Beyond business as usual: Higher education in the era of climate change

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Executive summary

This paper proposes a new role for UK higher education in the era of climate change: a time of rising global temperatures and massive biodiversity loss, intersected and intensified by deep social and economic inequalities.

In June 2020, temperatures in the Siberian arctic reached over 30 degrees Celsius and wildfires in California and Australia ravaged millions of acres of land. In the UK, the red soil of Devon's coastal erosion extends hundreds of metres into the sea while communities from Yorkshire to the Midlands struggle to recover from disastrous flooding.

Around the world, however, a new movement is growing: individuals, networks, governments and industry are beginning to question the social and economic practices that are driving biodiversity loss and climate change. They are innovating, imagining and experimenting with new practices oriented towards regenerating societies, restoring land and relationships and rethinking economies. This is an enterprise drawing on many talents – from farmers to philosophers, artists to economists, scientists to schoolchildren.

Universities and colleges, as society's critical learning infrastructure, have a huge opportunity to play a role at the heart of this process, facilitating a transition away from ecologically and economically unsustainable practices.

This paper argues that climate change is not a scientific and technical matter alone, but is driven by a set of underpinning issues relating to economics, social inequalities, how we produce knowledge and ideas of what it means to be human. Higher education therefore has an important contribution

to make, not only in researching the technical and scientific aspects of climate change as it has for years, but in addressing these fundamental and underlying challenges at a whole institution level.

This paper describes how universities and colleges might respond to these challenges in four areas of activity:

i.   **Redesigning the day-to-day operations** of universities and colleges to reduce emissions, nurture biodiversity and adapt to the impacts of a changing climate;

ii. **Reinvigorating the civic role** of institutions to build ecologically and socially resilient communities;

iii. **Reshaping the knowledge structures of the university** to address the interdisciplinary complexity of climate change; and

iv. **Refocusing the educational mission of the institution** to support students to develop the emotional, intellectual and practical capacities to live well with each other and with the planet in the era of climate change.

This paper is written for all of those who are interested in ensuring that UK higher education institutions can better confront the realities of the current situation. The guidance here can be used by governing bodies, vice-chancellors, students and staff to reflect on their own institutions' practices and to identify areas for development. It builds on the important work that many universities and colleges have already been doing in this area for many years, and seeks to foreground, encourage and accelerate such efforts.

i.   Redesigning the day-to-day operations of universities and colleges to reduce emissions, nurture biodiversity and adapt to the impacts of a changing climate

Universities and colleges can rapidly take practical steps to reduce their own carbon emissions and improve biodiversity. Some universities have already achieved carbon neutrality (see Glossary) and others are implementing more ambitious strategies to achieve net zero (see Glossary) within the next few years. As a result of long-term practice by sustainability practitioners in the sector, there are now widely available and accessible guidelines on how these goals might be achieved, as well as supportive networks and robust monitoring tools to assist rapid progress. The paper therefore recommends that universities and colleges should:

- **reconfigure their day-to-day operations to achieve urgent, substantial and monitored climate change mitigation and biodiversity enhancement action** in accordance with Paris climate commitments and the Aichi biodiversity targets; and

- **develop a clear operational plan for implementing climate change adaptation measures** developed in partnership with local communities.

ii. Reinvigorating the civic role of the institution to build ecologically and socially resilient communities

Some universities are already mobilising their existing economic resources – from endowments to day-to-day procurement – to support the creation of ecologically sustainable local economies. Others are developing civic engagement strategies to build partnerships with industry

and community partners to ensure socially beneficial supply chains. The pandemic and its economic fallout also present a new opportunity for universities and colleges to rethink their educational provision to meet the needs of lifelong learners from local communities seeking to transition away from carbon-intensive and ecologically damaging employment. Through this civic role, universities and colleges can exemplify what a meaningful transition towards sustainable economies might look like. The key recommendations here are that all universities and colleges should:

- **develop an endowment, investment and procurement plan oriented towards ecological and economic sustainability;**

- **develop a civic engagement strategy that identifies how to build stronger partnerships to create sustainable futures; and**

- **explore how they can rebalance their educational offerings to support older adults transitioning away from high-carbon forms of work.**

iii. *Reshaping the knowledge structures of the university to address the interdisciplinary complexity of climate change*

The interconnected ecological, economic and social drivers of climate change require greater dialogue across disciplines as well as between university expertise and that of communities outside the walls of universities. Addressing the 'wicked problem' of climate change requires conversations across the Sciences, Engineering, Social Sciences, Arts and Humanities, the insights of those with lived experience and partnerships with social enterprise, industry and local government, as well

as the insights of those whose knowledge has historically been excluded from universities. This paper highlights examples of innovative practice in these areas from across Europe and North America. The key recommendation here is that universities and colleges should:

- **examine the institutional barriers – historic, organisational, cultural – to building dialogue across disciplines and with knowledge traditions outside the university and establish the institutional structures and practices needed to address these barriers.**

iv. *Refocusing the educational mission of the institution to support students to develop the emotional, intellectual and practical capacities to live well with each other and with the planet in the era of climate change*

The era of climate change raises profound questions about what it means to be human. Both the coronavirus pandemic and the climate crisis make visible the inadequacies of seeing humans as autonomous, rational, wealth-seeking individuals, independent of wider natural and social systems. Instead, a new conception of the human – as interdependent with natural systems and with other people – is evolving, with significant implications for education. Many new educational initiatives – often outside mainstream universities and colleges – are now emerging to support students to develop new ways of learning, living and working in these conditions. They address the significant emotional and psychological challenges of living in the era of climate change and offer practical and intellectual tools for developing responsibility and agency in these conditions. The recommendation here is that universities and colleges should:

- **initiate an institution-wide process to bring together staff and students to develop programmes that are adequate to the emotional, intellectual and practical realities of living well with each other and with the planet in the era of climate change.**

These four levels provide a framework for higher education institutions to review and renew their responsibilities in the contemporary conditions of interconnected ecological, economic and social crises. This paper should be read as an invitation for intellectual and institutional reinvigoration, rather than the capitulation of academic freedoms to external imperatives. It is an invitation to dismantle taken-for-granted ideas and inherited practices and to experiment with what a new higher education might be under these conditions.

Finally, the paper argues that there is an important role for national policymakers to facilitate the engagement of universities and colleges with these questions. This role, of course, includes ensuring that the financial arrangements of universities and colleges are robust and do not, in themselves, fuel unsustainable behaviour. Above this, however, three proposals are made for nationwide interventions that will actively support the proposals above:

1. **The Business, Energy and Industrial Strategy Research Roadmap (in partnership with devolved administrations) should establish a 'moonshot' research programme oriented to ensuring that all university and college operations in the UK (including academic and student travel) have zero carbon emissions by 2035, with a 75 per cent reduction by 2030;**

2. **A £3 billion New Green Livelihoods programme should be established to support educational activities that will enable debt-free mass transition of older adults from carbon-intensive employment towards creative sustainable livelihoods; and**

3. **The year 2022 should be designated a year of 'Sustainable Social Innovation' involving a programme of mass public education, in partnership between the BBC, universities and colleges and the Department for Business, Energy and Industrial Strategy; this should engage over two million people in collective learning for the changing conditions of the climate change era.**

The costs of these national programmes are not trivial, but they are less than the long-term costs of doing nothing, and they will begin to restore the UK's authority as an actor meaningfully concerned with climate change mitigation, adaptation and regeneration.

Taken together, these proposals have the potential to stimulate the huge talents of the UK's universities, colleges, students and communities in ways that begin to be commensurable with the urgent need to transition away from ecologically and economically unsustainable practices and towards flourishing and viable societies.

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Glossary and useful concepts

UNFCCC – United Nations Framework Convention on Climate Change – the 1992 Convention signed by 196 states has as its objective to 'stabilise greenhouse gas emissions in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system'.

IPCC – the Intergovernmental Panel on Climate Change – is governed by the UNFCCC and convened by the United Nations. It is tasked with bringing together science and social science to provide objective evidence on the causes and risks of climate change, as well as possible responses.

Conferences of the Parties (COP) – the annual meeting where those who signed the UNFCCC come together to negotiate and assess progress on dealing with climate change. The COP comprises two main areas of activity – the formal negotiations between countries and the informal gathering of activists, social movements, lobbyists, scientists and others seeking to influence these negotiations and learn from each other.

The Paris Agreement – the Agreement reached in Paris in 2015 as part of the United Nations Negotiations (the COP). This Agreement was signed by nearly all nations to keep greenhouse warming well below 2 degrees above pre-industrial temperatures and to pursue limiting warming to 1.5 degrees.

1.5 degrees / 2 degrees Celsius – these figures refer to the global increase in temperature above pre-industrial temperatures. They are significant as they set the international agenda for climate mitigation efforts. The 1.5 degree report

produced in 2019 by the IPCC demonstrates the importance of aiming for less than 2 degrees given the very significant difference in outcomes – for example, levels of droughts, floods, displacement – anticipated at 2 degrees warming rather than 1.5 degrees. There is a strong consensus that we are currently on track for levels of warming much higher than 2 degrees, that limiting warming to 2 degrees will require significant social and economic change and there is increasing scientific concern that the figure of 1.5 degrees is in itself too high given the risk of cascade effects and tipping points.

IPBES – the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services – an intergovernmental body set up to improve science-policy communication about biodiversity and ecosystem issues. Their reports provide an important overview of the current state of global biodiversity.

The Aichi Biodiversity Targets – were formulated as part of the UN Convention on Biological Diversity (an international treaty agreed to at the UN Earth Summit in Brazil in 1992). These comprise 20 strategic goals to conserve biodiversity.

UK Climate Change Act – this was passed in November 2008 with support across all parties and sets out emission reduction targets that the UK must comply with legally. The new target for this law, amended in 2019, is for the UK to achieve net zero emissions by 2050.[1] This means that there is now a basis in law for challenging activities that clearly impact on the likelihood of achieving this aim. This has already been successfully tested in relation to challenging the expansion of Heathrow.

Net zero / carbon neutral – means reaching a situation where carbon is still emitted but is balanced by either offsetting or sequestering equivalent emissions (although there are very

important critiques of offsetting, particularly for academic travel, and of carbon neutrality as a goal).[2]

Zero Carbon – means that no emissions are produced. The debate over the difference between Zero Carbon and net zero is significant in that Zero Carbon does not continue to contribute to the emissions problem.

A carbon negative organisation – is one that actively removes carbon from the atmosphere through its operations (sometimes and confusingly also called carbon positive).

Mitigation – means reducing greenhouse gas emissions (usually carbon dioxide and methane) in order to reduce global warming (the greenhouse effect).

Adaptation – preparing for the impacts of a warming climate, through, for example, localising food and energy systems and water retention, as well as mechanisms to prevent flooding.

Loss and damage – refers to the harms caused by sudden onset climate impacts, such as typhoons, and slow climate impacts, such as sea level rise. It highlights that not all harms can be addressed by adaptation and that vulnerable countries and constituencies require financial compensation to allow them to recover and relocate.

Regeneration / restoration – producing social systems or land use systems that are able to create positive benefits for restoring biodiversity, healthy ecosystems and viable communities as well as contributing to climate mitigation and adaptation.

Greenhouse gases – these are gases that contribute to the warming of the atmosphere. These include, in particular, carbon dioxide and methane and are produced in all areas of

human activity, from agriculture to transport and building to energy production.

Climate Justice – is a term that highlights the fact that greenhouse gas emissions are not produced in the same level and quantities by all humans on the planet and that they have historically been produced in far greater quantities by western industrialised nations and today by high-income groups. This term makes clear that discussions of climate change are not just technical questions, but also questions of politics, economics and fairness.

Carbon Budget – this is a term that describes accounting practices that define the total carbon budget available to countries and sets clear limits on what can be 'spent' to remain within the desired limits on emissions set by the Paris Agreement. These are beginning to be used by municipalities and other organisations as an alternative accounting frame.

Anchor organisations – large and typically non-profit organisations like universities, local councils and hospitals that have a long-term presence in communities and whose long-term sustainability is tied to the wellbeing of the populations they serve.

EAUC – the Alliance for Sustainability Leadership in Education. A voluntary body working across Higher and Further Education to promote sustainability and developing the Convention on Climate Change to support higher education and further education mitigation activities.

1. Introduction: A moment of change

We are, as a country and as a planet, facing profound and interconnected ecological, social and economic crises. It is now very clear that we are living in the era of human-caused climate change: a time of rapidly rising global temperatures and massive biodiversity loss intersected by deep social and economic inequalities. To give just one number to think about: temperatures in the Siberian arctic reached over 30 degrees Celsius this year.[3] The impacts of these changes will be uneven, but they are already being felt by all of us – in extreme weather events, drought and heat, changing patterns of food production as well as migration from areas of flood risk and food and water shortages.[4] As the climate scientist Johan Rockström and colleagues have argued, we are now approaching the limits of the 'safe operating space for humanity'.[5]

These numbers can be overwhelming and numbing. They can give the impression of a single, sudden change and of impossible obstacles. The reality is more complex – there are many different changes, happening at different speeds at different times with different effects, some of which are already clearly evident and with which we will live for many years, others over which we can and do have real influence.

What is clear, however, is that what the Intergovernmental Panel on Climate Change (IPCC) describes as 'transformative change' is required.[6] Changes are needed in how we produce energy, produce food, move around, work, consume and live our lives – particularly those of us in the richest 10 per cent of the global population who are responsible for over 50 per cent of emissions.[7] Our task, then, is to 'bend the curve' of the

emissions, and to do so in ways that are equitable and fair. The change required will not be trivial. The latest robust analyses suggest that even countries such as the UK and Sweden that pride themselves on their climate action require at the very least a doubling of their efforts:

> *The rate and depth of such a physical and social transformation will likely entail two to three decades of socio-economic activity reminiscent of 'the arsenal of democracy' invoked by Roosevelt's 1940 'fireside chat' (Roosevelt, 1992) or the 1948 European Recovery Programme (the Marshall plan).* [8]

Such change, however, is achievable. Indeed, given the need for ambitious and creative thinking in order to recover from the COVID-19 pandemic, major transformation is now easier to imagine than before. Transformative agendas are being actively considered as part, for example, of calls for Green New Deal programmes in Europe and the US. Achieving climate goals, however, is not simply a question of throwing money at the problem. Rather, a collective effort of imagination and learning is required to transition away from ecologically and economically unsustainable behaviours. Universities and colleges, as society's critical learning infrastructure, must be at the heart of this process.

Now is the moment, then – as universities and colleges around the world are already rapidly and dramatically reassessing how they operate in the face of the pandemic – to rethink higher education for the era of climate change. This will not be simple nor happen overnight. It will not, above all, be a matter of 'greenwashing' the campus with superficial references to ecofriendly activities. More profound change is required –

change in the futures we assume we are preparing students for, change in how we work in communities both local and international, change in how we manage our buildings and run our operations and change in how we engage with knowledge and expertise outside our walls.

Such change is possible. Universities and colleges, after all, have changed before: from the social and intellectual disruptions of the Enlightenment that gave birth to the modern research university to mass university access following the wars of the 20th century. The higher education we need is different in different times. Indeed, some of the institutions I discuss below are already demonstrating what shape this future learning and scholarship might take.

In this paper, I present a framework through which higher education institutions might begin to work through the changes required. I discuss how universities, colleges and a growing community of alternative education providers are already beginning to respond to these challenges. I conclude by proposing three key interventions for national policymakers to support the creativity and agency of higher education institutions in these conditions.
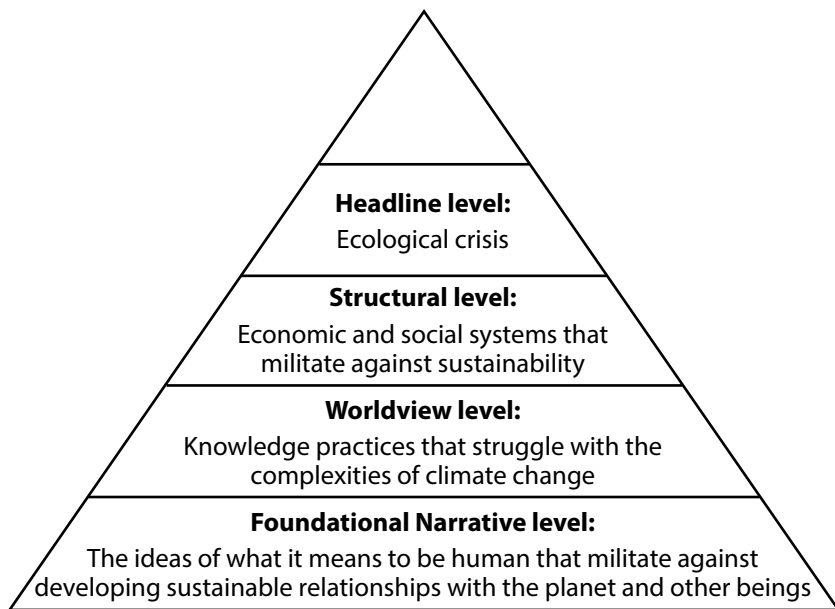
2. A framework for understanding the challenge

Making sense of where to begin in response to the complex challenges of the climate change era can be overwhelming. Many organisations start with the United Nations' Sustainable Development Goals (SDGs) and work from there.[9] These can be a useful tool to initiate conversations at a general level for all institutions around the broad theme of sustainability, despite their weaknesses.[10] For those with a particular interest in addressing the complex causes and consequences of climate change, however, they are too vague. They also offer little guidance in understanding how the different research, teaching and civic roles of universities and colleges might specifically map onto the challenges of climate change.

To address these weaknesses in the SDGs as a starting point for action, this paper works with a framework that does two things. First, it clarifies the four fundamental levels of the climate crisis. Secondly, it maps out how higher education institutions might respond to these through their day-to-day operations, civic roles, research and education responsibilities. The framework can usefully be read alongside the UK's Climate Commission work which is more specifically focused on the headline level of emissions reductions.[11]

By recognising that climate change is not just a technical question of reducing carbon emissions but is also defined by socio-economic, knowledge and cultural challenges, the framework makes more visible the wide range of contributions that universities and colleges can play over and above their more familiar roles in contributing research and knowledge.

Figure 1. The different factors shaping the climate crisis[12]

Throughout the paper, I start by talking about the most visible 'headline' of the ecological crisis with which most readers will be most familiar; then I work down through the structural questions associated with the social and economic underpinnings of climate change before discussing the worldview level that deals with questions of the knowledge we need to deal with climate change in its complexity. I conclude with a discussion of the underlying assumptions we have about the relations between humans and the planet, what I call here the 'foundational narrative', but what philosophers and others might call the 'ontological' level.

Table 1. Mapping the work of universities and colleges against the four levels of climate challenge

The climate challenge at this level	The work of the higher education institution
Headline: Address the immediate ecological crisis – limit global warming and restore biodiversity	The day-to-day operations and practices of higher education institutions in mitigation, adaptation and regeneration[13]
Structure: Address the social and economic drivers of climate change	The civic role of higher education institutions in creating ecological and socially regenerative local communities
Worldview: Address the weaknesses in our knowledge structures that limit our capacity to respond to climate change	The knowledge structures of the institution – research, scholarship and the organisation of teaching
Foundational Narrative: Understand what it means to be human in the era of climate change	The educational role of higher education institutions

Headline level challenge: address the immediate ecological crisis by limiting global warming and restoring biodiversity

The headline level of the climate change era is that we are facing a profound ecological crisis with significant short-term and catastrophic long-term effects. Climate impacts will intensify, and rapidly, bringing significant and short-term likelihood of profound ecological and social disruptions.[14] The world's nations agreed in 2015 to take the steps needed to keep global warming below 2 degrees Celsius above pre-industrial levels and pursue 1.5 degrees (what is known as the Paris Agreement).[15] Consent for such changes is growing as

developments such as the School Strike for Climate have put the issue back on the political agenda.

There is therefore an urgent need to work out how to reduce greenhouse gas emissions significantly, protect biodiversity and begin to regenerate ecosystems from floodplains to forests, as well as to begin building communities and societies that are able to adapt to the deep disruptions that are already in train.[16] Above and beyond their contribution as researchers in this area, therefore, universities and colleges have the potential to take a lead in demonstrating what the transition to zero carbon, biodiverse and regenerative institutions might look like in practice through their day-to-day operations.

Structural level: address the social and economic drivers of the crisis

At a structural level, the ecological crisis can also be understood as a socio-economic and political crisis. In particular, it is a crisis of economic and social inequality: the consumption patterns of the richest 10 per cent globally (including academics and students, for example), drive 50 per cent of global carbon consumption emissions.[17] Those who are most economically vulnerable are least well financially resourced to adapt to extreme weather events. Millions globally whose lives are already treated cheaply will have to add the impacts of a changing climate to the list of catastrophes they are facing. Indigenous communities who have been at the front line of protecting biodiversity against fossil fuel industries are now facing battles against loss of land and livelihoods as a result of 'green' economic exploitation.[18]

Addressing climate change is not simply a technological or scientific matter, then, it is deeply connected with questions of politics, economics and justice – in particular with the dependence of modern industrial economies on growth and the extraction of material and human resources. New regenerative economic and social practices are required to confront these inequalities and these economic disfunctions. Universities and colleges in their important civic role as anchor organisations have the potential to work with local government, industry and civil society to speed up the transition to socially and economically sustainable societies.

Worldview level: address the weaknesses in our knowledge structures that limit our capacity to respond to climate change

Of particular interest to universities and colleges is the growing argument that the failure to have thought or acted our way out of these ecological crises may be a product of weaknesses in dominant knowledge practices. This observation emerges from two positions. First, that there are limits to atomistic disciplinary thinking when grappling with problems like climate change that are inherently complex and interdependent, often called 'wicked' problems. While processes of deep specialisation may serve some purposes well, rigid disciplinarity can impede engagement with issues – such as the causes and responses to climate change – that straddle multiple fields.[19] Secondly, that the research base is characterised by important weaknesses arising from a history that has excluded indigenous forms of knowledge and continues to marginalise the lived experience and knowledge of people of colour, women and working-class communities.[20]

From this perspective, the current failure to understand and address the complex causes and realities of climate change arises from what the sociologist Boaventura de Sousa Santos calls 'epistemological monocultures': an over-reliance on one tradition of thinking.[21] The task for universities and colleges – which no other social institutions can reasonably take on – is to bring into dialogue different disciplines, different life experiences and different knowledge traditions in order to inquire into the causes of and responses to our ecological crisis. As de Sousa Santos argues:

> since no single type of knowledge can account for all possible interventions in the world, all of them are incomplete in different ways [therefore] each knowledge is both insufficient and interdependent on other knowledges.[22]

Foundational level: understand what it means to be human in the era of climate change

If the Coronavirus pandemic has taught us nothing else, it has taught us that humans are far from autonomous – we are deeply entangled with and dependent upon the actions of other people and on the actions of non-human actors, from viruses to air currents to T-cells. The same lesson is being taught to us by a rapidly changing climate. We are part of a living, complex system, in which our actions have effects and interactions with other non-human actors, the consequences of which can be profound and disruptive. This complex system is what we depend upon for the very fundamentals of life: air, water, food. As the writer and professor Amitav Ghosh puts it – we realise now that we are living as part of, and not outside, a 'lively planet'.[23]

The ecological crisis, then, can also be understood as a crisis in the story of what it means to be human. In particular, it disrupts the story that has dominated recent western thinking – namely, the tale of the inevitable ascent and progress of *homo economicus*, the rational, autonomous, wealth-seeking individual. The challenge, then, is to begin to work out what it means to be human now we know we are living as part of a complex interdependent world. This is a form of humanity that is not in control of all that it surveys, but that is responsible for its actions. The responsibility of higher education, in this context, is to create conditions in which teachers and students can begin to understand fully and explore together what this new story – of our interdependence with the other beings of a lively planet – means for our work, our lives, our professions, our communities and our ways of organising ourselves.

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3. No greenwashing, no blueprints

Looked at through the four lenses, it is clear that we cannot return to business as usual in our universities and colleges as we work out how to respond to the wreckage of the pandemic. Nor can we just throw money at greenwashing our activities – a few fair trade coffees and a little bit of offsetting of flights for conferences – and think this constitutes an adequate response to the changed world we now inhabit. More substantial action is required if the emissions curve and biodiversity loss is to be addressed and if students are to be supported to live and act with confidence in these changing times.

In the remainder of this paper, I point to ways in which the UK higher education sector might respond. The exact shape that a university or college might take in these conditions, however, is as yet unknown. It will necessarily change as conditions change. As the sustainability scholars Arjen Wals and Lisa Schwarzin argue:

> *we cannot think about sustainability in terms of problems that are out there to be solved or in terms of 'inconvenient truths' that need to be addressed. Instead, we need to think in terms of challenges to be taken on in the full realization that, as soon as we appear to have met the challenge, things will have changed and the horizon will have shifted once again.*[24]

There is no exemplary institution to point to and suggest that everyone follows their lead. There is no easy blueprint to pull off the shelf. These are, however, exciting times and there are already many different organisations, individuals and networks beginning to experiment with what might be possible. Moreover, universities and colleges are not alone in addressing

these questions, and will find themselves with friends in wider society as they begin to move in search of ecologically and socially regenerative practices.

With this in mind, what follows should be read as an invitation to explore the new practices of higher education that might evolve, even if we cannot perhaps yet conceive what their final form will be. What is clear, however, is that grappling with these questions will also allow higher education institutions to address many long-term problems that are currently troubling the community – from how to address the mental health crisis among students and staff, to how to begin to imagine an economically viable set of institutions that are not dependent on international student income.

4. Practical action at four levels

4.1 Working at the headline level

Redesigning the day-to-day operations of universities and colleges to reduce emissions, nurture biodiversity and adapt to the impacts of a changing climate

Between them, UK universities and colleges are responsible for 3.8 million students, 550,000 staff as well as, in some cases, land and property worth billions of pounds.[25] Even the smallest institution is responsible for setting expectations around travel, energy use, food consumption and buildings use. All institutions have material footprints. There is therefore a clear and significant way in which higher education institutions can address climate change and biodiversity loss, as well as beginning to build adaptive capacity and resilience to the highly disruptive effects of global warming already in train. Namely, to make changes in their own operations. Two key orienting questions for universities and colleges to consider are:

i. How do our physical estates, our land and our day-to-day operations contribute to global warming and ecological degradation?; and

ii. What can be done to make them regenerative of ecological health and social resilience?

In response to these questions, we might expect to see institutions take actions such as committing to the year-on-year reductions in carbon emissions needed to make activities compatible with the commitments in the Paris Agreement.[26] We might expect to see internationalisation strategies

characterised more by remote campuses, online learning and increased virtual international student collaboration and less by international student and academic travel. Indeed, internationalisation rediscovered as participation in a global intellectual community, rather than simply racking up the airmiles, might become the new norm.[27] We might see the redesign of landscape and buildings to sustain biodiversity, carbon capture, renewable energy production and local food. We might also expect to see the development of partnerships with local government to develop robust strategies for local resilience in conditions of disruptive weather events and shocks to food and water supply.

There is significant and growing activity in this area in the UK and internationally. In late 2019, *the Climate Commission for UK Higher and Further Education Students and Leaders* was established – a coalition of the Association of Colleges, the Alliance for Sustainability Leadership in Education (EAUC), GuildHE and Universities UK. The Commission has developed a clear and accessible roadmap for the further education sector with the aim to reduce greenhouse gas emissions to net zero by 2050 and is in the process of developing an equivalent roadmap for universities which should have been launched by the time this paper is published.[28] It is worth noting, of course, that net zero by 2050 is not a particularly ambitious goal when some universities reached net zero carbon emissions in 2019.[29] The Climate Emergency website is providing a useful point of connection for many of the more active institutions seeking to show leadership in this area.[30] Students are taking a particularly active role: the NUS's Students Organising for Sustainability has launched its Learning Academy to promote student leadership in these areas and to advocate for sustainability across the

higher education curriculum. Across Europe, the Green Office movement – student-led hubs resourced by higher education institutions and developing campus-wide projects for sustainability – is strong and growing.[31]

In terms of high-profile changes, the No Fly movement was gaining ground in 2019 and early 2020, leading to significant commitments to low carbon academic practice with leading institutions such as ETH Zurich in Switzerland committing to over 20 per cent year-on-year reductions in emissions due to travel, reductions that in the pandemic era now seem less ambitious.[32] Innovations such as 'train-based' conferences are being developed and virtual conferences are now commonplace courtesy of the pandemic.[33] In the UK, the Alliance for Sustainability Leadership in Education (EAUC) offers tools to assess these and other institutional changes as well as Green Gown Awards to showcase good practice. The UN has established a Green Universities network and a 'Green Toolkit' to support universities to integrate low carbon and sustainability principles into their day-to-day activities.[34] The University Climate Change Coalition in the US and Canada is interesting for its unusually clear commitments to monitoring and assessment of progress against specific targets, and for its case studies of academic practice.[35]

There is, in other words, a reservoir of support and practice for those institutions looking to address the ecological crisis actively through changes in land management, buildings and operations, food and transport activities. These networks offer a wide range of opportunities: new alliances between universities to buy clean energy, innovations in food sourcing, examples of enhancing biodiversity across campuses, retrofitting old buildings and changing transport patterns.[36] There is a strong and

active network of sustainability specialists across the UK higher education community, with deep experience and motivation.

To achieve organisational change at a more significant scale and pace than is currently happening, however, and to avoid the ever-present risk of greenwashing, it is worth looking beyond the higher education community to find tools for robust evaluation and practice. Organisations such as the Science Based Targets Initiative, for example, demonstrate how carbon budgets might be used to create a baseline analysis of an institution's current practices and to establish roadmaps to move quickly to achieve meaningful emission reduction goals.[37] These analyses are oriented specifically towards what is needed to achieve the Paris Agreement commitments to keeping emissions below 2 degrees Celsius above pre-industrial levels. They also provide targets relating to freshwater, biodiversity and land use.[38] For higher education institutions with significant land holdings, this approach also provides insights into how land can be used for ecosystem regeneration and carbon sinks.

Beyond questions of mitigation and regeneration, there is also the neglected question of adaptation to already growing climate impacts. The Transition Towns and Deep Adaptation networks are informal networks of individuals concerned with building social resilience to ecological and social disruption.[39] Higher education institutions looking to understand how their activities will be vulnerable to significant weather disruptions, infrastructure failures and social unrest may find resources to support them here as well as in the growing field of disaster education research. This, however, is an under-developed area in higher education and new networks and support are required to address adaptation issues.

The key recommendation here is that universities and colleges should:

- reconfigure their day-to-day operations to achieve urgent, substantial and monitored climate change mitigation and biodiversity enhancement action compatible with UN data and in accordance with Paris climate commitments; and

- develop a clear operational plan for implementing climate change adaptation measures developed in partnership with local communities.

4.2 Working at the structural level

Reinvigorating the civic role of institutions to build ecologically and socially resilient communities

Universities and colleges are powerful anchor organisations that can make a significant contribution to the creation of ecological and economic sustainability in local communities. They are also, however, able to do the reverse – to intensify social divisions between those who enter higher education and those who do not. This is a schism that is becoming more visible in the wake of both the Brexit vote and the COVID-19 pandemic. Two key questions to orient thinking in universities and colleges here are:

i. How are we using our financial resources, procurement processes and civic role to encourage ecological and social sustainability in our local communities?

ii. How are we supporting local communities to transition towards ecologically and economically sustainable livelihoods?

These are significant and potentially daunting questions, but there are clear signs of how they might be answered.

In the UK, we are already seeing many institutions divesting from fossil fuels and carbon intensive industries (not least since the Governor of the Bank of England advised that such investments are increasingly risky) and there are now also campaigns growing for divestment from fossil fuels in pension funds.[40] There is also a growing shift towards positive social investment, where institutional investors are actively using endowments and other resources for social benefit. See, for example, the Responsible Investment Network that brings together Cambridge, St Anne's College, Oxford and Edinburgh.[41] Although such work requires attention to the risks of financialisation of climate action.[42]

Civic university traditions also offer a deep well of practice for higher education institutions to draw upon. The recent Civic University Commission report, *Truly Civic: Strengthening the connection between universities and their places*, shows the contribution that universities and colleges could make to creating ecologically and economically sustainable local communities (albeit that this report strangely does not in fact mention climate change).[43] At the same time, many organisations working on climate change action – from the international network of transition towns to the Incredible Edible Movement – are looking to universities for partnership.[44] Such groups are often internationally networked themselves, demonstrating the potential for universities to work with such organisations to 'think global and act local'. Lessons from the field of public engagement with science also show how universities can actively collaborate and partner with communities to the benefit of both research and social resilience.[45]

The Community Wealth programme that began in Cleveland, Ohio, and since developed in Preston, UK, among other cities, provides a concrete example of how higher education institutions can build resilient, low-carbon, local economies.

The Cleveland Model of Community Wealth building

The Cleveland Model of Community Wealth building was established in Cleveland, Ohio, and sees anchor institutions, such as higher education institutions and hospitals, explicitly developing new economic policies to create resilient and sustainable local economies. Together with local government, a new model of large-scale and worker-owned co-operatives is being developed to address urban and economic decline through green job creation. Specific roles for universities in this collaborative process are:

-- directing a greater percentage of their purchasing power toward local vendors based in the community;

-- hiring a greater percentage of their workforce locally;

-- providing workforce training for people needing assistance in the community;

-- incubating the development of new businesses, including social enterprise among nonprofits;

-- serving as an adviser or network builder;

-- leveraging development to promote local retail, employer-assisted housing and community land trusts; and

-- using pension and endowment funds to invest in local job creation strategies and to provide community venture capital for nonprofits, entrepreneurs and employee-owned firms.

Critically, this work is not about spending new or more money, but about spending money in better ways.[46]

Examples like this show how higher education institutions can model sustainable economic activity and support transitions to sustainability. These questions are also at the heart of many local government and city initiatives emerging in response to the pandemic. In Amsterdam and the Brussels region, for example, city leaders are basing their recovery strategy on the principles of Oxford economist Kate Raworth's new economic theories.[47] These demonstrate the value of economic regeneration that is both socially and ecologically resilient. In other words, universities and colleges seeking to build partnerships will increasingly find urban leaders and local government advisers who are open to collaboration.[48]

Creating more ecologically and economically sustainable communities, however, also requires a strategy that supports adults in the local community to transition away from high-carbon and unsustainable forms of employment. As levels of unemployment, precarious employment and under-employment rise in the wake of the pandemic, and as governments around the world explore new welfare systems, such as universal basic income, now is the moment for universities and colleges to diversify their student intake to enable older adults to transition to ecologically and

economically sustainable livelihoods.[49] Indeed, calls for a 'Green New Deal' and for a 'Just Transition' oriented towards a rethinking of the nature of work and employment suggest an urgent need for universities and colleges to explore creatively how they might enable debt-free educational offerings adequate for fundamentally different economic conditions.[50] As the Centenary Commission for Adult Education argues:

> *Adult education must not be regarded as a luxury for a few exceptional persons here and there … it is a permanent national necessity, an inseparable aspect of citizenship, and therefore should be both universal and lifelong.*[51]

Such adult education is often framed as retraining for 'green collar work' with a focus on vocational skills. Given the scale of the challenge we are facing, however, universities could reasonably make the case that adult learners should be invited to engage in more blue-skies thinking and learning to open up the possibility of inventing novel ways of living, working, thinking and being.

All of these factors taken together suggest a sea change in the relationship between universities, colleges and their local communities. In this context, previously overlooked local older adult communities have the potential to become a new priority for higher education institutions rather than an afterthought.[52] Indeed, it is not beyond the realms of possibility to imagine a rebalancing of higher education away from the dependence on international students that is, in any case, highly risky in the pandemic era, towards an increasing attention to developing the talents of local communities through courses that are taken up at different times and in different ways over the life course.

The key recommendations here are that all universities and colleges should:

- develop an endowment, investment and procurement plan oriented toward ecological and economic sustainability;

- develop a civic engagement strategy that identifies how to build stronger partnerships to create sustainable futures; and

- explore how they can rebalance their educational offerings to support older adults transitioning away from high-carbon forms of work.

4.3 Working at the worldview level

Reshaping the knowledge structures of the university to address the interdisciplinary complexity of climate change

The climate crisis is a scientific, economic and political problem. It is also, however, a problem of how knowledge is organised, valued and shared. In the face of sustainability issues that combine everything from human behaviour to institutional change, from the workings of forests to the structure of global economic systems, different ways of thinking, researching and learning are required that allow researchers and students to engage with complex interdependent challenges. Two questions might prompt reflection on how today's universities and colleges are creating opportunities to develop research practices that can deal with this complexity:

i. How do we systematically and actively facilitate dialogue across disciplines and subject areas?

ii. How do we systematically and actively facilitate dialogue

with knowledge traditions and practices beyond those historically found in universities?

Interdisciplinarity, of course, has been a touchstone of funding calls and institutional priorities for many universities and colleges over the last two decades and low-level interdisciplinary practice is now relatively normalised. Some institutions, however, have taken a more transformative approach to this challenge, such as Arizona State University's institutional redesign to foster transdisciplinarity. Similarly derived from a critique of over-specialisation, interesting examples are also emerging across Europe: Chalmers University of Technology in Sweden, for example, has set up what it calls the Chalmers Challenge Lab, which is a combined research and teaching initiative in which teams of students are supported to become 'brokers' for conversations between diverse academics and local actors to address sustainability challenges.[53] In the Netherlands, the University of Groningen's Sustainability Campus Fryslân is an entire campus dedicated to fostering interdisciplinary study in partnership with actors outside the university and oriented towards societal impact.[54] In Germany, Leuphana University's 'faculty of sustainability' is another interesting model.

Leuphana University in Germany

Leuphana University in Germany has developed a faculty of sustainability, which is particularly notable in that it states that it is 'guided by the normative concepts of system integrity and justice', specifically: 'By system integrity we mean to maintain life support systems in their boundaries and preserve the well-being of life on earth. By justice we proclaim that we need to enable a world where all people

can fulfil their potential without compromising the system's integrity and other people's well-being'.

This group is intentionally working to foster real world change. Particularly interesting is their Global Sustainability Science programme, where their students are expected to combine scientific, political and governance theory with real-world engagement with societal actors. They explicitly engage with different disciplinary perspectives and students conclude by writing journal papers and participating in practical activities in the community. This is a joint degree that exemplifies a commitment to global collaboration and local action.

These institutions are actively creating the conditions for new forms of research, scholarship and education that engage the interconnected ethical and political, scientific and philosophical questions posed by climate change.

Alongside the drive to interdisciplinarity within institutions is the growing practice of co-producing research with partners outside institutions. As the water scientist Carina Wyborn and colleagues argue in a thorough review of the field: 'Co-production has become a cornerstone of research within the sustainability sciences'.[55] Researching in partnership with different communities of expertise and knowledge outside the university is becoming increasingly recognised as central to understanding causes of and responses to the complexity of climate change. In particular, the long history of indigenous scholarship is finally being acknowledged as central to the knowledge and thinking required in this field, as recognised in particular by the latest Intergovernmental Panel on Biodiversity and Ecosystem Services.[56] Central to this reorganisation of knowledge practices is the impetus to attend

to knowledge traditions – whether of women, of people of colour, of non-western or working-class communities – that have until now found limited space in the university. The language and practice of decolonisation, in particular, is providing an important way of opening up dialogue between different knowledge traditions.[57]

Gesturing Towards Decolonial Futures (GTDF)

The Gesturing Towards Decolonial Futures Collective is an arts / research collective based in Canada that is engaged in 'artistic, pedagogical, cartographic, and relational experiments that aim to identify and de-activate colonial habits of being, and to gesture towards the possibility of decolonial futures'. The researchers in the group develop tools to support reflection upon complicity in violence and unsustainability and develop the capacity for educators to have difficult conversations and support themselves and students to 'show up to do what is really needed'. The work is immediately useful to anyone with an interest in pedagogy, but it also offers a space for deep theoretical exploration of what it means to educate in conditions where the legacies of colonialism are still strong. Particularly useful in this work is the way in which the researchers develop tools to allow dialogue across indigenous and western practices of producing knowledge.[58]

This is an exciting and challenging moment in intellectual development, as academics across all fields and partners in knowledge traditions outside the university are beginning to explore how to systematically develop new knowledge practices that allow the strengths of each tradition to feed into the challenge of addressing the current ecological crisis. The form that these new knowledge structures should take will

necessarily be specific to each institution and be designed by the academic community in each institution.

The key recommendation here is that universities and colleges should:

- examine the institutional barriers – historic, organisational, cultural – to building dialogue across disciplines and with knowledge traditions outside the university and establish the institutional structures and practices needed to address these barriers.

4.4 Working at the level of the foundational narrative of what it means to be human today

Refocusing the educational mission of the institution to support students to develop the emotional, intellectual and practical capacities to live well with each other and with the planet in the era of climate change.

Arguably, none of the changes outlined above will address the core challenges of climate change unless universities and colleges create spaces for students, teachers and researchers to interrogate the foundational stories they are telling about the relationship between humans, the planet and the other beings we live alongside.

The students who start courses at our institutions today will have been shaped – whether as participants or observers – by the school strike for climate movements. Surveys suggest that 80 per cent of students in universities and further education want to explore questions of sustainability in their courses, a figure that has stayed constant for eight years.[59] These students want to learn what it will mean to be an engineer, an

artist, a builder or a nurse in an era of climate change – what challenges will they face, what changes might this bring to their work, what does this mean for how they see themselves, how can they prevent global warming and ecological damage, what possibilities are open to them to create regenerative practices?[60] Central to these questions is the dilemma of what it means to be human in a complex interdependent world where we live, whatever field we are working in, alongside other beings – from coronaviruses to carbon dioxide molecules, from our close neighbours to the thousands of people around the world involved in the supply chains for the items we consume. Confronting these new questions with honesty is central to addressing the increasing prevalence of climate anxiety and to building a new founding narrative for the university today.[61]

One of our key challenges as educators, then, is to explore with students what it means to be human in a world where we have responsibility but no easy solutions, what it means to build hope in a world where we are interdependent with other people, systems and actors and what it means to be creative in a complex, changing, natural world. Three key orienting questions to prompt our thinking in this area might then be:

i. How do we support our students to explore what it means to be living as part of a complex, lively planet alongside other people and other beings?

ii. How do we support our students to reflect upon their emotional, intellectual and practical responses to the significant risks of ecological and social disruption?

iii. How do we support all of our students to understand and exercise their capacity to respond individually and collectively to these conditions?

This is not, then, a question of teaching 'about' sustainability. Instead, it is about creating educational spaces in all programmes in which lecturers and students can work through their field of study to inquire together into the broader questions of what human agency and responsibility means in these conditions. This is likely to be a process of shared inquiry – between students and educators. Our students, as we are, are moving into a new world for which we have no maps.

There are a number of groups and organisations who have been working with these questions for some years outside the mainstream institutions of higher education. New higher education practices have been developed, such as the Young Innovators Programme, Knowmads, One Year in Transition, Gaia University and the Bioneers Program – all of them attracting students of all ages to explore new ways of thinking, living, engineering and inventing in the face of climate change. In the United States, Sterling College's new EcoGather platform uses online learning as a basis for supporting internationally collaborative and networked place-based learning communities. It is designed, in their words:

to advance ecological thinking and action as a foundation for building regenerative communities. EcoGather will upend the traditional online delivery model of education common among colleges and universities by co-designing courses with communities around the world as they confront the challenges of climate change, biodiversity loss and an extractive globalized economy. Communities in Vermont, Bhutan, India, Puerto Rico and England will collaborate with EcoGather staff to co-create online educational courses and tools that can best serve their specific needs and audiences.[62]

A number of well established networks bring together those educators who are already developing fundamentally different approaches to learning, approaches that emphasise the creation of ecologically regenerative ways of being. The Ecoversities Alliance brings together programmes from around the world that combine western, indigenous, arts-based and land-based knowledges. The Global Ecovillages movement brings together the expertise of those who have been experimenting at scale with renewable energy, regenerative agriculture and new forms of social organisation. Schumacher College in Devon is acting as a centre for an international movement of ecologically aware experimental learning. Transition Towns and Deep Adaptation networks are connecting people from all fields to participate in rapid, hands-on learning and knowledge-sharing around climate change impact and adaptation.

What characterises these practices is a higher education that promises to engage the 'head, hearts and hands' of students. These students are learning how to network together different forms of knowledge to create regenerative communities that are both economically and ecologically viable. They are learning how to deal with anxieties, hopes and fears in collaboration with others, and to look honestly at the challenges humanity faces without being debilitated. Research is also beginning to provide helpful guidance on the forms of education needed in these conditions. The psychologist Maria Ojala, for example, is building robust insights into how to build what she calls 'critical hope' – the ability to recognise the significant challenges and disruptions that are being faced as well as the ability to engage creatively and hopefully with these conditions. Central to her insights is the importance for students of the experience of collective action to support

meaningful and long-term transformative practices.[63] The cultural geographer and climate science specialist Karen O'Brien is developing the intellectual foundations for a new understanding of human agency and responsibility in the complex technological, social, cultural and political processes of the era of climate change.[64]

All of this work is sketching the outline of a new idea of what it means to be human. In turn, a new idea of the student around which universities and colleges might reorganise and rethink their education is emerging – a student who is both aware of the complexity of change and able to act with responsibility to develop relationships and influence processes to make substantive and transformative differences.

At a time when UK universities and colleges are struggling to respond to mental health crises, these programmes demonstrably empower students to act in an imperfect damaged world. Above all, they recognise that a higher education in the era of climate change is not simply about learning a body of knowledge but a rite of passage, an initiation into becoming grown-up in a complex world. While most universities and colleges leave this question of maturation to the world of student societies, these emerging institutions, in contrast, understand the emotional, practical and psychological transition to adulthood in a complex world as central to what it means to be educated today.[65]

The key recommendation here, therefore, is that universities and colleges should:

- initiate an institution-wide activity to bring together staff and students to develop programmes that are adequate to the emotional, intellectual and practical realities of living

well as individuals and with others in the era of climate change.

Taken together, then, this analysis offers a four-layered approach to mapping out the challenges and potential trajectories for higher education institutions in the era of climate change.

These four layers concern:

1. how universities and colleges might ensure that their own institutional ecological footprint is regenerative rather than harmful of the planet;

2. how universities and colleges might act as anchor institutions within their local and national communities to create economic, ecological and social resilience;

3. how universities and colleges can begin to create the knowledge cultures that can help researchers, students and society to deal with the complexity of sustainability challenges; and

4. how universities and colleges can support their students to develop a new awareness of their responsibilities and capacities for hope in challenging times.

Addressing these questions will require a whole-institution conversation; one that is open to the possibility not merely of bolting on new activities, or building new programmes, but of whole-system redesign.[66] It may no longer be a case of doing the same things better, but of doing different things and, indeed, letting some things go.[67] As Geoffrey Chase and Peggy Bartlett, scholars of Education for Sustainable Development, argue, asking these questions may in time 'call us to new sets

of relationships – with our students, with each other, with what we learn, and with ourselves'.[68] It is this last position that has informed the argument in this paper; more cautious roadmaps for action can be found elsewhere.[69]

Central to taking these ideas forward is the clear recognition that this is not about asking all staff to 'teach sustainability', nor is it about rendering higher education subservient to external demands. Indeed, we should rightly be cautious of any argument that proposes higher education should place itself in the service of agenda defined elsewhere. Rather, it is an invitation to enable students and staff to participate in the urgent process of exploring together what it means to be human in conditions of deep ecological and social fragility and to act responsibly in that world – in whichever field or subject area they may stand. It is a call for staff and students to have the freedom to convene around the urgent and lively matters of concern that they are confronting everyday – to bring together different sets of expertise to interrogate what is possible in the world and to imagine what might become possible in ways not yet envisaged. It is an invitation to ask new questions that could not be asked otherwise. What else is a higher education for, if not for this practice of exploration?

5. A role for national policymakers

Universities and colleges do not act in a vacuum. There is an important role for national policymakers in creating favourable conditions for universities and colleges to respond to the invitations I outline here. The first of which, clearly, is the creation of a sustainable economic foundation for higher education institutions that does not push universities and colleges towards ecologically and economically unsustainable behaviours. There is also a monitoring role for national government – ensuring the creation of common goals and powerful strategies for sharing practice.

As these questions are being addressed elsewhere, however, I conclude with three speculative proposals for national interventions designed specifically to support universities and colleges to respond to the calls I have made so far in this paper. The costs here may seem high, but the costs of not acting are much higher.[70] I propose:

The development of a massive, open programme of public learning as a partnership between BEIS, the BBC and UK higher education

- In the 1980s, the BBC micro programme – a partnership between government, industry, the BBC and education providers – laid the foundation for the transition to a digitally enabled society. Today, the UK has the potential to do the same in encouraging mass participation in the transition to sustainable futures.[71] A year of technical and social green innovation should be designated, with online courses co-developed by universities and broadcasters, supported by high-profile television campaigns encouraging civic action, energy transitions and collective learning. Funded by the

Department for Business, Enterprise and Industrial Strategy at a scale equivalent to the funding of the original BBC micro and supported by public broadcasters, the initiative should aim to involve two million people a year in face-to-face, community-based and online learning around green transitions supported by community-level and regional grants to stimulate investment in people, skills and social and technical innovation.

A 'moonshot' capital and revenue research fund from UKRI / BEIS (in partnership with devolved administrations) to stimulate the research and innovation needed to ensure that all UK universities and colleges have zero carbon emissions by 2035, with a 75 per cent reduction by 2030. [72]

- The BEIS *Research Roadmap* calls for a small number of 'moonshot' challenges.[73] This should be one of them. This fund would turn the physical infrastructure and practices of higher education – the land, buildings, procurement and transport operations (including student and staff mobility) of hundreds of institutions in the UK into a focus for radical innovation and inquiry. It might support the development of internationally significant demonstrators, covering everything from biomimetic buildings to transformed transport systems, from rewilding land to holographic international student teaching.[74] Bringing together Social Sciences, Arts, Design and Engineering, the moonshot fund would be administered through UKRI as a cross-council programme with the expectation of significant contributions from university partners such as housing providers. All developments should be subject to robust monitoring against the Paris Agreement and Aichi biodiversity targets.[75]

The creation of a £3 billion National Green Livelihoods Transition Fund

- This fund would comprise: 1. Catalyst funds for higher education institutions to create and provide free cutting-edge diploma and degree programmes in partnership with civil society and green industries in the areas of green social and technical innovation; 2. Funding for apprenticeships (including living costs) for low-income students seeking to transition from high-carbon forms of employment, to take these courses alongside placements with businesses, local government and civil society partners who are working to develop new ecologically sustainable activities.[76]

Together, the three initiatives in this chapter would combine to create the conditions to allow the UK's higher education community to act as a beacon for practical action and radical innovation in sustainability. They would support the rapid transition towards sustainable livelihoods in the wider population and catalyse widespread social innovation to low carbon and ecologically thriving communities.

Beyond business as usual: Higher education in the era of climate change

6. Conclusion: towards collective experimentation and learning

As a country and as a planet, we are facing profound and interconnected ecological, social and economic crises. Universities and colleges have a central role to play in enabling us to understand, adapt and survive in these conditions. First, in their preparation of young people and adults for the challenges that are already being felt and that are likely to intensify; and, secondly, in their ongoing partnership with communities to develop the knowledge and practices that will constitute ecological and economic sustainability. The situation we find ourselves in is so grave – the ecological and social harms already so great – that new thinking and a spirit of collective generosity is required. This, indeed, is a moment for systemic change of a scale we never have quite managed before – although the astonishing response to the pandemic by teachers, students and administrators begins to show what might be possible. Imagine what might happen if we were able to harness such energy towards the four challenges I have outlined here:

- **reconfiguring the day-to-day operations of our higher education institutions** – focused on a massive reduction in carbon emissions and renewed commitment to sustaining biodiversity;

- **reinvigorating the civic role of institutions** – committing to ethical and socially positive investment, playing active roles in civic society, educating adults for a just transition away from carbon intensive work and creating sustainable supply lines that challenge economic inequalities and ecological harm;

- **reshaping the knowledge structures of the university** – creating more opportunities for interdisciplinarity and for collaboration with previously excluded knowledge traditions, allowing academics and students to more adequately engage with the complexity of sustainability challenges; and

- **refocusing the educational mission of the institution to support students to develop the emotional, intellectual and practical capacities to live well with each other and with the planet in the era of climate change –** creating the educational experiences that allow students to explore their abilities to act and learn in interdependence not only with each other, but as active participants in the ongoing natural, technological, political and cultural processes that together are shaping the era of climate change.

It is, in other words, time for a creative reinvention of higher education. It has been done before, it can be done again.

Endnotes

1   Although there is still doubt that this figure is in line with commitments in the Paris Agreement. See https://www.theccc.org.uk/wp-content/uploads/2020/07/Kevin-Anderson-and-Isak-Stoddard-University-of-Manchester-and-Uppsala-University-response-The-Sixth-Carbon-Budget-and-Welsh-emissions-targets-Call-for-Evidence.pdf

2   Kevin Anderson, *The inconvenient truth of carbon offsets*, (2012) https://www.nature.com/news/the-inconvenient-truth-of-carbon-offsets-1.10373

3   See the Copernicus institute report: https://climate.copernicus.eu/temperature-records-siberia-while-wildfires-arctic-surpass-last-years-activity See also AFP 'Highest Ever Temperature Recorded in Norwegian Arctic Archipelago', *PhysOrg*, (2020) https://phys.org/news/2020-07-highest-ever-temperature-norwegian-arctic-archipelago.html

4   See the 'Carbon Brief' website: https://interactive.carbonbrief.org/impacts-climate-change-one-point-five-degrees-two-degrees/?utm_source=web&utm_campaign=Redirect; See also the NASA Climate Change Site: https://climate.nasa.gov/news/2865/a-degree-of-concern-why-global-temperatures-matter/ and section B5 of the IPCC (2018) report cited above https://www.ipcc.ch/site/assets/uploads/sites/2/2019/05/SR15_SPM_version_report_LR.pdf

5   Johan Rockström et al, 'A safe operating space for humanity', *Nature,* (2020) 461, 472-475. It is worth also noting that the IPCC report describes as 'likely' that warming of 1.5 degrees will happen as early as 2030. Intergovernmental Panel on Climate Change (IPCC) (2018) Summary for Policymakers. In: *Global Warming of 1.5°C. An IPCC Special Report*. Masson-Delmotte, V., et al (eds.)

6   Intergovernmental Panel on Biodiversity and Ecosystem Services (2019): *Summary for policymakers of the global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services*. S. Díaz, J. Settele, E. S. Brondízio E.S., et al (eds.). IPBES secretariat, Bonn, Germany. 56 pages.

7   Kartha, S., Kemp-Benedict, E., Ghosh, E., Nazareth, A. & Gore, T. (2020) *The Carbon Inequality Era. An assessment of the global distribution of consumption emissions among individuals from 1990 to 2015 and beyond*. Joint Research Report. Stockholm Environment Institute and Oxfam International. See also Lucas Chancel (2020) *Unsustainable Inequalities: Social Justice and the Environment*, Boston: Harvard University Press.

8   Kevin Anderson, John F. Broderick & Isak Stoddard (2020): 'A factor of two: how the mitigation plans of "climate progressive" nations fall far short of Paris-compliant pathways', *Climate Policy*, pp.1-15.

9   The Sustainable Development Goals are explained here: https://www.un.org/sustainabledevelopment/sustainable-development-goals/

10 On weaknesses of the SDGs see, for example, Thomas Pogge and Mitu Sengupta (2016) 'Assessing the sustainable development goals from a human rights perspective', in *Journal of International and Comparative Social Policy*, 32/2 (2016), 83–97; Leon Tikly et al (2020) *Transforming Education for Sustainable Futures: Foundations Paper*, https://tesf.network/wp-content/uploads/2020/07/TESF-BACKGROUND-PAPER-Foundations-for-public-consultation-1.pdf; Jeffrey D. Sachs (2012) 'From Millennium Development Goals to Sustainable Development Goals', *Lancet,* 379 (9832):2206-11.

11 Although perhaps also note that the targets of the Climate Commission remain conservative and, in some views, unlikely to be compliant with Paris climate commitments. The Climate Commission Website: https://www.eauc.org.uk/climate_commission

12 This framework draws on an approach called Causal Layered Analysis which was developed by the critical futurist and philosopher Sohail Inayatullah. See Sohail Inayatullah (1998) 'Causal Layered Analysis: poststructuralism as method', *Futures*, Vol. 30, No. 8, pp. 815–829. His framework uses the terms 'litany' and 'myth' for the levels I have titled 'headline' and 'foundational narrative'.

13 A university's research will in theory, also contribute to emissions reductions at a global level.

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15 The Paris Climate Agreement is summarised here: https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement

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23 Amitav Ghosh (2017) *The Great Derangement: Climate Change and the Unthinkable*, p3. See also Bruno Latour (2017) *Facing Gaia: Eight Lectures on the New Climatic Regime*, Cambridge: Polity Press. Zoe Todd (2013) *Indigenising the Anthropocene*, in Art and the Anthropocene, p241. Full text available here: https://law.unimelb.edu.au/__data/assets/pdf_file/0005/3118244/7-Todd,-Zoe,-Indigenizing-the-Anthropocene.pdf

24 Arjen Wals and Lisa Schwarzin (2012) *Fostering organizational sustainability through dialogical interaction*. The Learning Organisation 19:11-27.

25 2.383 million students in Universities 2018 (HESA); 1.4 million students in FE Colleges (AoC College Key Facts Document); 111,000 staff (AoC College Key Facts Document), 439,000 staff (HESA data). It is almost impossible to access information on land ownership by universities. Figures on Oxford and Cambridge property ownership alone suggest over £3.5bn worth of assets: https://www.theguardian.com/education/2018/may/29/oxford-and-cambridge-university-colleges-own-property-worth-35bn

26 Kevin Anderson, John F. Broderick & Isak Stoddard (2020): 'A factor of two: how the mitigation plans of 'climate progressive' nations fall far short of Paris-compliant pathways', *Climate Policy*, DOI: 10.1080/14693062.2020.1728209

27 Robin Shields (2019) 'The sustainability of international higher education: Student mobility and global climate change', *Journal of Cleaner Production,* vol 217, pp 594-602.

28 The FE College Roadmap is here: https://www.eauc.org.uk/7033
    Updates on the Commission's work are available here: https://www.
    eauc.org.uk/climate_commission_updates

29 Bear in mind that ASU does still include offsetting as a basis for its
    claims to carbon neutrality – with all the risks that that involves. https://
    asunow.asu.edu/20200421-solutions-asu-achieves-carbon-neutrality-
    ranked-among-most-sustainable-universities-world

30 The University of Hull is aiming to become carbon neutral by 2027:
    https://www.hull.ac.uk/work-with-us/more/media-centre/news/2019/
    university-of-hull-announces-plan-to-be-carbon-neutral-by-2027-at-
    flagship-waterline-summit. The University of Bristol has a target to
    achieve carbon neutrality by 2030, see http://www.bris.ac.uk/media-
    library/sites/green/documents/policy/UoB%20Sustainability%20
    New%20Policy%20Document_v2.pdf.

31 Green Office description at Groningen here: https://www.rug.nl/about-
    ug/profile/facts-and-figures/duurzaamheid/green-office/

32 ETH account of their transport emissions reduction plans: https://
    ethz.ch/services/en/organisation/executive-board/vice-president-
    infrastructure/mobilitaetsplattform/air-travel.html

33 See the highly successful virtual CIES conference: https://cies2020.org/
    virtual/

34 Green University Toolkit 2.0: Transforming Universities into Green
    and Sustainable Campuses, UNEP: Paris https://www.unenvironment.
    org/resources/toolkits-manuals-and-guides/greening-universities-
    toolkit-v20

35 https://secondnature.org/initiative/uc3-coalition/

36 https://www.climateemergency.uk/blog/u-k-universities-sign-first-of-a-
    kind-wind-driven-power-purchase-agreement/

37   https://carbontracker.org/carbon-budgets-explained/

38 Although some caution should be applied given their reliance on using Negative Emissions Technologies in their target setting http://sciencebasedtargetsnetwork.org/

39 See the Transition Towns movement: https://transitionnetwork.org/. See also the Deep Adaptation network https://deepadaptation.ning.com/

40 See https://www.bbc.com/news/business-50868717. The campaign for USS to divest is here: https://divestuss.org/

41 Social investment fund announcement: https://bigsocietycapital.com/latest/major-universities-unite-to-align-investments-with-values-launching-responsible-investment-network/.

42 The financialisation of climate action, however, also requires treating with caution. Hache F. 2020. *50 Shades of Green Part III: Sustainable Finance 2.0 – The Securitization of Climate and Biodiversity Policies*, Green Finance Observatory, Brussels https://greenfinanceobservatory.org/wp-content/uploads/2020/03/50-shades-part-III_v5.10.pdf

43 The UPP Foundation/Civic University Commission Report (2020) *Truly Civic: Strengthening the connection between universities and their places,* https://upp-foundation.org/wp-content/uploads/2019/02/Civic-University-Commission-Final-Report.pdf

44 The Transition Network: https://transitionnetwork.org/ and the Incredible Edible Network: https://www.incredibleedible.org.uk/

45 See the work of the Civic University Network: https://www.shu.ac.uk/about-us/civic-university-network and the National Coordinating Centre for Public Engagement: https://www.publicengagement.ac.uk/ as well as the Connected Communities Programme: https://connected-communities.org/, accessed August 2020

46 The Community-Wealth Programme: https://community-wealth.org/strategies/panel/anchors/index.html

47 See also David Boyle and Andrew Simms (2009) *The New Economics: A Bigger Picture*, London: Earthscan.

48 The Amsterdam City approach to regenerative development here: https://www.kateraworth.com/2020/04/08/amsterdam-city-doughnut/

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52 Tom Sperlinger, Josie McLellan, Richard Pettigrew (2018) *Who are Universities For? Re-making Higher Education,* Bristol: Policy Press.

53 Challenge Labs at Chalmers University: https://www.challengelab.chalmers.se/

54 More on Campus Fryslân here: https://www.rug.nl/cf/

55 Carina Wyborn et al, (2019) 'Co-Producing Sustainability: Reordering the governance of science, policy and practice', *Annual Review of Environment and Resources*, 44:319–46 see also Norström et al (2020) 'Principles for Knowledge Co-Production in Sustainability Research', *Nature: Sustainability*.

56 Intergovernmental Panel on Biodiversity and Ecosystem Services (2019): *Summary for policymakers of the global assessment report on biodiversity and ecosystem services*. S. Díaz, J. Settele, E. S. Brondízio E.S., et al (eds.). IPBES secretariat, Bonn, Germany. See also: Linda

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59 https://sustainability.unioncloud.org/our-research/our-research-reports/education-learning-employment-and-sustainability/sustainability-skills-annual-survey

60 See Joy Carter (2020) The Value of A Degree? What do Gen Z Expect from their University? https://www.sustainabilityexchange.ac.uk/the_value_of_a_degree_what_do_gen_z_expect_from

61 Maria Ojala (2016) 'Facing Anxiety in Climate Change Education: From Therapeutic Practice to Hopeful Transgressive Learning', *Journal of Environmental Education*, Vol 21.

62 See press release on latest development of the programme here. Further information available by following links in the document. https://sterlingcollege.edu/news-room/sterling-college-receives-1-5-million-grant-to-launch-ecogather/

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64 Karen O'Brien, (2019) *Activating Personal and Political Agency*, a contribution to the forum The Climate Movement: What's Next?, *Great Transition Initiative* (June 2019), https://greattransition.org/gti-forum/climate-movement-obrien. See also Karen O'Brien (2020) *You Matter More Than You Think,* open access book, available at https://www.youmattermorethanyouthink.com/download-form

65 It is worth also attending to the work of Wilderness and Vision Quest organisations, who are supporting many adults to participate in transformative experiences that support them to emotionally and psychologically engage with their place in a wider non-human universe.

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68 Geoffrey Chase and Peggy Bartlett (2013) *Sustainability in Higher Education: Stories and Strategies for Transformation*, Cambridge, MA: MIT Press, p15.

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70 Stern Review: http://www.lse.ac.uk/granthaminstitute/publication/the-economics-of-climate-change-the-stern-review/

71 See also NESTA's Participatory Futures Programme: https://www.nesta.org.uk/project/participatory-futures/

72 To ensure fair contributions to Paris agreement targets, the target for this initiative should be for zero CO_2 emissions (scope 1-3) by 2035, which would see rapid ramping up of mitigation to over 10% per year within the next 2-3 years, and achieving around a 75% cut by 2030. On Non-CO_2 emissions (principally from food and agriculture and some industrial emissions), this would see 5% cuts each year, aiming to be net zero by 2040. Put simply, the goals would be: on CO_2, real zero by 2035 and a minimum of 10% cut year on year by 2023, and on non-CO_2 'net zero' by 2040 and an annual cut of 5% from 2023. The proposed figures are based personal communication with Kevin Anderson, and on Kevin Anderson, John F. Broderick & Isak Stoddard (2020): 'A factor of two: how the mitigation plans of "climate progressive" nations fall far short of Paris-compliant pathways', *Climate Policy*, DOI:10.1080/14693062.2020.1728209.

73 Government Research Roadmap Consultation - https://www.gov.uk/government/publications/uk-research-and-development-roadmap/uk-research-and-development-roadmap

74 If that sounds a little 'far out', it's worth noting that Imperial were already developing holographic lecture technologies a few years ago: https://www.bbc.com/news/technology-46060381

75 The EAUC provides a scorecard for universities to self-assess. People and Planet also offer an alternative model for monitoring. The Office for Students has already proposed a voluntary monitoring scheme (as of January 2020).

76 This proposal also addresses aspects of the longer term underfunding of FE and adult education provision identified by the IFS https://www.ifs.org.uk/publications/14369

With climate change continuing to be the biggest global threat, this paper argues that universities and colleges should take a leading role in putting the world on a more sustainable footing.

Making use of the latest research and powerful case studies, Keri Facer makes a series of recommendations for students, staff and policymakers that would deliver a new approach, from changes to day-to-day operations to the core educational mission and civic role of the university.

Debate Paper 24