Cumberland Lodge
exchanging views, inspiring minds

Conference briefing

Climate Futures:
Youth Perspectives

February 2021

William Finnegan

Foreword

This briefing document has been prepared to guide and inform discussions at Climate Futures: Youth Perspectives, the virtual conference we are convening from 9 to 18 March 2021. It provides an independent review of current research and thinking, and information about action being taken to address the risks associated with our rapidly changing climate.

In March, we are convening young people from schools, colleges and universities across the UK, together with policymakers, charity representatives, activists, community practitioners and academics, for a fortnight of intergenerational dialogue on some of the biggest challenges facing the planet today.

We are providing a platform for young people to express their views, visions and expectations for climate futures, ahead of the 2021 United Nations Climate Change Conference (COP26) in Glasgow, this November. Ideas and perspectives from the Cumberland Lodge conference will be consolidated into a summary report, to be presented to the Youth4Climate: Driving Ambition meeting (Pre-COP26) in Milan this September.

We are grateful to our freelance Research Associate, Bill Finnegan, for preparing this resource for us. Bill will be taking part in our virtual conference and writing our final report. The draft report will be reviewed and refined at a smaller consultation involving conference participants and further academics and specialists in the field of climate change, before being published this summer.

I hope that you find this briefing useful, both for the conference discussions and your wider work and study. I look forward to seeing you at the conference.

Edmund Newell

Canon Dr Edmund Newell
Chief Executive

About the author

William Finnegan is the author of this briefing document. He is supporting our work on Climate Futures this year, as a freelance Research Associate, and will be participating in our March 2021 conference and writing our summary report.

Bill is a doctoral student at the University of Oxford's Environmental Change Institute, whose research explores secondary-school energy and climate programmes and youth climate activism in the UK. He has also been appointed to join the doctoral enrichment scheme at the Alan Turing Institute, the UK's national institute for data science and artificial intelligence.

In 2003, Bill co-founded Tamarack Media Cooperative, a digital communications firm that supports a wide range of environmental organisations. Bill's documentary films and multimedia productions have appeared on US public television, the BBC, and in film festivals around the world, and he is also a contributor to the online publication *The Conversation*.

Bill won the Director's Award from the North American Association for Environmental Education in 2016, a TogetherGreen Fellowship from the National Audubon Society and Toyota in 2010, and the New Voices Award from J-Lab: The Institute for Interactive Journalism in the USA, in 2007.

Bill will be taking part in our Climate Futures: Youth Perspectives conference and writing our summary report.

Contents

1 Introduction

Climate change will shape the future. Through environmental destruction and pollution – mostly as a result of the burning of fossil fuels such as coal, oil and gas – we have changed the composition of the atmosphere. The global average atmospheric concentration of carbon dioxide (CO_2) has risen from 280 parts per million (ppm) before the Industrial Revolution to over 400 ppm in the past decade.[1] As a consequence of how CO2 and other greenhouse gases absorb heat, average global temperatures have increased by 1°C from pre-industrial temperatures and are on a trajectory to increase by an additional 0.2°C per decade.[2] The 2015 Paris Climate Agreement aims to limit global warming to well below 2°C, to avoid devastating consequences to natural and human systems.[3]

Our changing climate can feel disconnected from our daily life, due to the distance in time and space between the actions that lead to global heating and their impacts. Our carbon-intensive lifestyles today, from frequent flights to daily meat consumption, will result in global climate disruptions and localised natural disasters such as flooding and wildfires in the future, with poorer countries and communities bearing the brunt of this impact. The basic injustice of climate change – the fact that some people suffer the costs of two centuries of planet-altering industrialisation whilst not fully participating in the benefits – is even more extreme when considering future generations. In terms of intergenerational climate justice, we are shaping up to be bad ancestors, having benefited from economic growth and improvements in our quality of life, whilst leaving behind a world stretched beyond the 'planetary boundaries' of ecological stability and resilience.[4]

About 1.8 billion young people between the ages of 10 and 24 — the largest youth generation in global history – were born after the science of human-caused climate change was settled and the political process to address this problem began.[5] As these people continue their studies, enter the workforce and participate in

democratic processes, the uncertainty and anxiety of the climate crisis hangs over their futures. Youth perspectives on climate are perhaps best illustrated through the handmade signs found at the Fridays for Future protests: *There is no planet B*; *System change not climate change*; *You'll die of old age – we'll die of climate change*. And, of course, the sign that launched a movement and turned Greta Thunberg into a household name: *Skolstrejk för klimatet* (*'School strike for climate'*).

The COVID-19 coronavirus pandemic has paused the latest wave of youth climate activism and delayed the annual UN climate change gathering – the Conference of the Parties (COP) – which next takes place in Glasgow, Scotland (COP26), on 1–12 November 2021.

Climate Futures: Youth Perspectives was originally envisioned as a chance for young people to engage with the outcomes of COP26 at Cumberland Lodge. As a result of the pandemic, however, this virtual conference will now help to inform discussions in Glasgow, and the preliminary Youth Summit in Milan this September, elevating youth voices as the UK prepares to host this important international gathering. For Climate Futures: Youth Perspective participants, this briefing document sets out to provide a shared understanding of key elements of our response to the climate crisis, through the lens of youth: policy, education, green careers, adaptation and grassroots action. The panel discussions and intergenerational conversations that Cumberland Lodge is hosting will be developed into a report to be released in the summer of 2021.

What is our climate future? Will the climate crisis spiral out of control, resulting in a dystopian collapse of modern civilisation? Can technological innovation and collective political action bring about social transformation and a green utopia? Or will we navigate the many shades of 'staying with the trouble' that lie between dystopia and utopia?[6] Young people are more than passive victims of the climate crisis – all around the world they are rising up as powerful agents of change. Our planet's future lies in these hands.

2 Climate science and impact

Before turning to our response to the climate crisis, it is worth briefly addressing the state of our knowledge of climate science and providing an overview of the key impacts of climate change.

The Intergovernmental Panel on Climate Change (IPCC), an unprecedented and ambitious scientific collaboration, has played a major role in informing our understanding of this issue. The IPCC was established by the UN Environment Programme and the World Meteorological Organization, in 1988. Scientists involved in the IPCC volunteer their time to synthesise the latest peer-reviewed research on climate science, climate change impacts and climate change mitigation (which involves actions to limit the amount or rate of global warming and its related effects).

In 2007, the IPCC and the United States' Vice President Al Gore were awarded the Nobel Peace Prize, 'for their efforts to build up and disseminate greater knowledge about man-made climate change, and to lay the foundations for the measures that are needed to counteract such change'.[7]

Our current understanding of climate change is captured in the IPCC's comprehensive *Fifth Assessment Report* (AR5), which was completed in 2014.[8] An updated *Sixth Assessment Report* is currently being finalised. In 2018, the IPCC published the influential *Special Report on Global Warming of 1.5 °C*, which emphasised that the next ten years would be a decade of consequence for climate action.[9]

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AR5 clearly concludes that humans are changing the climate (which is referred to as *anthropogenic* change – being generated by humans). It states that:

> *Anthropogenic greenhouse gas emissions have increased since the pre-industrial era, driven largely by economic and population growth, and are now higher than ever. This has led to atmospheric concentrations of carbon dioxide, methane and nitrous oxide that are unprecedented in at least the last 800,000 years. Their effects, together with those of other anthropogenic drivers, have been detected throughout the climate system and are extremely likely to have been the dominant cause of the observed warming since the mid-20th century.*[10]

The IPCC indicates the certainty of its report findings, both in terms of the amount of evidence to support the claim and the level of scientific agreement. 'Extremely likely' is defined as a statement made with 95-100% confidence – representing both high agreement and robust evidence. Systematic reviews of published articles reflect a similar level of scientific consensus, with over 97% of peer-reviewed articles agreeing that humans are causing climate change.[11]

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AR5 also goes into great detail about observed and potential impacts of climate change to both natural and human systems. Raising average global temperatures by a few degrees may not sound that serious, and may be even presented, flippantly, as a positive development in temperate climates, but the results on the ground can be devastating. Changes in weather patterns – ranging from drought to flooding – impact food systems, and extreme weather events and wildfires are both deadly and destructive. In 2020, there were 22 climate-related disasters in the US that each cost over $1 billion, making it the sixth consecutive year with over ten billion-dollar weather and climate disaster events.[12] Meanwhile, the instability of climate change also amplifies existing threats, from biodiversity loss to armed conflict.

Based on current trends, by 2070, parts of the planet that are home to 3.5 billion people will experience annual average temperatures of over 29°C – potentially intolerable conditions for a third of the global population.[13] Resulting climate migration (where people are displaced from their homes by extreme heat, disasters and insecurity) and fears about a wave of incoming climate refugees might fuel xenophobia and lead to tighter immigration restrictions, and with this in mind, researchers have been calling for more work and dialogue on this issue.[14]

Figure 1 – A series of graphs showing increases in temperature (IPCC, 2014):[15]

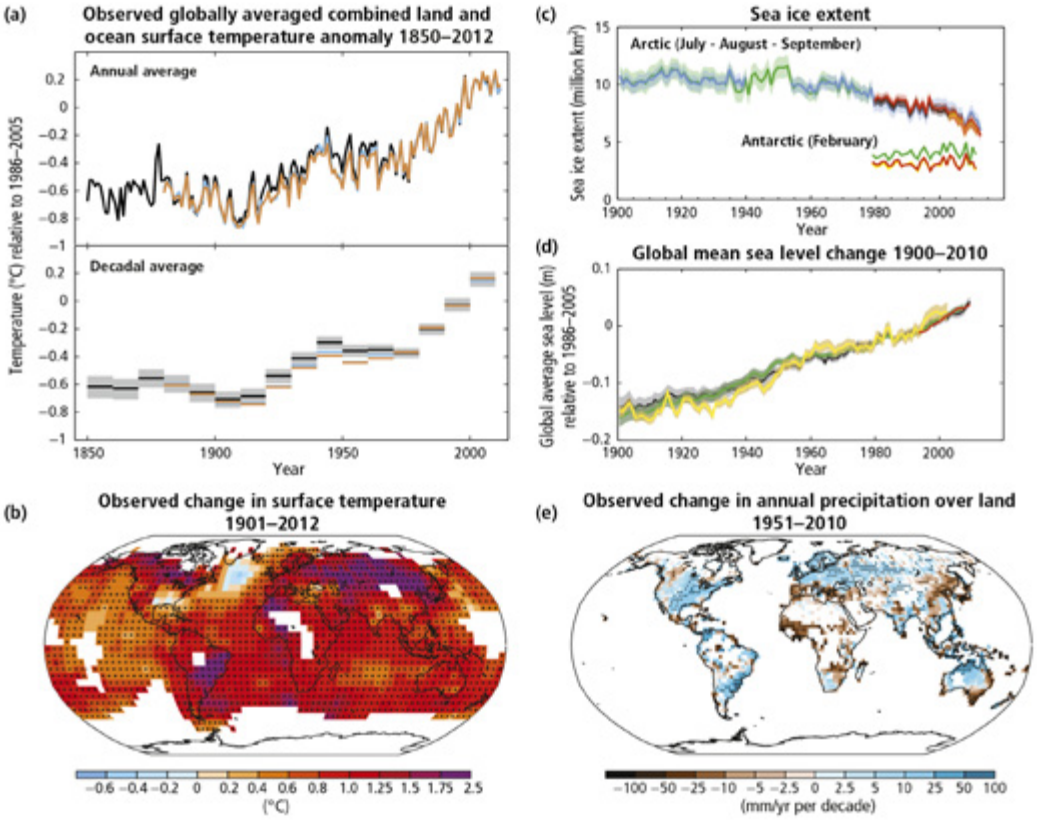
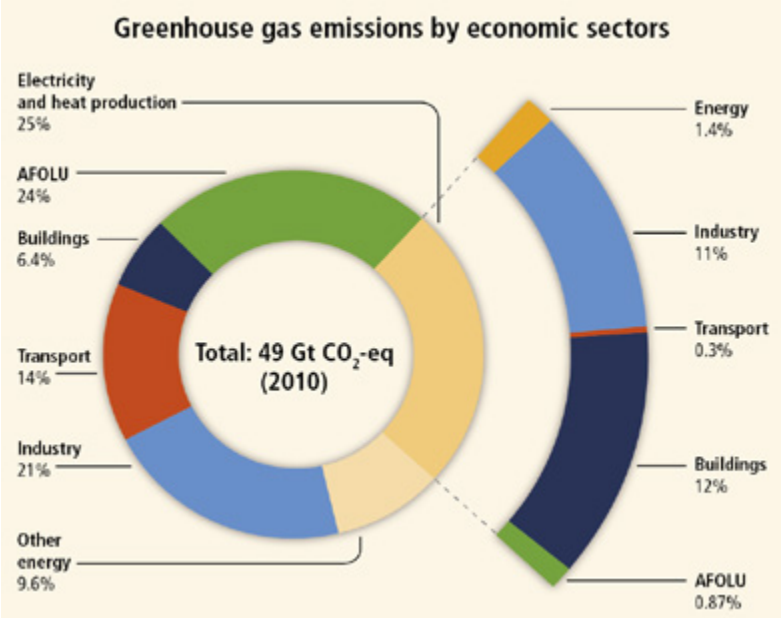


Figure 2 – Breakdown of global greenhouse gas emissions by economic sector (IPCC, 2014):[16]



(AFOLU refers to Agriculture, Forestry and Other Land Use)

This brief survey of climate science and impacts is a necessary prelude to any discussion about climate change, but it is worth restating and emphasising the overwhelming scientific consensus that people are changing the climate and that this is having serious consequences for both the natural world and human societies.

The science is settled. The scale of the problem is clear. The question is: what will we do about it?

3 Climate policy

Climate change is a global, systemic problem that cannot be prevented by individual behaviour changes or a single, ambitious country working in isolation. For the past 28 years, the United Nations has convened and facilitated the international climate policy effort. This dates back to the 1992 Earth Summit in Rio de Janeiro – a milestone in sustainable development – at which the UN Framework Convention on Climate Change (UNFCCC) was launched.[17] As an international treaty, the UNFCCC came into force in 1994, with 166 countries as signatories, and it now has 197 parties (196 countries plus the European Union). Negotiations and progress reports take place at an annual Conference of the Parties (COP), a large gathering that includes policymakers and representatives from civil society, including young people, indigenous peoples and other constituencies.

From the Paris Agreement to COP26

Two additional international agreements have been negotiated and adopted under the UNFCCC, since the early 1990s. The 1997 Kyoto Protocol added clarity to global CO_2 emissions reduction commitments and processes for reporting and co-operation.[18] The 2015 Paris Agreement set a goal of limiting global heating to well below 2°C compared to pre-industrial global average temperatures, with the ambition to limit warming to 1.5°C.[19] To this end, the Paris Agreement calls for greenhouse gas emissions to peak as soon as possible, so that net-zero emissions might be achieved by the second half of this century. 'Net zero' is when sources of greenhouse gas emissions are balanced out by 'sinks' that absorb similar quantities of these gases; for example, through nature-based solutions like ecological restoration and tree planting, or through carbon capture and storage technologies.

The Paris Agreement requires countries to agree nationally determined contributions (NDCs), which are national climate

plans, outlining how they are working to reduce greenhouse gas emissions. Every five years, each country needs to revisit their NDC and adopt a more ambitious plan, in what is known as the 'ratchet mechanism'.[20] COP26 in Glasgow is an opportunity to both review the enhanced ambitions of the second round of NDCs and to sort out some lingering details of the Paris Agreement, especially with respect to carbon markets (where emissions reductions are traded between countries).[21]

The 2015 Paris Agreement set a goal of limiting global heating to well below 2°C compared to pre-industrial global average temperatures, with the ambition to limit warming to 1.5°C.

Mock COP26

When COP26 was delayed from 2020 to 2021, a network of young climate activists decided to host their own international climate conference, online. With support from the UK charity Students Organising for Sustainability, which grew out of the environmental programmes of the National Union of Students, Mock COP26 involved 350 delegates from 140 countries. The resulting declaration outlines 18 policies, covering education, justice, resilient livelihoods, physical and mental health, biodiversity and the NDCs.

UK climate policy

UK Prime Minister Margaret Thatcher was an early advocate for international co-operation to address climate change. In 1990, in response to the first IPCC assessment report, Thatcher commented:

> *The danger of global warming is as yet unseen, but real enough for us to make changes and sacrifices, so that we do not live at the expense of future generations…. I see the adoption of these policies as a sort of premium on insurance against fire, flood or*

other disaster. It may be cheaper or more cost-effective to take action now than to wait and find we have to pay much more later.[22]

In 2008, UK leadership on climate policy was reinforced by the trailblazing Climate Change Act, which received strong cross-party support (only three Members of Parliament voted against it).[23] The key components of the UK's climate law include:

- A long-term emissions reduction target – the Act was amended in 2019 to commit the UK to achieving net-zero emissions by 2050 (the original target was an 80% reduction in emissions, compared to the 1990 baseline used by the Kyoto Protocol)
- The creation of the Committee on Climate Change (CCC) – an independent advisory body, now called the Climate Change Committee, chaired by the UK's longest-serving Secretary of State for the Environment (1993 – 1997), Lord Deben
- Statutory five-year carbon budgets, which are set 12 years in advance – the Sixth Carbon Budget, which covers 2033 – 2037, was published by the CCC in December 2020
- A five-year cycle of the Climate Change Risk Assessment (CCRA) and National Adaptation Programme (NAP) – the second iteration of the NAP was published in 2018, outlining the actions that the Government and others will take to adapt to the challenges of climate change in the UK.[24]

In 2019, the confluence of youth climate strikes, Extinction Rebellion protests and the broadcast of a David Attenborough documentary, *Climate Change – The Facts*, led to increased public awareness and heightened political pressure in the UK.[25] In response, Parliament declared a 'climate emergency' and updated the Climate Change Act to enshrine the UK's 2050 net-zero commitment in law, and the House of Commons-convened Climate Assembly UK, a citizens' assembly on climate change.

Green New Deal

Over the past year, the coronavirus pandemic and lockdowns around the world have stalled the momentum of both the youth climate movement and international climate policy. But

this unprecedented pause in normal life has also illustrated how quickly societies can change; for example, with respect to dramatically reducing travel and working from home. As economies around the world emerge from COVID-19 and the resultant economic downturn, there will be growing calls for a green pandemic recovery.[26]

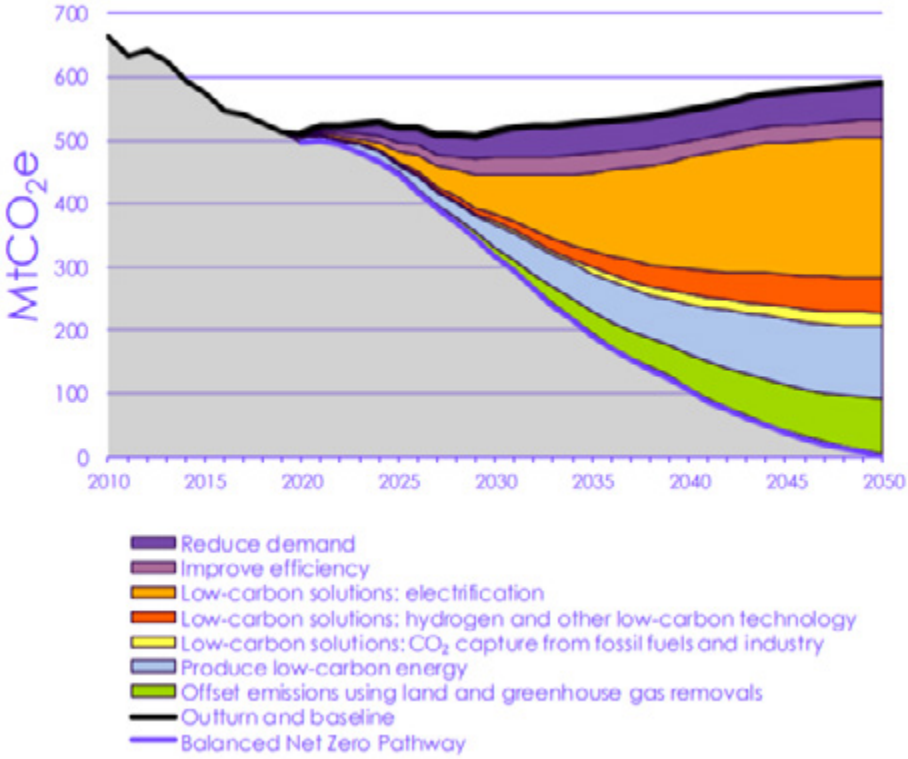
Large-scale government investments in infrastructure and jobs to decarbonise the economy and improve climate resilience are often referred to as 'a Green New Deal', a reference to the New Deal of the 1930s in the United States, which was a massive public works programme initiated by President Franklin Roosevelt in response to the Great Depression. During the 2007–2008 financial crisis, a group in the UK first proposed a Green New Deal as a means of aligning long-term economic policy and environmental sustainability.[27] This concept achieved prominence when US legislators Alexandria Ocasio-Cortez and Ed Markey co-sponsored a Green New Deal resolution, and there have also been calls for a Green New Deal for Europe. A diverse group of youth climate activists have been at the forefront of these campaigns; for example, through the US Sunrise Movement and Green New Deal UK.

The Ten-Point Plan for a Green Industrial Revolution (Department for Business, Energy & Industrial Strategy, 2020):[28]

1. Advancing Offshore Wind
2. Driving the Growth of Low Carbon Hydrogen
3. Delivering New and Advanced Nuclear Power
4. Accelerating the Shift to Zero Emission Vehicles
5. Green Public Transport, Cycling and Walking
6. Jet Zero and Green Ships
7. Greener Buildings
8. Investing in Carbon Capture, Usage and Storage
9. Protecting Our Natural Environment
10. Green Finance and Innovation

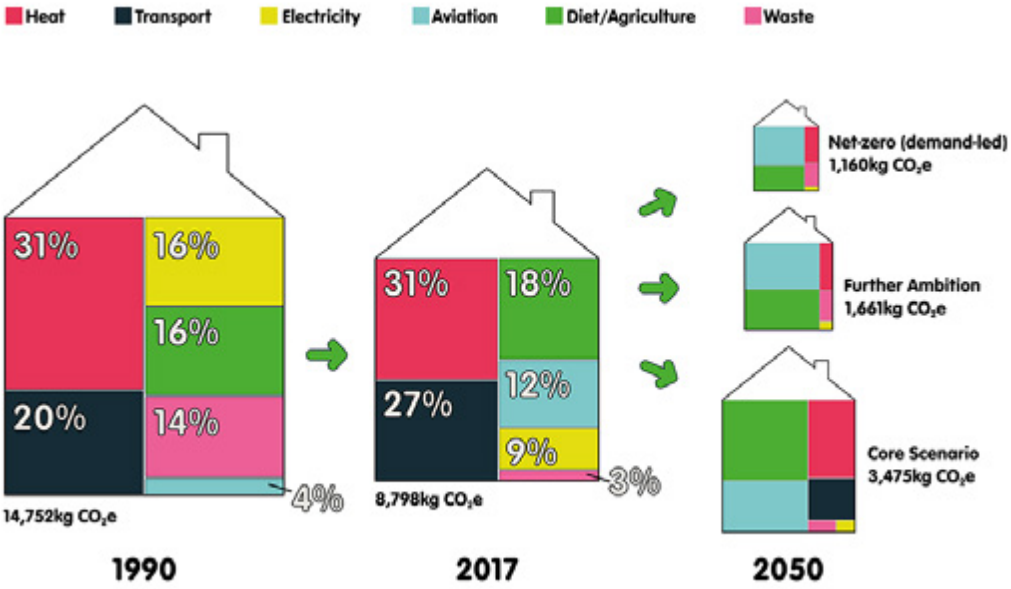
Ahead of COP26, the Conservative government continues to highlight the UK's leadership role in fighting climate change. The UK has made progress, by cutting greenhouse gas emissions by over 45% compared to 1990 levels – the largest relative reduction in the world.[29] This has been largely achieved by decarbonising energy supply, with renewables now generating more electricity than fossil fuels.[30]

Figure 3: Projected emissions reductions over time in the UK, by emissions reduction strategy (Committee on Climate Change, Sixth Carbon Budget, 2020):[31]



The Sixth Carbon Budget calls for a 78% emission reduction by 2035, which will require the widespread electrification of transport and heating, whilst ramping up offshore wind production.[32] For example, the UK government is supporting a shift to electric vehicles by investing £1.3 billion in charging infrastructure and banning the sale of new petrol and diesel cars from the year 2030.[33]

Figure 4 – UK average historic household emissions and future scenarios (Energy Systems Catapult, 2019):[34]



With falling costs for renewable energy, widespread public support for climate action, and cross-party political consensus on the need for urgent action, the UK is poised to see through these commitments, but a long (and bumpy) road to net zero lies ahead.

4 Climate education

Education is an essential component of responding to the climate crisis. Through formal education and informal, lifelong learning, people are able to make more sustainable decisions and work towards systems change and social transformation. Climate education cuts across traditional subjects and disciplines – it encompasses climate science, human and social factors that drive greenhouse gas emissions, technical and political solutions that are required to mitigate climate change, strategies for individual and community adaptation to a changing climate, and the ecological restoration that is required for a more resilient future.[35]

Education theorist Gert Biesta describes three dimensions of the purpose of education: qualification, socialisation and subjectification.[36] These can also be applied to climate education, whereby:

- **'Qualification'** relates to the skills that people will need to navigate smart homes and cities, and to pursue green careers in the future
- **'Socialisation'** is about developing social norms, or accepted ways of thinking and behaving, that support low-carbon living (but which, wrongly applied, can reinforce patterns of consumption and waste, instead)
- **'Subjectification'** involves the development of critical thinking, over the course of our education, to equip and enable us to challenge the *status quo*, as illustrated by the student climate strikes.

Environmental and sustainability education

Climate education has grown out of the broader field of environmental education. In 1977, UNESCO (United Nations Educational, Scientific and Cultural Organization) and UNEP (United Nations Environment Programme) organised the

Intergovernmental Conference on Environmental Education in Tbilisi, Georgia, which was part of the former Soviet Union.[37] It was the middle of the Cold War (1947–1991), but delegations from around the world came together to explore how education could be harnessed to address environmental problems.

In 2005, UNESCO launched the UN Decade of Education for Sustainable Development, and the 2015 United Nations Sustainable Development Goals (SDGs) for 2030 promote both education for sustainable development (Target 4.7) and climate education (Target 13.3).[38] Each Sustainable Development Goal (SDG) is accompanied by a target for 2030, and indicators of how far that target is being met. All 17 SDGs are illustrated on page 15.

Sustainable Development Goal No.13 – Take urgent action to combat climate change and its impacts

Target 13.3: Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning.

Indicator 13.3.1: Number of countries that have integrated mitigation, adaptation, impact reduction and early warning into primary, secondary and tertiary curricula.

Indicator 13.3.2: Number of countries that have communicated the strengthening of institutional, systemic and individual capacity-building to implement adaptation, mitigation and technology transfer, and development actions.[39]

Climate Education and the Paris Agreement

Article 12: Parties shall cooperate in taking measures, as appropriate, to enhance climate change education, training, public awareness, public participation and public access to information, recognizing the importance of these steps with respect to enhancing actions under this Agreement.[40]

The language of the SDGs is echoed in both the UNFCCC (Article 6) and the Paris Agreement (Article 12). A recent analysis of NDCs found that 95% of countries have referred to some sort of climate education initiatives – mostly relating to public awareness and cognitive understanding of climate change, rather than learning that supports emotional wellbeing or behavioural change.[41] However, examples of comprehensive climate change education at a national level are very limited: Italy now requires one hour a week of climate change and sustainability education for all learners, through established civic education programmes in schools;[42] New Zealand has produced a comprehensive climate change education resource – *Climate Change: Prepare Today, Live Well Tomorrow* – that includes a focus on wellbeing and the mental health of young people;[43] and in the US state of New Jersey has updated its K-12 (Kindergarten to 12th-Grade) school curriculum to integrate climate change study across all its learning standards.[44]

Figure 5 – United Nations Sustainable Development Goals:[45]

The UK National Association for Environmental Education – which began in 1960 as the National Rural Studies Association – supports environmental educators across the UK through teaching resources and a fellowship program. The Council for Environmental Education was founded in 1968, and in 2008 it evolved into Sustainability and Environmental Education, which promotes the UNESCO 'whole-school approach' to sustainability and manages the UK's Sustainable Schools Alliance. This helps schools to embed sustainability, and learning about sustainability, throughout whole schools and networks of schools.

The Eco-Schools programme is also very active across the UK. It is managed by a different charity in each of the four nations: Keep Britain Tidy, Keep Scotland Beautiful, Keep Wales Tidy, and Keep Northern Ireland Beautiful – with the first 'Green Flag' awarded to a school in Northern Ireland in 1994.[46]

More recent climate change education initiatives include: the teaching training programme eduCCate Global; a climate-crisis curriculum developed by ThoughtBox Education that combines critical thinking, system thinking and empathy-building; and a campaign for schools to make a 'Let's Go Zero' on carbon emissions by 2030 pledge, led by Ashden and Global Action Plan.

Teach the Future

In 2019, the UK Student Climate Network and Students Organising for Sustainability launched the Teach the Future campaign calling for education reform in the UK to respond to the climate crisis. Based on research that found 68% of students want to learn more about climate change and 75% of teachers feel they do not have adequate training to teach the subject, these young activists have proposed an English Climate Emergency Education Act.[47]

Educating for empowerment and hope

Climate change education is an emerging field of both practice and research. A 2019 study on the impact of climate change education, led by the University of Florida researcher Martha Monroe, found that it is most effective when it focuses on personally relevant and meaningful information, and uses active and engaging teaching methods.[48] Other teaching strategies identified by the review include:

- Engaging in deliberative discussions
- Interacting with scientists
- Addressing misconceptions
- Implementing school or community projects.[49]

Another 2019 review of climate education literature, by David Rousell at Manchester Metropolitan University and the Australian researcher Amy Cutter-Mackenzie-Knowles, found that knowledge-based approaches to studying climate science were insufficient, and advocated engaging learners in the emotional dimensions of climate change as a better way of empowering them to become agents of change.[50]

An emerging theme in climate education research is the importance of hope for counteracting climate anxiety and fatalism, with a distinction made between 'constructive hope' and 'passive optimism' – the latter of which can have negative consequences, with optimistic people being less likely to take action in order to address environmental issues.[51]

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Schools have a critical role to play in addressing climate change – from the carbon footprint of their operations to the classroom teaching that prepares young people for the future. Keri Facer, a Professor of Educational and Social Futures at the

University of Bristol, has articulated a new responsibility for the education system to embrace, as the climate crisis unfolds – especially in terms of adaptation that relates to both physical climate resilience and a cultural shift in how we think about environmental issues. She writes:

> *The unanswered question is whether schools will be liberated as a powerful social resource to facilitate a civilisation shift or whether industrial models of education, too closely allied to the institutions and beliefs of neoliberal modernity, will respond with business as usual.*[52]

5 Climate careers

As outlined by the UK's recent ten-point plan for a 'green industrial revolution', fighting climate change can be framed as an opportunity to create new jobs and pursue economic growth. Business concern for environmental issues has evolved out of more general calls for Corporate Social Responsibility (CSR), which has been defined as the economic, legal and ethical responsibilities of the private sector.[53] From Victorian philanthropy to modern shareholder activism, CSR involves businesses minimising harm and actively working to solve social problems, within their workforce, in their surrounding communities and throughout their supply chains.

In 1968, the Italian industrialist Aurelio Peccei and the Scottish scientist Alexander King convened a group of economists and scientists – in what became known as the Club of Rome – to explore the unsustainable direction of global capitalism. In their ground-breaking report *The Limits to Growth*, published in 1972, early computer models were used to explore the trends of accelerating industrialisation, rapid population growth, widespread malnutrition, depletion of non-renewable resources, and a deteriorating environment. On page 23 of their report, the authors stated:

> *If the present growth trends in world population, industrialization, pollution, food production, and resource depletion continue unchanged, the limits to growth on this planet will be reached sometime within the next one hundred years. The most probable result will be a rather sudden and uncontrollable decline in both population and industrial capacity.*[54]

New economics

In the 1990s, many multinational corporations began to tackle 'eco-efficiency' as an opportunity to align business and social objectives. By reducing waste and avoiding pollution they

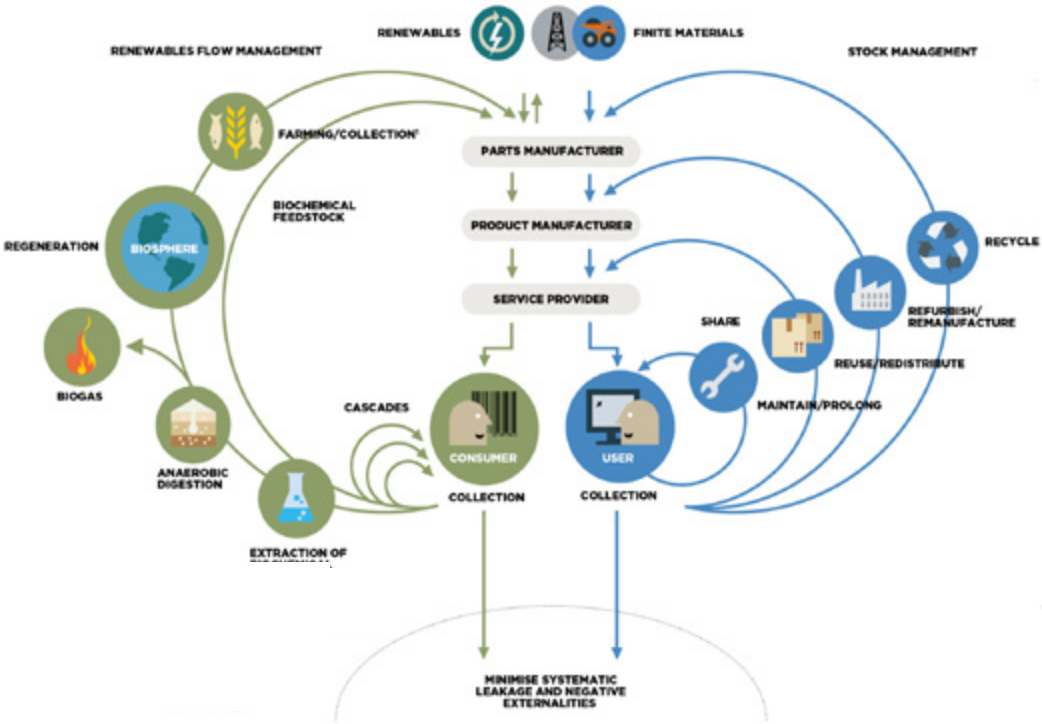
could also cut costs and reduce risks.[55] This became known as the 'triple bottom line' of social, environmental and economic impacts. However, in recently revisiting the phrase he coined, the entrepreneur John Elkington argued that the triple bottom line was not intended merely as an accounting system, to boost profitability, but rather as a tool for disruption – 'a genetic code, a triple helix of change for tomorrow's capitalism'.[56]

Several new economic concepts are critical to understanding the opportunity of green growth and market-based solutions to the climate crisis. The economist Kate Rayworth has developed a theory of 'doughnut economics', to illustrate a world economy operating within both social and planetary limits.[57] In this model, the doughnut is composed of two concentric circles: the outer circle captures the planetary boundaries beyond which we will overshoot ecological stability and resilience; while the inner circle reflects the basic needs of humanity, or sufficiency, as articulated by the SDGs (see page 14 above).

Figure 5 – 'Doughnut economics' model (doughnuteconomics.org):[58]

Whilst setting a world record for the fastest solo circumnavigation of the globe, in 2004–2005, Dame Ellen MacArthur had an epiphany about finite resources, and on her return to the UK, became an advocate for the 'circular economy'.[59] Building on previous thinking about natural capital and industrial ecology, the circular economy elevates environmentalism's 'three Rs' – reduce, reuse, recycle – to completely design out waste and pollution.[60]

Figure 6 – The Circular Economy (Ellen MacArthur Foundation):[61]



Another criticism of the focus on economic growth and the failure of metrics like Gross Domestic Product (GDP) – which

measures the market value of all the goods and services that a country produces – has been levelled by the economist Mariana Mazzucato, who argues that modern capitalism must shift from extracting value to creating value, and in the process revisit our very definition of value.[62]

The greening of business has entered the mainstream, with conversations about climate change dominating the World Economic Forum in Davos, Switzerland,[63] many recognisable brands like Ben & Jerry's ice-cream and the Guardian Media Group choosing to pursue certification as a purpose-driven B Corporation, and the former Bank of England governor Mark Carney concluding the 2020 Reith Lectures with a call to harness the power of markets to respond to the climate crisis.[64]

Future careers

An economy that operates within limits will require new forms of investment, leadership and entrepreneurship, and a workforce with a range of new skills. The International Labour Organization's Decent Jobs for Youth programme has projected that greening the economy could result in 60 million new jobs by 2030.[65] Whilst recognising the opportunities that sustainable transitions in energy and could bring , this initiative emphasises the fact that 'greening the economy does not automatically translate into decent jobs for young people', arguing that long-term planning and strong policies will be required if we are to ensure that we increase 'access to economic opportunities in ways that reduce inequalities and promote social well-being'.[66]

What are the specific green jobs of the future that we are talking about? IET (The Institution of Engineering and Technology) has identified various potential jobs in science and technology, for the next generation of young workers:[67]

- Oceanographer
- Environmental engineer
- Forest and conservation technician
- Geoscientist

- Soil and plant scientists
- Clean car engineer
- Natural scientist
- Wave energy producers
- Wind energy workers/technicians
- Green architect/designer
- Hydrologist
- Conservation scientist
- Ocean/earth scientist.

Raleigh International: Actions Not Excuses

The charity Raleigh International empowers young people as agents of change and active members of civil society. Through its Actions Not Excuses campaign, it is working with around 50,000 young people to create new green jobs. This programme is helping young entrepreneurs to start eco-positive businesses and workers to adapt to changing industries.

Young people can also influence the private sector through their shopping habits. The majority of 'Generation Z' (which refers to young people born after 1996) prefer to buy from sustainable brands and are willing to spend more for sustainable products.[68] However, consumers may struggle to differentiate between actual commitments to sustainability and more superficial marketing campaigns and 'greenwashing'.[69] In the 2019 *Earth Logic Fashion Action Research Plan*, Professors Kate Fletcher and Mathilda Tham call for revolutionary approaches to capitalism that put the planet first:

> *Many arguments against rapid and comprehensive change take place explicitly or implicitly under the banner of 'the needs of the market', whether this be upholding supply of clothes to growing populations, maintaining jobs for textile workers, or a general need for growth. This is plainly a distraction, as without a healthy planet all activities will cease. Earth must come first.*[70]

From sustainable fashion to electric vehicles, the private sector has a role to play in addressing the climate crisis. However, without fundamental change in how businesses operate, more consumption and growth – at the expense of natural systems – will only exacerbate the problem.

6 Climate adaptation

The IPCC defines climate change adaptation as:

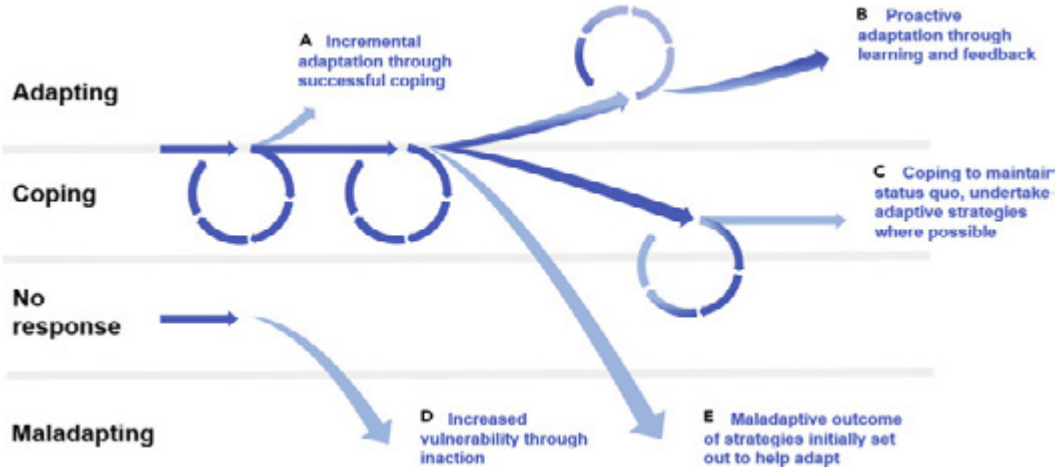
> *The process of adjustment to actual or expected climate and its effects. In human systems, adaptation seeks to moderate or avoid harm or exploit beneficial opportunities. In some natural systems, human intervention may facilitate adjustment to expected climate and its effects.*[71]

We have already changed the climate. While we strive to mitigate this problem, to avoid the worst possible impacts, adaptation is essential. We need to navigate the change and improve the resilience of natural systems, infrastructure and human communities to disruption. Adaptation is both place-based and context-specific, encompassing disaster preparedness, natural resource management and agriculture innovations.

Exploring maladaptation to climate change in international development, Dr Lisa Schipper from the Environmental Change Institute at the University of Oxford, considers the case of a farmer in an increasingly dry region. The farmer has a range of options:

- Ignore the trend and take no action, which will lead to increased vulnerability
- Adopt short-term 'coping' strategies, based on the assumption that things will eventually get back to normal – the farmer will not become more vulnerable, nor more resilient, and the status quo could be costly to maintain
- Learn and adapt, even if this involves starting with coping strategies – leading to incremental improvements in resilience and positive adaptation
- Adopt strategies, with the aim of adapting or coping, that go wrong, leading to maladaptation and increased vulnerability.[72]

Figure 6 – A Conceptual Diagram of Adaptation Outcomes over Time, Including Maladaptation (Schipper, 2020):[73]



Adaptation in the UK

Under the Climate Change Act 2008, the UK Government produces a Climate Change Risk Assessment (CCRA) and a National Adaptation Programme (NAP) on a five-year cycle (see page 9 above). The 2017, the CCRA identified the following substantial risks facing human and natural systems in this country:[74]

1. Flooding and coastal change risks to communities, businesses and infrastructure *(more action needed)*
2. Risks to health, well-being and productivity from high temperatures *(more action needed)*
3. Risks of shortages in the public water supply, and for agriculture, energy generation and industry – with impacts on freshwater ecology *(more action needed)*

4. Risks to natural capital, including terrestrial, coastal, marine and freshwater ecosystems, soils and biodiversity *(more action needed)*
5. Risks to domestic and international food production and trade *(more action needed)*
6. New and emerging pests and diseases, and invasive non-native species, affecting people, plants and animals *(research priority)*.

In reviewing the 2018 NAP, the Climate Change Committee commended the water sector for long-term planning and the Environment Agency for an ambitious risk management strategy with respect to flooding and erosion, but warned, 'England is not prepared for even a 2°C rise in global temperature, let alone more extreme levels of warming'.[75]

Anxiety and human resilience

For many people, the acceptance that we have already changed the climate and are unprepared for future climate impacts is a source of anxiety. Psychotherapist and researcher Caroline Hickman notes that this anxiety should not be seen as a pathology, but rather as a reasonable and healthy response to the existential threat of climate change.[76] In a 2019 study of two communities that have engaged deeply with climate change – climate scientists and campaigners – Rosemary Randall and Paul Hoggett found that activists had developed communities of support to deal with the emotional toll of environmental campaigning, whilst the hyper-rational culture of science served as a defence mechanism for many researchers, but left those who expressed feelings of grief or loss professionally isolated.[77]

Force of Nature – with Clover Hogan

At the age of 16, Clover Hogan found herself representing young people at COP21, the 2015 United Nations Climate Change Conference, in Paris. As she engaged with activists

and political leaders, Clover realised that the powerlessness we feel in the face of climate change is a very real threat that could undermine the Paris Agreement. In response, she started Force of Nature, an youth-led organisation that helps young people turn their climate anxiety into agency.

Arts and culture can help us to make sense of a changing world, navigate tumultuous times and build individual and collective resilience.[78] In December 2018, the Icelandic-Danish artist Olafur Eliasson's *Ice Watch* installation made climate change a more visceral experience by relocating 30 icebergs from Greenland's fjords to the Tate Modern so that Londoners could physically experience them melting and reflect on the melting of glaciers due to global warming.[79]

Since 2014, the Scottish artist Katie Paterson has been exploring longer-term thinking through a 100-year artwork project called The Future Library, in which 1,000 trees planted in a forest outside of Oslo, Norway, will be left to grow for a century and then used to create books for a future anthology, using manuscripts submitted by guest authors each year but not published until 2114.[80]

Meanwhile, the writers involved in the Dark Mountain Project publish a journal featuring creative responses to the major challenges of our time:

> *Together, we are walking away from the stories that our societies like to tell themselves, the stories that prevent us seeing clearly the extent of the ecological, social and cultural unravelling that is now underway. We are making art that doesn't take the centrality of humans for granted. We are tracing the deep cultural roots of the mess the world is in. And we are looking for other stories, ones that can help us make sense of a time of disruption and uncertainty.*[81]

7 Climate action

Experts have been critical to our understanding of climate change and the crafting of potential solutions, but our future will be determined by the mobilisation of civil society to demand climate action. Over the past two decades, the social movement in response to the climate crisis has largely been shaped by young activists. Young people have taken to the streets outside UN meetings, staged creative interventions at museums and theatres to protest sponsorship from oil companies, pressured educational institutions into divesting their endowments from fossil fuels, and walked out of their schools on weekly climate strikes.

Earth Day and the Earth Summit

Young people were just as important in the origins of the environmental movement, five decades ago. The first Earth Day, on 22 April 1970, was organised by the 25-year-old graduate student and activist Denis Hayes, and an estimated 20 million Americans (10% of the US population at the time) participated in protests, campus 'teach-ins' and community-based environmental projects, involving 10,000 schools.[82] The idea of teach-ins had emerged at universities in the mid-1960s as a hybrid model of peaceful protest, involving student sit-ins and informal lectures in opposition to the Vietnam War. Rather than going on strike, teachers and students occupied classrooms instead.[83]

Two decades later, one of the most powerful voices at the Rio Earth Summit in 1992 was 12-year-old Severn Cullis-Suzuki, who told the international delegation:

> *Coming up here today, I have no hidden agenda. I am fighting for my future. Losing my future is not like losing an election, or a few points on the stock market.... Do not forget why you are attending these conferences – who you're doing this for.*

We are your own children. You are deciding what kind of a world we are growing up in.[84]

Civil society at the UN

In the UNFCCC COP summits that followed, non-governmental organisations (NGOs) were granted 'observer status' to officially participate in meetings and lobby world leaders.[85] The different constituencies at these meetings are an 'alphabet soup' of interests: ENGO (environmental), BINGO (business), RINGO (research), YOUNGO (youth), and others.

The Pre-COP events due to take place in Italy this September include the global youth summit Youth4Climate: Driving Ambition (an online Youth4Climate series, launched in 2020), which findings from the Cumberland Lodge conference Climate Futures: Youth Perspectives will directly inform.

The UN Secretary-General António Guterres also recently created a Youth Advisory Group on Climate Change, to help bring the voices of young people into the highest levels of climate negotiations.[86]

Advisors in the UN Youth Advisory Group on Climate Change:[87]

- Nisreen Elsaim (Sudan) @NisreenElsaim
- Ernest Gibson (Fiji) @ErnestKGibson
- Vladislav Kaim (Moldova) @VladislavKaim
- Sophia Kianni (United States) @SophiaKianni
- Nathan Metenier (France) @Nathan_Metenier
- Paloma Costa (Brazil) @pcopaloma
- Archana Soreng (India) @SorengArchana

Climate protests

The grassroots climate movement has also been influential outside of these formal roles. For example, starting in 2005,

the UK charity Friends of the Earth led the successful Big Ask campaign to pressure the Government to adopt the Climate Change Act (see page 9 above), with almost 200,000 people contacting their MPs.[88] In 2008, 350.org – which is the name of the organisation, its URL, and a reference to the safe level of 350 parts per million of CO_2 in the atmosphere – was founded by the writer and activist Bill McKibben and a small group of his students at Middlebury College in Vermont, USA. As leaders of an initial wave of internet-savvy, youth-driven climate advocacy organisations, they organised distributed protests around the world, direct action at the White House, and the 400,000-strong People's Climate March outside a UN climate summit in New York, in September 2014. 350.org's digital campaigns have been described as a virtuous cycle, where online tools spur offline action – the results of which can be documented and shared online to inspire further action.[89]

In October 2018, a small group of climate campaigners from a variety of backgrounds converged on the Houses of Parliament under the banner of Extinction Rebellion, and in a truly grassroots groundswell of support they were joined by more than 1,000 protesters. Rallying around three demands – declare a climate emergency, commit to net-zero emissions by 2025, and hold a citizens' climate assembly – thousands of Extinction Rebellion activists blocked bridges and roads in central London (including occupying Oxford Circus with a large pink boat) for 11 days in April 2019.[90] The youth wing of this movement has played a critical role in shaping the network to be more inclusive and future-orientated, whilst also arguing against an escalation of direct action that could undermine public goodwill. For example, XR Youth opposed an action that involved illegally flying drones at Heathrow Airport to disrupt flights.[91]

Fridays for Future

The school climate strikes originated in August 2018, when 15-year-old Greta Thunberg famously skipped school to protest against inaction on climate change, outside the Swedish

parliament. Within little more than a year, seven million students and their supporters were joining school strikes around the world.[92] With echoes of Severn Cullis-Suzuki, Thunberg rose in prominence and delivered scathing speeches at UN meetings and at the World Economic Forums in Davos.

Speaking at COP24 in Poland, she projected into the future:

> *The year 2078 I will celebrate my 75th birthday. If I have children, maybe they will spend that day with me. Maybe they will ask me about you. Maybe they will ask why you didn't do anything while there still was time to act. You say you love your children above all else, and yet you are stealing their future in front of their very eyes. Until you start focusing on what needs to be done rather than what is politically possible, there is no hope.*[93]

Building on this momentum, the UK Student Climate Network (UKSCN) now co-ordinates the #FridaysforFuture school strikes and protests in Britain, with more than 350,000 students and adults taking part in September 2019. In terms of political action, UKSCN campaigns for the Green New Deal, Teach the Future, and electoral reform to lower the voting age to 16 and implement proportional representation.

Citizens' Climate Assembly

Another form of democratic participation on climate issues is found in citizens' assemblies. This model of engaging randomly selected people in a deliberative process of dialogue, on contentious political issues, gained prominence in Ireland over the past decade.[94] The Irish government has used citizens' assemblies twice, to bring ordinary people together to make policy recommendations that resulted in Constitutional reforms, on both gay marriage and abortion rights. In 2019, six Select Committees in the House of Commons commissioned Climate Assembly UK to bring together ordinary people to explore the question, 'How should the UK meet its target of net-zero greenhouse gas emissions by 2050?'[95]

The 108 people who participated in Climate Assembly UK were a representative sample of the UK population, both demographically and in terms of their concern about climate change. Guided by a number of experts, they met for six weekends in 2020. Half of these sessions were in-person and half were virtual, due to COVID-19 pandemic restrictions. They discussed a range of issues, including travel, home energy use and food.

The Assembly agreed upon a number of principles and gave specific recommendations to guide the UK net-zero strategy, which were presented in a report called *The Path to Net Zero*. Some of the themes that were highlighted were: education and information, fairness, freedom and choice, co-benefits, and the restoration of nature.[96]

Youth Climate Summit

In November 2020, the charity Global Action Plan hosted a virtual Youth Climate Summit, involving thousands of students and teachers from around the UK. Youth Ambassadors synthesised the concerns of young people that were expressed at the summit into five main calls for action, which are quoted below:[97]

- Set up specialist protection areas for all carbon sinks such as peatlands, forests etc., with a fund that businesses impacting these areas pay into,
- All new schools to be carbon zero, government and business to help all existing schools achieve carbon zero by 2030,
- Stop subsidising farming that harms the planet and instead subsidise good farming practices such as regenerative farming and polycultures,
- Business and government to accelerate the circular economy,
- Government and business to make good on the green recovery they keep talking about - starting now, especially with green jobs.

Figure 7 – How much do you agree or disagree that each of the following policy options should be part of how the UK gets to net zero? (Climate Assembly UK, 2020):[98]

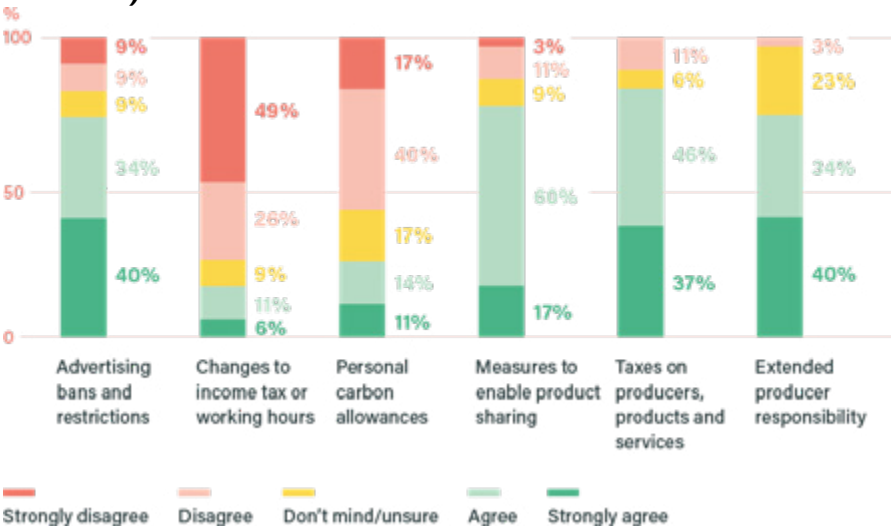


Figure 8 – How much do you agree or disagree that each of the following technologies should be part of how the UK generates electricity? (Climate Assembly UK, 2020):[99]

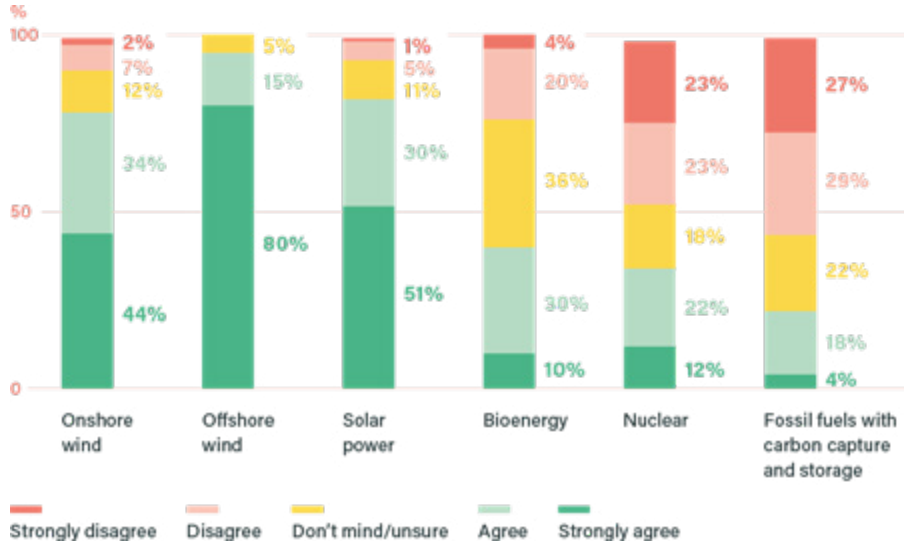
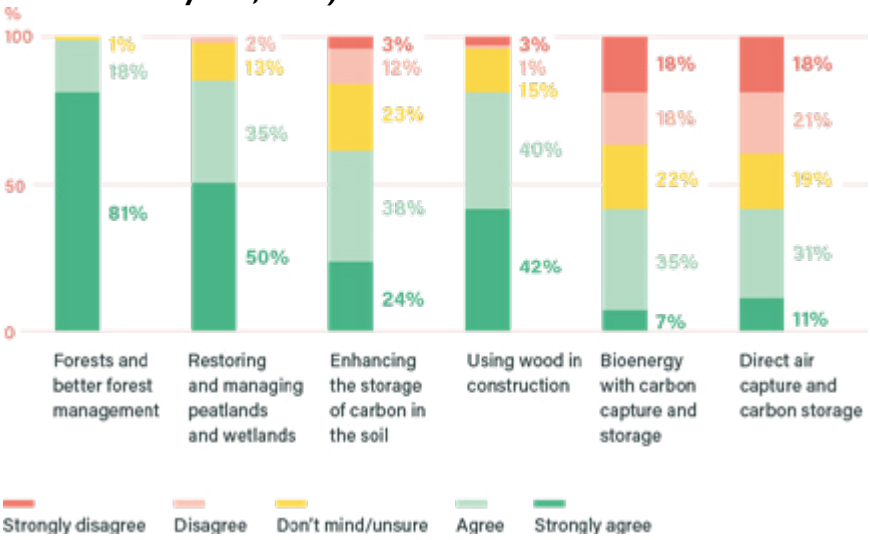


Figure 9 – How much do you agree or disagree that each of the following greenhouse gas removal methods should be part of how the UK gets to net zero? (Climate Assembly UK, 2020):[100]



Participation in democracy can take many forms – voting, political lobbying, citizens' assemblies, public protests and direct action. Many young people are not yet able to vote, but they have still found creative ways to get their voices heard by politicians – including going on strike from school. Traditionally, civil society representatives have played an important role at the UNFCCC COPs, both as formal observers inside the halls of power and as 'rabble rousers' in the streets outside. In Glasgow, a significant mobilisation by a cross-section of society might remind political and business leaders of the public appetite for ambitious climate action. However, ongoing concerns about COVID-19 may serve to limit public access and stifle the voices of those who would call for change.[101]

8 Conclusion

Future scenarios have played an important role in the development of climate science and the negotiation of climate policy. From *The Limits to Growth* to IPCC reports, models allow us to analyse trends in emissions, climate, and natural and social impacts.[102] Climate scenarios also influence how we think about the future – offering visions of both new green paradigms, on the one hand, and the collapse of civilisation on the other. They can help to crystallise our hopes and fears, and motivate political action.[103] Perhaps climate change is best understood as a 'wicked problem' – a complex socio-technical issue, with no simple or clear solution.[104] As a result, our response must be multifaceted and cut across government policy, corporate responsibility, individual choices and social transformations.

Young people across the UK, and around the world, are demanding solutions that will require new thinking and create new opportunities, but the future cannot rest on these shoulders alone. Participants in the Cumberland Lodge virtual conference, Climate Futures: Youth Perspectives, are invited to engage deeply with *the* challenge of our time, to help ensure that future generations inherit a resilient planet, where their basic needs are met and they can pursue meaningful work and rewarding lives.

Former US President Barack Obama captured our small window of opportunity to address the climate crisis in a speech before the UN, in 2014: 'We are the first generation to feel the impact of climate change and the last generation that can do something about it'.[105]

> 'We are the first generation to feel the impact of climate change and the last generation that can do something about it'.

What can we do together to make sure that COP26 in Glasgow is a turning-point that sets humanity on the path towards a secure and sustainable future?

Endnotes

1. Scripps Institution of Oceanography, UC San Diego (2020). *The Keeling Curve*. https://keelingcurve.ucsd.edu/ [Accessed 18 December 2020].
2. IPCC (2018). *Global Warming of 1.5°C: An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty*. Geneva: World Meteorological Organization.
3. UNFCCC (2015). *Adoption of the Paris Agreement. 21st Conference of the Parties*. Paris: United Nations.
4. Steffen, W, Richardson, K, Rockstrom, J, Cornell, S E, Fetzer, I, Bennett, E M, Biggs, R, Carpenter, S R, de Vries, W, de Wit, C A, Folke, C, Gerten, D, Heinke, J, Mace, G M, Persson, L M, Ramanathan, V, Reyers, B, Sorlin, S, 2015. Planetary boundaries: Guiding human development on a changing planet. *Science* 347(6223), 1259855–1259855.
5. United Nations (2020). *Climate Action: Youth in Action*. https://www.un.org/en/climatechange/youth-in-action [Accessed 18 December 2020].
6. Haraway, D J (2016). *Staying with the trouble: Making kin in the Chthulucene*. Duke University Press.
7. The Nobel Prize (2020). *The Nobel Peace Prize 2007*. https://www.nobelprize.org/prizes/peace/2007/summary/ [Accessed 18 December 2020].
8. IPCC (2014). *Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Geneva: IPCC.
9. IPCC (2018).
10. IPCC (2014), 4.

11. Cook, J, Nuccitelli, D, Green, S A, Richardson, M, Winkler, B, Painting, R, Way, R, Jacobs, P, and Skuce, A (2013). Quantifying the consensus on anthropogenic global warming in the scientific literature. *Environmental research letters* 8(2): 024024.

12. IPCC (2014). *Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Geneva: IPCC. Figure 1.1.

13. IPCC (2014). Figure 1.7.

14. NOAA National Centers for Environmental Information (2021). U.S. *Billion-Dollar Weather and Climate Disasters*. https://www.ncdc.noaa.gov/billions/ [Accessed 15 January 2021].

15. Xu, C, Kohler, T A, Lenton, T M, Svenning, J C and Scheffer, M (2020). Future of the human climate niche. *Proceedings of the National Academy of Sciences*, *117*(21), 11350-11355.

16. Boas, I, Farbotko, C, Adams, H et al (2019). Climate migration myths. *Nature Climate Change*. 9, 901–903.

17. UNFCCC (1992). *United Nations Framework Convention on Climate Change*. New York: United Nations

18. UNFCCC (1997). *Kyoto Protocol to the United Nations Framework Convention on Climate Change*. Kyoto: United Nations.

19. UNFCCC (2015). *Adoption of the Paris Agreement. 21st Conference of the Parties*. Paris: United Nations.

20. Yeo, S (2016). Timeline: the Paris agreement's 'ratchet mechanism'. *CarbonBrief*, 16 January. https://www.carbonbrief.org/timeline-the-paris-agreements-ratchet-mechanism [Accessed 18 December 2020].

21. Evans, S and Gabbatiss, J (2019). In-depth Q&A: How 'Article 6' carbon markets could 'make or break' the Paris Agreement. *CarbonBrief*, 29 November. https://www.carbonbrief.org/in-depth-q-and-a-how-article-6-carbon-markets-could-make-or-break-the-paris-agreement [Accessed 18 December 2020].

22. Margaret Thatcher Foundation (no date). Speech at 2nd World Climate Conference. https://www.margaretthatcher.org/document/108237 [Accessed 18 December 2020].

23. The National Archives (2019). *Climate Change Act 2008*. https://www.legislation.gov.uk/ukpga/2008/27 [Accessed 18 December 2020].

24. Fankhauser, S., Averchenkova, A. and Finnegan, J. (2018). *10 years of the UK Climate Change Act*. London: Grantham Research Institute on Climate Change and the Environment and the Centre for Climate Change Economics and Policy.

25. Turney, C (2019). UK becomes first country to declare a 'climate emergency'. *The Conversation*, 2 May. https://theconversation.com/uk-becomes-first-country-to-declare-a-climate-emergency-116428 [Accessed 18 December 2020].

26. UNEP (2020). *Emissions Gap Report 2020*. Nairobi: United Nations.

27. Simms, A, Pettifor, A, Lucas, C, Secrett, C, Hines, C, Legget, J, Elliott, L, Murphy, R, Juniper, T (2008). A Green New Deal. London: New Economics Foundation.

28. Department for Business, Energy & Industrial Strategy (2020). *The Ten Point Plan for a Green Industrial Revolution*. London: HM Government

29. Department for Business, Energy & Industrial Strategy (2020). *2019 UK greenhouse gas emissions: provisional figures - statistical summary*. London: National Statistics.

30. Department for Business, Energy & Industrial Strategy (2020). *Energy Trends September 2020*. London: National Statistics.

31. Climate Change Committee (2020). *The Sixth Carbon Budget: The UK's path to Net Zero*. London: Climate Change Committee.

32. Climate Change Committee (2020). Figure 2.6.

33. Department for Business, Energy & Industrial Strategy (2020).

34. Energy Systems Catapult (2019). *Living Carbon Free*. London: Committee on Climate Change. Figure 1.

35. Facer, K, Lotz-Sisitka, H, Ogbuigwe, A, Vogel, C, and Barrineau, S (2020) *TESF Briefing Paper: Climate Change and Education*. Bristol: TESF.

36. Biesta, G (2011). *Good Education in an Age of Measurement: Ethics, politics, democracy*. London: Routledge.

37. UNEP (1978). *Intergovernmental Conference on Environmental Education, Tbilisi, USSR, 14-26 October 1977: Final report*. Paris: United Nations.

38. United Nations General Assembly (2015). *Transforming our world: the 2030 Agenda for Sustainable Development*. New York: United Nations

39. United Nations, Department of Economic and Social Affairs, Sustainable Development (2020). 13: *Take urgent action to combat climate change and its impacts*. https://sdgs.un.org/goals/goal13 [Accessed 18 December 2020].

40. UNFCCC (2015). *Adoption of the Paris Agreement. 21st Conference of the Parties*. Paris: United Nations..

41. UNESCO (2019). *Country progress on climate change education, training and public awareness: an analysis of country submissions under the United Nations Framework Convention on Climate Change*. Paris: UNESCO

42. [Accessed 27 January 2021].

43. Ministero dell'Istruzione, dell'Università e della Ricerca (2020). *Educazione alla Cittadinanza Sostenibile*. Rome: Governo Italiano.

44. Ministry of Education/Te Tāhuhu o te Mātauranga (2020). *Climate Change: Prepare today, live well tomorrow*. Wellington: New Zealand Government.

45. State pf New Jersey Department of Education (2020). *Adopted 2020 New Jersey Student Learning Standards (NJSLS)*. https://www.nj.gov/education/cccs/2020/ [Accessed 18 December 2020].

46. United Nations (n/d). News and Media – Communications Tools. https://www.un.org/sustainabledevelopment/news/communications-material/

47. FEE (2019). *Changing Together: Eco-Schools 1994-2019*. Copenhagen: Foundation for Environmental Education.

48. Teach the Future (2019). *Asks*. Macclesfield: Students Organising for Sustainability.

49. Monroe, M C, Plate, R R, Oxarart, A, Bowers, A, and Chaves, W A (2019). Identifying Effective Climate Change Education Strategies: A Systematic Review of the Research. *Environmental Education Research* 25(6): 791–812.

50. Monroe, M. C, Plate, R R, Oxarart, A, Bowers, A, and Chaves, W A (2019). 801.

51. Rousell, D and Cutter-Mackenzie-Knowles, A, (2019). A systematic review of climate change education: giving children and young people a 'voice' and a 'hand' in redressing climate change. *Children's Geographies* 18(2): 191–208.

52. Ojala, M (2012). Hope and Climate Change: The Importance of Hope for Environmental Engagement among Young People. *Environmental Education Research* 18(5): 625–642.

53. Facer, K (2019). Climate Change: How should public education respond? *FORUM* 61(2): 207-216.

54. Latapi Agudelo, M A, Johannsdottir, L and Davidsdottir, B (2019). A literature review of the history and evolution of corporate social responsibility. *International Journal of Corporate Social Responsibility*, 4(1), pp.1–23.

55. Meadows, D H, Meadows, D L, Randers, J and Behrens, W W (1972). *The Limits to Growth*. New York: Universe Books, 23.

56. Hart, S L (2010). *Capitalism at the crossroads: Next generation business strategies for a post-crisis world*. Upper Saddle River: Pearson Education, Inc.

57. Elkington, J (2018). 25 Years Ago I Coined the Phrase "Triple Bottom Line." Here's Why It's Time to Rethink It. *Harvard Business Review*, 25 June. https://hbr.org/2018/06/25-years-ago-i-coined-the-phrase-triple-bottom-line-heres-why-im-giving-up-on-it [Accessed 18 December 2020].

58. Raworth, K (2017). *Doughnut Economics: Seven ways to think like a 21st-century economist*. London: Random House Business.

59. Doughnut Economics (n/d). https://doughnuteconomics.org/about-doughnut-economics [Accessed 27 January 2021].

60. MacArthur, E (2015). The surprising thing I learned sailing solo around the world. *TED*, March. https://www.ted.com/talks/dame_ellen_macarthur_the_surprising_thing_i_learned_sailing_solo_around_the_world [Accessed 18 December 2020].

61. The Ellen MacArthur Foundation (n/d). *Concept: What is a circular economy? A framework for an economy that is restorative and regenerative by design*. https://www.ellenmacarthurfoundation.org/circular-economy/concept [Accessed 18 December 2020].

62. Ellen MacArthur Foundation (2019). Circular economy systems diagram. February 2019. Drawing based on Braungart & McDonough, Cradle to Cradle (C2C). https://www.ellenmacarthurfoundation.org/circular-economy/concept/infographic [Accessed 1 January 2021].

63. Mazzucato, M (2018). *The Value of Everything: making and taking in the global economy*. London: Penguin.

64. Worland, J (2020). How Davos Became a Climate Change Conference. *Time*, 27 January. https://time.com/5771889/davos-climate-change/ [Accessed 18 December 2020].

65. BBC Radio 4 (2020). *The Reith Lectures*. https://www.bbc.co.uk/programmes/articles/43GjCh72bxWVSqSB84ZDJw0/reith-lectures-2020-how-we-get-what-we-value [Accessed 18 December 2020].

66. Decent Jobs for Youth (n/d). *Green Jobs for Youth: Boosting decent jobs for young people, greening the economy*. Geneva: International Labour Organization.

67. Decent Jobs for Youth (n/d). 4.

68. ET (2020). *Generation Green ambitions at risk of going to 'waste'*. https://www.theiet.org/media/press-releases/press-releases-2020/18-september-2020-generation-green-ambitions-at-risk-of-going-to-waste/ [Accessed 18 December 2020].

69. Petro, G (2020). Sustainable Retail: How Gen Z Is Leading The Pack. *Forbes*, 31 January. https://www.forbes.com/sites/gregpetro/2020/01/31/sustainable-retail-how-gen-z-is-leading-the-pack/ [Accessed 18 December 2020].

70. Watson, B (2016). The troubling evolution of corporate greenwashing. *The Guardian*, 20 August. https://www.theguardian.com/sustainable-business/2016/aug/20/greenwashing-environmentalism-lies-companies [Accessed 18 December 2020].

71. Fletcher, K. and Tham, M. (2019). *Earth Logic Fashion Action Research Plan*. London: The J J Charitable Trust.

72. IPCC (2014). Summary for policymakers. In: *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, edited by Field, C B, Barros, V R, Dokken, D J, Mach, K J, Mastrandrea, M D, Bilir, TE, Chatterjee, M, Ebi K L, Estrada, Y O, Genova, R C, Girma, B, Kissel, E S, Levy, A N, MacCracken, S, Mastrandrea, P R, White, L L. Cambridge: Cambridge University Press, 1-32.

73. Schipper, E L F (2020). Maladaptation: When Adaptation to Climate Change Goes Very Wrong. *One Earth*, 3(4), 409-414.

74. Schipper E L F (2020) Maladaptation: When Adaptation to Climate Change Goes Very Wrong. *One Earth*, 3(4), 409-414. https://doi.org/10.1016/j.oneear.2020.09.014 [Accessed 28 January 2021].

75. Department for Environment, Food & Rural Affairs (2017). UK Climate Change Risk Assessment 2017. London: HM Government.

76. Climate Change Committee (2019). *Progress in preparing for climate change – 2019 Progress Report to Parliament*. London: Climate Change Committee.

77. Ro, C (2019). The harm from worrying about climate change. *BBC Future*, 10 October. https://www.bbc.com/future/article/20191010-how-to-beat-anxiety-about-climate-change-and-eco-awareness [Accessed 18 December 2020].

78. Randall, R and Hoggett, P (2019). Engaging with Climate Change: Comparing the Cultures of Science and Activism. In *Climate Psychology. Studies in the Psychosocial*, edited by Hoggett, P. London: Palgrave Macmillan, 239-261.

79. Julie's Bicycle (2020). *Insights: Now, we make tomorrow…* https://juliesbicycle.com/news/now-we-make-tomorrow/ [Accessed 18 December 2020].

80. Jonze, T (2018). Icebergs ahead! Olafur Eliasson brings the frozen fjord to Britain. *The Guardian*, 11 December. https://www.theguardian.com/artanddesign/2018/dec/11/icebergs-ahead-olafur-eliasson-brings-the-frozen-fjord-to-britain-ice-watch-london-climate-change [Accessed 18 December 2020].

81. National Galleries of Scotland (2019). *Katie Paterson, Future Library: A Century Unfolds*. https://www.nationalgalleries.org/art-and-artists/features/katie-paterson-future-library-century-unfolds-2019 [accessed 18 December 2020].

82. The Dark Mountain Project (n/d). *About the Dark Mountain Project*. https://dark-mountain.net/about/ [Accessed 18 December 2020].

83. Rome, A (2013). *The genius of Earth Day: How a 1970 teach-in unexpectedly made the first green generation*. New York: Macmillan.

84. Sahlins, M (2009). The Teach-Ins: Anti-War Protest in the Old Stoned Age. *Anthropology Today*, 25(1), 3-5.

85. BBC Ideas and BBC Radio 4 (2020). *The child who tried to save the world... in 1992*. https://www.bbc.co.uk/ideas/videos/the-child-who-tried-to-save-the-world-in-1992/p07zxlwx [Accessed 18 December 2020].

86. UNFCCC (2020). *Admitted NGOs*. https://unfccc.int/process-and-meetings/parties-non-party-stakeholders/non-party-stakeholders/information-by-category-of-observer/admitted-ngos [Accessed 18 December 2020].

87. Secretary-General's Youth Advisory Group on Climate Change (2020). *2020 Global Youth Outreach Outcome Report*. New York: United Nations.

88. United Nations (2020). *The Youth Advisory Group on Climate Change*. https://www.un.org/en/climatechange/youth-in-action/youth-advisory-group [Accessed 18 December 2020].

89. Nulman, E (2015). *Climate Change and Social Movements: Civil Society and the Development of National Climate Change Policy*. New York: Palgrave Macmillan.

90. Hestres, L E and Hopke, J E (2017). Internet-Enabled Activism and Climate Change. *Oxford Research Encyclopedia of Climate Science*. Oxford: Oxford University Press.

91. Taylor, M (2020). The evolution of Extinction Rebellion. *The Guardian*, 4 August. https://www.theguardian.com/environment/2020/aug/04/evolution-of-extinction-rebellion-climate-emergency-protest-coronavirus-pandemic [Accessed 18 December 2020].

92. Extinction Rebellion (2019). *(UK) XR Youth and Extinction Rebellion: Forging a New Relationship*. https://extinctionrebellion.uk/2019/07/24/uk-xr-youth-and-extinction-rebellion-forging-a-new-relationship/ [Accessed 18 December 2020].

93. Fridays for Future (2020). *Strike Statistics*. https://fridaysforfuture.org/what-we-do/strike-statistics/ [Accessed 18 December 2020].

94. Connect4Climate (2018). *Greta Thunberg full speech at UN Climate Change COP24 Conference*. https://www.youtube.com/watch?v=VFkQSGyeCWg [Accessed 18 December 2020].

95. Farrell, D M and Suiter, J (2019). *Reimagining Democracy: Lessons in Deliberative Democracy from the Irish Front Line*. Ithaca: Cornell University Press.

96. Climate Assembly UK (2020). *The Path to Net Zero*. London: House of Commons.

97. Climate Assembly UK (2020). *The Path to Net Zero*. London: House of Commons.

98. Transform Our World (2020). *Youth Climate Calls from Youth Climate Summit*. https://www.transform-our-world.org/events/youth-climate-summit-2020/youth-climate-summit-news/youth-climate-calls-from-youth-climate-summit [Accessed 18 December 2020].

99. Climate Assembly UK (2020). *The Path to Net Zero: Climate Assembly UK full report*. Executive Summary, Figure 3. https://climateassembly.uk/report/read/1/2.1l6.6yvqz.xt47w.yeks_.2jmj7.html [Accessed 29 January 2021].

100. Climate Assembly UK (2020). *The Path to Net Zero: Climate Assembly UK full report*. Executive Summary, Figure 4. https://climateassembly.uk/report/read/1/2.132.z-vly.xsjzf.wu8ln.2jmj7.html [Accessed 29 January 2021].

101. Climate Assembly UK (2020). *The Path to Net Zero: Climate Assembly UK full report*. Executive Summary, Figure 5. https://climateassembly.uk/report/read/1/2.145.jbky6.ypv48.gqqy0.2jmj7.html [Accessed 29 January 2021].

102. Hudson, M (2020). Climate Ambition Summit showed how much the pandemic has cost momentum on climate change. *The Conversation*, 15 December. https://theconversation.com/climate-ambition-summit-showed-how-much-the-pandemic-has-cost-momentum-on-climate-change-152025 [Accessed 18 December 2020].

103. Hausfather, Z (2018). Explainer: How 'Shared Socioeconomic Pathways' Explore Future Climate Change. Carbon Brief, 19 April. https://www.carbonbrief.org/explainer-how-shared-socioeconomic-pathways-explore-future-climate-change [Accessed 18 December 2020].

104. Great Transition Initiative (n/d). *Global Scenarios: Taxonomy of the Future*. https://greattransition.org/explore/scenarios [Accessed 18 December 2020].

105. Rittel, H W J and Webber, M M (1973). Dilemmas in a general theory of planning. *Policy Sciences* 4, 155–169.

106. The White House (2014). *Remarks by the President at U.N. Climate Change Summit*. https://obamawhitehouse.archives.gov/the-press-office/2014/09/23/remarks-president-un-climate-change-summit [Accessed 18 December 2020].

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