

**INITIAL  
FINDINGS**

# ZERO CARBON

## MAKING IT HAPPEN

A multi-disciplinary  
investigation into  
overcoming the  
barriers to a zero  
carbon future



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# Introduction

The climate science is clear - **we must** rapidly move beyond fossil fuels and eliminate man-made emissions of greenhouse gases (GHGs) almost entirely by mid-century.

The news from the technology is also clear: many robust scenarios from across the globe clearly demonstrate that **the technologies already exist** to reach zero or near-zero net GHG emissions.

Recently, globally influential establishment figures such as the Pope,<sup>1</sup> the head of the IMF<sup>2</sup> and the Presidents of the US and China<sup>3</sup> have joined the large international chorus calling for urgent action. There are many successful projects on the ground and a growing movement of people that give rise to hope.

### **But change is not happening fast enough!**

This new project *Zero Carbon: Making it Happen!* actively seeks to integrate research and cutting-edge thinking from across many disciplines.

### **We want to identify both the barriers to achieving a zero carbon future and the means to overcome them.**

Over the coming months, we will be building dialogues with researchers working in economics, psychology, sociology, history, politics and other social sciences, as well as in arts and culture. We also want to include insights from those working practically on the ground and in communities delivering renewable energy, energy efficiency, transport, sustainable food projects, and more.

Changing how millions of people live is a very special kind of problem – the forces that shape our lives exist on many different levels. Tackling such a complex global challenge requires a new kind of approach which joins up research and practice across disciplines, borders, sectors and scales. To date such interdisciplinary investigations have been thin on the ground and have tended to focus on ‘climate change’ – rather than exploring solutions. To initiate this process, we have compiled some of our initial findings in this report.

The premise of our project is that the climate science is clear about the need for rapid and deep emission reductions and that humanity has the technology to make these emission reductions happen. To offer context, we open with two introductory chapters on the science and the technology. The first is a summary →

of a recent article in the journal Nature Geoscience by leading climate scientist Kevin Anderson. It stresses the need to be absolutely clear about what the climate science is saying and explores an interesting barrier to the required action – the tendency for the current economic and political orthodoxy to frame our response. The second is a summary of our recent report *Who's Getting Ready for Zero?*, which demonstrates the wealth of research showing that we have the technology to achieve a zero carbon future.

We then go on to offer the initial findings of our multi-disciplinary investigation on the barriers to zero carbon and how they can be overcome. We include summaries of initial findings from the disciplines of psychology, sociology, economics, politics, history and the media, as well as a section on interdisciplinary studies. We also include a perspective on the role of the arts in sparking cultural change by Lucy Neal based on her recent book *'Playing for Time'*.

No single discipline has all the answers to this multi-dimensional, profound, global problem but each of them has something valuable to contribute. Ultimately we need collaboration across all disciplines and at all levels if we are to offer the best chance of solving the gravest threat to humanity and the biosphere we have ever faced.

*"There is exciting research and writing in the social sciences and humanities suggesting that we have more agency and potential for collective action than we think...This research shows that small changes can make a big difference, and that individuals working together can generate rapid social change." <sup>4</sup>*

Whilst the initial focus of our research is on the UK, we hope the work can be applicable to achieving zero carbon globally. We intend the report to open new conversations and set people thinking. We hope it will encourage experts, researchers and practitioners to get involved and help us by answering the following question:

**What do you consider the main barriers to achieving a zero carbon future at the rate demanded by the climate science and can you offer any ideas, research or case studies showing how they can be overcome?**

If you are interested in collaborating with our project, giving insights from your personal or professional perspective please email contributions to [makingithappen@cat.org.uk](mailto:makingithappen@cat.org.uk).

Also please share with your colleagues, friends and any others that are keen to engage.



## What we mean by ZERO CARBON?

Here we use 'zero carbon' as shorthand for a destination determined by the requirements of the climate science. That means net zero carbon dioxide (CO<sub>2</sub>) emissions globally by mid-century and net zero greenhouse gas (GHG) emissions not long after<sup>5</sup>. This can be achieved with current technologies and we shouldn't rely on speculative future technologies. All emissions that can go to zero, should go to zero. Fossil fuels are phased out and replaced by renewable energy, avoidable GHG emissions are minimised, and any 'negative emissions' (such as carbon captured by reforestation) offset unavoidable GHG emissions or better still reduce atmospheric GHG concentrations.

Making 'zero carbon' happen therefore implies a range of actions that include reducing energy demand, installing renewable energy, moving to more sustainable food systems, and restoring natural ecosystems



*Life Cairn on the Sussex Downs. Photo by Victoria Kornevall*

# Science: On the duality of climate scientists ... how integrated assessment models are hard-wired to deliver politically palatable outcomes

There is no question about the science: the vast majority of climate scientists agree that the earth's climate is warming as a result of human activities. The question is whether we can move beyond politically palatable technology scenarios and policy measures to create bold new plans which will actually reduce emissions quickly enough to keep global average surface temperatures from rising to 2°C above pre-industrial levels? 2°C is the 'red line' which the world's nations have agreed on to limit the catastrophic impacts of climate change.

The box on page seven is an extract from a paper published by Professor Kevin Anderson of the Tyndall Research Centre on Climate Change. As the abstract states, the paper *"demonstrates the endemic bias prevalent amongst many of those developing emission scenarios to severely underplay the scale of the 2°C mitigation challenge. In several important respects the modelling community is self-censoring its research to conform to the dominant political and economic paradigm. Moreover, there is a widespread reluctance of many within the climate change community to speak out against unsupported assertions that an evolution of 'business as usual' is compatible with the IPCC's 2°C carbon budgets. With specific reference to energy, this analysis concludes that even a slim chance of 'keeping below' a 2°C rise, now demands a revolution in how we both consume and produce energy. Such a rapid and deep transition will have profound implications for the framing of contemporary society and is far removed from the rhetoric of green growth that increasingly dominates the climate change agenda."*



*The following is extracted from a pre-published version (made available online) of a commentary published in Nature Geoscience by Professor Kevin Anderson of the Tyndall Centre in October 2015.*

The value of science is undermined when we adopt questionable assumptions and fine-tune our analysis to conform to dominant political and economic sensibilities. The pervasive inclusion of speculative negative emission technologies to deliver politically palatable 2°C mitigation is but one such example. Society needs scientists to make transparent and reasoned assumptions, however uncomfortable the subsequent conclusions may be for the politics of the day.

Currently many highly complex integrated assessment models (IAMs) – which bring together prices, markets and human behaviour with the physics of climate change typically offer highly optimistic futures through a combination of very early peaks in global emissions and a belief that negative emission technologies will prove practically and economically viable in removing CO<sub>2</sub> from the atmosphere.

As it stands, the expedient and ubiquitous use of speculative negative emissions to expand the available 2°C carbon budgets, implies a deeply entrenched and systemic bias in favour of delivering politically palatable rather than scientifically balanced emission scenarios. Nowhere is this more evident than in the IPCC's scenario database<sup>7</sup>. Of the 113 scenarios with a "likely" chance (66% or better) of 2°C (with 3 removed due to incomplete data), 107 (95%) assume the successful and large-scale uptake of negative emission technologies. Such technologies are ubiquitous in 2°C models and scenarios<sup>8,9</sup>, despite their remaining at little more than the conceptual stage of development. The remaining 6 scenarios all adopt a global emissions peak of around 2010. Extending the probability to a 50% chance of 2°C paints a similar picture. Of the additional 287 scenarios, 237 (83%) include negative emissions, with all the remaining scenarios assuming the successful implementation of a stringent and global mitigation regime in 2010.

In plain language, the complete set of 400 IPCC scenarios for a 50% or better chance of 2°C assume either an ability to travel back in time or the successful and large-scale uptake of speculative negative emission technologies. A significant proportion of the scenarios are dependent on both 'time travel and geo-engineering'.

Applying simple arithmetic to the headline data within the IPCC's Synthesis Report raises fundamental questions as to the realism of both the content and the tone of much of the reporting that followed its publication. Moreover, the failure of the scientific community to vociferously counter the portrayal of the findings as challenging but incremental suggests vested interests and the economic hegemony may be preventing scientific openness and freedom of expression.

The carbon budgets aligned with international commitments to stay below the 2°C characterization of dangerous climate change demand profound and immediate changes to



how energy is both used and produced. (This would demand a dramatic reversal of current trends in energy consumption and emissions growth. Global mitigation rates would need to rapidly ratchet up to around 10% p.a. by 2025 and continue at such a rate to the virtual elimination of CO<sub>2</sub> from the energy system by 2050.)

### **Conclusions**

The IPCC's synthesis report and the scientific framing of the mitigation challenge in terms of carbon budgets was an important step forward. Despite this, there remains an almost global-scale cognitive dissonance with regards to acknowledging the quantitative implications of the analysis, including by many of those contributing to its development. We simply are not prepared to accept the revolutionary implications of our own findings, and even when we do we are reluctant to voice such thoughts openly. Instead, my long-standing engagement with many scientific colleagues, leaves me in no doubt that whilst they work diligently, often against a backdrop of organised scepticism, many are ultimately choosing to censor their own research.

Explicit and quantitative carbon budgets provide a firm foundation on which policy makers and civil society can build a genuinely low-carbon society. But the job of scientists remains pivotal. It is incumbent on our community to be vigilant in guiding the policy process within the climate goals established by civil society; to draw attention to inconsistencies, misunderstandings and deliberate abuse of the scientific research. It is not our job to be politically expedient with our analysis or to curry favour with our funders. Whether our conclusions are liked or not is irrelevant. As we massage the assumptions of our analysis to fit within today's political and economic hegemony, so we do society a grave disservice – one for which the repercussions will be irreversible.

Download the full article at

<http://kevinanderson.info/blog/duality-in-climate-science>





# Technology: Who's Getting Ready for Zero?

The science tells us we must get to zero, this report highlights the blueprints already out there.

If we are to take the message from the climate science seriously, all countries – developed and developing, large and small – should prepare resilient 2050-orientated low and zero carbon technology scenarios. This will ensure each country's development pathway aligns with both the emission reduction actions and the climate impact adaptation needed to live in a near 2°C world. There is now a growing body of forward-thinking groups across the globe that have developed such scenarios which offer robust blueprints for a zero carbon future. Whilst the scenarios are ambitious they are firmly rooted in the physical realities of the energy and land-use systems.



This work has been brought together in our recent report *Who's Getting Ready for Zero?* The report maps out how different actors at global, regional, national and city levels are already modelling the elimination of GHG emissions on science-based timeframes compatible with 2°C.

The report draws on results from over 100 scenarios, models and practical real-life projects that demonstrate how we can reach low or zero emissions before the second half of the century with existing technology and without harming social or economic development. It features 27 of the most powerful examples in more detail to showcase work occurring in developed and developing countries, covering both low as well as full decarbonisation scenarios. The report offers hot links to all the scenarios plus key conclusions and analysis. Some examples of the scenarios included are given in the table below.

## Example scenarios from *Who's Getting Ready for Zero?*

### GLOBAL SCENARIOS



WWF, Ecofys & OMA

[The Energy Report – 100% Renewable Energy by 2050](#)

### REGIONAL SCENARIOS



Nordic Energy Research & IEA

[Nordic Energy Technology Perspectives - Pathways to a Carbon Neutral Energy Future](#)

### COUNTRY SCENARIOS



Beyond Zero Emissions

[Zero Carbon Australia](#)



German Federal Environment Agency

[Germany in 2050 - a greenhouse gas-neutral country](#)



Centre for Alternative Technology

[Zero Carbon Britain: Re-thinking the Future](#)



The Solutions Project

[100% Wind, Water and Sunlight Energy Plans for the 50 United States](#)

### CITY SCENARIOS



City of Copenhagen

[Copenhagen 2025 Climate Plan – a Green, Smart and Carbon Neutral City](#)



In addition to stabilising our climate, such transitions offer a huge opportunity to achieve a wide range of additional benefits – such as more inclusive and more stable economic systems, greater equity both within and between nations, increased wellbeing, resilience to climate impacts, strengthened communities, better diets and land-use practice and an improved relationship between humans and nature.

Scenarios which bring to life this systemic shift offer a powerful tool that can engage stakeholders and citizens, and will increase confidence in a country's long term contribution to the UN international climate negotiations. They can also drive the immediate term actions, decisions, targets, incentives and legislation which are urgently needed to ensure we do not lock ourselves into a dangerous future path by investing in the wrong technology choices today.

The key conclusion of the *Who's Getting Ready for Zero?* report is that we have the technology and the tools to meet the demands of the science, but we urgently need to connect across borders – geographic, professional and political, as well as learning across scales. Although there are now an increasing number of rapid decarbonisation models, including global scenarios as well as individual country studies, it is vital we recognise that there are still some essential pieces of the picture missing. Some countries do not yet have their own detailed models exploring zero emission futures, and therefore still lack the tools to open necessary conversations around a sustainable energy mix, energy democracy, and development priorities. The report therefore calls for a Zero Practitioners Network bringing together both developers and users of zero emission and deep decarbonisation scenarios to create new collaborative knowledge platforms.

Download the full *Who's Getting Ready for Zero?* report at <http://www.zerocarbonbritain.org/ready-for-zero>

**STOP PRESS!** Just released by Stanford University – 100% clean and renewable wind, water, and sunlight (WWS) all-sector energy roadmaps for 139 countries of the world. Available here <https://100.org/100-goes-global-maps/> ●

# Multi-disciplinary investigation

## **Initial findings**



# Introduction

To date the UK Government's policy response to climate change has focussed largely on technological solutions plus policies and programmes aimed at changing individual behaviour. Yet this has reduced energy demand by far less than the radical reductions demanded by the climate science.<sup>10</sup> Although individual change is necessary, additional approaches are clearly needed and so we need to gather the best ideas and thinking from all fields. The following are some initial insights from a range of disciplines on overcoming the barriers to a rapid transition to a zero carbon future. Only one month into a year-long project, we have reviewed only a fraction of the large body of relevant studies but we hope this paper gives a flavour of some of the thinking within each discipline and prompts both researchers and practitioners to get in touch with comments and ideas.

While presenting the disciplines separately reinforces the differences in approach and thinking, it also highlights some commonalities and themes. As we progress through this project we hope to integrate the findings from the different social sciences, together with practical examples of where barriers have been overcome. Although this paper is focussed on overcoming barriers in the UK it hopefully has relevance to action in other countries.

## PSYCHOLOGY



There is a very large body of psychological research helping to understand the human causes, consequences and responses to climate change.<sup>11 12 13</sup>

### Barriers and Biases

*Dragons of Inaction* by Robert Gifford<sup>14</sup> summarises the reasons we often don't think clearly about climate change and gives an excellent outline of the psychological barriers preventing action. These include:

1. Limited cognition (ancient brain, ignorance, environmental numbness etc.)
2. Ideologies (worldviews, techno-salvation and system justification)
3. Social comparisons (social norms and networks, perceived inequality)
4. Sunk costs (place attachment, financial investments and habit)
5. Discredence (mistrust, denial and perceived programme inadequacy)
6. Perceived risk (physical, functional, financial, social, and psychological risks)
7. Limited behaviour (tokenism and the rebound effect)

There are numerous studies on the way our 'perceptions of risk' are conditioned by our emotions, mental shortcuts, social experiences etc.<sup>15</sup> People are often unaware of these cognitive biases that prevent us acting on, or even thinking about, climate change, for example the fact that we don't respond well to threats that appear distant in time or place.<sup>16 17</sup> We also tend to look for information consistent with what we already believe and dismiss information that requires us to change our minds and behaviour.<sup>18</sup>

### Denial and helplessness

Although there are high levels of awareness and acceptance of the science and reality of climate change amongst the British public, there is widespread scepticism about the *efficacy* of actions taken to address it.<sup>19</sup> The majority of people are still failing to take responsibility for climate change or act accordingly, a concept termed 'stealth denial'.<sup>20</sup> These individuals, the 'unmoved' or 'climate ignorers' fail to act because they feel that nothing they can do will have any effect.<sup>21</sup> Some psychologists believe that feelings of helplessness are *'the pivotal issue'* in terms of preventing more environmentally responsible behaviour and provision of more information on an environmental problem only serves to increase the sense of helplessness.<sup>22</sup>



### **Divorce from nature**

Another reason for our failure to act on climate change is the way in which we in western societies have become so divorced from nature.<sup>23</sup> There is a wealth of evidence that shows that not only does nature provide all our material needs but contact with nature also satisfies our psychological, emotional and spiritual needs.<sup>24 25</sup> This disconnect is a form of denial: *'Seeing the environment as separate from oneself creates a false distinction colouring our sense of the interdependencies between self and environment'*<sup>26</sup>. Psychologists suggest this split needs to be resolved: nature is within us, rather than 'out there'.<sup>27</sup> This requires a much deeper connection with nature, that not only benefits our individual well-being but also helps re-orientate our values towards the natural world.

### **Consumerism undermines collective effort**

Despite widespread public concern and numerous community-based actions to counter climate change, our entrenched individualistic and consumer culture fosters a negative feedback loop when it comes to the cooperation necessary to limit the effects of climate change. The fatalistic view that nothing can be done *'is arguably underpinned by an individualistic worldview in which one's preferred social relations are anathema to the idea that collective effort is required to address a social dilemma such as climate change.'*<sup>28</sup> This creates doubts about the effectiveness of responding at all, along with doubts about the willingness and capacity to respond to climate change at the personal, political and societal level. In Britain<sup>29</sup> and across Europe there is a widespread view that people are 'too selfish' to act on climate change, prompting scepticism of the efficacy of voluntary collective action.<sup>30</sup>

While psychology has contributed significantly to the understanding of climate change, it is suggested that too much psychological research has focussed on further enabling the current consumerist and individualistic culture.

*'Psychological research has done very little to counter trends of increasing population and increasing materialism. In fact, in the world of advertising and marketing, applied psychologists are working feverishly to accelerate and exacerbate materialistic desires.'*<sup>31</sup>

Where psychological interventions are used to try to change behaviour (e.g. reduce energy demand) these rarely address or challenge unstated assumptions about materialism and consumption.<sup>32</sup>

### **Motivating action through intrinsic values**

Moving away from what prevents us from acting on climate change there is interesting research on what might impel us to act in spite of the many psychological barriers. One study of people engaged in lower carbon lifestyles found that values of social justice (e.g. concern about impacts of poor people in developing countries), as well as links to their community were even more important motivating factors than environmental concerns.<sup>33</sup> Perceptions of justice and fairness also affect people's perception and acceptance of policies on climate change.<sup>34</sup> →

Research has also found that for some behaviours intrinsic factors (such as values) are more important for motivating action than extrinsic factors (such as incentives).<sup>35</sup> Some suggest the way forward is to *'activate cooperative values rather than competitive values, as these offer a better life for our children, health, security, thriving communities'* and *'relate solutions to climate change to the sources of happiness'* such as the connections with neighbours and friends.<sup>36</sup>

While not a panacea for the enormous challenge of climate change, there is psychological evidence that the practice of mindfulness, a calm and detached awareness of one's own feelings and emotions, promotes non-materialistic intrinsic values so that people are more likely to engage in pro-environmental behaviours.<sup>37 38</sup>

Rapid social shifts such as those needed as a response to climate change require a deepening of awareness to mobilise individual and collective action.<sup>39</sup> Drawing an analogy with the 'nuclear swerve' of the 1980's when there was a growing public feeling that it was *'deeply wrong, perhaps evil, to engage in nuclear war'* it is suggested that a similar 'climate swerve' may be happening as we begin to realise that it is *'deeply wrong, perhaps evil, to destroy our habitat and create a legacy of suffering for our children and grandchildren.'*<sup>40</sup> Such ethical passion results in deepening awareness that is pooled into a shared narrative by large numbers of people.<sup>41</sup>

The importance of intrinsic values in how climate change is framed and communicated is discussed further in the section on media and communications.

### **Overcoming fear**

In order to overcome the potentially paralysing fear associated with climate change it is necessary to work through anxieties and to provide genuine emotional support. Fear can potentially be reduced through discussion and conversations about the climate and the future.<sup>42</sup> Carbon Conversations, a practical programme for individuals to talk about climate change, facilitates more people to feel safe to face the realities of climate change and support each other to reduce their carbon emissions.<sup>43</sup> Surveys have shown that this can lead to radical behaviour change, and reductions in individuals' carbon emissions but this work needs to be supported by broader shifts of social values and effective policy frameworks.<sup>44</sup> While conversations are not enough without meaningful action, they are a crucial start.<sup>45</sup>

### **Emphasising the proximity of climate change**

To address the fact that most people view climate change as a distant future threat, thus discounting the risk, it is suggested we need to emphasise the proximity of climate change and that it is happening now.<sup>46 47</sup> This can be done by emphasising local risks, for example when extreme weather events occur, though caution is needed when highlighting the 'here and now' as it can sometimes backfire.<sup>48</sup>






### **The power of examples**

The disempowering effects of 'believing that the actions of individuals don't make a difference' can be countered through examples that show what is possible and foster a sense that other people care. It is suggested that more success stories of collective action can help to overcome a negative view that people are too selfish and encourage more people to take action.<sup>49</sup>

### **The power of social norms**

There is much evidence that our social and political identities critically determine our perceptions of climate change and our beliefs are a function of group identity.<sup>50</sup> It's not what we learn so much as how and from whom that matters.<sup>51</sup> But caution is needed: using social norms can be effective in encouraging more sustainable behaviour but only if they are used in the right way so they don't provide perverse incentives or reinforce unhelpful behaviours.<sup>52</sup> Approaches that use the power of social influence, e.g. engaging volunteers in a particular neighbourhood to deliver energy reduction interventions and advise neighbours, can be effective<sup>53</sup> and can reinforce more significant behaviours through peer pressure.<sup>54</sup> There are also successful city-wide attempts to use peer support for deep carbon reduction programmes, tapping into people's need for meaning and purpose and social connections.<sup>55</sup> The empowering effects of social networks has also been shown in other contexts.<sup>56</sup> Despite the many societal and individual barriers to change, surveys have shown that a majority of people agree with the idea of 'doing one's bit' on the basis that they are contributing to action at a cumulative level.<sup>57</sup>

These are just a few of the insights from a vast body of research. Psychology has an important part to play in understanding human behaviour and motivations, not just in terms of individual resource use but also how individuals influence choices made by organisations and governments.<sup>58</sup> However, the complexity of climate change and how it is interconnected with the way our societies are structured mean that a study of individual choices and behaviour can provide only part of the story. For a fuller picture we need other disciplines.



# SOCIOLOGY

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Unlike psychology, where the focus is primarily on the individual, sociology is concerned with the study of human interaction at a group level.

## **Sociological perspective on denial**

From a sociological viewpoint the failure to act on climate change in western societies is not just a matter of individual psychology but is in large part due to social and cultural organisation of daily life within a broader political and economic context.<sup>59</sup> From interviews with a well educated community in Norway, the term ‘socially organised denial’ was used to describe the phenomenon where people avoided thinking about climate change not just because of individual psychological processes but for a range of social and cultural reasons including the need to follow cultural norms and maintain a positive national identity.<sup>60</sup> It is suggested the reason why so many well meaning people feel powerless to act is a ‘psychological’ barrier in response to social, cultural and political factors such as the political dominance of the fossil fuel industry. To overcome these feelings of powerlessness we need to provide people with opportunities for effective engagement in which their actions matter.<sup>61</sup>

## **Social Practice Theory**

Sociologists argue that the dominant psychological and economic models of behavioural change wrongly frame the issues of climate change in terms of individual behaviour and personal responsibility.<sup>62</sup> Thus the conventional focus on ‘individuals’ supports uncontroversial policy interventions (e.g. provision of more information) without reference or challenge to the political power structure.<sup>63</sup> By contrast a sociological perspective, such as the theory of social practice, recognises that practices (such as driving a car) are culturally determined and are interlinked with social and physical structures (such as the way our cities are designed) and institutions.<sup>64</sup>

Thus the practice of driving a car is part of a complex system of billions of agents, involving machines, cities, cultures, modes of governance and lifestyles.<sup>65</sup> For cycling to replace driving on a collective scale therefore requires policy interventions at a system level, e.g. restrictions on car use or investment in cycle infrastructure, rather than simply campaigns that focus on encouraging people to use bikes.<sup>66</sup> Results from cycling success stories like Groningen in the Netherlands<sup>67</sup> or lessons from UK programmes such as Cycling City<sup>68</sup> point to the importance of the possibilities of ‘system change’ through a fully integrated approach that addresses infrastructure, economic incentives, community engagement, governance etc. Currently, with rare exceptions, this systems



approach is lacking in most UK towns and cities.

Moving to a low carbon society involves developing new systems of low carbon social practice and different social institutions, habits and fashions.<sup>69</sup> Suggested features of a low carbon society include a reasonable level of well-being, high levels of social connectivity and equality plus redesigning places and buildings for lower energy which involves higher density living, slower travel, more locally based lifestyles and innovation.<sup>70</sup>

### Alternative insights

While the drawback of sociological approaches is that conclusions drawn from analysis of one practice or system are unlikely to be wholly applicable in another context,<sup>71</sup> sociological approaches can provide useful and alternative insights for policy makers. Despite the contrasting theoretical approaches of psychology and sociology, both an understanding of the motivations of individuals on the one hand, and the socially organised nature of practices on the other are considered necessary.<sup>72</sup> It depends on the scale and ambition of an intended change as to whether an individual behaviour or sociological model is more appropriate. For example, workshops with civil servants have looked at a particular problem (how to support home-working in government departments) from the viewpoint of behavioural economics and have also considered the extent to which such practices are socially embedded, as a means of identifying new ways of thinking through policy development.<sup>73</sup>

Sociological approaches have been widely integrated into a number of interdisciplinary studies discussed later.



# ECONOMICS



There are numerous economic barriers, real or perceived, to achieving a zero carbon future. Perhaps the key barrier is that zero carbon is perceived as more expensive than business-as-usual and this is seen as inherently problematic. There is also an underlying fear that the economic system as currently constituted won't work without fossil-fuelled growth.

Governments are largely unwilling to instigate the economic measures (regulations, subsidies and taxes) to deliver a zero carbon future at a fast enough rate. This is most likely because of a mixture of concerns about the macroeconomic impacts (especially if they act unilaterally), the unpopularity of higher energy bills, taxes or living-costs, and ideological resistance to 'interference' in markets. Businesses face many barriers posed by the need to operate profitably in the current economic system. Individuals may be up against the barrier that they cannot afford to choose zero carbon technologies and behaviours (especially in the absence of government incentives), but individuals may also be a barrier in that they do not want to make zero carbon choices (a problem linked to range of social factors and exacerbated by the influences of media and marketing).

Therefore, the economic case for a zero carbon future must be made at different levels and to different actors. The two most important may be the macroeconomic arguments necessary to convince governments to act and the persuasion needed to influence the economic choices made by individuals. Although there are other actors, such as businesses and community organisations, each actor will influence the others, and overcoming barriers on any level will impact barriers for other actors.

Our initial research has identified that there are various different arguments that can be made to convince governments, individuals, businesses etc. that action to build a sustainable society is in their economic interest.

## **What is cheaper?**

The simplest case to make is that a zero carbon future is cheaper, in the pounds or dollars price, than the fossil fuel alternative. This is a difficult argument to make, particularly in the early stages when new technologies are more expensive than established ones<sup>74</sup>. It is also the case, as a recent report by the IMF<sup>75</sup> has shown, that fossil fuels are heavily subsidised, both directly and indirectly, making it harder for clean technologies to compete against them. And whilst it may be possible to demonstrate that over the long-term the lower carbon option is cheaper (as did a recent study by Citigroup<sup>76</sup>) psychologically and in formal economic models, future benefits are discounted in favour of immediate gains. In any case, arguments framed in terms of what is cheaper may not be helpful and may reinforce thinking that is part of the problem. →

### Externalities and co-benefits

An easier case to make, and one that has been powerfully made by reports such as the Stern Review<sup>77</sup>, is that when the true costs are evaluated, including the 'externalised' costs of polluting activities, then a cleaner future does indeed carry lower costs than the unsustainable alternative. A recent report by the United States Environmental Protection Agency makes the same case, concluding that 'global action on climate change will significantly benefit Americans by saving lives and avoiding costly damages across the U.S. economy'<sup>78</sup>.

A problem, however, is that although externalised costs, such as the impacts of air and water pollution, have been well quantified by studies (such as TEEB<sup>79</sup>), they are not currently included in prices. So systems must be developed either to 'internalise' these costs into prices, for example through a carbon tax, or to regulate markets with knowledge of these costs taken into account. Countries may feel that to do this unilaterally will put them at a competitive disadvantage. The value of these 'externalised' costs can also be contentious because they have not been determined by markets and may rely on contested scientific predictions of future impacts. They may also be contentious because they should not be determined by markets. It is considered inappropriate by some to assign a cash value on things, for example a human life or pristine natural ecosystem, whose value should not be measured in those terms, and that this only reinforces the framing (everything is dispensable at a price) that is at the core of current problems<sup>80</sup>. However, such valuation is common practice in other contexts such as health and insurance, and it is arguable that it is better to place some value on these things rather than none at all.

Whilst arguments based on externalised costs and avoided liabilities are sound in principle and have been made very powerfully on a theoretical level, there remain challenges to their use to motivate real world action. However, there is also a growing number of studies evaluating the so-called 'co-benefits' of action to deliver a zero carbon world<sup>81</sup>. Many of these co-benefits are similarly quantifiable to the externalised costs discussed above. Such an example would be the health benefits of climate change mitigation in the transport sector.<sup>82</sup> It could be argued that some co-benefits, such as improved wellbeing from a low carbon lifestyle, may be subjective or hard to quantify. However, whilst there may be some subjectivity involved, the positive value of the benefits being considered is in general uncontroversial. The evaluation and inclusion of such co-benefits in economic analyses is valid and useful alongside the inclusion of externalised costs.



### **Beyond costs and benefits**

Whilst adding up the costs and benefits of going to zero is necessary and useful it does not tell the whole story. We also want to know what the overall economic impact of this action will be. Most energy system models used to compare the costs of different scenarios are designed to find the least cost energy system option. Rather confusingly, this energy system cost is often reported as a percentage of GDP, even though it doesn't include all the macroeconomic effects associated with a particular scenario. However, some studies, such as that by Cambridge Econometrics for the WWF<sup>83</sup>, assess the overall economic impact of action in terms of GDP, wages, employment etc. Such studies can conclude that the 'least cost' energy system will not always deliver the greatest macroeconomic benefits and that the economy will be stronger if zero carbon policies are pursued than if they were not. For example, in a high renewables scenario, although energy system costs are typically higher, less money is spent on imported fossil fuels and more is spent on domestic investment, which creates an economic stimulus and domestic jobs.

Without needing to include externalities that have not been included in prices, modelling such as that by Cambridge Econometrics can provide evidence for the commonly held belief that by pursuing clean energy and energy efficiency, countries like the UK will create jobs and strengthen their economy. The potential for job creation and economic development is well described in studies such as A Green New Deal<sup>84</sup> and the One Million Climate Jobs report<sup>85</sup>. It must be acknowledged that different economic models give different results – some studies show a strengthened economy (in terms of GDP and jobs), others show a weakened one<sup>86 87</sup>. However, by analysing of the overall economic impact of climate action, preferably using a range of economic models, the narrow dialogue around our energy system (and our other systems for that matter), in which all expenditure is seen as a burden to be minimised, can be replaced with a fuller discussion of the implications. This can include the costs, benefits, overall economic impact, and societal changes that will result depending on the choices we make.

**The current government is committed to a 'least cost' strategy; even if the analysis were to include all costs it is necessary but not sufficient – we need an adequate economics that can help us find the 'maximum benefit' strategy for our society as a whole.**

### **Making the case**

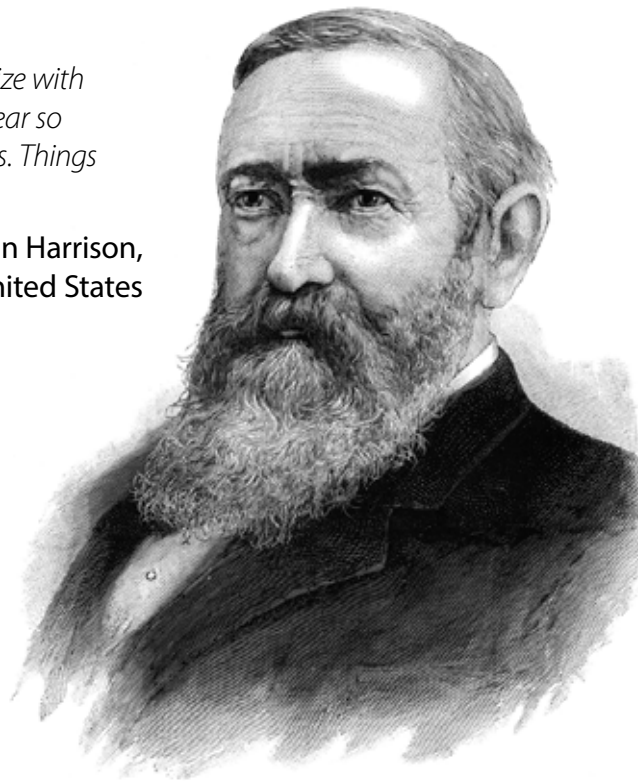
Arguing for increased energy system expenditure, even in the context of a strengthened economy and better long-term outcomes, must overcome resistance based on short-term concerns about fuel poverty, the competitiveness of energy intensive industries, and, in particular, energy prices for consumers. Whilst a strengthened economy with more job opportunities may be predicted, any increases in energy bills or taxes will need public support and this may be difficult to secure, especially when communicated through the prism of the media.



It is for these reasons that ‘least cost’ approaches to tackling climate change tend to dominate the narrative, with politicians keenest to reassure voters that any impact on energy bills will be minimised. This obsession with minimising the costs of a new and growing sector of the economy is, whilst understandable, also somewhat curious. It is true that people generally prefer lower prices, but the government does not systematically seek to minimise expenditure in other sectors of the economy, such as housing, cars, clothes or food. And growth is of course the overriding imperative of the economic system. If only solar panels, insulation, efficient vehicles and low-carbon food choices could be made objects of desire, how much more favourably would expenditure on them be viewed?

*‘I cannot always sympathize with that demand which we hear so frequently for cheap things. Things may be too cheap.’*

Benjamin Harrison,  
23<sup>rd</sup> President of the United States



A key strand of green economics is to consider what a better economy would look like – one that is more enjoyable, humane, equitable, convivial. These approaches tend to avoid the regular indicators of economic success (such as GDP). In fact, they challenge the conflation of economic success with national success and favour indicators such as health, happiness, equality, and access to education when measuring progress. Such indicators can help us see what is not shown by conventional economic indicators but which are the things that really matter<sup>88 89</sup>. Whilst some aspects of what makes a better economy are subjective and may be dependent on values and worldview, in general, measures such as health, education, and environmental quality are widely accepted as ‘the things that matter’. Therefore, highlighting how a zero carbon future could be inherently better and more desirable than the status quo is a powerful and necessary element in overcoming barriers to its achievement. A remaining barrier to this approach may be scepticism and fear that the benefits of modern living cannot be maintained without the current economic system. →

## The big issue?

A key issue that must be faced is that our economy, as currently constituted, is inherently dependent on growth. Crucially, because of the way money is created, with banks loaning money into existence on the expectation of repayment with interest, the economy must continually grow to service the debt<sup>90</sup>. This is not simply a desire to consume new or more goods and services, it is a structural requirement of the economic system. It is, therefore, unsurprising that politics is so dominated by the imperative to deliver growth.

Some, such as the New Climate Economy group<sup>91</sup>, propose that economic growth can be 'decoupled' from carbon emissions and resource use, allowing a continuously growing economy to be sustainable. However, others are unconvinced and believe that the structures of our economy must be changed so that it is capable of functioning in a 'steady-state'<sup>92</sup> (it is not so much that growth must never occur - but that the system must not be reliant on growth always occurring). A key proposal is that the role of private banks in money creation be reduced or even eliminated and be replaced with money creation by a democratically accountable body. Further, it is proposed that publicly created money could be used to finance the investments required to fund a zero carbon future<sup>93</sup>. Given the large upfront costs of many zero carbon technologies and infrastructures, the issue of how finance is raised, the rates of interest charged, and who benefits from this financing is of central importance.

### Winners and losers

We must also acknowledge that, whilst good arguments can be made that action on climate change will deliver overall economic benefits, there will also be losers. As the Carbon Tracker Initiative has shown, up to 80% of fossil fuel reserves must remain unburned if we are to maintain a safe climate<sup>94</sup>. It is unsurprising that those with vested interests in the status quo have conducted powerful campaigns to spread confusion and uncertainty around the science of climate change<sup>95</sup>. The 'Carbon Bubble' - of money invested in fossil fuels we must not burn - is not just a problem for oil company executives: it affects a great many people whose pension funds and savings are invested, at least in part, in these companies. And more broadly our economy is heavily focused on high environmental impact goods and services, the desirability and justification of which is maintained by a pervasive media and marketing campaigns (see the Media and Communication section). So whilst the divestment movement<sup>96</sup> is crucial in highlighting the issue of the billions malinvested by institutions in fossil fuels, it must also spur individuals to question the destination of their savings and everyday spending.

However, given how entrenched the vested interests are, and the systemic risk posed by bursting the carbon bubble, might we also have to consider compensating those with fossil fuel reserves that must be 'retired' for the greater good? Whilst this would seem unpalatable to many, there is a historically parallel with the compensation of slave owners to gain acceptance for abolition → (see the History section).



## Summary

We currently have slow and insufficient progress but, as shown, there are many powerful and persuasive economic arguments that can be made for building a zero carbon world. Some of the key economic barriers and potential solutions to overcome them are summarised in the table below.

Barriers	Solutions
Zero carbon seen as more expensive than business as usual	Include all subsidies, externalities, co-benefits and ecosystem services in any economic analyses Show that zero carbon will deliver a stronger economy and don't accept the 'least cost' framing on action Develop and promote new economic indicators that measure what people actually want and demonstrate that a zero carbon economy is a better economy
Perception that the economy won't work without fossil fuelled growth Economic system based on continual growth and profit, with money created as debt by private banks	Try to demonstrate that growth can be decoupled from emissions/resource use Propose structural changes, such as a new system of money creation, to allow a steady state economy to function Highlight the inherent instability and risk of current arrangements
Governments will not legislate (through regulations, subsidies and taxes) to deliver a zero carbon future at a fast enough rate, most likely because of a mixture of concerns about: <ul style="list-style-type: none"> <li>• the macroeconomic impacts (especially if they act unilaterally)</li> <li>• the unpopularity of higher energy bills, taxes or living-costs</li> <li>• ideological resistance to 'interference' in markets</li> </ul>	Make macroeconomic arguments that zero carbon economy can function or that continuation of fossil fuel economy is greater risk Popular calls for zero carbon future override political caution
Individuals genuinely cannot afford to choose zero carbon technologies and behaviours (especially in the absence of government incentives)	Popular pressure for government action and analyses showing economic benefit of action convince government to deliver required subsidies and investment
Individuals can afford to choose zero carbon technologies and behaviours but don't want to or are insufficiently motivated	Make it positive, cool, aspirational Visualise positive futures Shifted mindsets / cultural shifts result in changing preferences
Powerful and well-resourced vested interests use various avenues, such as lobbying, the media and marketing to cast doubt on seriousness of problem and reassure governments and individuals that their current economic decisions are justified and correct	Expose the misinformation by vested interests Use arts and media to subvert media messages and project 'alternative aspiration' Consider compensation for compulsory purchase of all unburnable fossil fuel reserves



# POLITICS



The current policy focus on individuals and behaviours is challenged by political theorists, who argue that because the barriers to dealing with climate change are primarily political there is, therefore, a need to bring political economy into the debate and better understand the nature of power relations. Key political obstacles to effective action on climate change include the power of vested interests, the political risks of implementing unpopular policies, and unconstrained growth and consumption.<sup>97 98 99 100</sup> Despite apparent high levels of public awareness of climate change in industrialised nations, climate policy has not been given political priority, reinforcing public perceptions that climate change is not a key concern.<sup>101</sup> This creates something of a 'catch 22' situation.

## Political cultures

One of the challenges for most political parties is accommodating the radical responses required by climate change into their political thinking, which has evolved on the basis that the natural world is, more or less, a stable given. There is strong evidence that responses to new policy issues are influenced by political cultures.<sup>102</sup>

Ways in which action on climate change can be considered within the different UK political traditions (conservative, labour, liberal) have been outlined by Green Alliance. For example, within conservative thinking this may be an emphasis on increased resource productivity, support for entrepreneurs and innovation; social democrats can look at ways to increase civic input to improve decision making on transport and energy infrastructure renewal; and liberals can look at ways to address short term thinking within the Treasury through clearer objectives on climate change, longer budget horizons and review of discount rates.<sup>103</sup> There have been warnings about the dangers of political polarisation within the climate movement, which create conditions for blame and in-fighting; to be successful the movement needs more political diversity based on a shared humanity.<sup>104</sup>

## Power of vested interests

The powerful vested interests of the fossil fuel industry and state powers are identified by many as a significant barrier, through their control of production, influence on government policy,<sup>105 106</sup> and the control of dissemination of knowledge and information (e.g. via the media).<sup>107</sup> This is not a simple process to overcome. Our economies have become dependent on fossil fuel systems through a process known as 'carbon lock-in' where they are stabilised and perpetuated by technical and institutional co-evolution, despite the known impacts and existence of cost-effective alternatives.<sup>108</sup>



Possible ways we can overcome fossil fuel vested interests include using a knowledge of political economy to map winners and losers, gain support from ambivalent groups and mobilise support from a coalition of the willing.<sup>109</sup> Others have suggested we need a better understanding of the fossil fuel industry tactics.<sup>110</sup> Effective legislation is aided by a strong government that can take on vested interests.<sup>111</sup> Making corporate influence on governments totally transparent will also help to weaken hidden power.

Many are now suggesting litigation processes similar to those taken against the asbestos and tobacco industries, for future liabilities.<sup>112</sup> The divestment campaigns led by coalitions of students, faith groups, environmental groups and trade unions, aim to remove the legitimacy of the fossil fuel industry, similar to campaigns against apartheid in South Africa,<sup>113</sup> with indications they are causing some reputational damage to the fossil fuel industry.<sup>114</sup> Cultural protests have also been used: for a month musicians played outside Shell Headquarters in London as part of a successful campaign against exploratory drilling in the Arctic.<sup>115</sup>

### **Influence of democratic processes**

There is evidence that the extent and form of democratic processes impact the effectiveness of climate change policy: countries with democracies are more likely to implement climate change policies, while those with parliamentary systems and proportional representation tend to have stricter environmental policies.<sup>116</sup> In other research the level of democracy alone was not found to be a significant driver of climate change policy once levels of public awareness were taken into account (since the concerns and priorities of the electorate can cut both ways).<sup>117</sup> Instead public knowledge of the threats of climate change was found to be the most powerful driver.<sup>118</sup>

Often the main drivers for legislation may not be primarily about climate change, but alternative objectives such as air pollution, or energy security.<sup>119</sup> Bundling climate policies with complementary policies and objectives such as improved health, cleaner air, reduced congestion etc. can be a way of reducing political risks.<sup>120</sup> Government pilot projects with the private sector and civil society can also be used effectively to 'demonstrate success, overcome opposition and avoid policy deadlock'.<sup>121</sup>

It is also important to consider the extent of political change that is being sought. There are a significant number of researchers who posit that the global ecological crisis is a direct result of the profit and accumulation model of capitalism and this must be addressed by systemic change (e.g. from Ward<sup>122</sup> to Klein<sup>123</sup>). On the other side, there are those who propose that eco-capitalism or green growth is a better model for achieving emissions reductions within the current economic system (e.g. Porritt, 2007<sup>124</sup>).



### Role of the EU

The UK's climate policy is inextricably linked to the EU as the latter has been a leader on climate policy<sup>125</sup> and EU laws supercede Member States' laws.<sup>126</sup> The UK was the first country in the world to make a legally binding long term commitment through the 2008 Climate Change Act<sup>127</sup>, but its role within the EU is mixed – arguing for higher emissions reductions in the 2030 targets on the one hand, but opposing binding renewable energy targets on the other.<sup>128</sup> It is argued that the UK's EU membership has had 'a revolutionary effect' on environmental policy,<sup>129</sup> providing external pressure and legal avenues for action. The proposed 2017 referendum on the EU therefore has profound implications for UK climate and other environmental policies.<sup>130</sup>

### Role of cities

The key role of state and city political actors in developing effective climate change policies and programmes has also been well documented. For example a network of the world's biggest cities (C40) has been collaborating since 2006 to drive urban action on climate change. Cities are in a unique position to catalyse wider climate action, using innovative approaches and governance techniques to deliver extensive action even where they don't have strong power.<sup>131</sup> For example Copenhagen has a policy mandating that households connect to the city's district heating scheme.<sup>132</sup> In the UK, eight 'city deals' have enabled cities like Birmingham to deliver low carbon growth, through £3 million government funding to trial new technologies and engage residents on domestic energy reduction.<sup>133 134</sup> The work of the Cool Climate Challenge shows the results from eco-teams in cities all over the world.<sup>135</sup>

### Motivating politicians

Moving from the political system to individual actors within it, there has been some interesting work looking at the propensity of key decision makers to act on climate change. While there are myriad reasons preventing politicians and business leaders taking effective action, ranging from an education grounded in neoliberalism, to undue faith in technical solutions, the main factor was found to be their political worldview.<sup>136</sup> Top decision makers were found to have a high sensitivity to peer group opinions and appeared particularly reluctant to act on their personal concerns about climate change because of their perception of their peers' views.<sup>137</sup> This finding was echoed in the experience of a climate leadership programme for UK politicians which showed the importance of getting politicians to talk about climate change with people they trust.<sup>138</sup> Other ways to help politicians recognise why action on climate change is essential include getting them to understand that our radical divorce from nature is the root of the problem and that climate change is not just an environmental issue but relevant for all sectors, particularly health and economy.<sup>139</sup>



### Mass social movements

A common theme running through much of the political studies literature is the need for mass social movements to urge political action.<sup>140 141 142</sup> This was identified as one of the key drivers of change by twenty leading international climate change researchers and policymakers – together with evidence, education and legislation, social and technical innovation, and decisive action at moments of crisis.<sup>143</sup> It is suggested there is an important role for radical voices, which tend to be from smaller activist groups rather than larger NGOs, to help shift the ‘window of political possibilities’ and make more radical policies acceptable.<sup>144</sup> Possible strategies to shift the ‘window’ of debate include: rebuilding the capacity for grassroots organising; cultivating ‘unusual suspects’; framing positions differently; and organising those people who stand to lose.<sup>145</sup> A number of grassroots campaign groups are using nonviolent civil disobedience and other tactics to successfully mobilise large numbers of people in direct political action on climate change.<sup>146</sup>

### The role of low carbon communities

However, others have suggested the traditional advocacy model is insufficient and argue instead for an approach combining leadership/action driven by an intersection of motives (poverty, health, housing etc) with ‘action networks’ of low carbon communities which influence behaviour.<sup>147</sup> Rather than seeing individual behaviour as an alternative to political action it is suggested it should be seen as a means to it: *“Individual action on the scale necessary will only emerge through collective decisions in the networks and communities...which give them both the motive and opportunity to act.”*<sup>148</sup> There is a need for a visible, collective project that individuals can coalesce around to make their actions feel worthwhile.<sup>149</sup>

This need for both top down and bottom up political action suggests an important role for low carbon communities, whose strength in empowering people complements the delivery role of local authorities.<sup>150</sup> The Transition Network has examples<sup>151</sup> of successful low carbon community projects ranging from food gardens in Belgium to repair cafes in the Netherlands, demonstrating the power of networks in spreading ideas and experience. These community-scale projects may not impact climate change significantly by themselves, but *“help people recognise that they have power to make a difference”*<sup>152</sup> and give them confidence and the impetus to take political action.

While community movements can contribute to systemic change it requires a coordinated movement with shared objectives and funding to scale up.<sup>153</sup> For example despite ‘astounding support’ from the UK public for community energy schemes, the sector is stymied by numerous barriers,<sup>154</sup> particularly the lack of a simple and predictable government policy framework.<sup>155</sup> →

### Need to address social justice

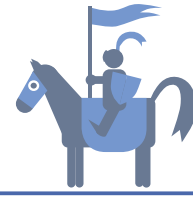
For reasons of social justice there is a need to consider how the impacts of climate change, as well as mitigation strategies, will affect the most vulnerable members of society internationally as well as at a national level. Generally low income households contribute least to the problems but are likely to be the most affected.<sup>156</sup> As well as considering rights and responsibilities in the context of responses to climate change, it is argued we need to include recognition of the cultural, social and economic basis of inequalities.<sup>157</sup> This points to a need for greater community resilience as well as a 'systems approach' that considers the specific needs of vulnerable people.<sup>158</sup> Within the UK the Scottish Government is leading on climate justice,<sup>159</sup> for example setting up a Climate Justice Fund that supports projects to increase community resilience in developing countries.<sup>160</sup>

### Need for coalitions

Recognition of how climate change intersects with social issues such as health, poverty and inequality creates opportunities for building coalitions: it is argued climate activism must link up with other movements to have any chance of success.<sup>161</sup> Successful work has been done in the UK, for example by Green Alliance, Oxfam, NEF<sup>162</sup> and the Baring Foundation<sup>163 164</sup> to broaden the range of organisations involved in climate change outside the environmental movement including those working with the elderly, refugees and youth and children. Additional lessons from past social movements on how to build successful coalitions can be found through the historical analysis which follows.



Photo by Meganlorio 2015



# HISTORY

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History is not a blueprint and caution is needed applying lessons from one point in time to another with perhaps a totally different cultural and social context. That said, history has a track record of providing useful insights and many researchers from all fields have analysed older, successful social movements to draw out useful lessons for the climate change movement.

## **Civil disobedience and collective identity**

Historical analysis of four social movements which used nonviolent civil disobedience – the Indian Freedom struggle, the US Civil Rights movement, the Philippine People’s Power Revolution and the Burmese uprising – found that the successful movements all helped forge a sense of collective identity and ownership so the movements became self-directing, and provided a unified alternative to the status quo.<sup>165</sup> Other effective mechanisms included: the use of hopeful symbols consistent with people’s aspirations; encouraging a diversity of participants; and using alternative media for communication.<sup>166</sup> While political activism, such as marches, lobbying and direct action, needs to be sustained and strengthened, the authors see an equally important role for community based activism which highlight achievable solutions with direct benefits.<sup>167</sup>

## **Unity on moral principles**

Other researchers have looked at the movement to abolish slavery and found one of the key mechanisms for success was the fact that groups with significant and ingrained theological and political differences were still able to unite on various moral principles such as human dignity or the shame of colluding with brutality (Turley, 1991; Huzzey, 2015<sup>168 169</sup>). The abolition movement was also positively influenced by economic actors (new industrialists) whose income were not linked to the slave trade but who could recognise the benefits of abolition in terms of their own interests.<sup>170</sup> A key parallel with climate change is the difficulty of freeing a society from a policy that is inextricably linked with the economic system and powerful vested interests.<sup>171</sup> The consequence of this for the abolition of slavery movement was that the slave owners had to be ‘bought off’ with approximately £20 million (equivalent to £1 billion today) in compensation by the British government.<sup>172</sup> Similarly, it has been suggested a global agreement to purchase unburnable fossil fuel reserves is needed.<sup>173</sup>

## **Home Front Values**

World War II has been frequently cited in the US and UK as a model for effort on climate change and how to power down a whole society.<sup>174 175 176</sup> However, others suggest this may be misguided due to many key differences and that the war effort is misunderstood as a period of accelerated, progressive change<sup>177 178</sup> →

For example, the commonly held belief that Britain became more self-sufficient during the war is belied by the fact that Britain's oil imports doubled and meat imports increased by exploiting new and more distant global supplies.<sup>179</sup> Despite this, it is argued that appeals to positive values associated with the home front such as equality, collective purpose, self-sacrifice and solidarity are useful.<sup>180 181</sup>

### Importance of cultural activities

In the US there has also been analysis of lessons for the contemporary environmental movement from early social movements. For example, the early US labour and civil rights movements both relied on a similar mix of public education tools including informal schools, independent media and communication networks, mass meetings and cultural activities.<sup>182</sup> It is suggested that cultural activities (music, literature, theatre, films etc) played a crucial part in these early social movements as they involved changing deeper values and worldviews, thus increasing commitment and hence public participation in movements.<sup>183</sup> The essential role that coalition-building plays in building a sufficient base of support in all social movements is also emphasised.<sup>184</sup>

Despite the useful lessons drawn from all these analyses it is also worth noting that *'all social movements are uncertain, unpredictable and contentious social processes'*<sup>185</sup> and the diversity of the climate change movement means there is a multitude of different directions in which it can go. Other important differences include the fact that the climate movement is on a much bigger global scale impacting on every society, including future generations as well as non-human species.

*Poster for the Dig for Victory campaign, encouraging Britons to supplement their rations by cultivating gardens and allotments during WW2.*





# MEDIA AND COMMUNICATION

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A common theme from all disciplines is the key role of communication and particularly the media in terms of the barriers and how we overcome them.

### Media bias

Problems in the way climate change is framed and information bias in the media is identified through numerous studies. The notion of balance-as-bias where mass media provide marginal climate change deniers or sceptics almost equal prominence to the consensus in the scientific community was identified over 10 years ago.<sup>186</sup> While UK broadsheets began to report accurate coverage in 2005, UK tabloid coverage of the issue was found to continue to significantly diverge from the scientific consensus.<sup>187</sup> Even in 2011 an independent review of BBC coverage of scientific issues including climate change found that climate change deniers were still continuing to find a place on the airwaves, hindering objective reporting of the issue.<sup>188</sup>

### Media coverage

The difficulties for the climate change movement to get extensive media coverage is another barrier. Much of the mainstream news media in the US failed to report on the massive 2014 People's Climate March in New York, attended by hundreds of thousands of people,<sup>189</sup> prompting comparisons with Burma's control of the media.<sup>190</sup> This lack of media exposure of the climate change movement is exacerbated by the fact that their resources for communication of the issues are massively outweighed by those of the fossil fuel industry: Exxon Mobil and oil industrialists have spent millions of dollars in the US on a network of more than 40 front groups to try to discredit mainstream climate science.<sup>191 192</sup> In the UK, Europe's second-biggest retailer of gas reportedly spent £2 million on a marketing campaign targeting elite decision-makers, including paying for articles in a mainstream newspaper.<sup>193</sup> This is in addition to the vast amount spent on advertising by the fossil fuel and associated industries such as car companies. To counter the fossil fuel industry influence on policy discourse some have suggested explicit media campaigns that mirror those executed by the fossil fuel industry.<sup>194</sup> However in the absence of equivalent resources the climate movement needs to be much more astute in how it counters misinformation and lobbying power. →

### Promotion of consumerism

On a wider issue the media contribute to climate change through the pervasive promotion of consumerism and material wealth on the one hand, and the tacit collusion with businesses for the sake of advertising revenue.<sup>195</sup> The role of advertising in promoting materialism may be somewhat self-evident, given that the average adult sees some 3,000 advertisements a day, according to some estimates.<sup>196</sup> There is good evidence that increased spending on advertising increases individual consumption levels, especially for cars and household goods,<sup>197</sup> and exposure to commercial advertising has been shown to lower levels of concern about bigger-than-self problems.<sup>198</sup>


Yet despite the links between consumption and climate change, and evidence<sup>199</sup> that the public recognise that reduced consumption equates with improved well-being, social scientists face difficulties promoting reduced consumption since this would run up against the prevailing economic orthodoxy.<sup>200</sup> Perhaps surprisingly, we could find no third sector movement in the UK working to counter the pervasive cultural impacts of advertising, even though many countries and cities<sup>201</sup> have imposed restrictions.

### Change in worldviews

A common thread running through all the disciplines is that changing the economic, political and social systems needs to go hand in hand with changes in our prevailing values and worldviews. Our individual and cultural mindsets are perhaps the real root of the problem so there is a need for personal transformation alongside other essential activities, such as promotion of social justice<sup>202</sup>. There are possibly some useful lessons from business on promoting inner transformation for leadership.<sup>203</sup>

### The power of framing

The way climate change is framed<sup>204</sup> is an issue of great importance in terms of how information or a message is perceived and acted on by individuals. It has been widely observed that climate change should not be framed as merely an environmental problem. Climate change communicators have also been urged to avoid negating an opponent's frame. Some cognitive scientists suggest this can strengthen unhelpful frames; instead communications need to be framed in terms of strong, positive values.<sup>205</sup>

While all information is framed by its context, some of it can trigger deep frames, or a set of deeper values and concepts<sup>206</sup>. The media, marketing, even public policy, all have a profound influence on our cultural values, which in turn affect public support for new policies.<sup>207</sup> It is therefore essential that the climate change movement works to promote deep frames that convey intrinsic (cooperative) values, such as empathy, social justice, concern for future generations and our connection with the natural world, rather than extrinsic (competitive) values such as image, power and financial success, so that these more helpful values become strengthened at a societal level.<sup>208</sup> One example of how to promote deeper frames is the Climate Coalition's "for the love of" 

campaign which highlights the positive things that people value that are threatened by climate change.<sup>209</sup>

An understanding of the power of framing has many practical uses. For example climate communicators have found ways to connect with centre-right voters by framing climate change in language that resonates with those voters in terms of narratives (localism, energy security, the green economy and the good life) and values (e.g. pragmatism, scepticism and stewardship).<sup>210</sup> However, while it can be useful to frame climate change in ways that resonate,<sup>211</sup> care must be taken in tailoring a message to particular audiences. There is compelling evidence that framing climate action through appeals to wealth creation or social status is likely to backfire, undermining more durable and systemic motivations for pro-environmental behaviour.<sup>212 213</sup>

There are many examples of organisations such as Carbon Brief<sup>214</sup> and Climate Outreach<sup>215</sup> and associated guides<sup>216</sup> offering clear information to help promote understanding of climate change. While these provide a useful counter to the mainstream reporting of issues, there is still a long way to go in terms of raising the issue of climate change in the public consciousness in a way that engenders effective mass action.



*Liberate Tate's Human Cost, a durational performance, marking the anniversary of the Deepwater Horizon explosion, Tate Britain, 2011. Photo by Immo Klink*

# INTERDISCIPLINARY

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There is a small but growing number of interdisciplinary studies, research programmes and models that try to integrate knowledge and methods from different disciplines. Various theoretical models have been proposed to analyse how rapid transitions to a more sustainable future can occur. For example one study integrates insights from psychology, economics and anthropology and applies these to real life environmental policy examples, to illustrate how, for example, community support for an offshore wind farm can be developed through economic incentives, different framing of the issue and involving communities early on in the planning process.<sup>217</sup>

Research on the conditions for successful social and technical innovations has looked at the role that institutions play in preventing or enabling transformations.<sup>218</sup> It suggests radical innovation originates in niches from which a new practice can develop and this requires institutional entrepreneurs: individuals with particular skills who act as brokers for connecting people.<sup>219</sup> Transitions are non-linear and need disruptive innovation,<sup>220</sup> as demonstrated by Germany's shift to a renewable energy supply<sup>221</sup>. Successful social innovation requires action from both a bottom up and top down perspective.<sup>222</sup>

The Scottish Government have attempted to move beyond the individual to consider wider social and material contexts that shape behaviour, and provide a practical user guide for policy makers.<sup>223</sup> Using a worked example of buying an electric vehicle (EV), the guide shows the wide range of factors that need to be addressed for a step-change in EV use. Through a process that includes mapping existing policies and interventions it can help identify gaps and generate ideas.<sup>224</sup>

One interdisciplinary programme involving researchers from 10 universities used a model based on the interactions between technological niches, socio-technical regimes and the broader political, social, cultural and institutional values.<sup>225</sup> Applying this model to outline a transition pathway to a low carbon electricity system in the UK, the researchers developed possible pathways including 'a thousand flowers', a more diverse, grassroots-led system. Subsequent research sets out what the UK's energy system would look like if 50% of the final electricity demand was provided by distributed systems led by civil society.<sup>226</sup>

A similar model combining economic, scientific and technological and sociological theories has been applied to historical as well as future cases of transitions to sustainability including electricity systems, mobility and organic food.<sup>227</sup> Researchers in Norway have suggested models that not only integrate behavioural change and technical solutions, with the wider political, economic and social landscape, but also include individual and collective values and worldviews.<sup>228</sup> They argue climate change is essentially a mindset problem requiring action at both a personal and political level.<sup>229</sup>





# THE ARTS

The following is a perspective on the role of the arts in cultural change by Lucy Neal, based on her recent book 'Playing for Time'. It explores how the arts have a tradition of sparking cultural change and creating emergent space to rethink the future - collectively.

## The Great Imagining: how the arts spark cultural change

*'..it's the job of the artist, poet or storyteller to point out the ground under our feet, to offer us images through which to wake up to our present condition, to show us anew the moment we stand in'*

Mat Osmond, Dark Mountaineer<sup>230</sup>

### Finding our part to play

It's hard to imagine, at this 'moment we stand in' that as humans, we're accountable for reimagining our world on behalf of ourselves, subsequent generations and all species.

Whilst blueprints, such as The Centre for Alternative Technology's *Who's Getting Ready for Zero?*, demonstrate how societies across the globe can transition to low carbon futures, there's no collective map of how they're invented socially, or how a cultural commons is created for the future we want and can find our place in.

When facts and figures about climate change cannot catalyse the shifts needed to move towards a zero carbon future, the arts have a tradition of sparking cultural change and speaking differently, creating emergent space to rethink the future - collectively. With poetry and metaphor, they explore the language of the heart, the pain of what we're losing and the deep yearning in us for the restoration and celebration of life. They re-engineer time to allow our imaginations to flourish, glimpsing other ways of seeing and feeling and it is from these experiences that different futures can emerge.

Artists use the word practice, but it's one that everyone can use to describe a daily life that combines creativity and intentional change. *'The artist is not a different kind of person'* sculptor Eric Gill said *'but every person is a different kind of artist.'*



Drawing on patterns of belonging, empathy, kindness, community resilience, stewardship, reskilling, alternatives to 'limitless' growth, the arts energise people's capacities for action, activate their skills and transform their capabilities. Confronted with having to 'act' in the big change stories of the planet, a certain 'scriptlessness' descends, says theatremaker Zoe Svendsen: we lose the thread of the part we're to play and agency for making change.

When the artist, Emily Hinshelwood, walked through Wales for a year asking each person she met three questions about climate change, she discovered none of the people she met discussed climate change with anyone they knew. They knew about it, but they didn't know how to act. They talked to Emily for hours. She made their responses into a wonderful verbatim poem, *A Moment of Your Time*<sup>231</sup>.

In recent years, UK arts and cultural initiatives such as Platform London<sup>232</sup>, Cape Farewell<sup>233</sup>, Julie's Bicycle<sup>234</sup>, Tipping Point<sup>235</sup>, Artsadmin<sup>236</sup>, Emergence<sup>237</sup>, Creative Carbon Scotland<sup>238</sup> and others have created a step change in recognising the role the arts play in re-imagining a more viable future on the planet, shifting society's rules and values away from consumerism and commodity towards community and collaboration. ArtCOP<sup>239</sup> demonstrates the scale of creative responses internationally to the urgency of climate change. As the Emergence *Culture Shift* report states<sup>240</sup>, artists can be 'outriders and alchemists in the vanguard', speeding up a public process of seeing and feeling the 'truth' of climate change.

### **Making art as if the world mattered**

My own handbook *Playing for Time*<sup>241</sup> has gathered an abundance of over 100 stories of artists and activists, reclaiming a traditional role for artists in the community as truth-tellers and agents of change. Few fall into the conventional, siloed categories of 'dance' 'music' or 'visual arts' - or art that can be purchased, coveted or consumed; all include recipes for action to trigger ways of making art 'as if the world mattered.' The art critic Suzi Gablik called this the 're-enchanting of our culture' where personal and collective creativity connect to social, moral, ethical and ecological responsibility. Not responsibility for the world in general, but one that is practical, specific and different for each one of us: creating everyday parts for people to play.

In *Field of Wheat*<sup>242</sup>, Anne-Marie Culhane and Ruth Levene, plant 22 acres of wheat in Lincolnshire, the bread basket of England. They've recruited a collective of individuals from different background to invest money in the project, who with farmer Peter Lundgren, will learn about the complexities of our food system and how to sell the harvested wheat on a globalised futures market.

Harry Giles' show *Everything I Bought and How It Made Me Feel*<sup>243</sup> questions the relentless nature of consumer culture, and The Happy Museum<sup>244</sup> supports the UK Museum sector to explore how our own wellbeing connects to that of the planet.



Happiness becomes a trojan horse to decouple the notion that our own prosperity is linked to material wealth and infinite economic growth.

The Clayground Collective<sup>245</sup> explores the use of our hands with practical clay-making skills, connecting to the history of ceramics and the canal system; Fruit Routes<sup>246</sup> plants edible fruit and nut trees across Exeter University campus to connect ecology, art and the sustainable management of land, whilst in Sussex Andreas Kornvall builds a Cairn for Lost Species<sup>247</sup>.

In Scotland, Deirdre Nelson's Bird Yarns<sup>248</sup>, draws attention to the plight of Arctic Terns whose long-distance migrations have been disrupted by climate change. Amy Sharrocks invites people to donate 'water that is precious to them' to a Museum of Water<sup>249</sup> whilst Liberate Tate<sup>250</sup> 'gift' a wind turbine blade to Tate Modern, highlighting corporate sponsorship by BP. Human Cost, marking the anniversary of the BP Deep Water Horizon explosion, takes questions of fossil fuel sponsorship of the arts and culture further into public debate. It's a huge challenge to move beyond what artist Brett Bloom calls our 'petrosubjectivity' - a sense of self comprehensively enmeshed in fossil fuels. The grassroots Transition movement, modelling change in how you live where you live, does this: connecting communities across the globe to imagine a world beyond fossil fuels in immediate, creative, practical ways.

An activist art spectrum also includes the everyday activism of Eva Bakkeslett<sup>251</sup> who works with microorganisms to reclaim living cultures in yoghurt and kefir. She celebrates culture's resilience - microbial and social - when fermented, exchanged and shared. Encounters Arts<sup>252</sup> creates a temporary High Street shop 'with nothing on sale, but lots on offer' where a community's memories are shared and a future re-imagined - a process now being applied to the creative development of the disused 3.5 acre Dairy Crest site in Totnes as part of a Community Right To Build.

Repair cafés and Restart parties show the 'haptic skills' revolution taking place. Meeting a hunger for reskilling and self reliance, they reconnect us with a material world beyond conspicuous consumption. Our hands can liberate us from the tyranny of a disposal culture and build on long traditions of craftsmanship from lacemaking to hedgemaking to boatbuilding.

These creative skills build connection between ourselves, our communities and the natural world: joining dots between key drivers of change - in energy, finance, climate change, food and community resilience to create an art of living within ecological limits.

### **Right brain living**

Some barriers for reimagining a livable world could be in our own brains. Psychiatrist Iain McGilchrist argues that, in the West particularly, we've created a 'left' brain world of rationality and logic that prefers the detail of linear sequencing to an



improvised world of creativity and play. Facts and figures of climate change are very 'left brain' - a barrier to overcome is to develop our right brains, which by contrast, handles newness, interconnection and uncertainty and can better understand an embodied world of emotional expression. The 'right' brain, proposes McGilchrist, has a 'disposition for living'<sup>253</sup>.

When science cannot play the role of interpreting the challenges we face or questioning the values that underpin the need for change, the arts have the ability to challenge the status quo and engage people collectively at an imaginative level. They draw on the perspectives of everyone to create a future we want to live in: their metaphors, dreams, disruptions and symbolism provide that 'other space' from which a new exploration of the self and the world can emerge and an unshakeable belief that change can and does happen.

### **A shift of consciousness**

The deep ecologist, philosopher and activist, Joanna Macy calls the rapid historic shift taking place at present from a Growth Industrial Society to a Life-Sustaining Society, the 'Great Turning'<sup>254</sup>. Revolutionary change happens systemically in a million ways at once, she proposes, but predominantly in three main ways:

- holding actions that prevent further damage to the biosphere, slowing it down by campaigning to save lives, forests, rivers, ecosystems and protesting against unjust laws
- alternative structures that experiment with new ways of organising that sustain life on Earth and finally
- a global shift of consciousness based on values of connection, empathy and community.

Macy advocates a combination of insight and compassion in how we engage with systemic change, paying attention to the physical, spiritual and emotional energy demanded at any one time. We can engage with direct action one day to protest against arctic oil drilling, teach a community to plant wheat the next, and sleep out beneath stars the next.

Excitement for getting our hands on life and being an agent of change gets inhibited by a culture of commodity, but, like a tide turning, it can be reached for, reclaimed, reinvented, renewed, rediscovered and remembered. The arts have the power to build our resilience and reinvent us: they hold the things we care about, give us moments to begin again from, extend our imagination, collective courage, and intuitive knowledge we're part of a larger whole. The opportunity to play for time is in our hands. The chance to reweave our world is within our imaginative grasp.





Lucy Neal is a writer and theatremaker and was co-founder director of the influential London International Festival of Theatre (1981-2005). Active in the grassroots Transition movement since 2008, she is interested in how celebratory events act as a catalyst for change. Her recently published handbook, *Playing for Time - Making Art as if the World Mattered* reclaims a traditional role for artists in the community as truth-tellers and agents of change. Described as 'a manifesto' 'a work of art' and a 'handbook for life', it joins the dots between the 'macro' stories of energy, food, finance and climate change it explores creativity's role in reimagining new ways of being human on Earth.

**Watch Lucy's recent RSA Lecture 'The Citizen Artist as an Agent of Change':**

<https://www.youtube.com/watch?v=YFFxo-dMsRA>

**Find out more about 'Playing for Time':**

<http://oberonbooks.com/playing-for-time>

[www.lucyneal.co.uk](http://www.lucyneal.co.uk)



*The Edible Garden: the grand entry for a celebratory feast in the East End of London, produced by Phakama. This project features in 'Playing for Time'. Photo by Ayako Tanaka*

# Conclusions

Our initial findings show that there is a wealth of research and insights from a wide range of disciplines on the barriers to achieving a zero carbon future and how we overcome them. It must be said, and it is not unexpected, that there is more clarity and conviction about the barriers than the solutions, but new ideas are increasingly emerging for making it happen. It is also interesting that our initial research is already finding common themes across different disciplines; we briefly summarise these here.

In terms of barriers to action at the speed required, it is clear across many disciplines that the inertia of the status quo – be that in physical, economic, political or social systems or in our mindsets and thinking – is a powerful barrier to change. Current systems are inherently self-reinforcing and are maintained by myriad forces, some deliberate and manipulative, others simply emergent from ‘the way things are’. Powerful vested interests certainly spread misinformation about the seriousness of climate change or the feasibility of solutions, and pervasive advertising constantly reinforces individualistic and materialistic mindsets. However, much of the power of the status quo is the unquestioned framing of issues in line with established norms, which expresses itself, without any deliberate intent, in our thinking, social practices, economics, politics and media.

Another important aspect of the status quo for the average ‘western’ person is how divorced we are from nature and our distance from the impacts of our consumption. This disconnect with nature and the consequences of our lifestyles undermines us psychologically and spiritually, and makes it hard to accept economic arguments that the ‘externalised’ costs of our current systems are a reality.

The consequences of the seeming immovability of the status quo are felt in many ways. These include: psychological responses to fear and sense of futility which lead us to shut away concerns in a mental box marked ‘too hard’; social responses, such as our collective ‘culture of silence’ around climate change or the ‘stealth denial’ of our behaviours not matching our beliefs; economic responses locked in the current paradigm; political responses that assert climate change must be tackled, just not yet or not at the root cause; or a largely uninterested media that claims to simply be reflecting the concerns and priorities of its public. The effect is also self-reinforcing, so that by thinking and convincing ourselves that things cannot change, or that others do not share our concerns and willingness for change, we collectively ensure that change doesn’t happen and we remain locked in a catch-22 situation waiting for others to break the deadlock.

The route out of this impasse seems difficult, but we also know that systemic change has been happening and can continue to grow. Some common themes emerge from our research about what can successfully spur change. A recurring →

theme is the power of collective action and positive examples to provide hope that a different way is both possible and desirable. Perhaps the best examples are those that challenge worldviews and values that are perceived to be ubiquitous, such as individual self-interest or the profit motive, and show that they are, in reality, anything but.

*“Build a narrative that is hopeful, inspiring, and that people can identify with, but which is also really credible”<sup>255</sup>*

Jonathan Rowson of the RSA on creating ‘authentic positivity’

Another common theme is that building a zero carbon future must move beyond being just an environmental issue brought to prominence by those ‘concerned about climate change’. Not only does this limit the numbers calling for change, but it also limits their motivation. The importance of forming coalitions between groups with different priorities, and potentially different values, emerges. This may include those focused on issues as diverse as health, community cohesion, job creation, national security, economic stability, innovation etc. as well as those wanting to protect nature. Such coalitions are not only bigger in number but can also better highlight the many positive and tangible co-benefits of reducing GHG emissions and moving beyond fossil fuels. By framing tackling climate change in terms of positive visions of a better future we may also be able to bypass the wrangling over rights, responsibilities and ‘fair contributions’ to a situation where action is seen as akin to progress and inherently desirable.

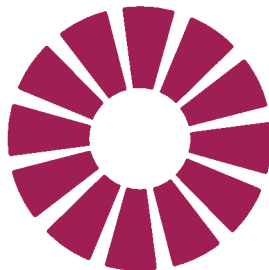
Clearly, we have much more work to do to expand our initial findings. However, we hope that these initial ideas will set people thinking and encourage experts, researchers and practitioners to help us. If you are interested in collaborating with our project, giving insights from your personal or professional perspective please email contributions to [makingithappen@cat.org.uk](mailto:makingithappen@cat.org.uk). ●

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**ZERO  
CARBON**

**MAKING IT  
HAPPEN**