Changing SYSTEMS

not just lightbulbs

Building Pathways to Zero Carbon in Higher Education: A guide to what works

CARBON NEUTRAL
University of Sheffield

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Changing Systems, Not Just Lightbulbs

Building Pathways to Zero Carbon in Higher Education:

A Guide to What Works

Contents

In front of you is testament to the power of student and staff co-creation.

Students are a formidable force for change. Even without initial buy-in from institutional leaders, this well researched and very practical Guide shows just how much can be done. But combine student with staff power, include voices from across the disciplines, give permission and space for ideas and creativity to flow across the intellectual and social dimensions of the institution, and a step-change in our approach to the goal of zero carbon is possible. No one has the single answer. But to quote Margaret Wheatley, 'The realm of collective intelligence is the wisdom we possess as a group that is not available to us as individuals.'

Inspired by the UN Sustainable Development Goals and the sector's SDG Accord, new cross-organisation and cross-sectoral collaborations and alliances are inspiring new thinking to solve old problems. This powerful Guide shines a light on how universities can be more than a resource to understand and inform society of changes needed, but critically, it puts universities at the heart of where the change happens.

The bar has just been raised. A new chapter in cross-system inclusion and thinking has been opened, and as more people contribute to this kind of work, the future looks increasingly hopeful.

Let's do this.

Iain Patton

CEO, the Environmental Association for Universities and Colleges (EAUC)

As young people, with their whole futures in front of them, students are justifiably concerned about the environmental crisis unfolding around us.

Little wonder then that students consistently make it clear that they expect sustainability leadership from their institutions and that they express a similarly high demand to learn more about sustainable development on their courses.

As this report makes clear, business as usual is no longer an option. That is why the National Union of Students have been at the forefront of pushing demands for environmental action from the higher education sector. We recognise that sustainability requires systems change and action across our campuses and this has been at the heart of our 'Green Impact' programs. It is also why the NUS have backed the student-led fossil fuel divestment campaigns across the UK and why we are calling for the UN sustainable development goals to be embedded in the curricula of all higher education courses.

Whilst there has been progress, there is still much to be done. This inspiring new report shows us how students and staff can work together to experiment with new ways to green our campuses and how to apply systems thinking to guide practical actions.

By working together with urgency and ambition we can share a safe and sustainable future.

Shakira Martin

President, the National Union of Students

1. Summary

How can our universities develop a leading role in building a low carbon society in the UK?

This Guide sets out to answer this question, drawing on 'Changing Systems, Not Just Lightbulbs', a two-day event held at the University of Sheffield in May 2017, hosted by the Carbon Neutral University Network (CNU).[1] It presents the case for a multi-faceted participatory approach, and covers concepts, principles, and practical tools.

Our aim in creating the Guide is to help people in any position at a university, including students, staff members, volunteers and senior leaders, to build effective low carbon initiatives. The focus is on leading the way by example, using university campuses, curricula and procurement practices as 'living laboratories'.

The Guide begins with a short consideration of the overall situation regarding climate change. The central argument here is that vigorous action is called for. A step change is needed in both the scale and the pace of work in order to reduce emissions. We go on to look in more detail at the specific challenges for universities.

"Developing low carbon institutions calls for change at every level including the infrastructural, economic, psychological and social."

We recognise that developing low carbon institutions presents wide-ranging challenges and calls for change at every level including the infrastructural, economic, psychological and social. We consider how these challenges present a unique range of learning opportunities, calling for institutional and social creativity. We examine how embracing systems thinking across the institution can lay the foundations for such creative change. This leads to a consideration of how low carbon leadership can come from any level in an institution. Four key areas of work are examined in this light:

1 www.carbonneutraluniversity.org

- **Engaging Multiple Perspectives: skills for movement-building**

This section (5) looks at ways of bringing different voices into the conversation on an equal footing – a process seen as fundamental to systems-level understanding. Approaches that underlie a systems approach are explored, including: collaboration across boundaries, renewing vision, and engagement with communities. Practical tools are introduced that can enhance levels of engagement.

- **Strategic Thinking: the roles of senior leaders**

This section (6) addresses questions for university leaders, especially at senior levels. It presents the case for universities becoming proactive agenda-setters in this field, building credibility, relevance and reputation. The need for both long-term thinking and rapid action that make a noticeable difference is emphasised. Practical actions covered include ways of finding and supporting natural sustainability leaders within the institution.

- **Engaging with University Management: the roles of students, staff and postgraduates**

This section (7) is aimed at students, postgraduates and staff members wanting to build momentum towards zero carbon in their institution. It looks at how to open channels of communication and build constructive relations with senior managers. It explores the kind of priorities and metrics that are likely to occupy university leaders, and considers how these can be used to build a case for strong action on the low carbon agenda. It poses a question about how deeper reflective conversations can be developed.

- **Prototyping and Scaling Up: moving from listening into action**

This section (8) looks at how we can nurture and take forward good ideas. This may be with or without 'buy-in' from senior managers – initially at least. Building an understanding of both what is happening, and what could happen, is explored. The role that universities can play in catalysing or supporting low carbon projects in the community is considered. A seven-point test for effective prototyping is introduced.

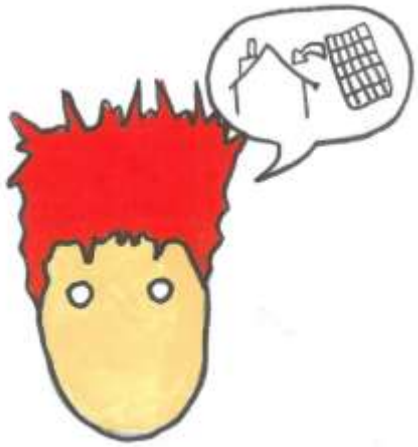
Two case studies are then considered that illustrate the approaches discussed: the University of Edinburgh's 'Zero by 2040' Climate Strategy, and Solar SOAS, a student-led community renewable energy project.

The Guide concludes with the key action points identified under each of the four themes.

We conclude that this is a complex challenge, which will not yield to a single approach. Systems thinking calls for action on many fronts. We need to encourage and enable one another, working together to bring about one of the biggest transformations in human history. We contend that failure is not an option and that success can enhance every aspect of our lives. Our universities have a leading role to grasp in bringing about this transformation.

The Origins of this Guide

The 'Changing Systems, Not Just Lightbulbs' event was structured to draw out insights, with a focus on what works. We talked about how to build a 'Zero Carbon Story'. What work was out there, that offered credible pathways to zero carbon? What could be done to break down the barriers to change? What were we learning about changing systems – as opposed to just lightbulbs?



The themes emerging from participants' conversations became the four main sections of this Guide. Whilst the views expressed are the responsibility of the authors, the principles, practical actions and questions we present under each theme are drawn from these workshops and are the product of a year-long collective writing process.

Recognising that there is no 'one size fits all' solution, this Guide offers a range of ideas, tools and questions that we hope will be useful in your own unique setting. We also hope to build connections with our readers and to develop our learning together.

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Note: Footnotes and Links

Footnotes link to the References section (12), ordered by surname of first author.

All underlined links in the text are provided on a companion web-page for the convenience of readers who have a printed copy. This page can be found at www.carbonneutraluniversity.org/zero-carbon-university-guide---links

Supporting resources

The Guide has a companion web page[2] with a wide range of resources, including:

- Videos and slides from the four keynote presentations from the 'Changing Systems, Not Just Lightbulbs' event:
    - ***Zero Carbon Britain*** – **Paul Allen, Coordinator of the Zero Carbon Britain project at the Centre for Alternative Technology (CAT)**, speaking about a pathway for the UK to become zero carbon within twenty years.
    - ***Making it Happen*** **– Lisa Hopkinson, Lead Researcher on CAT's latest zero carbon report,** speaking on 'Making It Happen', CAT's research into overcoming psychological, social, economic and political barriers to building a zero carbon society.
    - ***Zero by 2040*** **– David Somervell** on the evolution of the **University of Edinburgh's climate strategy 2016-2026**. David was the Sustainability Adviser to the University of Edinburgh, and is currently an associate of the Edinburgh Centre for Carbon Innovation.
    - ***Theory U: An Introduction*** **– Adam Howard, of the Carbon Neutral University Network** introduces this practical approach to achieving change in complex systems. Adam is a community organiser and holds a diploma in Renewable Energy from CAT.
- Videos and slides of short presentations by participants at the event, on a range of low carbon initiatives:
    - Solar SOAS, a successful student-led solar power project
    - The successful campaign to get universities to divest funds from fossil fuels
    - Engineers without Borders
    - REACH Homes, an innovative local low cost, low carbon housing project
    - 'Building a Sustainable Vision for the Sheffield City Region', report by Sheffield Climate Alliance, 2017
    - Carbon Neutral University Network Sheffield (CNU)
    - Aquaponics as a low carbon local food production system.
- Extra videos and blogs giving scientific background to the zero carbon agenda.

2 www.carbonneutraluniversity.org/zero-carbon-university-guide

2. The Zero Carbon Challenge

Urgency and opportunity

There is no more urgent task facing us today than to set the UK on a path to rapid, substantial emissions reductions. The goal we aspire to is to bring net UK carbon emissions down to zero by 2030 or shortly after. This is a significantly tougher target than the current legal requirement of reducing emissions 80% by 2050 as required within the UK Climate Change Act (2008). However, only such faster decarbonisation would be in line with science-backed carbon reductions to keep global warming to a maximum of 2°C.

We contend that the UK can take an integrated approach to transforming its economy to zero carbon. It is not an either-or situation: we can simultaneously create jobs, improve health, enhance community cohesion, create safer futures for our children - and balance the books.

The twin imperatives of climate science and social justice

Climate science paints a clear picture of the urgency of tackling our carbon dioxide emissions. Global average temperatures have risen by over 1°C since the late 19th century, and 2016 was the hottest year on record – for the third year in a row. The projected breakdown in our climate has variously been described as the "biggest global health threat",[3] the "single greatest threat to sustainable development"[4], and the "greatest threat to human rights in the twenty first century".[5] These impacts are on track to accelerate. We simply must take action to avoid a calamity.

To have a reasonable chance of staying below a 2°C increase, we can only emit a limited amount more carbon dioxide into the atmosphere[6]. If the current global rate of 40 gigatons a year continues, this `carbon budget' will be gone in less than twenty years. The longer we delay taking action, the harder it becomes to stay within the budget. The figure on page 13 illustrates how delaying action now requires us to take more drastic and economically damaging action in coming years.

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3 Helena Wang and Richard Horton, 'Tackling Climate Change: The Greatest Opportunity for Global Health', *The Lancet*, 386, 10006 (2015), pp.1798-1799.

4 United Nations Regional Information Centre for Western Europe, *UN Secretary-General: Climate Change Biggest Threat to Sustainable Development*, 22 October 2013.

5 World Future Council, *Climate Change - The Greatest Threat to Human Rights in the 21st Century*, 6 July 2016.

6 IPCC, *Climate Change 2014: Synthesis Report*, p.64.

As the Paris Climate Conference of December 2015 recognised, a 2°C rise represents a significant disruption of global climate. It is predicted that poorer people, mostly living in the tropics or subtropics, stand to lose the most, but there will be effects across the world. Above 2°C, the disruption of global climate intensifies, becomes more widespread, and increasingly risks major, irreversible changes.

Carbon emissions vary enormously between countries and regions of the world. The average European, for example, emitted more than three times as much carbon in 2015 as the average citizen of India, and around twenty times as much as a Kenyan citizen. The average American citizen's emissions are roughly double the European level. So where do the deepest and fastest cuts in emissions need to come from?

It is now generally accepted, in the global negotiations, that it is the richer countries with the most carbon-intensive economies that have both the ability and the responsibility to set the pace of reductions. In parallel, we need to support the countries in the Global South to mitigate their emissions while also developing their own economies. A clear picture of the role that each country needs to play for climate justice to prevail is presented in an engaging interactive form by Climate Fairshares.[7]

Worryingly, many of our current policies for decarbonisation are based on models that assume the successful deployment of negative emissions technologies many of which are only at the prototype stage. There are major issues with infrastructure and energy consumption to operate carbon capture at power plants, for example. At the time of writing (summer 2018) there are only two large plants operating attached to power stations, capturing approximately 2.4 million tonnes of CO_2 per annum.[8] To make an impact on current emissions, capture needs to be several billion tonnes per annum.

The most widely-featured technology, bio-energy with carbon capture and storage (BECCS) requires deployment at enormous scale to provide the kind of emissions reductions envisaged in the models. An area between one and two times the size of India would need to be planted with energy crops.[9] Scientists who examined BECCS have urged caution: *"Its credibility as a climate change mitigation option is unproven and its widespread deployment in climate stabilisation scenarios might become a dangerous distraction".*[10]

7 www.climatefairshares.org

8 Global CCS Institute, *Projects Database*.

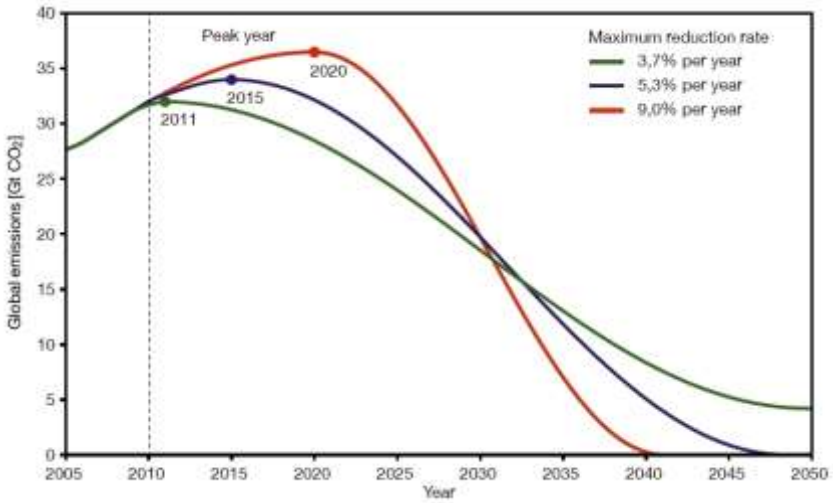
9 Kevin Anderson and Glen Peters, 'The Trouble with Negative Emissions', *Science*, 354, 6309 (2016), pp.182-183.

10 Sabine Fuss and 14 others, 'Betting on Negative Emissions', *Nature Climate Change*, 4, (2014), pp.850-853.

Prof. Kevin Anderson, Deputy Director of the Tyndall Centre for Climate Change Research, gave a talk to CNU[11] in 2016 in which he outlined how these modelling assumptions were creating a moral hazard. As he explained, we are delaying taking sufficient action in the short term in the hope that future generations will be able to engineer their way out of the problem we are locking them into. It is therefore our view that we should strengthen our current efforts to avoid leaving an unjust legacy.

Here in the UK, if we are to truly grasp the climate challenge on the scale required, and do so in an equitable manner, then we must strive to phase out greenhouse gas emissions over the course of just the next two decades.

We need to get our act together fast



(WBGU, 2009)[12]

Examples of global emission pathways for the period 2010–2050 with global CO_2 emissions capped at 750 Gt over this period. [1 Gt = 1 gigatonne = 1 billion tonnes = 1 x 10^9 tonnes.]

This shows the emissions reduction curves for a 67% chance of avoiding over 2°C of global warming. The longer we delay cutting emissions the more urgent the situation becomes if we are to stay within our carbon budget.

Note that 2016 global emissions of CO_2 were 36.2 gigatonnes[13] - almost exactly on the projected red line drawn in this 2009 report.

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11 Prof. Kevin Anderson, 26 April 2016.

12 German Advisory Council on Global Change (WBGU), *Solving the Climate Dilemma: The budget approach*, (Berlin, WBGU, 2009), p.16.

13 Statista, 'Historical carbon dioxide emissions from global fossil fuel combustion and industrial processes from 1756 to 2016', *The Statistics Portal.*


Sports Centre
Roger Stevens
Building
North-South
Campus Access Route

3. Universities Can Lead the Way

Around the world, many universities now have strategies to achieve carbon neutrality. In the USA, for instance, Cornell University has a 2035 target.[14] Here in the UK, the University of St. Andrews in Fife aims to be the first to go carbon neutral.[15] More British universities, such as Edinburgh, are committing to zero carbon and developing strategies to get there. At the University of Sheffield, the Carbon Neutral University Network has created a strategy[16] outlining one approach. The Environmental Association for Universities and Colleges (EAUC) is compiling experiences[17] and sharing knowledge[18] across the sector. The International Sustainable Campus Network is doing superb work "holistically integrating sustainability into campus operations, research and teaching".[19]

However… only a handful of UK universities are seriously trying to implement zero carbon plans. The fact is, climate goals face stiff competition for the attention of university leaders: research funding, Brexit, seeking new sources of income, renewing estate, attracting students in a competitive market, academic reputation, meeting academic excellence frameworks… It's not an easy set of balls to juggle.

On top of this, emissions targets set by the Higher Education Funding Council for England (HEFCE) are now defunct, as HEFCE has been disbanded. It had set a 43% reduction target by 2020[20] and had acknowledged that most were unlikely to hit this: the sector is expected to achieve a reduction of 13% on 2005 levels by 2020.[21] Since HEFCE's disbanding, a new *voluntary* target of a 30% reduction by 2020[22] has been established.

There are other underlying reasons why emissions reduction projects are dropping down the priority list. Over recent years government policy has been moving away from supporting public sector sustainability initiatives, and financial incentives to develop renewable energy schemes have been greatly reduced.[23]

With all this, what chance do we have of exhorting university leaders to give the necessary attention to the zero emissions issue and target it as a key strategic priority?

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14 Cornell University, 'Climate Action Plan: New Report Fall 2016', *Sustainable Campus*.
15 Rider Levett Bucknall, *St. Andrews' Aim to be UK's first Carbon Neutral University*, 24 April 2017.
16 Dr. Christian Unger, *A Proposal*, 27 January 2016.
17 EAUC, Next Generation Sustainability Strategy and Structure, May 2017.
18 EAUC, *Sustainability Exchange*, September 2018.
19 International Sustainable Campus Network, About, 2018.
20 Higher Education Funding Council for England, *Reducing Carbon Emissions*, 22 May 2017.
21 BriteGreen, *University Carbon Performance Tables 2015/16*, September 2017.
22 BEIS, *Emissions Reduction Pledge 2020: Emissions Reporting in Public and Higher Education Sectors*, 5th July 2018
23 Liz Lightfoot, 'Universities struggle to meet green goals', *The Guardian*, 22 November 2016.

This report starts from the premise that it has to be possible… because it is essential.

Universities can play a pivotal role in creating the global transition to a zero carbon future and it is vital that they do so. At one level, it is essential, because the climate science demands it of all our institutions, but it is also important because universities are uniquely placed to lead, and succeed, in becoming model zero carbon institutions. This is not just a case of learning to juggle one more ball, but rather it connects to the sector's deepest sense of purpose.

Our research is the basis for understanding climate change, and identifying the urgent need to act. Some universities are modelling ways forward, bringing expertise from many fields to bear on the technical, social and economic challenges. Remarkable success stories are emerging, for example, at Nottingham Trent, Brighton and Warwick universities.[24]

"Universities are uniquely placed to lead, and succeed, in becoming model zero carbon institutions. It connects to the sector's deepest sense of purpose."

Teaching many thousands of students across a wide range of disciplines in advanced facilities, with campuses and estates often the size of a small town, our universities could be 'living laboratories' for developing the zero carbon society. Our students are a formidable force for change. The ideas and mind-sets of many of the next generation of leaders in business, the media, civil society and politics are shaped in this crucible. The University of Bradford Ecoversity project[25] is another remarkable example of thinking about how to weave sustainability through everything a university does.

Universities can be more than a resource to inform society about the changes needed – they can be where the change happens. With students and staff learning and teaching together, universities can become 'intelligent systems', changing from within. Greening our campuses, changing behaviour patterns, reaching down into our deepest values: the learning opportunities are limited only by our imaginations.

24 Liz Lightfoot, *ibid*.
25 www.bradford.ac.uk/about/ecoversity/

4. Learning for a Low Carbon Future

"Human beings are natural systems thinkers...

... but like any innate capacity this talent must be understood and cultivated. Organisations committed to building the capacity to see the larger systems in which they operate not only create powerful learning environments within but begin to be a positive force for systems intelligence to flourish on a larger scale."[26]

Second order change and double-loop learning

Climate change has been characterised as a *"wicked problem"*. Wicked problems have been defined as *"complex problems involving multiple causes and internal dynamics that [cannot be] assumed to be linear, and [which] have very negative consequences for society if not addressed properly."*[27] Systems theory describes what happens when prevailing solutions are no longer adequate to bring about change on the scale needed.[28] The system *"goes into stress and must either evolve or breakdown"*. At this point, a *"second order change"* is called for – a change which *"transforms or reorganises a system to a higher level of performance."*[29]

As institutions dedicated to socially useful learning, universities can be natural leaders in this journey. The process of engaging in such transformational work offers a range of learning opportunities for staff and students, and for the institution itself. Second order change calls for 'double-loop learning', where what is discovered concerns not only the details of the challenge the system is presented with, but also the assumptions, values and beliefs that lie behind the situation.[30] [31] This leads into new and fascinating learning territory, beyond the existing tried-and-tested approaches to bringing about organisational or social change.

26 Peter Senge and others, *The Necessary Revolution: How Individuals and Organizations are Working Together to Create a Sustainable World*, (London: Nicholas Brealey, 2008), p.167.
27 B. Guy Peters, 'What is so Wicked about Wicked Problems?', *Policy and Society*, 36.3 (2017), p.385.
28 David Gershon, *Social Change 2.0: A Blueprint for Reinventing Our World* (New York: High Point/Chelsea Green, 2009), p.3.
29 David Gershon, *ibid*., p.3.
30 Mark K. Smith, 'Chris Argyris: Theories of action, double-loop learning and organizational learning', *infed*, 2013.
31 Richard Culatta, 'Double Loop Learning (C. Argyris)', *InstructionalDesign.org*, 2018.

Thinking in systems

An understanding of systems sets in context the importance of second order change and double-loop learning. We provide here a brief introduction to the fascinating field of systems thinking. Our aim in doing so is to show how the four areas of action presented in the following chapters each contribute important elements to bringing about the kind of systems change needed to meet the scale of this challenge.

Systems thinking is a field of work that has developed substantially over the last fifty years. The Academy for Systems Change provides a useful introduction.[32] Systems are collections of elements – people, technical components, resource flows – that are brought together for some purpose. They can be vastly complex – the health system or the education system, for example. Systems exhibit properties and behaviours not shown by the individual elements that make up the system: for example, a flock of starlings, or a class of children. Systems tend to be resistant to change, as anyone who has ever tried to turn an organisation round will testify. Furthermore, when attempts *are* made to change things, complex systems can respond in unexpected ways – often contrary to what logic would suggest.

"Changing systems means finding ways of working together that respect our differences and give us the courage to truly listen to one another."

Donella Meadows was one of the early pioneers of the use of computers for global systems modelling, co-authoring the seminal Limits to Growth[33] in 1972, followed by Beyond the Limits to Growth[34] in 1992. The challenge that has prompted this Guide – climate change caused by rising emissions – is, of course, one manifestation of breaching such limits. When the 'Beyond the Limits' team, Donella Meadows, Dennis Meadows and Jørgen Randers, had completed their second phase of planetary systems modelling in 1992, they were shocked by what they found. They came to realise that their second book needed to go beyond mathematical predictions. They turned their attention to what, in their view, was needed to address the issues they were presenting - the elements of the *"sustainability revolution"*.[35]

32 Academy for Systems Change, *Systems Thinking Resources*, 2018.
33 Donella Meadows and others, 'Limits to Growth', *Club of Rome.*
34 Donella Meadows and others, 'Beyond the Limits to Growth', *Academy for Systems Change.*
35 Donella Meadows and others, 'Beyond the Limits to Growth', *The Donella Meadows Project*, 1992, second heading: 'Love and the Revolution', second paragraph.

They argue in the final chapter of their 1992 book that the scale of the change that is needed calls on us to look at the core values and assumptions underpinning our society. Many of our rules and social structures promote individualism and competition. Yet we can only bring about this transformational change by working together and sharing power and resources, and therefore the authors close their book with a description of five 'tools' that can help us to do this. The last of these tools calls on us to evoke our capacity for *"brotherly and sisterly love"*, working together to overcome the cynicism and resistance that is inevitable, and to *"seek out and trust in the best human instincts in yourself and in everyone"*.[36]

We agree: changing systems means finding ways of working together that respect our differences and give us the courage to truly listen to one another. The following four chapters explore practical ways of doing this that have emerged in our own investigations.

Changing systems - leverage points

How can a systems approach be used to bring about change in the direction of zero carbon? Intervention points within a system need to be identified, where a relatively small effort can bring about a larger change - 'leverage points'.[37] What kind of leverage can we apply? We can change what flows into the system, in terms of energy, resources, people; we can change what flows out of it, for example greenhouse gas emissions. We can alter feedback loops – which either discourage or encourage certain behaviours or trends, i.e. negative and positive feedback respectively. We can change the rules by which the system operates; we can potentially change the basic assumptions, or paradigms, that underpin the behaviour of the system.

Amongst these interventions, some will be more effective than others, and give us a better return on our efforts. Given the unpredictable nature of systems, a systems perspective encourages us to test interventions on a small scale first. The results may not be what we expect. Once we do get encouraging results, the intervention can be scaled up. The relative effectiveness of different leverage points in the context of low carbon pathways is explored in our article, 'Embracing Systems Thinking and Complexity'.[38]

36 Donella Meadows and others, *ibid.*, third paragraph and final paragraph.
37 Donella Meadows, 'Leverage Points: Places to Intervene in a System', *The Solutions Journal*, 1.1 (2010), pp.41-49.
38 Adam Howard, *Embracing Systems Thinking and Complexity*, 11 July 2018.

Universities are themselves complex systems, nested within a complex social, economic and political environment. We propose not only that universities move in low carbon directions, but also that they take a leading role in bringing about such changes in the wider society. Embarking on a practical learning journey about systems change can strengthen a university's ability to lead this vital societal transition.

Changing systems - social creativity

David Gershon has led the development of programmes to promote environmentally friendly lifestyles in the USA[39] and to develop disaster-resilient communities in New York City and beyond[40]. In his 2009 book, 'Social Change 2.0: A Blueprint for Reinventing Our World', Gershon draws on thirty years of working in the field to offer a *"blueprint for transformative social change"*.[41]

In considering how we can address the climate change challenge, Gershon contrasts conventional, incremental change with transformative change. He argues that the former is not adequate to the task, in part due to the scale and pace of change that the climate science now tells us is required. He makes the case for *"a revolution in thinking about the very nature of social change itself"*, and for what he calls *"social creativity"*.[42] He reports that whenever he leads visioning exercises in communities, he is *"amazed by people's social inventiveness. All I do* [he says] *is give people permission to vision…. and create the safe and structured environment to help them bring these visions into form. They take over from there… This has taught me that the social creativity needed to invent the world anew is widely available to us"*.[43]

Our proposal in this Guide, supported by Gershon's arguments, is that our universities have a crucial role to fulfil in becoming leaders in this social transformation by moving to the cutting edge of institutional innovation and social creativity.

Joshua Cubista and his co-authors of the 2018 report from Global Education Futures, 'Educational Ecosystems for Societal Transformation', conclude *"What we believe is needed is nothing less than a paradigm shift in how we learn together so we can collaboratively co-create a future that works for all of humanity and our biosphere"*.[44]

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39 David Gershon, 'Low Carbon Diet: A 30-Day Program to Lose 5000 Pounds', *Empowerment Institute*, 2015.

40 David Gershon, 'Resilient Community Program: An Education and Outreach Program for Local Governments and Citizens to Create Resilient Communities', *Empowerment Institute*, 2015.

41 David Gershon, *Social Change 2.0: A Blueprint for Reinventing Our World*, p.8.

42 David Gershon, *ibid.*, pp.4-5.

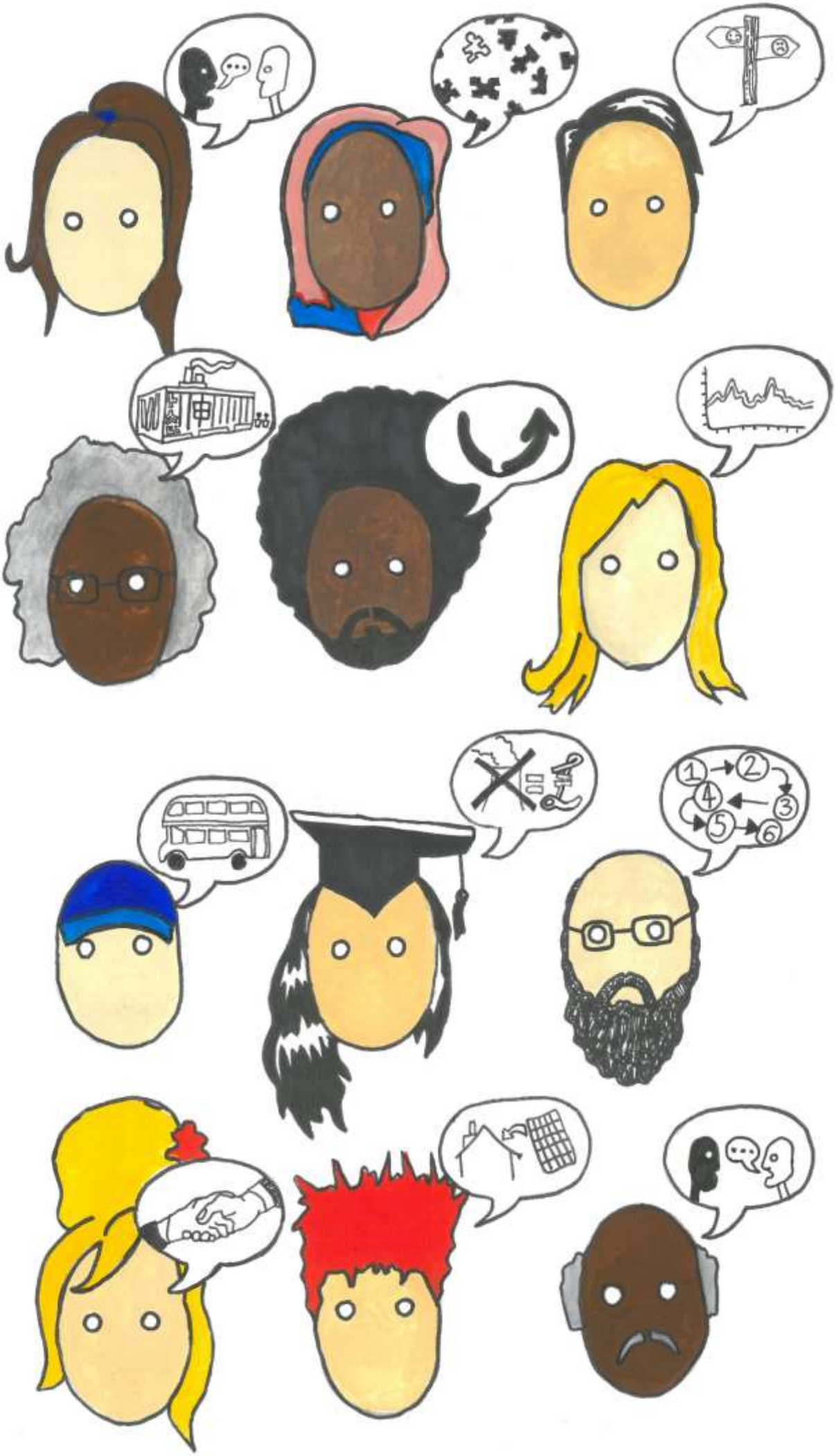
43 David Gershon, *ibid.*, p.200.

44 Joshua Cubista and four others, 'Educational Ecosystems for Societal Transformation', writing about the report on the *Academy for Systems Change* website, Blog 20 June 2018.

We present in the following chapters four steps on a path that could take our universities to such a position. For each, we consider principles and practical actions:

1. Embracing the creativity inherent within the institution and its surrounding community by engaging people from many disciplines and backgrounds, including students, academic staff and professional services staff in this challenge.
2. Developing high-level strategic thinking that embraces the collective nature of this challenge.
3. Building pathways by which staff and students can communicate effectively with people in senior positions, such that a genuine and open dialogue develops.
4. Creating a culture that encourages institutional and social experimentation through prototyping. This includes finding resources that allow good ideas to be developed and tried out, initially within the institution.

"We can change the rules by which the system operates. We can change the basic assumptions that underpin the behaviour of the system."



5. Engaging Multiple Perspectives:

Skills for Movement Building

"The realm of collective intelligence is the wisdom we possess as a group that is not available to us as individuals. There is a good scientific explanation for this. As separate ideas or entities become connected to each other, life surprises us with ***emergence*** *– the sudden appearance of new capacity and intelligence. All living systems work this way."*

Margaret Wheatley[45]

Can elaborate strategies written in lonely rooms really bring about lasting change? Margaret Wheatley suggests not. Instead, she encourages us to find ways of listening, learning and experimenting together: what emerges is more likely to be 'systems-intelligent'.

To make *"a sustainable, flourishing world for life beyond the Industrial Age"*, institutions of all kinds must learn to *"see the larger systems of which they are a part and foster collaborations across every imaginable boundary"*.[46] However, across the board - left and right, younger and older generations - we have not yet built a strong base of the skills and understanding needed to do this. We are going to need well-developed skills in listening to others and appreciating different perspectives; such skills are a crucial part of building systems intelligence.

Taking the example of Edinburgh, the University there has set itself an ambitious goal whilst recognising that no-one has *the* single answer as to how the University moves from emitting over 90,000 tonnes of CO2e in 2016 to emitting 'net zero' in 2040.[47] It has been accepted that the challenge will need to be addressed collectively, as David Somervell described in his presentation.[48]

45 From an Introduction entitled *'We can be wise only together'*, to the book *The World Café: Shaping Our Futures Through Conversations That Matter* by Juanita Brown and David Isaacs, pp.xii – xiii. Margaret Wheatley is a management consultant and author of the award-winning *Leadership and the New Science: Discovering Order in a Chaotic World*.
46 Peter Senge and others, *The Necessary Revolution*, p.11.
47 University of Edinburgh, *Zero by 2040: Climate Strategy 2016-26 Technical Summary*, p.3.
48 David Somervell, presentation at the CNU event 'Changing Systems, Not Just Lightbulbs', 13 May 2017.

The economist Jane Jacobs showed how successful development is a mix of intention and happy accident[49] - the predictable result of bringing people together with common purpose and an openness to trying new combinations of ideas and action.

So, what principles can guide us, and what practices can help us, in our pursuit of zero carbon? The rest of this section outlines a range of ideas to help you organise, foster collaboration, cross boundaries and build listening skills.

"Well-developed skills in listening to others and appreciating different perspectives are a crucial part of building systems intelligence."

A. Principles

- **Renew the vision**

There is an oft-quoted observation of Solomon: *"Where there is no vision, the people perish".* (Proverbs 29.18, King James Bible.) Visions of apocalyptic futures are not hard to come by. What about visions where the people *don't* perish? George Monbiot, amongst others, has called for a new narrative. He argues for a new 'Restoration Story', based on co-operation flourishing in an economy within ecological limits.[50] Senge and his colleagues urge us to keep our focus as creative as possible: *"When the creative orientation is primary, life becomes a journey of bringing into reality what you truly care about and addressing the many practical problems that arise along the way*".[51]

Paul Allen, who delivered the Zero Carbon Britain presentation at the 'Changing Systems' event,[52] told us that he once called into an HMV store and asked, *"Do you have any films that show how we made it through our current difficulties and built a sustainable, happy future?"* Standing amidst hundreds of DVDs, the assistant looked at him blankly.

We need positive stories that begin to make our vision a reality. Local stories of positive change can be especially powerful. One example where we are, in Sheffield, is the sustainable housing initiative REACH Homes, described in Jon Johnson's presentation.[53] Such stories need linking, wherever possible, to ways in which we ourselves can get involved.

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49 Jane Jacobs, *The Economy of Cities* (New York: Vintage Books, 1969).
50 George Monbiot, 'How Do We Get Out of This Mess?', *George Monbiot,* 11 September 2017
51 Peter Senge and others, *The Necessary Revolution,* p.50.
52 Paul Allen, presentation *Zero Carbon Britain: Rethinking the Future* at the CNU event 14 May 2017.
53 Jon Johnson, presentation *REACH Homes*, at the CNU event 14 May 2017.

In organising our conference, we found Otto Scharmer's 'Theory U' inspiring.[54] He encourages us to step back, and take the time to listen for *"what the future is calling for"*. (For more details, see Adam Howard's presentation.[55]) Once we begin to get a sense of what is being called for, Scharmer urges us to build prototypes, as we discuss on pages 51-55.

- **Identify values and purpose**

The extent to which a process of engagement is fruitful can depend on how well understood each partner's values and purposes are. Where there is agreement on shared values and purpose, there can be fertile ground for mutually beneficial collaborations. In the case of universities, and many other organisations, a set of values is identified in some statement of organisational purpose and mission.

One of the University of Sheffield's six 'Guiding Principles' in its 'Mission, Vision and Identity' is entitled 'Leading the Way', and it begins with this statement: *"We believe that universities have a responsibility to look ahead to important new problems and to offer intellectual leadership to society in response to them".*[56]

The University of Sheffield also discusses values and purpose in its Strategic Plan.[57] Whilst there is no specific mention of zero carbon as a purpose, under the heading 'Our Public Responsibility', the Plan makes this statement:

> *"We will foster a socially engaged approach that genuinely helps the society we serve, as well as supporting and growing the appetite for volunteering that exists in our staff and students. We will continue to work with our Students' Union to identify and give credence to locally, nationally, and globally essential conversations and reforms, especially those that support a socially inclusive and open society."*[58]

Many universities have similar vision or mission statements which can be an excellent place to find common ground to start these discussions. In the process of developing our own values and purpose, we can also hold our institutions to account, asking them to be true to their own word.

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54 C. Otto Scharmer, *Theory U: Leading from the Future as it Emerges* (San Francisco: Berrett-Koehler, 2009).
55 Adam Howard, presentation *Theory U*, at the CNU event, 14 May 2017.
56 University of Sheffield, *Mission Vision and Identity*, p.7.
57 University of Sheffield, *Our University Our Future Our Plan* (2015).
58 *Ibid*., p.32.

- **Make personal connections; become a trusted source**

We have found that personal connections, at all levels in the university hierarchy, are invaluable. Climate Outreach[59] specialises in communicating the importance of action on climate change. Their research with both young people[60] and the 'centre-right'[61] has found it is the people we know and trust who can influence us the most. This does not mean that in building such connections we have always to agree: we can be challenging within a relationship that respects the other person's point of view and priorities.

In communicating about climate change, the zero carbon agenda and the related challenges we face, it is important to be clear about our facts. We must not assume wide knowledge of these issues in the first place. Myths, misunderstandings and 'fake news' abound in this field. We need to base what we present on sound research. Luckily such expertise is plentiful in academic institutions.

And we need to offer positive recommendations for action. We can't avoid the gravity of the situation, but people need to hear about ways they can do something realistic and meaningful about what can otherwise seem overwhelming challenges. It is worth achieving clarity about what the 'calls to action' are before we present the scary stuff. We need to be attentive. How is our audience, or our conversation partner, engaging with what we are presenting? Which aspect are they most interested in? How can we build on that interest to take things further? Perhaps the most important thing is to offer ways of getting involved in taking action together with other people.

- **Engage with communities**

How can universities build effective engagement with local communities to address the 'grand challenges' of contemporary societal issues?

This question has been addressed in a project run by the N8 Research Partnership, a collaboration of the eight most research intensive universities in the North of England. Led by a team at the University of Sheffield, the project was entitled Co-Production - Knowledge that Matters.[62] The need to create environments where people listen well to each other came out strongly. With this in place, there is clear potential for valuable new knowledge to emerge.

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59 https://climateoutreach.org/

60 Climate Outreach, *How do young people engage with climate change?*

61 Climate Outreach, *Is framing a waste of time when it comes to climate change communication?*

62 N8 Research Partnership, *Co-Production: Knowledge that Matters.*

- **Build on the power of the student voice**

Research shows that at a life transition, such as starting university, people are often open to considering new ideas and perspectives, as discussed in Lisa Hopkinson's presentation.[63] The undergraduate years can present opportunities to open up the conversation about climate change and the environment.

There are 28,000 student voices at the University of Sheffield alone. If we want to engage undergraduates from different disciplines in the zero carbon movement, what will make this movement attractive? Having a strong social side to the movement may help, for example. What about style of communication and imagery? How suitable is the lecture mode for really engaging students with these issues?

What else could we do? We might involve celebrity figures, especially those who are past students or staff members or we could aim to give this movement 'a contemporary edge' for young people by giving them space and tools to develop their own ideas.

Surveys repeatedly show that the vast majority of students are deeply concerned about sustainability, with over 80% saying they want their institution to be doing more on sustainable development.[64] Most students also want to see their universities doing more to incorporate sustainability directly into the syllabus of their course. The National Union of Students (NUS) provides a host of examples of how this can be done in its report 'From Art to Zoo Management: Embedding sustainability in UK higher and further education'.[65] However, students also often report a lack of a sense of agency or awareness of how they can effectively contribute to collective action to bring about the changes they want to see. Efforts should be taken to share both narratives of past successes and how they were accomplished; and details of initiatives they can join or lend support to now.

The Students' Union is a body with significant influence. *"The SU President has more face-time with the Vice-Chancellor than the Director of Estates",* as someone at our event pointed out. At the University of Sheffield, the Students' Union is developing ambitious carbon reduction targets, and can be an important player in building this movement. How can we 'join the dots' here? For example, in Sheffield a joint statement was made in 2015 by the Vice-Chancellor and the President of the Students' Union on climate change and fossil-free divestment.[66] What could the next such statement say?

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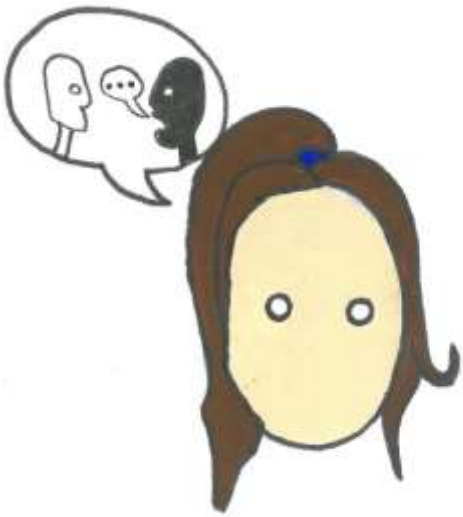
63 Lisa Hopkinson, presentation *Making it Happen* at the CNU event, 14 May 2017.
64 NUS, 'Skills and Sustainable Development', *Our Research.*
65 NUS, 'From Art to Zoo Management', *Resources.*
66 Prof. Sir Keith Burnett and Christy McMorrow, 'Joint statement on climate change and fossil-free investment', *The University of Sheffield News 30 November 2015.*

- **Be current and relevant; learn about emotional triggers**

Linking our case to current events and latest reports is vital for giving contemporary, and continuing, relevance to the arguments we are making and the appropriateness of the actions we are pushing our institutions to take. For example, as we write in summer 2018, recent news that global emissions rose again in 2016 can give a renewed sense of urgency.[67] It is important in any communications, however, that such news is linked to actions we can get involved in – or it can all-too-easily lead to an increased sense of powerlessness, and a turning away.



It is also important, however, to watch out for 'good news stories' that make it appear progress is being made - but in fact are misleading. For example, emissions for the institution may have dropped but in fact this is due to the closure of coal-fired power stations and increased generation from lower-emission gas-fired stations and renewable sources. This reduction is not due to any action on the institution's part - and the reduction cannot be sustained after these 'big hit' changes have been completed. These kinds of stories need to be put in context by those who fully understand the situation, quickly after the news breaks - or they may weaken a campaign message.

There are a number of things to consider in 'effective science communication', as Climate Outreach explain.[68] For example, do the people we are communicating with have a scientific or technical background? If not – beware of all those graphs! Beware, also, of simply 'laying the blame' at other people's (or another country's) door. Instead, explore what difference we can make. As far as the topic allows, be positive and constructive.

What emotional triggers are likely to catch our audience's attention? This is explored, for example, in Climate Outreach's "Bringing climate change into the here and now",[69] and on the linked video "For the Love of".[70]

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67 J. G. J. Olivier, K. M. Shure and J. H. W. Peters, *Trends in Global CO2 and Total Greenhouse Gas Emissions: Summary of the 2017 Report,* p.3.

68 Climate Outreach, *Do's and Don'ts of Effective Science Communication.*

69 Climate Outreach, *Bringing Climate Change into the Here and Now.*

70 The Climate Coalition, *For the Love of*.

- **Harness expertise and energy amongst staff members**

Universities have large numbers of staff: the University of Sheffield employs over 8,000. Amongst them will be people already passionate about this cause, and people with a range of specialist expertise.

How could we build on that to engage more staff members – especially perhaps people new to our university? How might they 'hear the message', what kind of invitation might they respond to? New academic staff are likely to be, firstly, very busy; and, secondly, interested in making connections. Specific invitations that link to their areas of expertise may catch their attention.

Many staff are represented by two unions; the University and College Union (UCU)[71] (for teaching staff) and Unite[72] (for professional services staff). Can we engage with union representatives? The UCU has a stated intention to *"press employers in every college and university to develop local carbon reduction strategies in conjunction with staff unions and student representatives."*[73] Unite, meanwhile, is calling for a 'just transition' to a low-carbon economy, with *"climate jobs".*[74] These nationwide organisations are potentially key allies. Could they be more 'actively green'? Can we raise the priority level of these intentions within the unions and, if so, how? Does our union branch have green reps?[75]

71 www.ucu.org.uk
72 www.unitetheunion.org
73 UCU, *The Environment*, January 2017.
74 Len McCluskey, *Meeting the Climate Change Challenge*, Unite the Union, October 2015.
75 TUC, *Go Green at Work: A Handbook for Union Green Representatives*, March 2008.

B. Practical Actions

● Systems mapping

Participatory approaches can help teams deepen their understanding of an organisation and the context in which it works, leading to collective goal-setting. Where goals are 'owned' collectively, commitment grows, a team spirit is generated - and conflicts are more likely to get resolved constructively. Here are some tools for participation:

- ➢ 'Theory U' is an example of a process that can build big picture understanding. See Adam Howard's presentation and the resources linked from it.[76]
- ➢ Techniques that involve people working together to create a 'systems picture' can be both valuable and enjoyable. One example is Tom Wujec's 'Draw How to Make Toast'.[77]
- ➢ Use graphics, draw maps, make models. Make the situation, the vision and the goals as tangible as possible. Explore participatory design tools, such as those outlined by Participate in Design.[78]

● Create conditions for engagement and collaboration

With a well-designed approach, and some relatively simple facilitation skills, events and meetings can be conducted such that everybody's voice is heard, respectfully. This is in contrast to what so often happens – when some voices are heard repeatedly and at length, and other voices are not heard at all. Such imbalances are the antithesis of what is needed to 'get the system in the room'. We risk missing out on the kind of systems intelligence that can develop when a respectful listening environment is created.

In his stories of 'Solving Tough Problems', Adam Kahane describes how, in meetings where people with different interests listen respectfully to one another, there may come a time when no-one is talking - but there is a special quality of listening taking place. From this, something genuinely new can emerge.[79] Where discussions are rushed, or dominated by a few people, this is unlikely to happen. Unhurried time is needed for this kind of listening.

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76 Adam Howard, presentation *Theory U,* at the CNU event, 14 May 2017.

77 Tom Wujec, *Draw How to Make Toast: A Simple and Fun Introduction to Systems Thinking*.

78 Participate in Design, *Our Tools, Methods and Principles*, 2018.

79 Adam Kahane, *Solving Tough Problems: An Open Way of Talking, Listening and Creating New Realities.* See for example 'The Wound That Wants to be Whole', pp.113-127.

- ➢ Guidance is available on creating the conditions needed for this kind of work – such as 'The Ten Components of a Thinking Environment'.[80]
- ➢ Here is a resource developed by Adam Howard, who delivered the 'Theory U' presentation: Conditions which encourage Creativity, Collective Intelligence and Commitment.[81]

● Make meetings effective

Meetings are an environment where creative thinking can be fostered, and collaborations developed. However, most of us have experience of long, frustrating and ineffective meetings. We may need to break out of established models and old habits!

Here is one resource that can help with the design of engaging and effective meetings: More Time to Meet, a toolkit for meetings designed by Adam Howard, drawing on the work of Nancy Kline.[82]

Another great resource for organising effective, inclusive meetings of all kinds can be found on the website of the training collective 'Seeds for Change'.[83]

We recommend that, if you try out some new ways of running meetings, you seek feedback on people's experiences (anonymously if need be). Find out how well it has worked - and invite suggestions for further developments.

● Develop systems to integrate engagement of different groups into governance

Whilst one-off events can be valuable, we also need to explore how new conversations can become integrated into the running of the organisation. Sheffield University Students' Union, for example, has established a Sustainability Committee as a bridge between activists and university managers.[84] CNU has set up a climate communications group where people plan, organise and rehearse respectful conversations with people who can get decarbonisation put on agendas across the institution. We have been inspired in this enquiry by the work of George Marshall[85] and Hope for the Future[86].

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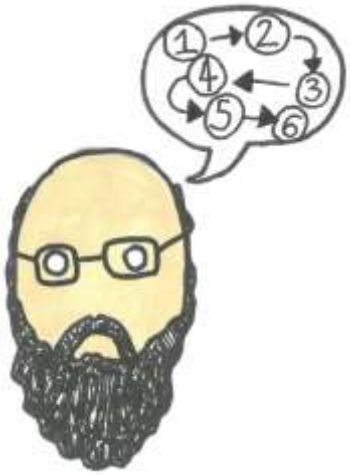
80 Time to Think, *The Ten Components*, 2012.
81 Adam Howard, *Conditions which Encourage Creativity, Collective Intelligence and Commitment*, February 2016.
82 Adam Howard, *More Time to Meet*, April 2018. Nancy Kline, *More Time to Think*, 2015.
83 Seeds for Change, *Our Resources.*
84 Sheffield Students Union, *Sustainability Committee – Be Part of the Solution*, 20 March 2017.
85 George Marshall, 'Don't Even Think About It: Why Our Brains are Wired to Ignore Climate Change', *climateconviction.org* [n.d.]. *Book of same title* (London: Bloomsbury, 2014).
86 www.hftf.org.uk

- **Work with networks that bring people together in common cause**

Networks can attract a diverse range of talented and committed people. We suggest, naturally, that the Carbon Neutral University Network (CNU)[87] is a good example! (See Section 11.) It has attracted members from right across the university and outside. Not all are active on a day-to-day basis but many will turn out for special events.



Alternatively, you might develop connections with existing structures such as staff-student committees and trade union branches representing university staff.

Local community groups working for action on climate change and sustainable zero carbon visions may be valuable allies. For example in Sheffield, CNU has strong links with Sheffield Climate Alliance.[88]

- **Make use of established programmes**

Green Impact is an example of a well-established programme for universities developed by the National Union of Students (NUS), with clear structures and an awards system.[89] Find out what's happening in your institution. What contribution might you make? Is decarbonisation being looked at?

- **Carbon Literacy training**

How would it be if everyone had some basic 'carbon literacy' training? Could a programme be developed for staff and students? The Carbon Literacy Project may be a useful inspiration.[90] It was developed in Manchester where a programme is now running at both the University of Manchester[91] and Manchester Metropolitan University[92] as well as for all local authority staff.

87 www.carbonneutraluniversity.org
88 www.sheffieldclimatealliance.net
89 NUS, *Green Impact: Staff and Students Greening Campuses, Curriculums and Communities*.
90 Carbon Literacy Project, *www.carbonliteracy.com*
91 The University of Manchester, *Carbon Literacy,* [n.d.].
92 Manchester Metropolitan University, Department of English, *Carbon Literacy Training for Students*, 8 May 2017.

- **Work together to create learning opportunities for zero carbon**

Working together to explore how we can reduce our own carbon footprints can lead to valuable learning both personally, and as a group, e.g. friends, neighbours or professional colleagues. Online tools designed to assist with this process include WWF's Footprint Calculator[93] and Global Footprint Network's 'What is your Ecological Footprint?'.[94]

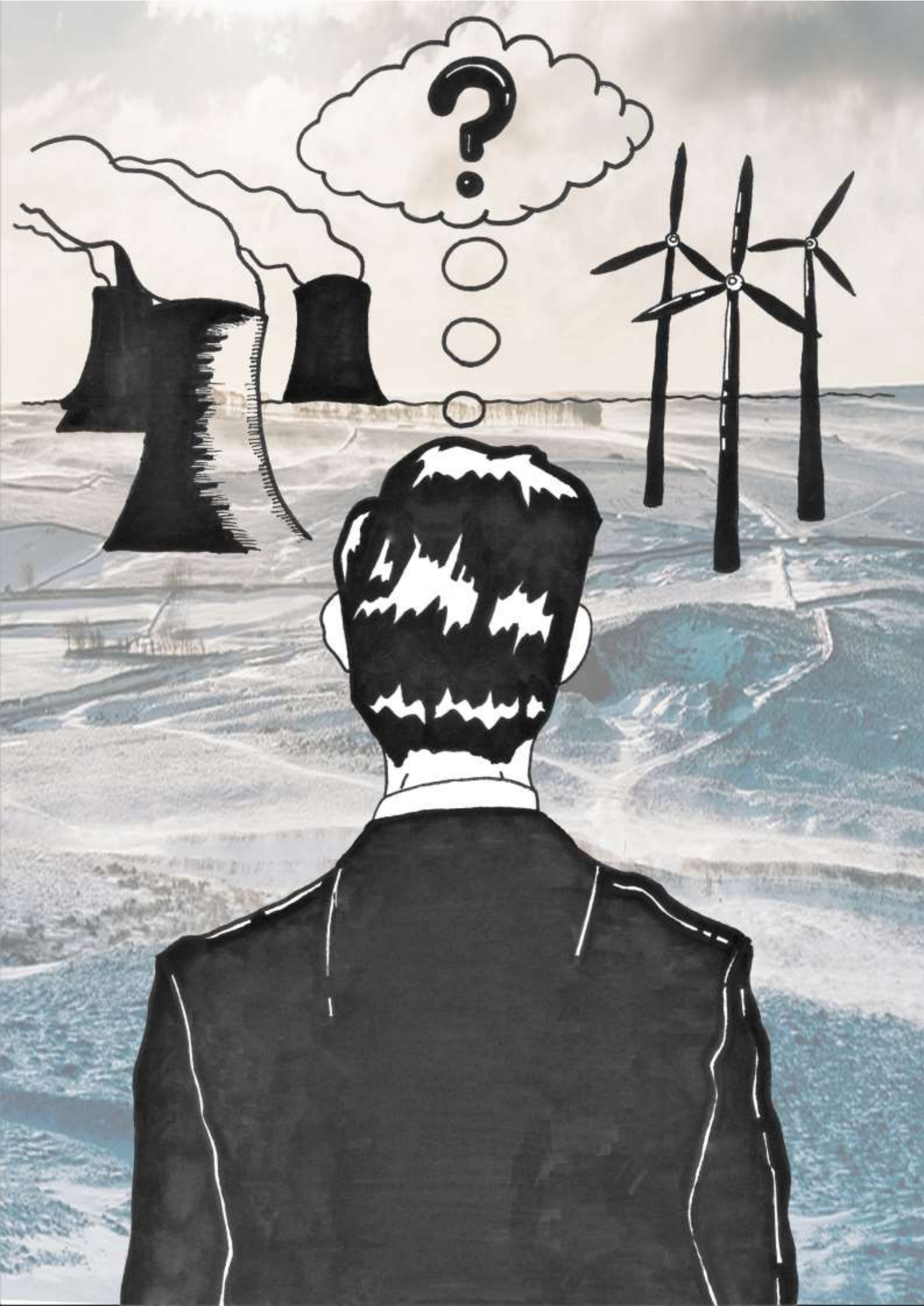
A growing body of research demonstrates that most people need the support of a group before they will commit to making significant changes such as personal carbon reductions - this, for example, is the approach of Carbon Conversations.[95] Here, the footprint work becomes part of a shared learning experience that locates individual action within the context of social, economic and infrastructural systems. The guidebook produced for Carbon Conversations, 'In Time for Tomorrow?', is a resource that groups can use to discuss the many dimensions of carbon reduction, and their feelings about the challenges, but it is also a practical handbook of things individuals can do.[96]

There is always an interplay between the individual and the systems they are operating within. A system such as aviation cannot be fully decarbonised with present technology, and so a reduction in usage is called for to bring down emissions significantly. But to achieve that reduction, new social norms have to be established. In higher education, the campaign to reduce academic flying[97] is one attempt to achieve this.

"Why go to all this trouble?"

There is no doubt about it: engagement and collaboration takes time, effort and resources. Where we are under pressure to work quickly, save money, and get results, it can certainly seem much easier not to bother! Ultimately, it may only be when – especially in a leadership position – we can answer clearly *for ourselves* why we want to work on collaboration and engagement, that we commit to doing so. Our recommendation is to ask this question of yourself, and to discuss it as a leadership team.

93 WWF, *Footprint Calculator*, [n.d.].
94 Global Footprint Network, *What is your Ecological Footprint?* 2018.
95 Carbon Conversations, *Can Interviews with the Carbon Calculator Reduce People's Carbon Footprints?* 31 May 2018.
96 Rosemary Rendall and Andy Brown, *In Time for Tomorrow? The Carbon Conversations Handbook*, Carbon Conversations, October 2015.
97 Clive L Spash, *Campaign for Academics to Fly Less*, [n.d.].



6. Strategic Thinking:

The Roles of Senior Leaders

A strategy has been defined as *"a plan of action designed to achieve a long-term or overall aim".*[98] The word comes from the Greek *stratēgia* – "function of a General"[99] - and thus implies a strong leadership role. The leader(s) produces a plan of action which has clear objectives: it lays out the steps needed to be taken and the order they need to be taken in, and anticipates possible obstacles. The objectives are likely to be both hard and soft. As with many military campaigns, in addition to meeting the practical challenges, it is necessary to win over 'hearts and minds'.

"Leadership from the front is essential because of the psychology of climate inaction..."

How can such strategies be developed for zero carbon? Paul Allen pointed out in his presentation that building a positive vision of a zero carbon world is vital. CAT's report 'Who's Getting Ready for Zero?' can help sustainability champions by showing what is already happening around the world.[100] Meanwhile, the EAUC's report 'Next Generation Sustainability - Strategy and Structure' gives examples of the different ways that HE institutions are approaching change, both 'top-down' and 'bottom-up'.[101]

A. Principles

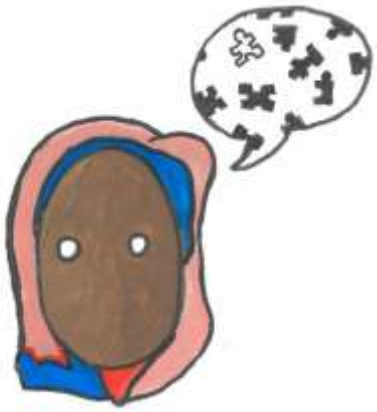
Sustainability is the future and an important direction for any strategy. This is a *"necessary revolution"*[102] and universities and colleges can become *"zero heroes"*, helping secure *"a stable climate and a prosperous future for generations to come"*, as Paul Allen says.[103]

Leadership from the front is essential because of the psychology of climate inaction, namely that climate change is too remote and gradual to trigger people's 'fight or flight' responses. A good strategist looks further ahead, seeing both the dangers and the opportunities that most people may not be fully aware of.

98 Oxford Living Dictionaries, *Definition: Strategy*, 2017.
99 Collins English Dictionary, Fourth Edition (Glasgow: HarperCollins, 1998), p.1516.
100 Centre for Alternative Technology (CAT) and Track 0, *Who's Getting Ready for Zero?,* 2015.
101 EAUC, *Next Generation Sustainability Strategy and Structure*, May 2017.
102 Peter Senge and others, *The Necessary Revolution.*
103 Centre for Alternative Technology, *Who's Getting Ready for Zero?,* p.7.

Leaders must create a positive vision and goals that inspire action with optimistic messages about what can be achieved, not negatives. Resistance is to be expected; achieving change may well mean confronting entrenched interests and working with those who hold them to encourage their transition to the 'clean tech' economy.

HE leaders need to think systematically, considering how policy, infrastructure, teaching, research, services, marketing, staff development, etc., interact with each other to set the parameters for thought and action and create the institution's culture. Accepting that the cultural shift towards sustainability is necessary means ensuring that it cannot be 'silo-ed' within a single department or aspect of the institution. Over time, the strategy must address the whole organisation: buildings, energy, transport, travel, purchasing, waste, food, behaviour and communication, etc.



HE institutions can be agenda-setters, shaping future opinions. However, to do so, they must overcome the 'ivory tower' problem. They need to engage with sustainability so as to build credibility, relevance and reputation, seeing it as central to the impact agenda. Establishing and integrating a sustainable campus would be a robust response to the challenge from policy-makers and the wider public that universities achieve intellectual understanding but take little action. By applying sustainability research taking place within the institution itself, a 'living laboratory' can be developed that serves as an example of positive change. Such activities attract attention in a way that any number of learned papers are unlikely to do.

Not least, developing a reputation for having a low-carbon campus could attract the attention of prospective students. In the NUS 2016-17 survey of factors influencing choice of where to study, 39% of higher education students reported that 'action their place of study takes on environmental issues' was a significant factor in their choice.[104]

It may be helpful to draw attention also to the wider benefits of sustainability, making the links with health, well-being and 'clean tech' jobs. Framing sustainability under social responsibility may appeal to a wider audience, and reduce the risk of it being pigeonholed as an 'environmentalist's concern'.

104 NUS, *Sustainability Skills 2016-17*, March 2018, p.12.

In building a strategy, much can be learned from what has been done already in other HE institutions in the UK and globally, but acceptance will be enhanced by relating to local issues and priorities. Engaging with sustainability league tables such as BriteGreen[105] and People and Planet[106] can allow universities to identify best practice in order to share and recognise success. A new EAUC/AUDE Sustainability Leadership Scorecard was launched in Spring 2018 by the Association of University Directors of Estates (AUDE) and the Environmental Association of Universities and Colleges (EAUC), designed as a comprehensive tool to measure sustainability work in UK higher education institutions.[107]

Senior leaders are the people best placed in their organisations to think about, and plan for, the longer-term. They need to anticipate and help lobby for national legislation that requires publicly-funded bodies to contribute to national carbon reduction targets under the UK Climate Change Act. They can produce policies to minimise emissions from all new developments, and ensure that institutions are not locked into high carbon emissions through badly designed new infrastructure.

The goal ought to be for low carbon and sustainable practices to permeate the entire organisation. Leaders need to inspire and enable actions, both large and small, at all levels, and not overlook the power of small but visible actions across the campus. Sustainability champions within the institution need authorisation, legitimisation and encouragement. Leaders can give permission and set an example.

Examples include Kristina Johnson, who took over as Chancellor of the State University of New York (SUNY) in September 2017. She is calling for all new SUNY buildings to be net zero carbon, and leading on a plan for the entire campus to become a zero carbon operation. She also plans to establish a substantial endowment fund to support research into zero carbon pathways.[108]

Manchester Metropolitan University achieved first place in the People and Planet University League in 2017, and has consistently held a place amongst the top three in the table since 2013. The University has worked to integrate sustainability into the student journey throughout the courses it offers, and offers paid roles for Student Sustainability Ambassadors to work on events and campaigns.[109] As Hannah Smith of People and Planet says, *"Manchester Metropolitan is showing the sector what's possible when a university community comes together to take action on climate and social justice".*[110]

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105 BriteGreen, *University Carbon Performance Tables 2015/16,* September 2017.
106 People and Planet, *University League: How Sustainable is Your University?*, 2017.
107 AUDE and EAUC, *Green Scorecard Launched*, 2018.
108 Bethany Bump, 'New Chancellor Envisions Zero-Carbon SUNY', *Times Union*, 22 January 2018.
109 Manchester Metropolitan University (MMU), *Student Sustainability Ambassadors,* 2017.
110 MMU, *Manchester Metropolitan ranked as the UK's greenest university*, 14 November 2017.

B. Practical actions

- Make spaces for deep and honest reflection and conversation about your organisation, climate change and sustainability.
- Think positive: build a positive vision for your institution using input from all sectors within it and, by engaging widely, develop and maintain commitment to the vision at all levels in the institution.
- Like the University of Edinburgh (see pages 58-61), empower the organisation with a well-publicised Mission Statement and create Champions at a high level to lead sustainability action around campus.
- Get going: decide what is doable today to allow for specific, measurable, achievable, realistic and timely (SMART) goals.
- Produce and publicise a well-researched and practical strategy, engaging a wide array of people in the process, with a view to permeation and cultural shift.
- Consider failure to achieve carbon neutrality and sustainability as part of the risk assessment.
- Reallocate resources internally to start delivering as a low carbon institution and 'living laboratory'.
- Assess senior leaders' performance also according to the success of meeting decarbonisation targets.
- Look for motivated thought leaders and change agents within the staff and student bodies: find those who understand the issues and can set an example. Develop strategy delivery groups.
- Identify where further research is needed to help overcome barriers and do it. Run small projects, learn from them, and then scale up successful prototypes. Consider the 'living laboratory' approach. Utilise research outcomes to inform, update and communicate your strategy.
- Ensure that carbon reduction research is locally impactful. Explore ways to build strong local links, to enhance the sense of place, building on dominant local values and identities, and contributing to the greening of the local economy, as an anchor institution.
- Work in partnership with other HE institutions, businesses, local authorities, etc., locally, regionally and nationally.

C. Questions for developing a strategy

The following questions are proposed as key points to reflect on when developing a sustainability strategy.

- **Where does our institution currently sit in relation to carbon neutrality and sustainability?** What would be the benefits of our setting ambitious goals? What would be the challenges and resistances?

- **What is our vision?** When do we aim to achieve carbon neutrality? How can we align this aim with our other aims and objectives and values? How can our particular institution best contribute to new knowledge and next practice in sustainability?[111]

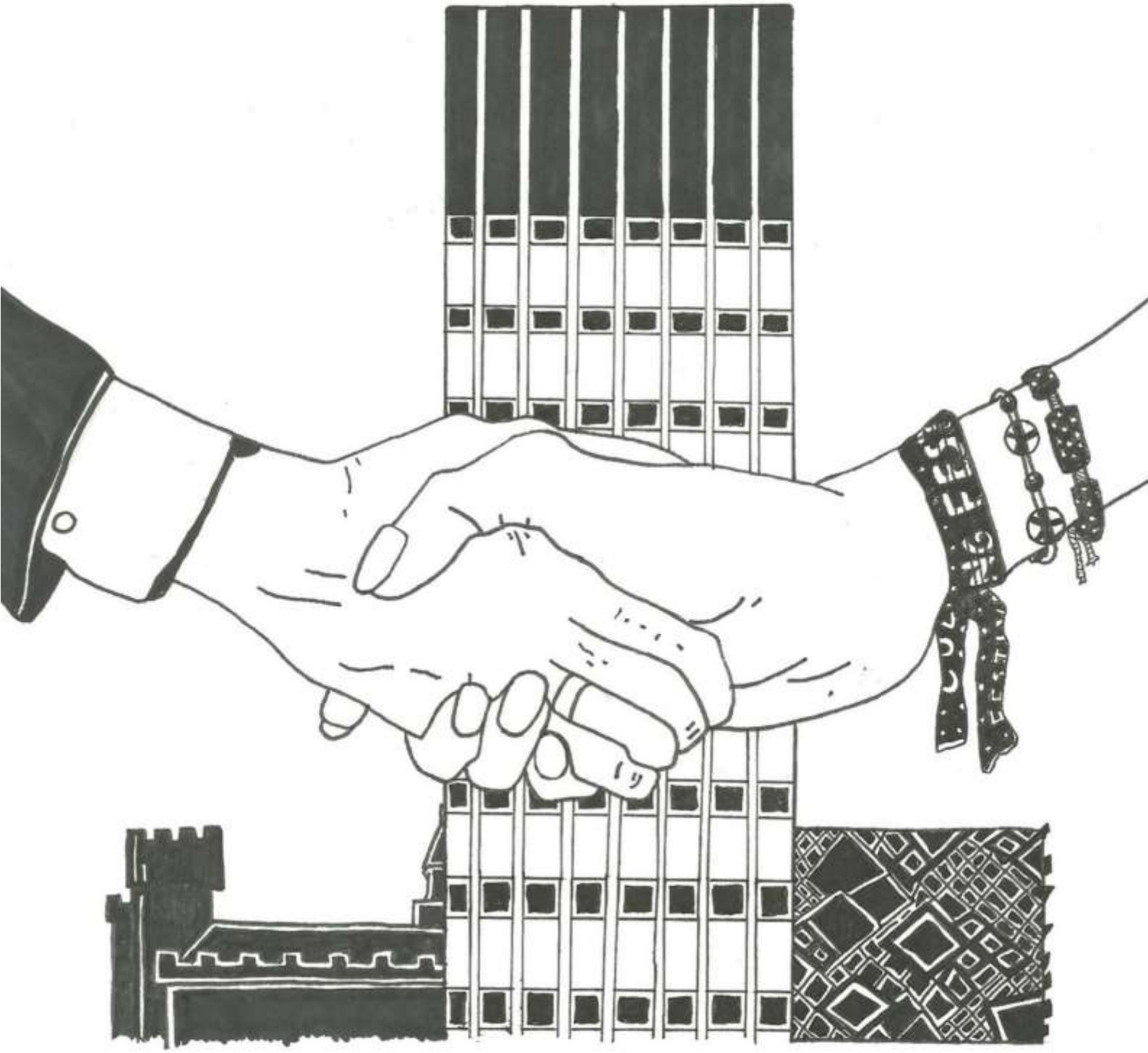
- **How can we get a cultural shift?** Which staff and what resources can we engage? What skills and motivations can we harness amongst them, as well as our undergraduates and postgraduates?

- **What local partnerships, skills, traditions and resources can we connect with?** What local projects are underway that we could build links with? How can we link regionally, nationally and internationally, but within a low carbon travel policy?

- **What are the risks of not aiming for zero carbon?** What challenges and resistances do we anticipate and how can we surmount them? How can we minimise 'collateral damage' such as destruction of infrastructure? How can we avoid carbon lock-in?

- **What is our own role in the overall picture?** What strengths – and what weaknesses – do we ourselves bring?

111 Paul Hobcraft, 'Forget About Best Practice, It Is All About Next Practice', *Hype Innovation Blog*, 23 November 2016.



7. Engaging with University Management:

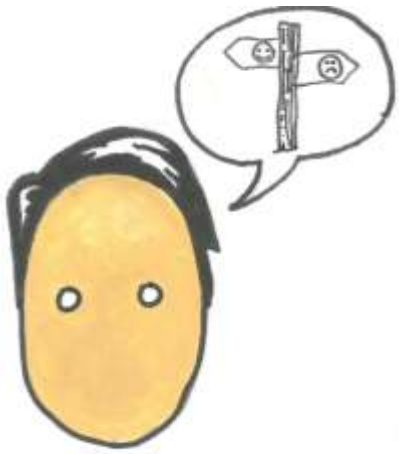
The roles of students, staff and postgraduates

Senior managers are some of the most influential people in your university: getting them on board is vital. At the 'Changing Systems, Not Just Lightbulbs' event, we asked people to think about principles that can be applied to engaging with management as well as share ideas for practical actions. We hope these will be helpful when building your own strategy.

A. Principles

Do your research.

It is important to build a dialogue with higher education leadership and encourage a shared, inclusive and achievable vision. Being positive is very important. Create a picture that people can identify with and get motivated by.



Aim for cultural change and establish long-term goals. Lessons can and should be learnt from other universities.

Identify who are the key gatekeepers, as their opinions have considerable impact when developing strategies for the future.

Economic considerations are often foremost in many senior managers' minds, but encourage them to look at the bigger picture by considering the triple bottom line of economic, social and environmental benefits when developing policies, projects and underlying business models. It helps to develop an understanding of how projects are analysed; for example, learn about the use of discount rates when costing projects.[112]

Sustainability should be embedded everywhere, but before trying to get it embedded in other strategies, you first need a specific sustainability strategy that lays out how to do it and who should do what.

112 Andreas H. Hermelink and David de Jager, *Evaluating our Future: The Crucial Role of Discount Rates in European Commission Energy System Modelling*, (Stockholm: European Council for an Energy Efficient Economy, 2015).

A building and environmental policy is often one of the first indicators of a commitment to sustainability, but it needs a clear management structure to ensure it is implemented. It is important that environmental policy is enabled with an environmental management system that enacts any policy, such as ISO 14001 (see page 47 for more on this).

Sustainability should be considered from the early stages of any project to harness the most benefits and achieve the biggest impact. Early transparency in the planning process is critical to allow for discussion of these matters with managers right from a project's conception stage when key design decisions are made.

Aim to develop an inclusive sustainability governance structure, connecting Estates management with academic departments, professional services, the University Executive, students, volunteers and external bodies.[113] Seek to represent and integrate all parties, tapping into a bigger collection of ideas and pooling transformative energy. Meeting climate change targets should not solely be the responsibility of the Estates department.

People working together in teams provides support, diverse experiences and skills and a shared workload. It is hard to get people engaged with an overwhelming workload.

Base your policies, campaigns and action plans on science. The University of Sheffield claims to be 'research-led' in its strategy. Climate change is an extensively researched field, offering clear targets for carbon reduction and solutions to achieve it.

Understand human psychology. It is important to recognise that sometimes people's motivations may be more emotional than objective. Personal concerns and stories help to get traction with the university executives who are employed to act on sustainability.

Understand the external environment and environmental compliance issues for universities. For example, until recently universities were required to report their carbon emissions to the Higher Education Funding Council for England (HEFCE).[114] Carbon targets are voluntary, and not achieving them does not result in a direct penalty but can result in negative publicity. There are a few sustainability league tables that hold institutions to account and which could be used as performance indicators for management, such as People and Planet's 'University League: How Sustainable is Your University?' and the BriteGreen 'University Carbon Performance Tables' (see page 39), or the 'Green Scorecard' developed by the Association of University Directors of Estates (AUDE).[115]

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113 EAUC, 'Governance Matters', *Next Generation Sustainability Strategy and Structure*, May 2017, pp.24-25.
114 HEFCE, *Reducing Carbon Emissions*, 22 May 2017.
115 AUDE, *Green Scorecard*, 2018.

Students are important stakeholders within HE. Reputation is directly relevant to students' choice of university, which is directly relevant to the university's business model since student fees are now the main income for most UK universities. More than 80% of students say they want their universities to be doing more on sustainability[116], and students can be strong campaigners if such issues are not addressed. They are taken very seriously if they compile a powerful message and ask for change from top management.

Walk the talk. It makes an impact if you set an example on campus. But, when campaigning, be aware that your own world view is often reflected in your surrounding community (as in social media), which means that you create your own bubble. To reach outside it, you need to listen to the values and concerns of others. However low carbon you are, avoid being sanctimonious about your own lifestyle - this will be counter-productive! (A useful resource here is 'Connecting on Climate, A Guide to Effective Climate Change Communication'.[117])

"Reach outside your own bubble - listen to the values and concerns of others."

Multiple things must happen to achieve sustainability, and so a multifaceted approach and many contributors are needed to enable holistic change. Everybody has a view on sustainability and all views should be considered. Don't get stuck on one particular difficulty and then never start. Just do what you can, but do it.

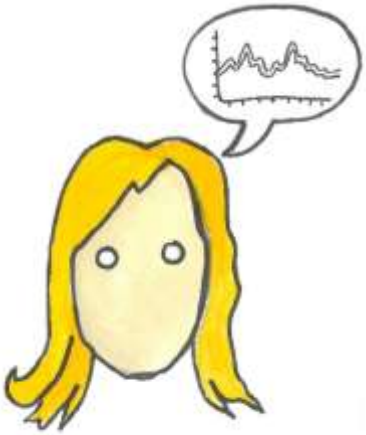
B. Practical Actions

- Draw up a 'power map' or organisational chart to identify who is doing what.[118] Find out who your management is, what their track records are, and what sustainability means to them. Include students and the student union. Who are the key players?
- Engage with these key players at every opportunity. Listen to what they need to deliver and tell them what you know and care about. This is better done as a representative for a recognised group, rather than as an individual. Where possible, use existing away-days and business planning days, rather than creating new ones.
- Identify and aim to get involved with key existing committees and governance meetings where sustainability is discussed and decisions made. Encourage transparency in the early planning stages of projects, listen, critique and support others and/or add your passion and evidence to drive changes.

116 NUS, 'Skills and Sustainable Development', *Our Research,* [n.d.].
117 Center for Research on Environmental Decisions and ecoAmerica, *Connecting on Climate: A Guide to Effective Climate Change Communication*, (New York and Washington, D.C: 2014).
118 Andrew Boyd, 'Power Mapping', *Beautiful Rising*, [n.d.].

- Do your research. Motivations, drivers and performance indicators for HE management are usually compiled in a publicly available strategy document.
- Identify the internal and external stakeholders for your university. Students, staff, academics, the local community, suppliers, and many more. Raise awareness among these people, and bring some of them with you when discussing with management, to augment your voice.
- Build a network of sustainability enthusiasts, visionaries and experts, and build a sustainability vision. Acquire skills and provide training (e.g. on climate change, biodiversity, energy, behaviour change and communication) to prepare yourself and others. Students often appreciate the chance to learn new skills and technologies.
- Starting with small things helps draw people in, so they can eventually achieve the big things together. It helps for project teams to form around shared interests and affinities.
- Academics are important drivers within HE, but are often very focussed on their own research. However, they can be valuable contributors if proactively engaged. Get in touch with the relevant experts in each department and keep them updated on your progress. Invite them to contribute their expertise for specific events, even if they can't make an ongoing commitment.
- Look around for external champions who can provide real-life examples of management engagement and share the sustainability vision that works for their institution. Invite them to share their experiences in events, seminars or just social environments.
- Create opportunities for management to engage with sustainability issues away from their day-to-day environment, e.g. on an away-day (somewhere nice where they can focus and discuss). Structure activities to focus on the sustainable future of the university. Bring leaders from successful sustainable institutions along, to provide positive examples and motivation. Take them on a trip to a site with successful sustainability solutions in action.
- Identify ways and opportunities to create dialogue between top level management across institutions (Vice-Chancellors, Executive Boards, Council). Peer perspectives can be important influences on top management. Overseas university leaders may provide additional inspiring examples, perhaps joining by Skype.
- Look at the Key Performance Indicators for your institution. KPIs provide pressure points that management understands and has to act upon. Question existing ones, and suggest new ones - particularly reduced carbon emissions - backed by scientific evidence and strong stakeholder support.

- One of the barriers holding back some university managers is that university growth seems incompatible with the reduction of total carbon emissions. Some managers have seen it as unfair to be scored on total emissions when they have always looked out for growing their business. It is hence important to point them to the possibility that growth and carbon emissions can be decoupled.[119]
- ISO 14001 certification is an internationally recognised environmental management standard that shows an ability and willingness to manage environmental targets. In 2017, the University of Sheffield went through the process of implementing an ISO 14001 environmental management system, which requires organisations to evaluate their impact and set out actions to minimise them. Ask your institution for their management system and what it aims to do.



- Work with managers to agree clear targets and a timeline, to simplify and enable management action and the measurement of progress. In terms of carbon emissions, clear guidelines on how to transition to a carbon neutral country are available from the Zero Carbon Britain (ZCB) report published by CAT.[120] A 2030 timeline for carbon neutrality has been suggested by ZCB, and the CNU network at the University of Sheffield has confirmed and researched timelines with the same result.
- Lobby important organisations for Higher Education, e.g. Office for Students, NUS, EAUC, AUDE, the Russell Group, and whoever is most relevant to your institute.[121]
- Ask questions, monitor university actions, and help make internal steps transparent to all.
- Use the web and social media to reach out and provide resources for others to act on. Keep people up-to-date with what's happening, both with your activities and with low carbon (or high carbon) developments at the university. Use a newsletter, social media, an e-zine. Find creative people who can make the stories attractive and engaging.

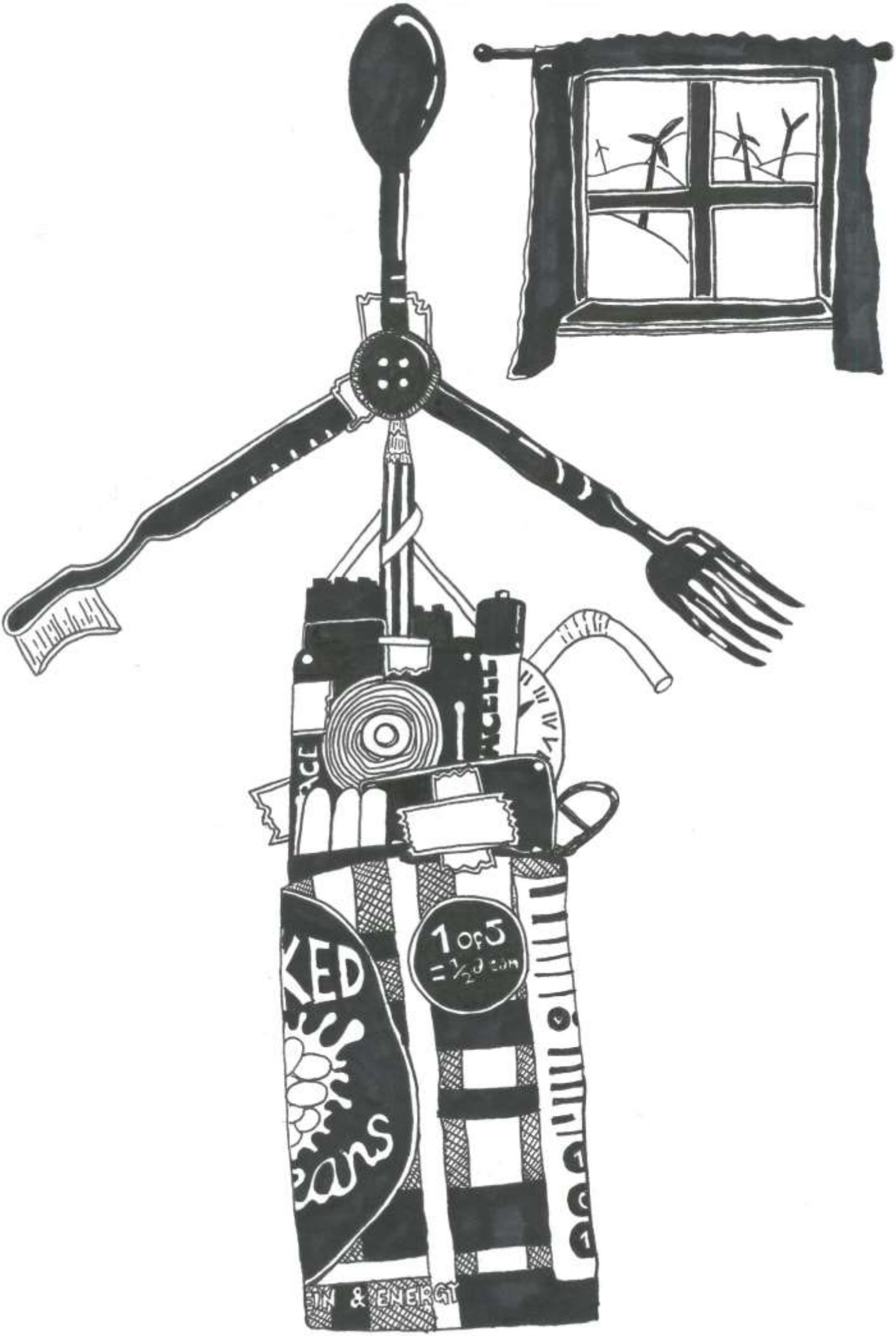
119 University of Edinburgh, *Zero by 2040: Climate Strategy 2016-26*, (Edinburgh 2016), p.3.
120 Centre for Alternative Technology, *Zero Carbon Britain; Making it Happen*, (CAT: Allan Shepherd, 2017).
121 www.officeforstudents.org.uk, www.nus.org.uk, www.eauc.org.uk, www.aude.ac.uk, www.russellgroup.ac.uk.

C. Questions to help you brainstorm about management engagement

- What do we know about our organisation? How does it work? What challenges and opportunities is it facing? What are its core values? How are decisions made?
- Who has the leverage over the principal and senior management team in terms of change? Who has the authority and can give permission to enact change?
- What do we know about the people who make key strategic and governance decisions? What are their concerns? Their interests?
- What are the politics of power more generally? What are the politics relevant for the top managers in HE?
- The 'people's university' concept: how can students, staff and citizens influence university policy at high level?
- How do we create a 'reflective space' for senior management? How can we help them achieve the required 'suspension' to slow down, observe and think, as proposed in 'Theory U'? (see pages 32/33). Beyond people already 'in the room', can we help one another to hear the voices of those in other parts of the world and of future generations?

"What do we know about our organisation? How does it work? What challenges and opportunities is it facing? What are its core values? How are decisions made?"

- How do we persuade academics to change their courses to integrate Education for Sustainable Development (ESD)?
- What's the appropriate university committee that climate action should come under?
- Does it help us gain traction if we frame climate change broadly under social responsibility rather than as part of the environmental agenda? Do we need to change our vocabulary away from 'sustainability' or 'green' to more social terms such as 'well-being' or 'happiness'?
- In talking to senior managers about finances and risk management, are we doing just what is needed or are we reinforcing their assumptions and preventing deeper reflection?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8. Prototyping and Scaling Up:

Moving from listening into action

Prototyping means creating *"living microcosms in order to explore the future by doing".*[122] This can take many forms - from practical, technical projects to innovations in organisation and ways of bringing people together. For example, the students at SOAS have created the first working prototype in the UK of a community energy project owned and run by students (see pages 62-66). The development of such prototypes is an iterative process which *"integrates head, heart and hand"* and *"generates feedback and suggestions for improvement by all key stakeholders".*[123]

People, cities and states across America responded to the USA's withdrawal from the Paris Accord in 2017 by doubling their efforts to work together. As Robert Orr, Dean of the School of Public Policy at the University of Maryland, put it at the time:

> *"The electric jolt of [Trump's withdrawal] is accelerating this process that was already underway. It's not just the volume of actors that is increasing, it's that they are starting to coordinate in a much more integral way."*[124]

These actors in the USA started to make links with other nations directly, and with the United Nations climate processes, bypassing the federal administration entirely.

The moral of the story is that we cannot wait around for 'top-down' management solutions to magically appear: we must take action ourselves. 'Prototyping and scaling up', as envisaged in Theory U, is about developing new project ideas, then working with colleagues to link them, and then making wider connections to expand their reach.

We have argued that universities can be a model for necessary changes at the national level. There are projects happening at many universities across the UK, showing what's possible. Two are discussed later (see pages 57-66).

Building connections between people working at different universities can enable change to happen without official leadership buy-in initially. That buy-in may follow later, but through 'bottom-up' actions we can lead the way ourselves, persuading senior management through example.

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122 C. Otto Scharmer, *Theory U: Leading from the Future as it Emerges,* (San Francisco: Berrett-Koehler, 2009), p.39.
123 *Ibid*., p.62.
124 Hiroko Tabuchi and Henry Fountain, 'Bucking Trump, These Cities, States and Companies Commit to Paris Accord', New York Times, 1 June 2017.

A. Principles

To make scaling-up a success, our approach has to be 'open source'. Don't be 'possessive': build inclusiveness into what we do, always be willing to connect and share openly. This will strengthen the connections across the system, making them more than the sum of their parts. Spreading good practice will happen naturally if we keep making new connections - and we can be continuously signing others up as our influence grows.

Another workshop participant asked how each prototype embodies what we believe: we need to keep asking each other, *"How does it reflect our values?"*, so that we can own the process wholeheartedly and collectively.

"We cannot wait around for 'top-down' management solutions to magically appear: we must take action ourselves."

Don't neglect what is important and unique locally. Each university has its own identity, its own strengths and weaknesses, and its own original ideas and projects. Bespoke projects that appeal to local identity are more likely to enable those involved to feel, *"We can do it"*.

Changing student and university perspectives will result as prototypes are scaled up and connections made, making what we do more and more visible. Over time, we can create strong links between different parts of the university and between organisations. We can start to think about longer-term targets. Can we build a network? How could we aim to build connections between universities? When might this be achieved by? How can we bring in other higher and further education institutions?

Questions will naturally arise about how we measure our university's position and its progress. For example, how does its emissions per student compare with other similar institutions? Or similarly, its emissions per £1 million of revenue? Are these figures falling year-by-year, or rising? These are the kind of 'benchmarks' that are commonly used to compare different institutions. Universities with many technical and scientific courses will have higher figures than those that concentrate on the arts, humanities and languages. Laboratories and workshops are usually energy-intensive facilities.

When we focus on prototyping, the early, small-scale results may have little impact on these large-scale 'benchmark' figures for an institution. We can argue, though, that valid benchmarks to establish also include the number of prototype initiatives coming forward, the amount that is being invested in the development of the best ones, and how long it takes for an investment decision to be made once an idea is presented. These measures can all be 'signs of health' of an enabling culture within an institution that encourages engagement and innovation.

Much carbon use is structurally locked in. As one workshop attendee said, we *"need to focus on the big stuff"* to achieve effective decarbonisation. Anything that might build in future CO_2 commitment, such as new buildings, needs to be questioned. An approach to 'commitment accounting' that quantifies future emissions implied by current investments is considered in this paper.[125]

Prototyping and scaling up can help to demonstrate what is possible and what should be done. There is always a risk of feeling overwhelmed. The optimism engendered by making and discussing prototypes can boost our resolve[126] to turn round the ocean-tanker-sized university sector.

B. Practical Actions

The practice of prototyping and scaling-up starts with ideas and projects from activists across UK universities. There is no shortage of ideas; this section touches on some of them that arose during the 'Changing Systems, Not Just Lightbulbs' event.

One participant asked, *"How can we accelerate what is already happening?"*. To do this, we need to audit what **is** happening - which can be a good way to build connections across HE establishments.

The audit might start with identifying existing low carbon projects and practices within the institution, as well as looking at what is happening beyond the university in the local area. You could create a library of good examples. Events like the 'Changing Systems, Not Just Lightbulbs' weekend are themselves excellent ways to share ideas. Invited speakers hopping between universities also act as pollinators, enabling new ideas to blossom.

Students - international as well as domestic - have a vital role to play in prototyping and scaling up. Many projects have started with amazing student work and grown into exemplars - for example, 'Switch Off' at Warwick University[127] and Solar SOAS[128] (see pages 62-66). Engaging with international students may present challenges with language and culture, but the opportunity to build cross-cultural connections is rich in potential for disseminating low carbon ideas and practices.

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125 Steven J. Davis and Robert H. Socolow, 'Commitment Accounting of CO_2 Emissions' *Environmental Research Letters* 9, no.8, 2014.
126 Per Espen Stoknes, 'Why our Brains Ignore Climate Change - and What to Do About It', *weADAPT.org*, 16 September 2016.
127 NUS, 'University of Warwick Student Switch Off Campaign', *Student Switch Off*, [n.d.].
128 UniSolar, *Solar SOAS is UniSolar's Flagship Project*, [n.d.].

The changes brought about through our prototypes need to be made visible if they are to have the desired impact. In Sheffield, one of the churches local to the University, St. Mark's, has a prominent physical display of energy use and how it is being improved. Why can't the University have this too? This could also be done for water and carbon. There are challenges of benchmarking, as already mentioned, but universities have the intellectual power to design effective tools: that's a great prototyping project in itself.

You may also want to create a communications and engagement strategy. Posters, social media posts, stalls, film nights, and groups like Sheffield's Carbon Neutral University Network, can all help to share what you are learning and build solidarity. Using visual, topical, and 'human interest' stories tends to engage readers more than purely technical ones. Some may want to look into climate change more deeply: one 'Changing Systems' participant suggested running Carbon Literacy[129] and Carbon Conversations[130] groups.

As well as more system-wide changes - promoting viable alternatives to international travel for work, for instance - we should not overlook simple technical gains. LED lightbulbs are one obvious example: they make a real, sustained difference to energy use, they are simple to install, and the process may raise awareness.

As with existing NUS Green Impact work, benchmarking can tie in nicely to a certain healthy competition between departments and awards can be offered.

In terms of funding good ideas to become prototypes, groups/networks can exert pressure on their own institutions to use development funds to support the prototyping of sustainability ideas as a key part of their strategy. A commitment to doing this would contribute to the whole idea of universities having a role as innovators in the area.

The work we all do from the ground up should support the growth of Education for Sustainable Development (ESD) within teaching and academic culture. Where possible, this can be co-curricular - built right into courses. The University of Bradford Ecoversity project[131] (mentioned in Section 3) shows how sustainability can be woven into everything a university does. At Edinburgh University, Prof. Pete Higgins has developed an accredited online course 'Learning for Sustainability' (introduced here[132]) that has since led to new, open global courses. Edinburgh's course will be running again in 2018[133] and there are many more available online (see, for example, here).[134]

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129 Carbon Literacy Project, *www.carbonliteracy.com*

130 Carbon Conversations, *www.carbonconversations.co.uk*

131 University of Bradford, *Ecoversity*, 2018.

132 RCE Scotland, *The University of Edinburgh Learning for Sustainability MOOC – a Free Online Course*, 12 June 2015.

133 University of Edinburgh, 'Learning for Sustainability', *Massive Open Online Courses (MOOCS)*, 15 January 2018.

134 University of Illinois, 'Introduction to Sustainability', *MOOC List*, 2018.

C. Questions for Prototyping

- What 'prototypes' do we think the situation is calling for?
- Will our ideas meet the '7 Criteria' test for effective prototyping in 'Theory U', i.e.
    - **Relevant:** Does it matter to the key people involved?
    - **Right:** Have we got the right dimensions? Does the microcosm mirror the whole?
    - **Revolutionary:** Can it change the system? Do we address the systemic root issues?
    - **Rapid:** Can we do it quickly?
    - **Rough:** Can we do it small scale?
    - **Relationally effective:** Are we leveraging the existing networks and competencies?
    - **Replicable:** Can we scale it?
- Is our prototype working? How are we going to test for this?
- How are we going to scale up?

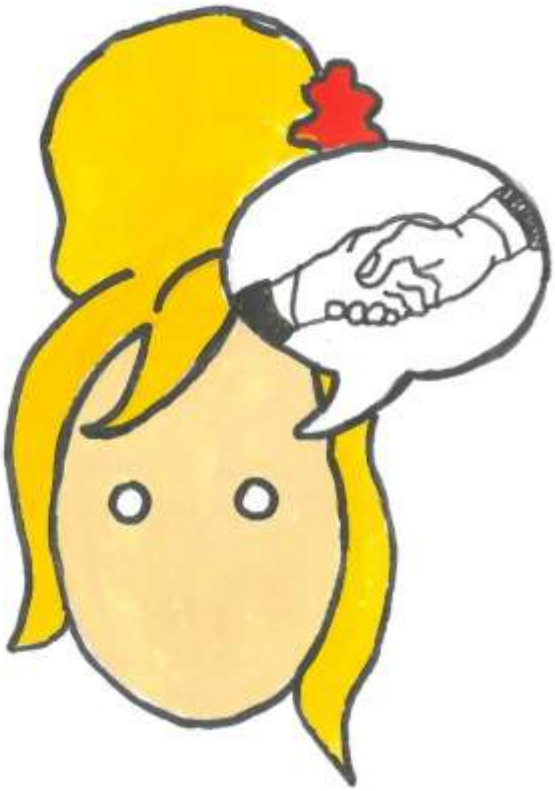
9. Case Studies:

Vision, leadership and learning

We present here two case studies that demonstrate practically much of what we have discussed in this Guide.

- The story of the University of Edinburgh's 'Zero by 2040' Climate Strategy 2016-26 illustrates how institutional leadership has evolved. It also emphasises the 'whole institution' nature of the conversation.
- 400 miles to the south, it is the students of the School of Oriental and African Studies (SOAS) in London who have taken on a leadership role, pioneering 'Solar SOAS': the UK's first student-led community renewable energy project.

At heart, both of these stories are about vision, leadership and learning: the very essence of the role our universities need to play in the coming transition to zero carbon.



Case Study 1: The University of Edinburgh's 'Zero by 2040' Climate Strategy

This story is drawn from David Somervell's presentation and interview, as well as research by the 'Changing Systems' editors.[135]

The story behind 'Zero by 2040'

In 2016, the University of Edinburgh adopted a new climate action plan with the ambitious target of achieving net zero carbon by 2040. This was the culmination of nearly 30 years of patient work. One of the key people in the story was David Somervell, who spoke at our event.

David started as the University's Energy Manager in 1989, *"sitting in a cupboard"*, he says, although his appointment was a sign of a real and on-going institutional commitment. David's first big job was to draw up an Energy Strategy which was adopted in 1990. The University agreed to allocate 5% of utility spend to energy efficiency measures.

"The Department for Social Responsibility and Sustainability at Edinburgh now has a team of 22. Their role is to engage with 300 academic colleagues, using the University as a living laboratory."

David then made the case to senior managers at the University for an even greater commitment. *"With gas prices as low as they are – unsustainably low - we are living in a false heaven"*, he said. He persuaded them to install the first Combined Heat and Power (CHP) plant at a student residence. In the following two years, gas prices rose 40% and then 60% consecutively. In due course, the University made the decision to invest £30 million in CHP, which now generates 80% of the electricity used on campus.

David described how the gradual development of an enabling culture amongst the University's senior leadership led to the creation of a new Department for Social Responsibility and Sustainability, headed up by Dave Gorman, who joined the University in 2013 as its first Director. It was a *"game-changer"*, David Somervell says. It became clear, he said, that the challenge was one for the whole University: it had become *"too big for Estates"*, as the then Director of Estates put it to him. 'Stretch targets' were adopted, including bringing the University's emissions down to 'net zero' by 2040.

135 David Somervell, presentation at the CNU event, 13 May 2017.

Good progress; big challenges

The Department for Social Responsibility and Sustainability at Edinburgh now has a team of 22. Their role is to engage with 300 academic colleagues, using the University as a 'living laboratory', and promoting a 'circular economy' leading to a low carbon future.[136] In the circular model, the focus is on restoration and regeneration, and waste is 'designed out', rather than jettisoned into an ever-more polluted environment.

There is now a Renewable Energy Working Group chaired by the Director of Finance. Moreover, no fewer than eight pages of the latest Annual Report are devoted to social responsibility and sustainability. *"This is a turnaround"*, David says, evidence of a cultural change over a number of years.

By 2013, the University had a new climate action plan for reducing its carbon emissions, and had made serious investments in energy efficiency and climate-related research. But it was still falling short of its targets. Its estate was expanding, new (energy-intensive) laboratories were being built, and student numbers had more than tripled since 1989. In the seven years to 2015, turnover increased by 52% to not far short of £1 billion. Should the University pursue a 'business as usual' path over the next eight years to 2025, without further changes in energy generation or usage patterns, absolute emissions will grow, in spite of all the action already taken.

There are five key drivers of emissions growth that the University recognises – common to most Russell Group universities. These are: growth in student numbers; expansion of the estate, including advanced facilities; internationalisation; a vast expansion of research activities ('massification'); and 'big data', requiring energy-intensive processing. The challenge, then, goes far beyond the Estates Department: it is for everyone.

136 Ellen MacArthur Foundation, *What is a Circular Economy?* 2017.

Commitment to change and innovation

The new strategy developed under Dave Gorman grew out of a process of engagement across the entire institution, including academics as well as estates staff. The ambitious target that emerged was endorsed by senior management and the University Court[137], signalling a new corporate commitment. The strategy takes a whole institution approach to climate change, and covers both practice and policy, under four headings:

- Effective use of space and energy
- Policy and behaviour change
- Investments in, or purchase of, renewables
- Changes to our investments.

A 'can do' environment is being created at the University, including a Sustainable Campus Fund[138] of £2.75 million that will support good projects brought forward by anyone. From proposal to answer, the turnaround time now is quick, and successful ideas are funded. It is a good model which supports the 'rapid prototyping' advocated in our presentation on 'Theory U'.

"The new strategy grew out of a process of engagement across the entire institution, including academics as well as estates staff."

The University of Edinburgh has built its knowledge, systems and credibility in sustainability over three decades, and now has set itself the kind of well-founded but challenging target that is needed if the world is to keep temperature rise below two degrees. David points out that agreeing the policy is only the first step: the real challenge is in implementation. He says, *"There will now have to be a spirit of enquiry across the university to make it happen"*.

A range of resources and information about the University of Edinburgh's 'Zero by 2040' commitment and its whole institution approach can be found here.[139]

137 University of Edinburgh, *Governance and Strategic Planning; About the University Court,* 22 March 2016.
138 University of Edinburgh, *Social Responsibility and Sustainability; Sustainable Campus Fund*, 1 August 2017.
139 University of Edinburgh, 'Zero by 2040', *Social Responsibility and Sustainability*, 13 December 2016.

A systems change perspective

What factors enabled the University of Edinburgh to come to this level of commitment?

- **Vision and leadership**: The key factor that David identifies is the support that he and his colleagues received early on from leaders with a long-term view of the institution.

- **Listening to everyone's concerns:** David emphasises that not all of the senior managers he has worked with over the years had sustainability as their primary concern. The appeal made to them needed initially to be in terms of the economic benefits (reducing costs) and risk management (insulating the University from the vagaries of fuel prices). The agenda widened out over time.

- **Leadership from below:** It is important to find and nurture senior managers, or members of the University Court, who are willing to be advocates. However, student pressure can also play an important role. David points out that many students are willing to speak up on behalf of the environment, as demonstrated by their campaign for divestment from fossil fuels.

- **Team learning and collaboration across boundaries:** Students' Union officers may even have greater access to the Vice Chancellor and senior committees than members of staff do. But sustainability campaigners need to show an understanding of institutional mechanisms and work within them to encourage and effect gradual change, *"putting a word in at the right time and place"*. This approach can help to bring people around: an early Director of Finance started out sceptical but became an active supporter. One model for this kind of change in values and assumptions is 'double-loop learning' – another recognised aspect of systems change work.[140]

- **'Creating rather than problem-solving'**: In general, a focus on what can be achieved, rather than the barriers, is more effective and generates positive feeling. Framing environmental sustainability under social responsibility means that it appeals to a wider audience, and is not pigeonholed as a marginal concern.

140 Academy for Systems Change, 'Double Loop Learning', *Systems Change Resources,* 2018, 4th heading in capitals.

Case Study 2: Solar SOAS

Solar SOAS is a student-led Community Renewable Energy project, based at the School of Oriental and African Studies at the University of London. The project owns and operates a 29.6 kW array of solar PV panels, has raised £40,000 in finance, and now generates around 24,000 kWh per year of electricity: enough to power 5 typical homes. According to calculations by the 'Changing Systems' team, this reduces CO_2 emissions by about 7.5 tonnes per annum.

There is a dynamic 'TED'-style presentation about the project by Hannah Short here.[141]

We asked Hannah to tell us more about the project, how it started and developed – and where it's going next. Here is what she said:

What got the project started?

Students at SOAS bring a strong international perspective to their concerns. The Energy and Climate Justice Society was formed there in 2013. Following the success of the 'Fossil Free SOAS' campaign to get the university to divest from fossil fuel-based investments, many of the ECJ Society's members wanted to look at the 'next question': so, if not fossil fuels, how do we build a clean energy future?

In September 2014, Solar SOAS was established to answer this question in a very practical way. Why not harness the sun's energy falling on the University itself? Why not make use of our empty roofs, and take energy generation into our own hands?

Who became involved?

The students who played key roles in driving this project came from a variety of backgrounds. None were technical specialists: SOAS focuses on social subjects such as humanities and languages. Some of them are still involved in Solar SOAS, some not – but all have been very helpful and appreciated! (The key players from amongst SOAS students, plus one from University College London (UCL), are listed on page 65.)

141 Hannah Short, presentation at the CNU event, 13 May 2017.

What have been the key steps and milestones in the project?

The evolution of Solar SOAS illustrates how important it is to 'just get started', to experiment – and to learn from the process. In 'Theory U' terms, the journey down the left-hand-side of the U began after the successful divestment campaign, with the question *"What now?".*

We went to a talk about community energy projects delivered by Agamemnon Otero of Repowering London,[142] and loved the idea of energy democracy – and decided to have a go at making it a reality on campus. Here's the journey to date:

1. A motion passed unanimously in the SOAS Students Union, supporting the Solar SOAS project, in 2015.
2. Positive dialogue with SOAS Estates and Facilities Management, as well as the SOAS Energy Manager.
3. UniSolar Limited was registered with the Financial Conduct Authority (FCA) as a Community Benefit Society (BenCom).
4. Solar SOAS was a finalist in the Mayor of London's Low Carbon Entrepreneurship Award 2014[143].
5. Awarded £500 IGNITE Fund from SOAS Ventures.
6. Received £20,000 feasibility funds from the Urban Community Energy Fund (UCEF) from the Department of Energy and Climate Change.
7. Applied for pre-accreditation Feed-in Tariff (FiTs).
8. Launched crowdfunding; successfully crowdfunded total amount from the SOAS community.
9. Installed 114 panels on SOAS in September 2016.

"The evolution of Solar SOAS illustrates how important it is to 'just get started', to experiment – and to learn from the process."

142 www.repowering.org.uk

143 SOAS University of London, 'Solar SOAS impress judges at the Mayor's Low Carbon Entrepreneur Award', *News,* 19 March 2015.

Once the decision was made to pursue a Community Renewable Energy project, all kinds of research and experimentation began. At first, there were many more questions than answers:

- What are the legal issues related to this?
- How do the finances work?
- What are the long-term implications?
- And many more…

Being finalists in the Mayor of London's Low Carbon Entrepreneurship Award was the tipping point: through that, we met lots of people within the community energy sphere who pointed us in the right directions.

We were really helped by the Urban Community Energy Fund (now defunct) application, it helped guide us in terms of what things needed to be thought of to make our project a reality. We were also helped by countless individuals and organisations along the way!

We worked very organically and had no official structure: people would step in if and when they were able, with ebbs and flows as to who was working when.

What's next for Solar SOAS?

We are now reaching out to other universities around the country to help them to set up their own projects. At the moment we are focused on London-based universities, as there is a London Community Energy Fund available.[144] So we are reaching out to students to encourage them to apply for it. It's a slow process, though, as lots of students have never heard of community energy. We've developed a 15-step 'How To' guide to help people get started – check it out here.[145]

We've also been involved in the Community Energy London group, linking up with other projects across London. Our work is part of the reason why the Greater London Authority (GLA) issued this new fund - thanks to our lobbying! We made the case that London is far behind average when it comes to community energy across the country.

We are looking forward to seeing the Mayor's Solar Action Plan for London come to fruition!

144 Mayor of London/London Assembly, *London Community Energy Fund*, 2018.
145 Solar SOAS (UniSolar Ltd), *A 15-step guide to setting up a University Community Energy Project*.

Key Players in Solar SOAS

Hannah Short, BA Chinese and Development Studies (2012-2016), SOAS

Isobel Annan, BA Chinese (2012-2016), SOAS

Charlotte Klinting, MSc Marine Systems and Policies (2015-2016), University of Edinburgh

Robert van Maaren, MSc Global Energy and Climate Policy (2012-2013), SOAS

Micheil Page, BA Development Studies and Geography (2014-2017), SOAS

Camilla Munkedal, BA Chinese and Economics (2016-2020), SOAS

Elly Dinnadge, MSc Global Energy and Climate Policy (2016-2017), SOAS

Valuable contributors

Clare Birkett, MSc Environment, Politics and Development (2013-2015), SOAS

Thos Thorogood, BEng Electronic and Electrical Engineering (2014-2017), UCL

Jane Nurse, MA Environmental Law and Sustainable Development (2015-2016), SOAS

Anouk Bontoux, BA Development Studies and International Relations (2015-2018), SOAS

Rachel Man, BA Social Anthropology (2015-2018), SOAS

Domenica Lewis, MA International Studies and Diplomacy (2012-2013), SOAS

What does 'Solar SOAS' tell us about Systems Change?

(This section was written by the 'Changing Systems' event team.)

There are several features of 'systems thinking' that the 'Solar SOAS' story illustrates.

- **Looking to the longer-term:** The team looked beyond immediate problems, and asked what our energy future might look like. As Peter Senge says in 'The Fifth Discipline'[146], *"[t]he systems viewpoint is generally oriented toward the long-term view."*

146 Peter Senge, *The Fifth Discipline. The art and practice of the learning organization* (London: Random House, 1990), p.92.

- **Leadership from within:** Rather than lobby the University to take a lead on a solar programme, the team decided just to get started. They had no formal authority, other than being students at SOAS, and young stewards of a planet already stressed by climate change! As the authors of 'The Necessary Revolution' say, *"Often [leaders of systemic change] do not occupy positions of obvious power… but rather [they are] passionate individuals working to transform their organisations from the bottom up…. They do not think of themselves as leaders, but time proves them wrong".*[147]

- **Team learning**: Hannah says: *"We worked very organically, and had no official structure – people would step in if and when they were able, with ebbs and flows as to who was working when."*

  Consider also this quote from Michele Doyle and Mark Smith:

  > *"Sometimes there may not even be one person we can readily label as leader – just a group working together to achieve what is wanted. Rather than people leading, it is ideals and ideas. We don't follow an individual; we follow the conversation. Through listening and contributing, thoughts and feelings emerge and develop. It is not the force of personality that leads us on, but the rightness of what is said. Other factors may also operate.*
>
> *"From this we can see that it is not our position that is necessarily important, but our behaviour. The question is whether or not our actions help groups and relationships to work and achieve. Actions that do this could be called leadership – and can come from any group member."*[148]

- **Collaboration across boundaries:** Looking at the 'Key Steps' that Hannah describes, it is very clear that the team took no notice of any formal 'boundaries', and most certainly did not remain in a 'passive student' role! Instead, a picture emerges of a dynamic team seeking inspiration and advice from many sources both inside and outside their institution. *"The systems intelligence needed to deal with the challenges we face… is collective, and must be built through working together at many levels, within and beyond organisations, in teams and networks that span industries [and] communities…".*[149]

- **Shared vision:** As Hannah said at our event, *"Basically you need to have a goal or vision, and be committed to making it happen. You can't take no for an answer, and you've got to just keep trying!"*

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147 Peter Senge and others, *The Necessary Revolution*, p.12.

148 Michele Erina Doyle and Mark K. Smith, 'Shared Leadership', *The Encyclopaedia of Informal Education*, 2001.

149 Peter Senge and others, *The Necessary Revolution*, p.48.


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10. Key Action Points:

A checklist for effective change initiatives

We summarise here the key actions identified in this Guide. This section is intended as a reminder of points to consider in designing an action programme.

Engaging Multiple Perspectives: skills for movement-building

Engaging with a wide range of people is fundamental to building an intelligent movement.

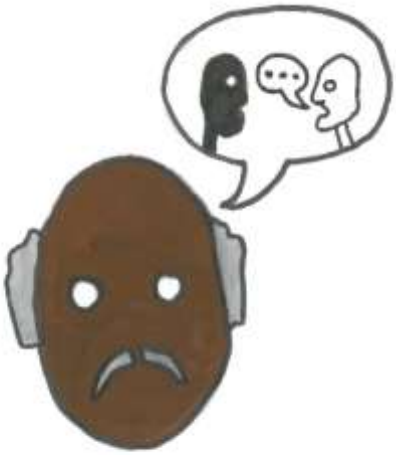
1. Investigate approaches to collaboration and engagement, such as those outlined in this Guide. Consider whether such approaches warrant committing further time and resources to their development.
2. Generate systems understanding. Bring different perspectives together in one room. Use participatory approaches and mapping techniques. Allow time to be in a *"we don't know yet"* phase, rather than rushing to find quick answers.
3. Look at values and purpose – and seek common ground amongst all groups.
4. Cultivate ways of listening that – like a stethoscope – allow us to hear what's happening beneath the surface. Listen for patterns and signals, for the unusual and the unexpected.
5. Pay attention to conditions for engagement. Create a listening environment and make meetings and events effective with high participant satisfaction. Find out if what you have done has worked: ask the participants, anonymously if need be.
6. Explore the potential for student engagement: for young people especially, a university is an excellent environment for introducing new perspectives.
7. Enrol staff members, both academic and non-academic. Make it worth their while to get involved; consider what is going to help them in their work.
8. Build community engagement around low carbon - building relevance and value locally. Seek out local players who may be beneath the radar – but who are making a difference and find ways of supporting their work.
9. Work with positive visions and positive stories. Be aware of approaches that can disempower people, such as focusing on the bad news, adopting approaches that blame individuals, or presenting a confusing level of scientific complexity.

10. Take a good look at communications – the Who, How and What - to get messages to land with different audiences. (For example – in science communication, be careful about all those emissions graphs.) Find out about emotional triggers.
11. Use contemporary stories and issues as a way in: for example, local air pollution.

Strategic thinking: the roles of senior leaders

Universities must adopt a more holistic approach, to ensure that carbon reduction permeates every level of their operations.

1. Assess the benefits and costs of an ambitious carbon neutrality and sustainability strategy. Include failure to achieve carbon neutrality as part of the risk assessment.
2. Create spaces to deepen the conversation around strategy; consider long-term goals in relation to climate change and sustainability. Ask questions about organisational culture, recognising that significant cultural change is likely to be needed to build strong low carbon pathways. Anticipate and work through resistance.
3. Recognise local issues and priorities and develop partnerships to increase local impact in greening the economy.
4. Create 'living laboratories' within and beyond the campus. Look for visual impact that sends a clear message.
5. Build a strategy that addresses the whole organisation, engaging all sections of the university community.
6. Find the leaders for this work and support them; they are often not in formal leadership positions. It is their passion that will make the difference. Tap into your own leadership potential.



7. Avoid 'carbon lock-in', such as specifying high carbon heating systems that cannot be converted or building designs that are profligate in their energy use. Take a good look at long-term plans for infrastructure, and at the falling costs of renewable energy. For example, heat pumps deliver low-temperature heat best – a basic building design consideration.
8. Build local, national and international connections in this work. The zero carbon movement is gathering momentum; become an active player in it.

Engaging with university management: the roles of students, staff and postgraduates

1. Build a positive, inclusive dialogue with management, based on opportunities, not just problems.
2. Do your research, and get to know the people, their priorities and motivations. Research the current position – such as emissions levels and emissions reductions, and why and how they have occurred. What do existing policies and strategies say about sustainability in general and carbon emissions in particular?
3. What environmental management systems are in place? Find out about ISO 14001. What Key Performance Indicators (KPIs) are being used? Can you suggest others related to the low carbon agenda?
4. Find out how the University works, its structures and governance; take part as best you can. Find ways in that that get your points heard but don't require a lot of additional time and commitment from busy people. Could you attend a scheduled high-level meeting and make your points? Do a presentation at a management away-day?
5. Use the science wisely to back up your case and push for ambitious targets. But remember that the science is only part of the picture. Recognise the importance of emotions.
6. Get to grips with the economics - a fundamental consideration for senior managers. For example, learn about discount rates when costing projects.
7. Work in project teams, and don't forget to make it fun.
8. Recognise that this is a whole institution agenda and help senior managers to build engagement – for example with your own peer group.
9. Set an example: walk your talk on campus and beyond, with a low carbon lifestyle. But don't be sanctimonious about it – this will be counter-productive!
10. Watch out for new projects which the institution is considering, such as new buildings or laboratories. Push for a strong sustainability dimension at the early design stage.
11. Get to grips with the idea of decoupling emissions from growth. For example, get to know what the three simple graphs in the University of Edinburgh's Climate Strategy represent.[150]

150 University of Edinburgh, 'Zero by 2040: Climate Strategy 2016-26', *Social Responsibility and Sustainability,* 2016, Fig.2, p.3.

12. Keep people up-to-date with what's happening, both with your activities and with low carbon (or high carbon) developments at the university. Use a newsletter, social media, an e-zine. Find creative people who can make the stories attractive and engaging.
13. Find natural leaders and champions within the institution and explore ways of supporting them. Do they need help? What skills or time can you offer them?
14. Build connections and networks with other institutions, especially where there are success stories in building low carbon pathways. Share the learning. If you can find external low carbon champions, they can have quite an influence.
15. Build your own skills and understanding about the issues and the solutions, and learn from one another.
16. Build on the power of the student voice. When significant numbers of students raise concerns, senior managers take notice.
17. Tap into the interests and expertise of academics. They generally like to be asked to contribute – even if they are extremely busy.
18. Keep going: a multifaceted approach is needed; don't get stuck if one door closes.

Prototyping and scaling up: moving from deep listening into action

1. Run the '7 criteria' test for developing prototypes that might change things at a systemic level (see page 55).
2. Find out what's happening in other universities, and in your local area. Use an 'open source' approach, sharing what you discover.
3. Organise events, visits and happenings where connections can be made, and ideas and experiences can be shared.
4. Find ways of spreading the word about what you're doing; use human interest stories, make it visual, make it topical; make a splash!
5. Encourage the creativity of students, and support them in developing prototype initiatives, both technical and social.
6. Develop resources to encourage prototyping – generally it doesn't need a lot of cash, but it does need a bit. The University of Edinburgh's Sustainable Campus Fund is one example.[151]

7. Look at benchmarking – and, if the existing benchmarks don't work so well, create some of your own.
8. Don't be overwhelmed by 'the big stuff'; recognise that small actions can ultimately make a big difference.
9. Keep asking, *"Is this working?".*
   And if it is, *"How do we scale it up?".*

The most important thing is to experiment.

151 University of Edinburgh, 'Sustainable Campus Fund', *Social Responsibility and Sustainability,* 23 November 2016.

11. The Carbon Neutral University Network

The Carbon Neutral University Network - Sheffield (CNU)[152] is an open network of students, staff and local citizens committed to encouraging and developing solutions to support the University of Sheffield to become carbon neutral by 2030. The network works to achieve its vision through:

1. Connecting the University and the wider local community
2. Providing and developing sustainable solutions
3. Holding the University to account.

Since its foundation in 2014, the Network has grown to over 300 members. It has hosted several events, including Prof. Kevin Anderson speaking on 'Triumph and Tragedy in Paris'[153] and leading architects speaking on 'The Future of Buildings'[154]. In March 2017, CNU hosted Dr. Aaron Thierry on 'The Brutal Logic of Climate Change'[155] – a presentation which has attracted a great deal of interest online.

Growing numbers of people are recognising that universities could be far more active in building exemplary pathways to a low carbon future. The Network is supported by leading figures calling for vigorous and imaginative action to address the web of sustainability challenges we face. We list some of these people on our website[156], including several of the University's own academics who are engaged in pioneering low carbon work. The development of the Network and its projects has been led by the University's students and post-graduate researchers.

CNU co-chair Dr. Christian Unger, supported by the Grantham Centre for Sustainable Futures[157], has produced a detailed proposal for a Climate and Sustainability Strategy[158] for the University, met the Vice-Chancellor, and presented at executive-level meetings throughout the year 2016. An outline of our case for universities becoming sustainability leaders was presented in an February 2017 article in Environment Journal.[159]

152 www.carbonneutraluniversity.org
153 Prof. Kevin Anderson, Presentation at the CNU event *Delivering on 2 Degrees*, 28 April 2016.
154 CNU event, *The Future of Buildings – Retrofit Showcase*, 9 November 2016.
155 Dr Aaron Thierry, presentation at the CNU event *The Brutal Logic of Climate Change*, 27 March 2017.
156 www.carbonneutraluniversity.org/-notable-supporters.html
157 http://grantham.sheffield.ac.uk
158 Dr Christian Unger, *A Proposal: University of Sheffield Climate and Sustainability Strategy*, 27 January 2016.
159 Dr Christian Unger, 'Universities must use their unique position to become sustainability leaders', *Environment Journal,* 13 February 2017.

CNU is working to encourage the University of Sheffield to take the following key steps:

1. To deliver on its original emissions reduction target of 43% below a 2005 baseline for 2020, as set by the (now disbanded) Higher Education Funding Council for England, HEFCE (see page 15).[160]
2. To adopt specific, ambitious and timed emissions reduction targets beyond the 2020 target, with responsibility for implementation held at senior level.
3. To develop a strategy to reach these targets.
4. To appoint and resource a professional team, of a size commensurate with the scale of the sustainability challenge.

As we conclude the writing of this Guide in the summer of 2018, the University of Sheffield is developing a new sustainability strategy, due to be launched in the autumn.

CNU believes that a positive vision of a carbon neutral future may be the most vital element of all. Some elements of such a vision can be found on the CNU website[161] – and we hope that this Guide will inspire further discussions and initiatives across the sector; we are more than happy to exchange learning and ideas.

www.carbonneutraluniversity.org

Email: carbonneutraluniversity@gmail.com

160 HEFCE, *Reducing Carbon Emissions*, 22 May 2017.
161 www.carbonneutraluniversity.org/our-vision.html

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To be truly radical
is to make hope possible
rather than despair convincing.

Raymond Williams

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