUCTION TO COST-BENEFIT ANALYSIS, GREEN FINANCING

Second Nature

Assess costs and benefits.

An overview of financing options that can be considered.

Starter

RAISE THE FUNDS. CAMPUS ACTION TOOLKIT

Radford University

A student and administrator's guide to funding mechanisms for campus sustainability initiatives.

Starter

RENEWABLE PPA TOOL

University of New South Wales Sydney

Free tools to assist large energy users, energy consumers, buyers' groups and local governments to contract with off-site renewables projects through a PPA and therefore meet their renewables and emissions goals. These tools also assist in PPA monitoring.

Starter

Proficient

Advanced

EXPLORE INNOVATIVE FINANCING FOR NET ZERO INITIATIVES

GREEN REVOLVING FUNDS. A GUIDE TO IMPLEMENTATION AND MANAGEMENT	THE CHALLENGE – BILLION DOLLAR GREEN CHALLENGE	DID YOU KNOW? GREEN BONDS IN 2 MINS	SUSTAINABLE ENDOWMENTS INSTITUTE	INVESTING FOR AN EQUITABLE, LOW-CARBON, AND REGENERATIVE ECONOMY	CAMBRIDGE UNIVERSITY ENDOWMENT FUND	ALUMNI AND COMMUNITY
Sustainable Endowments Institute and the Association for the Advancement of Sustainability in Higher Education	The Sustainable Endowments Institute	Asian Development Bank (ADB)	Sustainable Endowments Institute (SEI)	Intentional Endowments Network (IEN)	Cambridge University	The University of Queensland, Australia
A practical guidance for designing, implementing, and managing a green revolving fund (GRF).	The Billion Dollar Green Challenge encourages universities, cities, schools, healthcare institutions, airports, and other organisations in North America to invest in self-managed green revolving funds (GRFs) that finance energy efficiency improvements.	New financial products such as green bonds are providing innovative ways to combat climate change.	The Sustainable Endowments Institute (SEI) conducts research, education, and outreach to advance resilient institutional responses to climate change.	This peer-learning network encourages and supports higher education institutions to adopt investment strategies that create an equitable, low-carbon, and regenerative economy.	Learn more about the fund that holds and invests donations made to the University, its Colleges and charitable trusts associated with the University, and other long-term capital.	Listing of university-led projects that the alumni can support through financial contributions.
Starter	Starter	Starter	Starter	Starter	Starter	Starter
Proficient	Proficient		Proficient	Proficient	Proficient	Proficient
Advanced	Advanced		Advanced	Advanced	Advanced	Advanced

EXPLORE INNOVATIVE FINANCING FOR NET ZERO INITIATIVES

MONITOR, EVALUATE AND LEARN FROM NET ZERO INITIATIVES

WELCOME TO THE GREEN INITIATIVE FUND

University of Berkeley

Learn more about the student-led fund that provides funding, via grants, for projects that improve and support UC Berkeley's campus sustainability efforts.

Starter

Proficient

Advanced

CARBON PRICING

ACCIONA Sustainability

Learn about carbon pricing from carbon taxes to voluntary shadow prices.

Starter

Proficient

HOW-TO GUIDE: CAMPUS GREEN FUND IMPLEMENTATION

The Association for the Advancements of Sustainability in Higher Education (AASHE)

Learn more about campus green funds that can incubate projects and create the financial means for implementing sustainable education, research, operations, planning, administration, and engagement.

Starter

Proficient

HARVARD UNIVERSITY – GREEN LOAN FUND

Sustainable Endowments Institute

A case study on Harvard's green revolving fund.

Starter

Proficient

Advanced

BALL STATE UNIVERSITY AND CHEVROLET

Second Nature

A webinar with Ball State University sharing their pilot experience participating in Chevrolet's Carbon-Reduction Initiative using a specially-developed carbon credit methodology.

Starter

Proficient

Advanced

GUIDING PRINCIPLES FOR CITY CLIMATE ACTION PLANNING: TOOLKIT FOR CAMPUS-LEVEL REVIEW

Sage Project

A guide on campus-level assessments, with an indicative summary sheet of indicators.

Starter

Proficient

PROPOSED GUIDANCE ON CLIMATE-RELATED METRICS, TARGETS, AND TRANSITION PLANS

Task Force on Climate-Related Disclosures (TCFD)

A general guidance for organisations seeking to establish relevant metrics, targets, and transition plans around their climate-related risks and opportunities.

Starter

Proficient

REDUCE CAMPUS ENERGY DEMAND

QUICK FIXES AND LONGER-TERM SOLUTIONS FOR ENERGY CONSERVATION

Friendly Power

Recommen-dations to manage energy costs at colleg-es and univer-sities.

Starter

HARVARD UNIVERSITY. ENERGY EFFICIENCY

Harvard University

See how the university is implementing its energy efficiency projects.

Starter

Proficient

VM0025 CAMPUS CLEAN ENERGY AND ENERGY EFFICIENCY, V1.0 – VERRA

Verra

A modular methodology provides a framework for quantifying GHG emission reductions achieved through gains in energy efficiency and renewable energy deployment on college, university or school campuses in the United States.

Proficient

Advanced

THE LITTLE BOOK OF GREEN NUDGES | UNEP – UN ENVIRONMENT PROGRAMME

United Nations Environment Programme (UNEP)

Learn how to cue environmental behaviours in student, staff and campus community.

Starter

Proficient

Advanced

REPLACE FOSSIL FUEL DEPENDENT APPLIANCES

WHY HEAT PUMPS ARE ESSENTIAL FOR THE FUTURE – EXPLAINED

Matt Ferrell on Curiousity Stream

Video explainer of how heat pumps work to heat and cool buildings.

Starter

ELECTRIFYING UCSD: A CAMPUS ELECTRIFICATION SCENARIO AND COST ESTIMATE

Alex Andriatis

A report that details the scenario and critical metrices of electrifying the University of California San Diego campus.

Starter

Proficient

Advanced

UNIVERSITY OF CALIFORNIA STRATEGIES FOR DECARBONIZATION: REPLACING NATURAL GAS

The Institute for Energy Efficiency, National Center for Ecological Analysis and Synthesis, University of California 2018

Resource for universities that are committed to pursuing deep decarbonisation through the elimination of natural gas from its operations.

Proficient

Advanced

ESTABLISH CAMPUS (OR PRECINCT) MICROGRIDS

LEARN MORE ABOUT MICROGRIDS

Microgrid Knowledge

An article that explains microgrids in accessible language.

Starter

Proficient

TOOLBOX – NET ZERO INITIATIVE (MONASH.EDU)

Monash University

An online resource about Microgrids by Monash University's Net Zero Initiative.

Starter

Proficient

SOURCE RENEWABLE ENERGY

RENEWABLE ENERGY 101

National Geographic

Find out more about alternative and renewable sources of energy for your university.

Starter

RENEWABLES

International Energy Association (IEA)

Read detailed analysis and tracking reports for various forms of renewable energy.

Starter

Advanced

WHAT IS A PHYSICAL POWER PURCHASE AGREEMENT (PPA)

Enel Power

Video explainer of physical Power Purchase Agreements (PPAs).

Starter

Advanced

WHAT IS A VIRTUAL POWER PURCHASE AGREEMENT (PPA)

Enel Power

Video explainer of virtual PPAs.

Starter

Advanced

ENCOURAGE SUSTAINABLE COMMUTER TRAVEL

UC DAVIS TRANSPORTATION SERVICES

University of California, Davis

The website offers multiple links to transportation solutions on and off campus, including to their award winning bike (bicycling) program.

Starter

Proficient

Advanced

TRANSPORT DEMAND MANAGEMENT

Victoria Transport Policy Institute

Resource with innovative management solutions to transportation problems.

Proficient

Advanced

PUBLIC PRIVATE PARTNERSHIP MODELS FOR DEVELOPMENT OF SUSTAINABLE URBAN TRANSPORT SYSTEMS

Deloitte and Shakti Sustainable Energy Foundation

This report identifies key barriers to the success of PPP in urban transport infrastructure space particularly in bus terminals development and operation, Public Bicycle Sharing (PBS), city bus private operations, street infrastructure and Intelligent Transport System (ITS).

Relevant for south asian and global south contexts.

Proficient

Advanced

TRANSITION TO A ZERO EMISSIONS VEHICLE FLEET

TRANSITION YOUR FLEET TO ELECTRIC VEHICLES

Smartrack

A free eBook that outlines the ways an organisation can transition their fleet to electric vehicles.

Starter

VEHICLE COST CALCULATOR

US Department of Energy

This tool uses basic information about your driving habits to calculate total cost of ownership and emissions for makes and models of most vehicles, including alternative fuel and advanced technology vehicles.

Starter

Proficient

EV FLEET IMPLEMENTATION CHECKLIST

US Department of Energy

This checklist can be used to ensure your fleet is prepared to implement electric vehicles and charging infrastructure.

Starter

Proficient

IMPLEMENT SUSTAINABLE BUSINESS TRAVEL

REDUCING SCOPE 3 EMISSIONS: BUSINESS TRAVEL

Global Compact Network US

Informative webinar where climate specialists and business leaders share best practices for identifying, measuring, and reducing their Scope 3 emissions.

Starter

Proficient

Advanced

WWF TRAVEL POLICY

World Wide Fund for Nature (WWF)

A detailed policy guideline of how WWF reduces emissions from its business travel, commuting and personal travel.

Starter

Proficient

REPLACE CARBON AND ENERGY INTENSIVE EQUIPMENT

ENERGY TOOLKIT

National Center for Appropriate Technology (NCAT)

A practical series of energy-efficiency toolkits designed for building owners and managers.

Starter

Proficient

ROADMAP FOR ENERGY-EFFICIENT BUILDINGS AND CONSTRUCTION IN THE ASSOCIATION OF SOUTHEAST ASIAN NATIONS

International Energy Association (IEA)

This Roadmap is to identify possible energy-efficient and low-carbon actions and activities that ASEAN Member States (AMS) could consider for implementation by 2025, 2030 and beyond, moving towards net zero-carbon emission buildings.

Starter

Proficient

RETROFIT CAMPUS BUILDINGS

RETROFITTING EXISTING BUILDINGS TO IMPROVE SUSTAINABILITY AND ENERGY PERFORMANCE

Whole Building Design Guide (WBDG)

Lists key recommendations to consider for retrofitting projects.

Proficient

Advanced

CONSTRUCT NEW SUSTAINABLE BUILDINGS

HOW: PASSIVE HOUSE DESIGN PRINCIPLES

Passive House Accelerator

An easy-to-read look at the “classic five” Passive House design principles.

Proficient

Advanced

PLAN FOR A CIRCULAR ECONOMY

CIRCULAR ECONOMY PROCUREMENT FRAMEWORK

Ellen MacArthur Foundation

A circular economy procurement framework to help companies kickstart circular economy initiatives within their procurement process.

Starter

Proficient

Advanced

DRIVING THE CIRCULAR ECONOMY ON A UNIVERSITY CAMPUS

Ellen MacArthur Foundation and MIT

A case-study and resources that describes the approach MIT took as well as the solutions identified to ensure MIT’s new waste contract supports a circular economy on campus.

Starter

Proficient

Advanced

10 WAYS HOW UNIVERSITIES CAN LEAD THE WAY TOWARDS CIRCULAR ECONOMY

The Circular Collective

A list of ways a university could incorporate circular economy principles into their day-to-day operations.

Starter

PLAN FOR A CIRCULAR ECONOMY

SHARING ECONOMY: TOWARDS A RESOURCE-LIGHT LIFESTYLE

Sabrina Chakori at TEDxUQ

Sabrina Chakori founded the Brisbane Tool Library, a social enterprise that aims to reduce household waste and consumption based on a sharing economy.

Her talk brings to the forefront the need to rethink our consumption addiction and explores some possible solutions that could help change the economic growth paradigm.

Starter

Proficient

Advanced

SWAP SHOP | STUDENT PROGRAMS

University of Georgia

Take a look at the Swap Shop at UGA that encourages reuse, repair, and circular economy practices at no cost to campus community members.

Starter

Proficient

Advanced

IMPLEMENT MATERIAL RECOVERY ON CAMPUS

BUILDING A GLOBAL CULTURE OF SUSTAINABILITY IN SCIENCE

My Green Lab

Various resources to make laboratories more sustainable. This includes a database listing the environmental impacts of various products and equipments used in labs.

Proficient

GREEN LABS. BEST PRACTICE GUIDE

The University of Queensland

This guide serves as a reference outlining sustainable practices for University of Queensland lab personnel.

Proficient

THE IMPORTANCE OF ZERO WASTE IN HELPING ACHIEVE NET ZERO

Zero waste Cities

A look at what institutions can do to fight climate change by reducing emissions from waste.

Starter

WASTE NOT, WANT NOT: A STUDENT MANUAL TO CREATE ZERO WASTE COLLEGE CAMPUSES

University of Massachusetts Amherst

A report detailing a student project that implemented sustainable changes on their college campuses.

Starter

IMPLEMENT SUSTAINABLE PROCUREMENT PRACTICES

1.5C SUPPLIER ENGAGEMENT GUIDE

Exponential roadmap initiative

The guide provides practical guidance that any company can utilise to work with suppliers to set and implement a 1.5°C aligned target and move to action.

Starter

Proficient

Advanced

NET-ZERO CHALLENGE: THE SUPPLY CHAIN OPPORTUNITY

World Economic Forum (WEF)

A report that details nine initiatives companies can take to achieve net-zero supply chains.

Starter

Proficient

Advanced

MEASURING SUSTAINABILITY: ENVIRONMENTAL IMPACTS

SCS global services

Details of environmental impact categories in the Life Cycle Assessment Standard. These can be used to guide development of sustainable procurement policies.

Starter

SUSTAINABLE PROCUREMENT GUIDELINES

The Chinese University of Hong Kong

Guidelines used by the CUHK to ensure the products and services used are as sustainable as possible.

Starter

Proficient

Advanced

PURCHASING OFFSETS

IS CARBON OFFSETTING A STALLING TACTIC?

Al Jazeera

A video discussing the challenges related to offsets.

Starter

Proficient

Advanced

THE OXFORD PRINCIPLES FOR NET ZERO ALIGNED CARBON OFFSETTING 2020

University of Oxford, 2020

A guide that outlines how offsetting needs to be approached to ensure it helps achieve a net zero world.

Starter

Proficient

Advanced

GOLD STANDARD

Gold Standard

Learn more about the standard that quantifies, certifies and maximises the impact of climate and development interventions.

Advanced

MAKING SENSE OF THE VOLUNTARY CARBON. MARKET A COMPARISON OF CARBON OFFSET STANDARD

World Wide Fund for Nature (WWF)

This report discusses the role of the voluntary carbon market and provides an overview of the most important currently available carbon offset standards.

Advanced

ACT AS AN AMPLIFIER OF CHANGE

DRIVING ENERGY EFFICIENCY THROUGH HIGHER EDUCATION COLLABORATION	RACE TO ZERO	CLIMATE LEADERSHIP NETWORK	ASSOCIATION FOR THE ADVANCEMENT OF SUSTAINABILITY IN HIGHER EDUCATION (AASHE)	COMMONWEALTH CLIMATE RESILIENCE NETWORK	AUSTRALASIAN CAMPUSES TOWARDS SUSTAINABILITY	SDSN GLOBAL CLIMATE HUB
CBI, RMI, ARCH	UNEP, EAUC, Second Nature	Second Nature	AASHE	ACU	ACTS	Athens University and SDSN
Case studies on building alliances with other institutes, municipalities and utility companies.	UN-backed global campaign rallying non-state actors, including the higher education institutions, to take rigorous action to halve global emissions by 2030.	A Second Nature signature program for universities and higher education institutes in North America.	Learn more about the leading association for the advancement of sustainability in higher education with members primarily in North America.	Alliance of Commonwealth universities and their wider communities.	A non-profit that engages with sustainability leaders in Australiasian region.	The mission of the hub is to provide science-based recommendations for combating the climate crisis and preventing further deterioration.
Starter	Starter	Starter	Starter	Starter	Starter	Starter
	Proficient	Proficient	Proficient	Proficient	Proficient	Proficient
	Advanced	Advanced	Advanced	Advanced	Advanced	Advanced

ACT AS AN AMPLIFIER OF CHANGE

CLIMATE-U	ALLIANCE FOR SUSTAINABILITY LEADERSHIP IN EDUCATION: INTERNATIONAL UNIVERSITIES CLIMATE ALLIANCE	INTERNATIONAL SUSTAINABLE CAMPUS NETWORK	CLIMATE ALLIANCE – INTERNATIONAL UNIVERSITIES CLIMATE ALLIANCE	KENYA GREEN UNIVERSITY NETWORK	RESEARCH AND INDEPENDENT NON-GOVERNMENTAL ORGANIZATIONS (RINGO)	SOLUTION INITIATIVE: CLIMATE FRAMEWORK FOR HIGHER EDUCATION INSTITUTIONS	SOLUTIONS CENTRE
Climate-U	EAUC	ISCN	International Universities Climate Alliance	Kenya Green University Network	RINGO	SDSN Northern Europe	Second Nature
A multi-objective alliance focused on supporting local action on climate change in low-middle income countries, assessing existing coverage of climate change in the curricula, research and community engagement activities of these universities, contributing to theory and understanding of the impact of higher education on climate change and sustainable development and to build and strengthen national, regional and global university networks and knowledge exchange on climate change.	The EAUC is the environmental and sustainability champion within Further and Higher Education in the UK and Ireland.	90 universities from over 30 countries on 6 continents.	The Climate Alliance represents the leading research universities in climate research.	A functional network of Higher Education Institutions(HEIs) in Kenya with the aim of incorporating environment, low carbon climate resilience development strategies and sustainability aspects in their education, training, campus operations and enhanced student engagement.	Learn more about one of the nine NGO constituencies recognized by the United Nations Framework Convention on Climate Change (UNFCCC).	The starting off point for developing specific climate strategies at Northern European/Swedish universities.	See more examples of carbon and energy reducing activities on campus.
Starter	Starter	Starter	Starter	Starter	Starter	Starter	Starter
Proficient	Proficient	Proficient	Proficient	Proficient	Proficient	Proficient	Proficient
Advanced	Advanced	Advanced	Advanced	Advanced	Advanced	Advanced	Advanced

ENGAGE WITH STUDENT BODIES

SDSN YOUTH

Sustainable Development Solutions Network (SDSN)

Branch of the SDSN that mobilises youth for all of the SDGs, including climate action.

Starter

Proficient

Advanced

NET ZERO ME PILOT

Monash University

A student engagement program designed to raise awareness of Monash initiatives amongst the students.

Starter

ENCOURAGE NET ZERO ALIGNED EDUCATION, RESEARCH AND INNOVATION

TEACHING CLIMATE CHANGE IN THE UNIVERSITY TRANSFORMING UNIVERSITIES FOR A CHANGING CLIMATE WORKING PAPER SERIES NO. 8

Climate-U

Paper by Tristan McCowan

This paper explores the potential of climate for pedagogical renewal in higher education through an assessment of three spheres of enquiry: the ontological (interdependence of human beings and the natural environment), epistemological (sources of valid knowledge, academic disciplines and diverse knowledge traditions) and axiological (climate justice, the limits of state authority and the nature of the good life).

Starter

Proficient

Advanced

GUIDELINES FOR HEALTHY GLOBAL SCIENTIFIC COLLABORATIONS

Nature

Some guidelines to make international collaboration more inclusive, equitable and in the end more meaningful and relevant for all.

Starter

Proficient

Advanced

GLOBAL SOUTH CLIMATE DATABASE

Carbon Brief & Oxford Climate Journalism Network

A publicly available, searchable database of scientists and experts in the fields of climate science, climate policy and energy.

Starter

Proficient

Advanced

FOR MORE INFORMATION

Visit www.unsdsn.org/net-zero-on-campus for more resources and case studies to assist in the campus decarbonisation journey.

Media enquiries: media@unsdsn.org

This guide is the result of a collaboration between the United Nations Sustainable Development Solutions Network (SDSN), Climateworks Centre and Monash Energy Institute at Monash University, Australia.