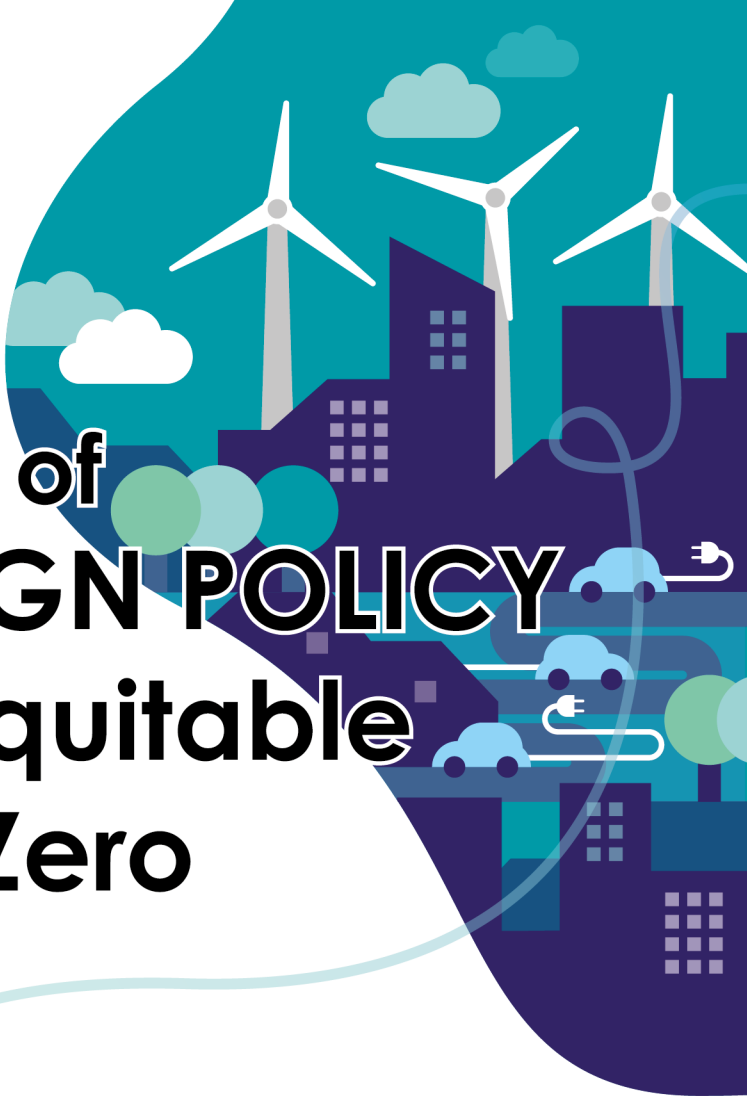
The Little Book of DESIGN POLICY for Equitable Net Zero



Louise Mullagh and Leon Cruickshank

General Editor
Dr Naomi Jacobs
ImaginationLancaster, Lancaster University

Copy Editor
Laura Glover

Designer
Nuri Kwon
ImaginationLancaster, Lancaster University

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Contents

What this Little Book tells you

This Little Book explains what net zero carbon policies are, and why these policies need to ensure that all of society is included in their design. It also includes suggestions for designing equitable net-carbon zero policies.

Introduction

Governments around the world, at national and local levels, are designing policies that enable them to reduce their carbon emissions. Global agreements, such as the 2015 Paris Agreement, which aims to limit global warming to below 1.5 degrees Celsius by the middle of the 21st century, have led to global action and a move towards drastically cutting carbon emissions. 2021 saw global leaders gather for the COP26 summit in Glasgow, where the urgency of this task was emphasised and the UK government took the lead on achieving net zero carbon emissions by 2050 (HM Government, 2021).

Whilst the reduction in carbon emissions will contribute to an improvement in health, through decreasing air pollution and a move towards more active lifestyles and diet (Munro *et al.*, 2020a, 2020b; Milner *et al.*, 2020), it is vital that policies enable all communities to benefit, and that they do not increase inequalities or cause harm to already marginalised communities. Ensuring that net zero policies benefit all is even more important as we begin recovering from Covid-19, which itself highlighted inequalities across different societies and sections of society. The pandemic and climate change have come together to compound inequalities between and within nations (Mattar *et al.*, 2021). It is also important that the move towards net zero is not derailed or postponed as countries work to build back and recover from the pandemic. The transition to a net zero society must include policies that take into account social conditions (Abram and Pegram, 2020).

For those individuals unable to afford changes to support the reduction in carbon emissions, it is vital that policymakers consider how initiatives are equitable. Behaviour change is 'not the solution', rather, structural restraints make it difficult for some communities

to engage in climate change initiatives.

It is imperative that the transition towards net zero carbon emissions does not leave people out and that policies designed in this area do not create greater economic or social hardship for those already struggling in society. This Little Book explores how policy making in this area could include seldom-heard communities in the transition towards net zero and the potential for positive impacts in this area.

What is net zero?

Global warming (climate change) is caused by the level of greenhouse gases in the atmosphere. Net zero refers to achieving a balance between the amount of greenhouse gas emissions produced and the amount removed from the atmosphere. Greenhouse gases include carbon dioxide, methane and nitrous oxide, and they are produced by burning fossil fuels (coal, oil and natural gas). The four highest-emitting sectors are transportation, energy supply (generating electricity from burning fuels such as coal, oil and natural gas), business (commercial use of electricity) and residential (heating homes) (see Figure 1).

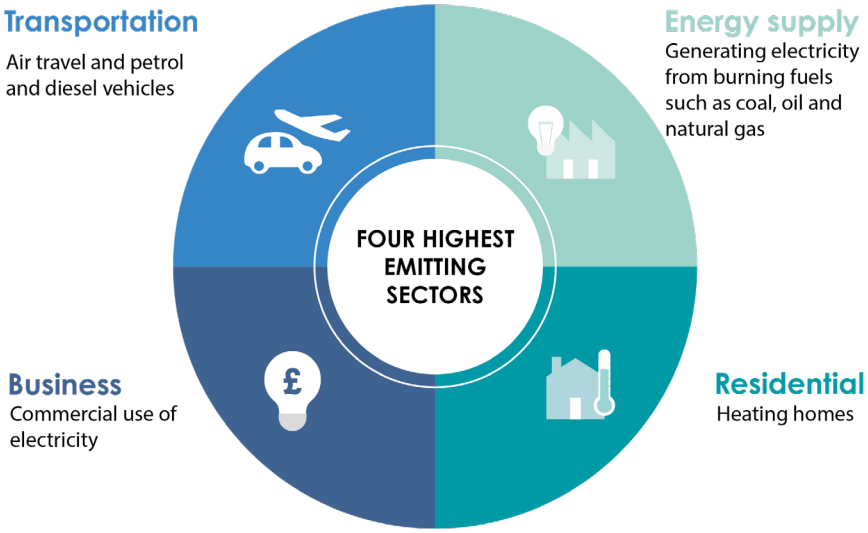

Figure 1. **Four highest emitting sectors**

There are two main ways of reducing greenhouse gases; by lowering the amount sent into the atmosphere (by reducing emissions from activities such as power generation, transportation and intensive agriculture) and by removing them from the atmosphere (such as capturing carbon or planting more trees). Planting trees is a popular method of carbon capture, and has become an option in transportation, for example purchasing an 'offset' when buying a flight. Technologies that help us work towards net zero tend to be expensive and have yet to be deployed at a large scale. However, scientists state that these removals cannot be a substitute for cutting emissions that cause planetary heating (see Figure 2a and 2b).

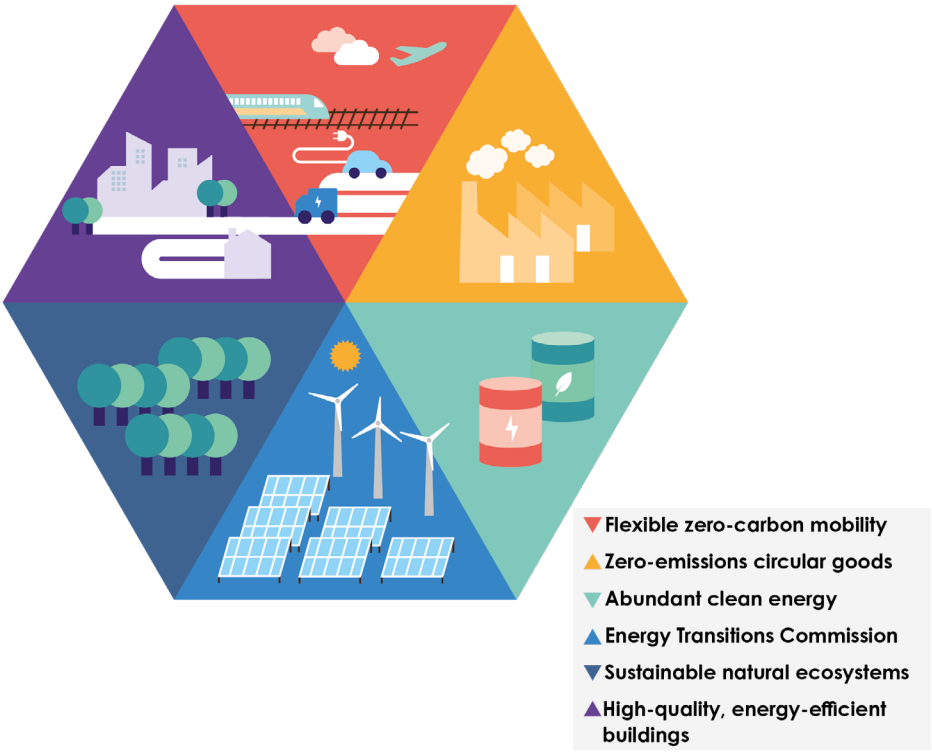

Figure 2a. **A prosperous net zero-emissions economy by mid-century is mission possible[1]**

1 Source: https://www.weforum.org/agenda/2020/11/how-world-get-to-net-zero-carbon/

Flexible zero-carbon mobility

- Zero-carbon logistics chains (ammonia ships, electric trucks)
- Carbon-free long-haul transport
- Mobility-as-a-service: efficienct and convenient shared and public transport
- Digitally connected people

Zero-emissions circular goods

- Materials reuse and recycling/ no more incineration and landfill
- Higher-quality products with longer lifetime and ability to repair
- Industry clusters powered by zero-carbon energy

Abundant clean energy

- Hydrogen ecosystem interconnected with the power sector
- Low emissions fuels from sustainable biomass or synthetic souces

Energy Transitions Commission

- Zero-carbon power generation dominated by renewables

Sustainable natural ecosystems

- Healthier diets, less food waste
- Regenerative agriculture and restored soil health
- Protected biodiversity
- Reforestation and carbon sinks providing carbon offsets for agriculture
- Limited bioenergy supply primarily from waste and residues

High-quality, energy efficient buildings

- Energy-efficient and digitally connected buildings
- Green and walkable cities with clean air
- Shared spaces and appliances

Figure 2b. **A prosperous net zero-emissions economy by mid-century is mission possible[1]**

1 Source: https://www.weforum.org/agenda/2020/11/how-world-get-to-net-zero-carbon/

Around the world, 19 countries and the EU have pledged to reach net zero, with the deadlines ranging between 2030 and 2050. In the UK, the Climate Change Act 2008 committed to an 80% reduction in carbon emissions by 2050 and, in 2019, further laws were passed to increase that target to at least 100% by 2050. The UK has halved their greenhouse gas emissions since 1990 (HM Government, 2021a) and operates 'carbon budgets'.

A policy can be described as an "expression of what society wants" (Picard, 2020, p.5) and is created in response to challenges, problems and the contexts in which they appear. Policies can be frameworks, principles and approaches for tackling the issues and become the basis for regulations, legislation and interventions by governments or organisations. A strategy can be described as the plan of action that enables policy to be carried out and implemented.

Net-zero policies are currently being made at all levels of governance, from global leadership (e.g., United Nations Climate Change Conference), national governments, local authorities and private organisations.

Policies are made by a range of people, including policy advisors, civil servants, Ministers of Government, Members of Parliament and the House of Lords, Chief Scientific Advisors and experts working in external organisations.

In the UK, the plan to reach net zero emissions by 2050 is made up of a range of policies that cover our personal actions and those of various organisations. The UK Government's 'Ten Point Plan for a Green Industrial Revolution' and the 'Net Zero Strategy: Build Back Greener' (HM Government, 2021) are the key overarching policies that will be enacted to reach their targets. The key principles of these policies include working with consumer choice (e.g., not forcing people to rip out their boilers or scrap their cars), ensuring the biggest polluters will pay the most in the transition, supporting the most vulnerable (e.g., through energy bill discounts and efficiency upgrades) and working with businesses to deliver cost reductions

in low carbon technologies. The strategy to reach net zero emissions by 2050 is made up of key policy areas under each of the four principles which enable policymakers and their advisors to work towards achieving them. These key policy areas have been adopted in countries who have committed to zero carbon and are:

- the adoption of renewable energy
- promotion of electric vehicles and
- restoring or planting forests.

Policies for net carbon zero in the UK are also made at a local level, within county, metropolitan and district councils. Around 300 councils have declared a climate emergency (LGA, 2020), meaning that reducing their carbon emissions is placed high on their policy-making agendas. They are doing this through developing policies to ensure that buildings (both commercial and residential), transportation and their own operation move towards being net zero.

How do equity and resilience relate to net zero?

While we know now that it is vital to reduce greenhouse gas emissions to ensure the health of the planet and its inhabitants, it is also vital that the policies designed to this end are fair to all and do not disadvantage those already facing challenges. Understanding and tackling these challenges is known as 'climate justice'. The concept of climate justice highlights the need for considering the impacts of climate change and the policies that are used to tackle it;

> *"only when the safety, social status, and livelihoods of all members of society are assured will voluntary, democratic decisions be possible to reverse climate change and fairly mitigate its effects" (Perkins, 2019).*

Equity

To make sure that net zero policies tackle climate justice, they must be equitable. This means that policy actions and the changing climate will not impact already disadvantaged communities unfairly, and that they are able to react and respond to future crises by building resilience. This is important because some households that are most affected by climate change will have contributed less and are therefore less responsible for its cause than more affluent households (Munro, 2020a; Meikle *et al.*, 2016; Petit, 2004). Globally, low income countries are more susceptible to the damages caused by climate change, and less able to cope with and rebuild after damage from events such as flooding or hurricanes (Nazrul Islam and Winkel, 2017).

Around the world, the need for an equitable transition has been acknowledged, and a range of rameworks, funds and commissions have been established. These include the European Parliament's 'Just Transition Fund' (European Parliament, 2020), the Scottish Government's 'Just Transition Commission' (Scottish Government, 2020) and Just Transition commitments from 46 nations at COP25 in 2019 (ILO, 2015).

The idea of equity relates to ensuring marginalised groups are included in the move towards net zero. Marginalised groups are defined as "[g]roups of people that are not traditionally given equal voice in governance processes. These include, but are not limited to, women, young men and women, low-income communities, ethnic minorities, people with disabilities, the elderly, and sexual and gender identity minorities and migrants" (UN, 2018). These groups are often prevented from fully participating in social, economic and political life.

In addition to coping with financial burdens of rising energy and food prices, marginalised communities face additional challenges in their recovery from the pandemic, which also requires building resilience. As we recover from the Covid-19 pandemic, it is vital

that we remember the context of designing net zero policies and take note of the profound impact that this has had on marginalised communities around the world. The pandemic also showed that communities cope differently with external shocks, and that our changing climate is creating further inequalities that need to be addressed.

Due to the way that the pandemic highlighted existing inequalities, it has been called "the great unequaliser" (Devakumar, Bhopal and Shannon, 2020), with minority groups and communities experiencing higher levels of unemployment, increased exposure to the virus, exclusion from digital services, such as healthcare and education, and a lack of access to green spaces and healthy housing. During the pandemic, services offered to marginalised groups, such as the clinically vulnerable, those suffering from mental health issues, immigrants and people facing poverty closed, creating gaps in government provision (Springer, 2020). In their place grew a network of mutual aid groups such as food clubs and action networks, to offer food, support and connection to those who were isolated.

Resilience

The term 'resilience' comes from the Latin *resilire*, which means to 'spring back' and is often used to describe what communities require, both in recovering from Covid-19 and dealing with future pandemics and becoming resilient to the changing climate. Future pandemics are predicted as the climate changes and we encroach on wild habitats, risking the spread of further zoonotic viruses (Honigsbaum, 2020). These linked crises highlight the need for policies to tackle different and very complex challenges. As we saw during the Covid-19 pandemic, communities came together to help the vulnerable through mutual aid groups, who offered food delivery and assistance with healthcare needs for those who were isolated. This community spirit is central to resilience, but there is also a need to work *with* communities to help them build skills and to provide them with the resources to deal with the recovery, both from the

pandemic and the potential impacts of net zero policies.

We face profound challenges, and crises such as climate change and Covid-19 do not occur in isolation. Communities and individuals who are already facing significant challenges will be impacted by such complex problems, and so it is vital that policies and interventions consider who is benefiting and who is not in the design. It is also important that seldom-heard communities are able to be resilient and resourceful in order to cope with future crises.

How are net zero policies inequitable?

There is a need for net zero policies to make sure the levels are reduced in line with governments' ambitious targets, while protecting lower income households and marginalised communities from unfair financial burdens. It is essential that the benefits of moving towards this new way of living, including savings on energy and transport, are shared amongst all. It is also vital that the costs of investing in decreasing carbon emissions, particularly as the world recovers financially from Covid-19, do not derail efforts.

In the past, focus has been placed upon changing the behaviour of individuals, through encouraging pro-environmental behaviours such as insulating homes, consuming less meat and dairy, and using single use plastics. However, there is also a need to consider the structural aspects of net zero policies, and where it is the responsibility of government and/or businesses to change their operations to become net zero. Low income households already face significant challenges in heating their homes and travelling and feeding themselves, without the added pressure to adopt climate-friendly behaviours.

There is a recognition that net zero policies must be equitable and sustainable (Munro *et al.*, 2020b), and that a range of options should be considered by policymakers, that reach across communities and organisations (IPPR, 2021). Three types of inequality have been identified (Nazrul Islam and Winkel, 2017):

- demographic (gender, race, religion, age)
- assets and income
- public decision-making and access to public resources, such as health, education, financing and other services.

All three types of inequality should be addressed when designing policies to make them equitable.

In addition, three key areas have been identified as key contributors to carbon emissions, and are also areas where policies risk being less equitable for low-income households and seldom heard communities. These are housing and energy, transportation and food production, and consumption.

Housing and energy

This area cuts across two key areas of net zero policy, that of moving away from fossil fuels and towards renewable energy for domestic and business buildings, and the issues resulting from buildings that are not energy efficient and therefore waste energy. Both of these areas impact significantly on equity for the following reasons:

- those on low incomes pay a higher proportion of their income on heating their homes
- heating homes is becoming more expensive due to rapidly increasing prices and poor energy efficiency
- those on low incomes do not have the money to invest in the technologies that will reduce their carbon emissions
- the lifestyles of higher income households need nearly five times more energy than the lowest income households (Owen & Barrett, 2020).

One of the key sectors that can contribute to net zero is housing, through the reduction of demand for energy by improving energy efficiency in homes. The UK's homes contribute 14% of the UK's greenhouse gas emissions (EJC, 2021). The key causes of inefficient homes are leakage of air, poor insulation, old and inefficient windows and inefficient heating systems, which run on fossil fuels.

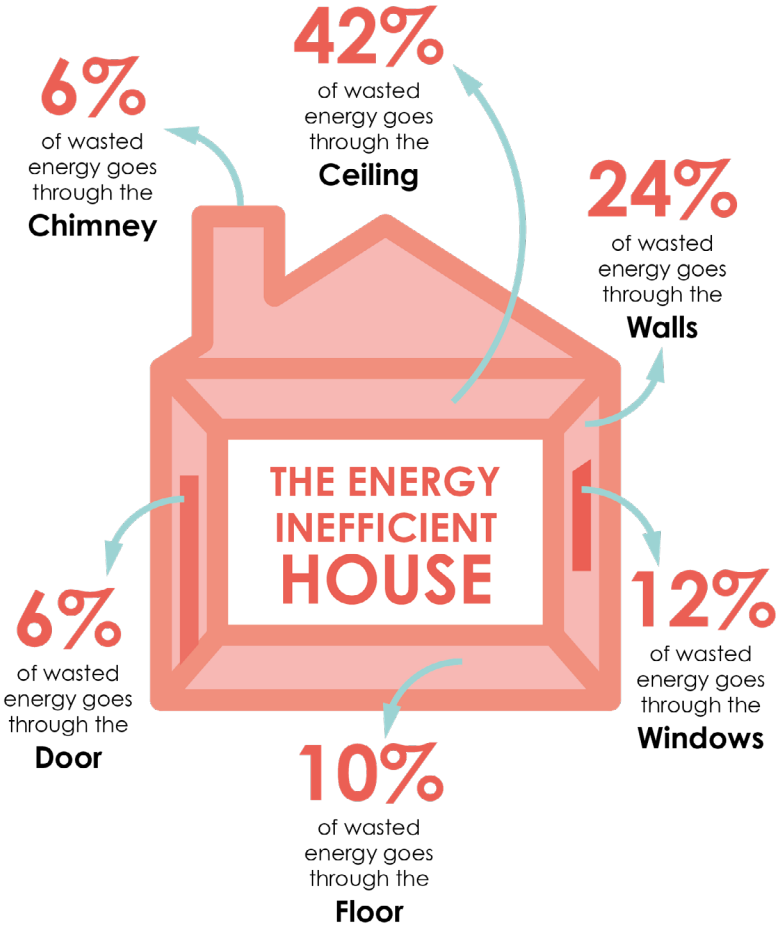

Figure 3. **The energy inefficient house**[1]

1 Source: http://www.brushstrips.co.uk/keep-heating-bills-affordable/

In 2050, the year the UK government has pledged to achieve net zero, 80% of the UK housing stock will already be built. This means that all methods of reducing the carbon emissions from housing will have to be retro-fitted. The debate around the use of heat pumps in houses highlights the structural challenges in this area, with the cost of installing energy-saving measures being too high for those suffering from fuel poverty (Harvey, 2022). Support for poorer households in this area does exist, through the increase of benefit payments and wider support for the installation of viable and affordable new technologies, such as heat pumps.

One of the key areas where carbon emissions can be reduced is through heating of buildings by changing fuel sources away from fossil intensive power, and through ensuring buildings are well insulated. However, an important issue to consider in this move towards net zero is the impact upon energy equity. This is described as ensuring "the consequences of the energy system reach beyond the environmental into economic and social spheres, and acknowledging the importance of the distribution of energy systems as well as costs" (Baker *et al.*, 2021).

People on lower incomes spend a higher proportion of their income on energy, and are often tied into pre-payment meters, where tariffs tend to be more expensive. The lowest income households spend 10% of income on heating and power, where the highest income households spend 1.5% (Owen and Barrett, 2020). They also face issues relating to poorly insulated homes, which drive up energy costs and increase carbon emissions. These issues have been highlighted recently due to the 'energy crisis' around the world, which has seen unprecedented price rises and a sharp increase in fuel poverty (NEA, 2021). The rising costs for low-income households are exacerbated by the burden of the transition towards renewable energy being placed on those who can least afford it. The cost of low-carbon policies including subsidising renewable energy, retrofitting houses with energy efficient measures and installing smart

meters adds 13% to fuel bills (Owen and Barrett, 2020). Whilst it is vital that renewable energy becomes the norm and we rely less on fossil fuels, it is also important that policies take account of and tackle this inequity in fuel pricing.

Those living in rented accommodation are limited in the steps they are able to take to improve the energy efficiency of their homes and have less scope for reducing their energy consumption (Haar, 2020). Standards such as the Passivhaus (Passivhaus Trust, n.d.) aim to reduce heat loss from buildings, so that the energy requirements for heating are reduced to almost none. Instead, passive sources such as the sun, the household occupants and appliances can produce the heat. Guidance for more low-cost and achievable fixes, or 'house hacks' such as dealing with draughts and other small interventions, however, are needed to enable those on lower incomes to decrease their heating bills and improve household energy efficiency.

Transportation

The move towards electric powered vehicles and restricting traffic through urban environments are two of the key policies being implemented by governments around the world. In the UK, all new cars and vans will have to be zero emission by 2030, ending all sales of new petrol and diesel cars. Policies are exploring 'active travel', using bicycles or walking, which will not only improve health levels, but also bring down carbon emissions.

Whilst these policies will have positive benefits in reducing carbon emissions, they also potentially disadvantage those people who rely upon private cars to travel, and who are unable to afford more efficient, or indeed electric vehicles. The infrastructure surrounding this move towards electric powered vehicles also disadvantages those who are unable to afford low emission vehicles.

The drive towards electric vehicle ownership would help those living in cities, where low-income households face the worst effects of air pollution (Verbeek and Hincks, 2022). However, one of the

largest barriers to electric vehicle ownership is affordability. More than half of electric vehicle owners are in the top 20% of earners, with only 4% of owners being from the two lowest income brackets (Osei Bonsu, 2021). Grants to purchase electric vehicles have been made available by the UK government, which can make them more affordable. However, access to charging points is problematic, particularly in houses that are located directly on a street where owners are unable to use their own energy supply to charge the vehicle (Mullen and Marsden, 2016). High-income households are 50% more likely to have a garage or off-street parking which will make it cheaper to charge their cars. Pressure on households to use their own energy sources to charge their vehicles is also problematic, since the cost of this in the future is unknown (*ibid*.). New legislation is being implemented by the UK government for all new homes and buildings, as well as those undergoing significant renovation, to have charging points from 2022 (UK Government, 2021). The issue of access to infrastructure, as with the issues in improving energy efficiency in homes, further highlights the disparity between those who rent properties, and those who can make retro-fitting adjustments to move towards net zero. These issues are structural, meaning that, whilst behaviour change at an individual level is vital in helping societies move towards net zero, there are limits as to what individuals can do themselves.

Active travel, which is the use of cycling or walking, is seen as key in the move towards net zero. During the Covid-19 pandemic, active travel schemes were rolled out around the country to take pressure off public transport systems and enable people to be outdoors more (Mullagh *et al.*, 2022). During this time, there was a large increase in active travel, as well as the use of public transport (Munro *et al.*, 2020b). Those living in deprived areas are already more likely to walk (Olsen *et al.*, 2021). To encourage more active travel, there needs to be significant improvement in infrastructure, for both walking and cycling (Sustrans, 2021; Gouais *et al.*, 2021).

When designing policies, it is important to balance the reduction of carbon and the increase in air quality for those living in the most affected areas, with recognising that buying low emission vehicles is not possible for all, therefore costing them more in fees to enter cities in their cars (for example the Ultra Low Emission Zone for London) (Verbeek & Hincks, 2022). For those on zero-hour contracts, or with uncertain working patterns, owning a car is a necessity. Many people without access to a car find job opportunities scarcer (Lucas

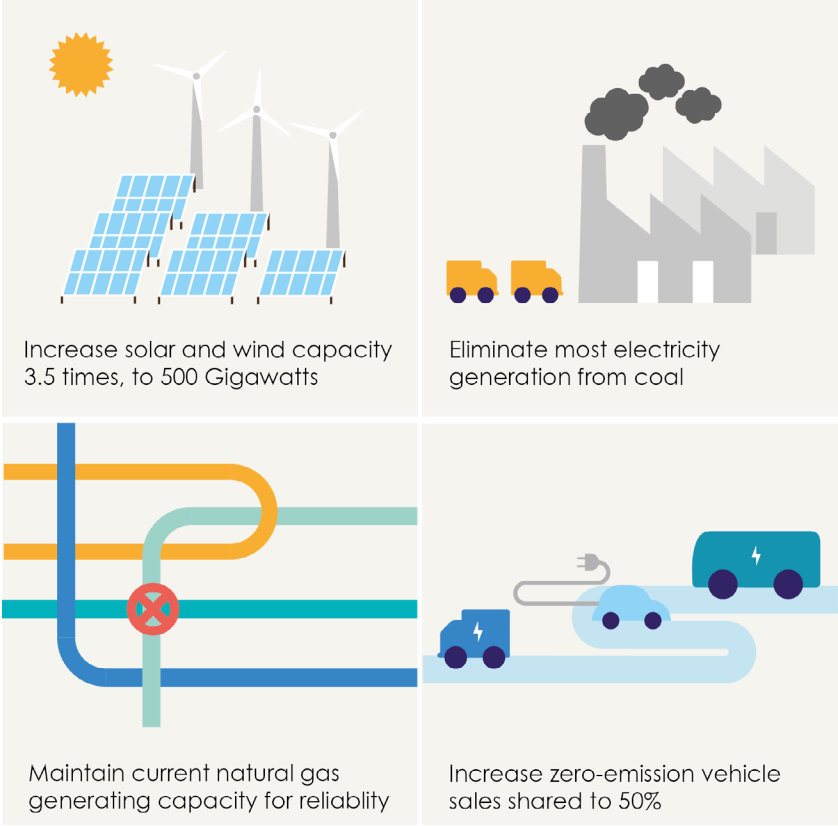

Figure 4a. **Getting to net zero carbon emissions by 2050, 8 actions needed by 2023[1]**

1 Source: https://newscenter.lbl.gov/2021/01/27/getting-to-net-zero-and-even-net-negative-is-surprisingly-feasible-and-affordable/

et al., 2019; DEMAND, 2015). Lack of access to private cars can also negatively affect access to training and education opportunities, and access to healthcare (Lucas *et al.*, 2019). To compound these issues, lack of equitable access to public transport leads to forced car ownership, even where this is expensive (Sustrans, 2012). This is often worse in rural locations, where the cost is higher (Crisp *et al.*, 2017).

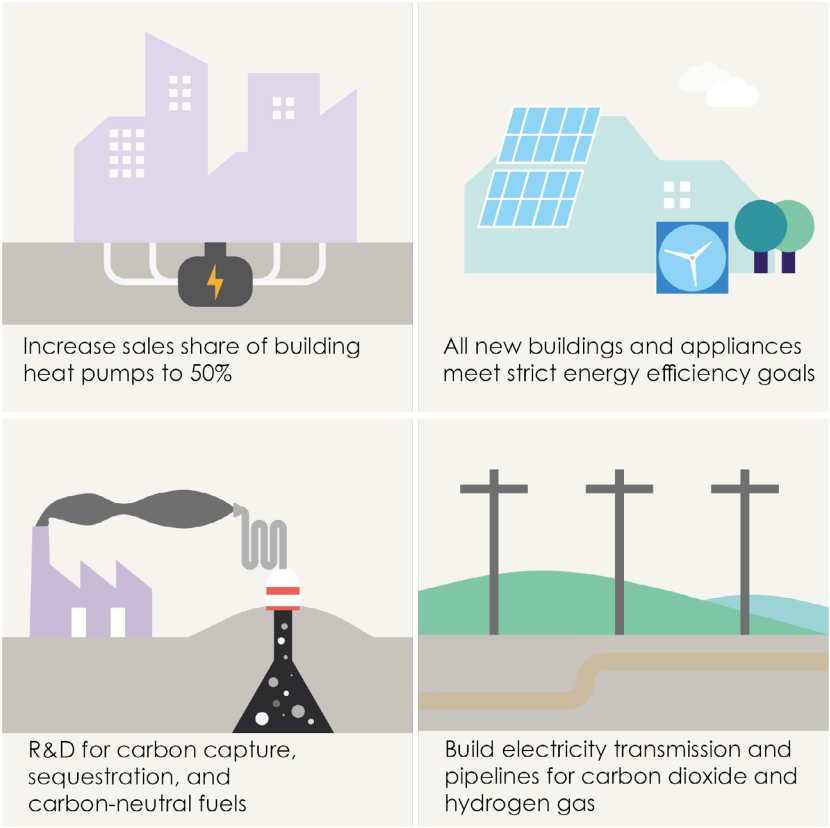

***Figure 4b.* Getting to net zero carbon emissions by 2050, 8 actions needed by 2023**[1]

1 Source: https://newscenter.lbl.gov/2021/01/27/getting-to-net-zero-and-even-net-negative-is-surprisingly-feasible-and-affordable/

Food

By 2050, the year the UK government has pledged to become net zero, there will be nearly 10 billion people living on the planet. The production of enough food to feed the population, while making sure we reduce carbon emissions, is a vast and complicated challenge. The IPCC (Intergovernmental Panel on Climate Change, 2018) found that 20% of human-produced carbon emissions are linked to agriculture and food production. This is mostly due to the increase in demand for meat and dairy products, caused by increased wealth around the world (Garvey *et al.*, 2021).

In the UK, land is used mainly for farming, such as animal grazing and growing crops, with only smaller pockets of land being left wild or for planting trees. Food security is important to consider as the climate changes. We will face issues with flooding, which affects crops produced by farms, and issues related to extreme heat and water shortages. The UK currently imports 46% of its food (Munro *et al.*, 2020b). A reliance on importing food, such as fruit and vegetables, from countries that also face changes in climate, such as water scarcity, is also a risk to the UK's food supply. This risk might also make food prices higher, making food poverty an even larger issue. To tackle these issues, it has been suggested that we look to produce more food in the UK, with locally produced and seasonal fruit and vegetables. However, these tend to cost more and are out of reach for low income households. Farmers in the UK face mounting challenges, not only to work towards lowering their own carbon emissions, but also in providing enough food and allowing for the impact of potential moves towards diets that feature less meat and dairy.

The way in which food is produced, consumed, transported and disposed of contributes to overall carbon emissions, and we must rethink how these systems work. It is also recognised that moving towards more plant-based, less carbon intensive diets, can have big impacts on carbon emissions (Munro *et al.*, 2020b). If half of the

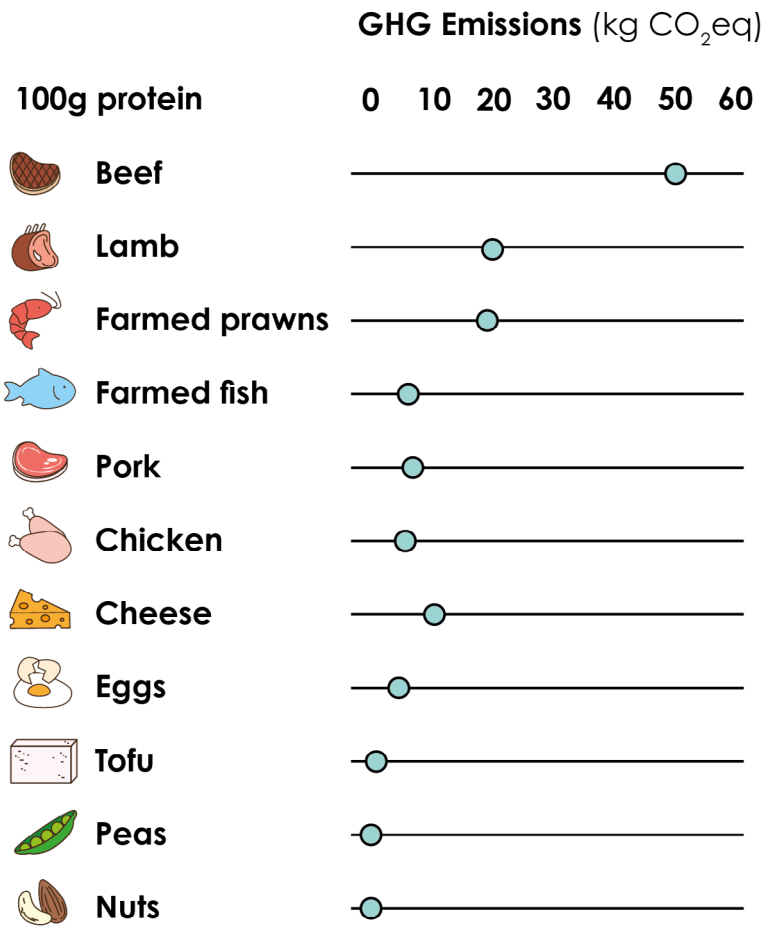

Figure 5. **Kilograms of greenhouse gas emissions of food**[1]

UK consumption of meat and dairy was replaced with vegetables, fruit and cereals, food related greenhouse gases would be reduced by 19% and premature deaths from cardiovascular disease and cancer could be avoided each year (*ibid.*). Benefits that reduce carbon emissions while increasing benefits in other areas such as health and prosperity are called 'co-benefits'. These co-benefits

1 Source: Poore and Nemecek (2018).

are similar to those we see in housing and transportation, where a decrease in greenhouse gases, and therefore carbon emissions, lead to an increase in health benefits. However, this makes designing policies more complex and highlights the need for governments to work with a wide range of organisations and communities. As with housing, energy and transportation, policy makers must think carefully about how those on low incomes might be affected by any structural changes to food systems. Changing diets is a difficult and challenging area in which to design policies, as our choice of diets is thought to be a fundamental human right (Garvey *et al.*, 2022). Policy discussions around food are also challenging as we move out of the Covid-19 pandemic, where the use of foodbanks in the UK has risen to even higher levels than before, due to increased levels of food poverty.

Attempting to tackle the health of the population, whilst decreasing carbon emissions, is a hard task, particularly in balancing the need for affordable and nutritious food for those on low incomes. Ultra-processed foods, which contain high calories, are frequently cheaper (Vandevijvere *et al.*, 2020) and low carbon (Garvey *et al.*, 2022). However, they are often of little nutritional value. These issues are structural, in that it is the structures in place, including the current economy and availability of food, that has a large impact. It is argued that "the focus ... should be on access to healthy food choices via a systemic approach that tackles the high cost of living and low incomes for many households" (IPPR, 2021).

Policy interventions to tackle carbon emissions and improve population health might include labelling and certificates, to show the impact of food, levies (or taxes) on unhealthy or carbon intensive food, or subsidies for healthier and/or less carbon intensive products. Governments might also introduce 'nudges', or interventions that make it easier for people to make healthier/more environmentally conscious decisions. However, this approach should consider people's ability to act within tight financial constraints.

The three areas covered here are not the only areas that are important in the move towards net zero. The future of work is also high on the agenda of policy making, as the move away from fossil fuels and towards green energy (such as wind and solar power) will mean huge changes in the workforce. As seen with the demise of coal mining in the UK, the changing of industry will have impacts on people's jobs and the economy. While there is a huge opportunity for green jobs, this requires a significant change in training and skills in key areas.

Designing equitable and resilient net zero policies

As the three key areas of housing and energy, transportation, and food highlight, those on low incomes are often negatively affected by policies that tackle net zero emissions. Working towards net zero will bring about changes to our environment but will also potentially benefit health as well. For example, improved air quality in urban areas, and a better protected natural environment. It is essential that cross-organisational thinking and policy design is promoted, as Baxter (2021) states: “Fighting climate change and helping people on lower incomes should not be seen as competing aims”.

One approach that that could enable equitable net zero policies is design for policy. The use of design in policy-making has emerged in recent years as an approach that can help governments at all scales to work with citizens. Design does not only relate to the design of new products but can be used in the creation of new services and,

more recently, in the creation of new policies. It can be used to help policy makers envision alternative futures and outcomes of policies, using a range of creative methods. Design also has a long history of research that works within power structures and hierarchies, for example, participatory design (Simonsen, *et al.*, 2012), human centred design (Norman, 1986), co-design (Sanders & Stappers, 2008) and open design (Cruickshank, 2014). These approaches all seek, in different ways, to achieve a balance between 'bottom up' and 'top down' approaches, which are set aside in favour of designing *with* communities.

Design for policy uses a range of design methods to gather evidence and create policies *with* communities and governments at all scales (Bason, 2014; Siodmok, 2014). This approach can potentially build bridges between communities and governments that enable marginalised groups to thrive. One key method used in design for policy is the gathering of evidence by capturing the lived experiences of those who the policy might affect (Siodmok, 2020). Using design in policy making can also help to identify and work with the wide range of stakeholders who need to be involved in net zero policies, and help to visualise networks and connections.

Examples of design for net zero policies

While using design methods in policy making is an area of growth, there have not been many examples of it being used in designing for net zero. We talk about design in terms of creating new technologies and systems or buildings for net zero, but more work is to be done in designing the policies that have a profound impact upon the societal move towards net zero.

The UK Design Council, who advise the government on all matters of design and how it can contribute to society, recently released a report, 'Beyond Net Zero: A Systemic Design Approach' (2021), which is a call to arms in the use of design in net zero initiatives. The report includes a Systemic Design Framework, which aims to support

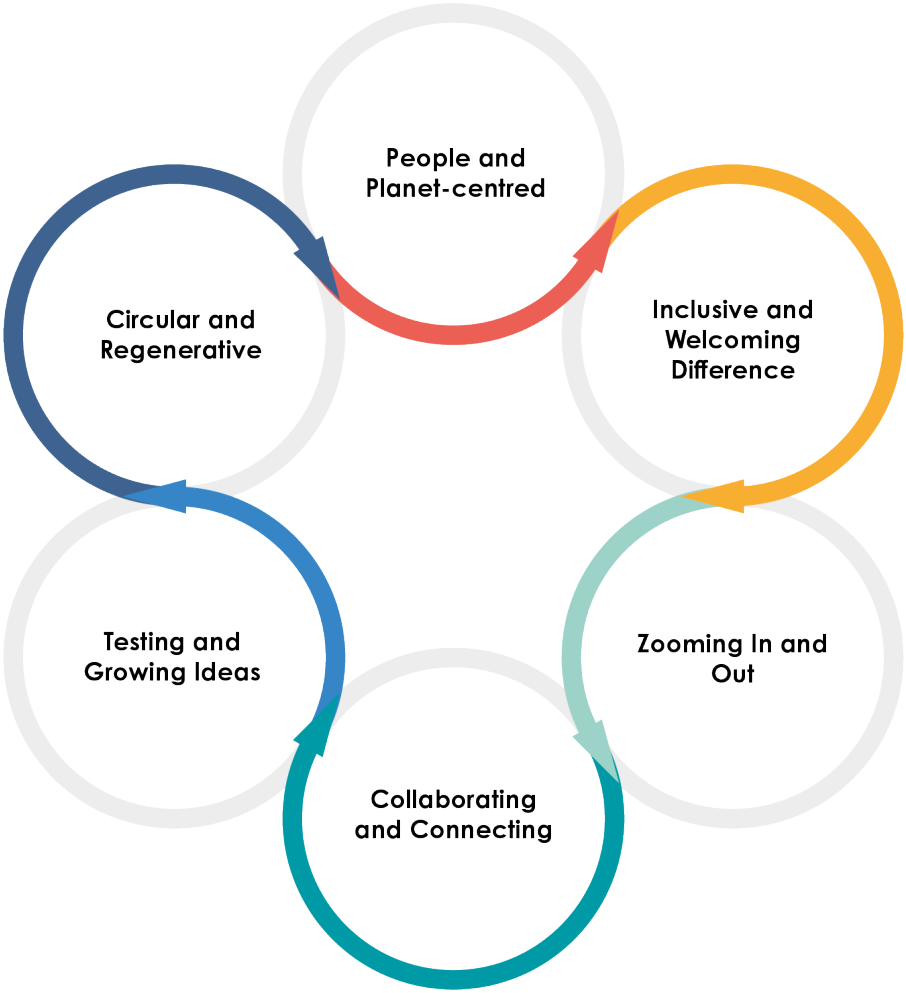

Figure 6. The Design Council's Systemic Design Framework

designers and commissioners who are working towards net zero solutions (see Figure 6).

The six principles shown in the framework and elaborated on below provide guidance for designers and offer tools for helping net zero design projects.

People and planet centred: focusing on the shared benefits of all living things.

Zooming in and out: from the micro to macro. From root cause to hopeful vision, from the present to the future, from the personal to the wider system.

Testing and growing ideas: making things to see how they work and helping more things emerge.

Inclusive and welcoming difference: creating safe, shared spaces and language to bring in multiple and marginalised perspectives.

Collaborating and connecting: seeing a project as one element in a wider movement for change.

Circular and regenerative: focus on existing assets – physical and social – and how we can re-use, nurture and grow these.

Even though the Design Council's framework does not apply solely to policy making, it offers a starting point for designers and policy makers to think about the key areas that should be considered when designing policies across contexts such as housing and energy use, transportation, and food supply and consumption.

The Policy Lab, a team dedicated to design in policy embedded in the UK government, have been working on design tools to inform climate policy at a national level. The Design Council held a festival, 'Design for Planet', during the COP26 conference, where they explored how design methods might be used in climate policy and took a 'learning through doing' approach (Miller and Buchanan, 2021). In the first session, using co-design, they used handmade policy canvases to "help participants develop their ideas, and origami polar bears … crafted from discarded buffet cart bags" that enabled the workshop participants to reflect mindfully through physical interactions. These objects launched conversations and created shared understandings, which could be valuable in creating policies that engage *with* communities.

The second session held at the 'Design for Planet' workshop explored

how system maps might be useful in opening up and visualising complex processes of policy making, particularly in the context of climate change and net zero policy. The mapping of a system helps to visualise a system, identify unintended consequences of a given policy, locate reinforcing loops and vicious circles in a policy cycle, reveal critical nodes in the system and identify gaps for new policies (Bennett, 2022). Thinking in terms of a systems approach in the move towards net zero is very useful, as this area is very complex and involves a vast array of stakeholders and communities.

An example of design being used specifically for net zero policy is currently being carried out by the authors of this Little Book. Working with our local district council, we are exploring how design methods (e.g., co-design, speculative design, participatory design) can be used to engage with a wide range of stakeholders in the design of the district's net zero buildings policy. This project not only seeks to understand how design can inform the creation of policy, but how the policy itself can be designed, so that it signposts action and support, as well as offering more regulatory policies and guidance (e.g., to private landlords on reduction of energy bills).

A manifesto

We are now recognising that, in order to ensure a fair, equitable and resilient move towards net zero, it is important for governments and organisations to design policies that ensure nobody is disadvantaged. There are clear co-benefits to be gained from working towards a net zero society, including a reduction in air pollution and improved health, ensuring homes are warmer and more comfortable, improved access to active travel and public transport and healthier and more sustainable food and eating practices.

Many charitable and research organisations have produced reports that offer ways forward in the move towards net zero, offering guiding principles and guidelines (IPPR, 2021). What these guidelines share is a call for governments and organisations to work *with* communities, particularly those who are seldom heard and on lower incomes, to make sure their voices are heard. Building in the experience of people who live with poverty and challenges is called 'lived experience' and it can help policy makers to understand how policies might affect people, both positively and negatively.

A recent report, 'Sustainable Health Equity: Achieving a Net Zero UK' (Munro, 2020b), published by the Institute of Health Equity, included the following key strategy recommendations:

- support a just energy transition that minimises air pollution from all sources
- design and retrofit homes to be energy efficient, climate resilient and healthy
- build a sustainable, resilient and healthy food system
- develop a transport system that promotes active travel and road safety, and which minimises pollution
- develop healthy and sustainable models of work.

These strategy recommendations are vital in ensuring that policies do not harm communities, and ensures that the co-benefits of moving towards net zero are achieved. However, these complex issues will require work across many organisations to ensure actions are designed to benefit all.

For these actions to be effective, governments at national, regional and local levels need to work with other agencies, including health organisations and anti-poverty groups. Policies need to enable communities to have an equal voice in decision making (IPPR, 2021).

Conclusion

The key challenges in designing net zero policies that are beneficial to society and the environment will be transforming policies into action and bringing about structural change. This will include tackling the issues related to housing and energy, the production and consumption of food and transportation, and the future of work, amongst other issues. This could be achieved by:

- Including communities in decision making, rather than consulting them on policy decisions that have already been made.
- Exploring how small acts as well as big ones can help towards decreasing energy bills and usage, e.g., 'home hacking', low energy cooking.
- Ensuring there is more joined up thinking across government departments and across anti-poverty organisations.
- Making sure that changes are not forced upon low-income households and marginalised communities.
- The provision of useful and appropriate information and advice in areas such as housing and energy, transportation and food. Policies can be designed that encourage a wide range of communities and include stakeholders such as private landlords.

There is still much to do in ensuring that net zero policies bring about benefits for society as well as the environment, but conversations are ongoing, and organisations are beginning to understand and explore how this might be done. The future is challenging, but there is cause to be hopeful.

References

Abram, S., Pegram, T. (2020). Net-zero carbon emissions won't be sustainable if social inequalities aren't addressed, UCL Global Governance Institute Blog. URL: https://www.ucl.ac.uk/global-governance/news/2020/oct/net-zero-carbon-emissions-wont-be-sustainable-if-social-inequalities-arent-addressed. (Accessed 8th April 2022)

Baker, E., Goldstein, A.P.; Azevedo, I.M.L. (2021). A perspective on equity implications of net zero energy systems, Energy and Climate Change, Vol.2. URL: https://www.sciencedirect.com/science/article/pii/S2666278721000246. (Accessed 8th April 2022)

Bason, C. (2014). Introduction: The Design for Policy Nexus, in Bason (2014) *Design for Policy*, pp.1–8, Farnham: Gower Publishing.

Baxter, D. (2021). Net zero: A just transition is necessary, and is key for maintaining public support, Joseph Rowntree Foundation. URL: https://www.jrf.org.uk/blog/net-zero-just-transition-necessary-and-key-maintaining-public-support. (Accessed 8th April 2022)

Bennet, S. (2022). Tools for climate policy: 2) systems mapping, Policy Lab Blog, URL: https://openpolicy.blog.gov.uk/2022/01/24/tools-for-climate-policy-2-systems-mapping/. (Accessed 8th April 2022)

Crisp, R., Gore, T., McCarthy, L. (2017). Addressing transport barriers to work in low income neighbourhoods: a review of evidence and practice. Report prepared by Sheffield Hallam University URL: https://www.shu.ac.uk/centre-regional-economic-social-research/publications/addressing-transport-barriers-to-work-in-low-income-neighbourhoods. (Accessed 8th April 2022)

Cruickshank, L. (2014). *Open Design and Innovation: Facilitating Creativity in Everyone*. Ashgate Publishing Limited.

DEMAND (2015). *Research Insight 14 Precarity in Housing and Employment: A hidden dimension of car dependency*. URL: www.demand.ac.uk/wp-content/uploads/2015/11/demand-insight-14final.pdf. (Accessed 8th April 2022)

Devakumar, D., Bhopal, S. S., Shannon, G. (2020). COVID-19: the great unequaliser. *Journal of the Royal Society of Medicine*, 113(6), 234–235. DOI: https://doi.org/10.1177%2F0141076820925434

European Parliament (2020). *Just transition in EU regions: support to people, economy and environment*. Press release URL: www.europarl.europa.eu/news/en/press-room/20200703IPR82625/just-transition-in-eu-regions-support-to-people-economy-and-environment. (Accessed 8th April 2022)

Garvey, A., Norman, J.B., Owen, A., Barrett, J. (2021). Towards net zero nutrition: The contribution of demand-side change to mitigating UK food emissions, Journal of Cleaner Production, Vol.290. URL: https://www.sciencedirect.com/science/article/pii/S0959652620357188?via%3Dihub. (Accessed 8th April 2022)

Garvey, A., Norman, J.B., Barrett, J. (2022) Reducing the UK's food footprint: Demand-side action for more palatable food emissions, URL: https://www.creds.ac.uk/publications/reducing-the-uks-food-footprint-demand-side-action-for-more-palatable-food-emissions/. (Accessed 8th April 2022)

Haar, L. (2020). An empirical analysis of the fiscal incidence of renewable energy support in the European Union, Energy Policy, Vol.143. URL: https://www.sciencedirect.com/science/article/pii/S0301421520302317?dgcid=author. (Accessed 8th April 2022)

Harvey, F. (2022). UK must spend on home insulation and heat pumps, ministers told, URL: https://www.theguardian.com/business/2022/mar/15/uk-must-spend-on-home-insulation-and-heat-pumps-ministers-told. (Accessed 8th April 2022)

HM Government (2021). *Net Zero Strategy: Build Back Greener*, London, HM Government.

Honigsbaum, M. (2020). *The Pandemic Century: A History of Global Contagion from the Spanish Flu to COVID-19*, London: WH. Allen.

International Labour Organisation (ILO). (2015). *Guidelines for a just transition towards environmentally sustainable economies and societies for all*, Switzerland.

IPCC. (2014). *Climate Change 2014: Impacts, Adaptation and Vulnerability*, New York: Cambridge University Press.

IPCC. (2022). Summary for Policymakers (Pörtner,H. O.; Roberts, D.C.; Poloczanska, E.S.; Mintenbeck, K. ; Tignor, M. ; Alegra, A.; Craig, M. ; Langsdorf S.; Löschke, S.; Möller, V.; Okem, A. (eds.). In: *Climate Change 2022: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge University Press. Pörtner,H. O.; Roberts, D.C.; Poloczanska, E.S.; Mintenbeck, K. ; Tignor, M. ; Alegra, A; Craig, M. ; Langsdorf S.; Löschke, S.; Möller, V.; Okem, A. (eds.). In Press.

IPPR. (2021). *Delivering an equitable net zero transition: Workshop series summary*, IPPR, the Joseph Rowntree Foundation and the Zero Carbon Campaign.

LGA (Local Government Association). (2020). Climate Change Survey, URL: https://www.local.gov.uk/publications/climate-change-survey-february-2020. (Accessed 8th April 2022)

Lucas, K., Stokes, G., Bastiaanssen, J., Burkinshaw, J. (2019). *Inequalities in Mobility and Access in the UK Transport System*, Foresight Future of Mobility Report, Government Office for Science, London.

Mattar, S.D., Tahseen, J., Schröder, P., Ahmad, Z. (2021). Climate justice: priorities for equitable recovery from the pandemic, *Climate Policy*, 1307–1317, DOI: https://doi.org/10.1080/14693062.2021.1976095.

Meikle, M.; Wilson, J.; Jafry, T. (2016). Climate Justice: Between mammon and mother earth, *International Journal of Climate Change Strategies and Management*, 8(4), 488–504.

Miller, B., Buchanan, C. (2021). Tools for Climate Policy: 1) co-design in parallel to COP26, Policy Lab Blog URL: https://openpolicy.blog.gov.uk/2021/12/16/tools-for-climate-policy-1-co-design-in-parallel-to-cop26/. (Accessed 8th April 2022)

Milner, J., Hamilton, I., Woodcock, J., Williams, M., Davies, M., Wilkinson, P., Haines, A. (2020). Health benefits of policies to reduce carbon emissions, *BMJ* 2020;368:l6758.

Mullagh, L., Jacobs, N., Cooper, R., Kwon, N. (2021). Design strategies for future governance in emergencies: *A case study, Paper presented at International Research Society for Public Management*.

Mullen, C., Marsden, G. (2016). Mobility Justice in low carbon energy transitions. *Energy Research and Social Science*, 18. pp.109–117.

Munro, A., Boyce, T., Marmot, M. (2020a). Sustainable Health Equity: achieving a net-zero UK, The Lancet Planetary Health, Vol.4, December 2020. URL: https://www.thelancet.com/action/showPdf?pii=S2542-5196%2820%2930270-9. (Accessed 8th April 2022)

Munro, A., Boyce, T., Marmot, M. (2020b). Health Equity: Achieving a net-zero UK, Advisory Group Report for the UK Committee on Climate Change, London. URL: https://www.instituteofhealthequity.org/resources-reports/sustainable-health-equity-achieving-a-net-zero-uk/main-report.pdf. (Accessed 8th April 2022)

Nazrul Islam, S., Winkel, J. (2017). *Climate Change and Social Inequality*, DESA Working Paper No. 152, Department of Economic and Social Affairs.

NEA Action for Warm Homes. (2021). Supporting Vulnerable energy customers, Policy Briefing URL: https://www.nea.org.uk/wp-content/uploads/2022/01/NEA-policy-briefing-supporting-vulnerable-energy-customers-this-winter-updated-260122.

pdf. (Accessed 8th April 2022).Norman, D. A. (1986). *User-Centered System Design: New Perspectives on Human-Computer Interaction*.

Olsen, J., Mitchell, R., Mutrie, N., Foley, L., Ogilvie, D. (2017). Population levels of, and inequalities in, active travel: A national, cross-sectional study of adults in Scotland, *Preventative Medicine Reports*, Vol.8, pp.129–134.

Osei Bonsu, N. (2021). Why the government is morally obliged to help low-income people buy electric vehicles, Birmingham Business School Blog. URL: https://blog.bham.ac.uk/business-school/2021/06/10/why-the-government-is-morally-obliged-to-help-low-income-people-buy-electric-vehicles/. (Accessed 8th April 2022)

Owen, A., Barrett, J. (2020). Reducing inequality resulting from UK low-carbon policy, *Climate Policy*, DOI: https://doi.org/10.1080/14693062.2020.1773754.

Passivhaus Trust (n.d). *What is Passivhaus?* URL: https://www.passivhaustrust.org.uk/what_is_passivhaus.php. (Accessed 8th April 2022)

Perkins, P.E. (2019). Climate justice, commons, and degrowth, *Ecological Economics*, Vol.160, pp.183–190.

Poore, J., Nemecek, T., 2018. Reducing food's environmental impacts through producers and consumers. Science, 360(6392), pp.987–992.

Sanders, E., Stappers, P. (2008) Co creation and the new landscapes of design, *Co-Design*, 4(1) pp.5–18.

Scottish Government. (2020). Just Transition Commission, URL: https://www.gov.scot/groups/just-transition-commission/. (Accessed 8th April 2022)

Simonsen, J., Robertson, T. (2012). Challenges and Opportunities in Contemporary Participatory Design, *Design Issues* 28(3): 3–9. DOI: https://doi.org/10.1162/DESI_a_00157.

Siodmok, A. (2014). Tools for Insight: Design Research for Policymaking. *Design for Policy*. C. Bason. Farnham, Surrey: Gower Publishing Ltd, 191–200.

Siodmok, A. (2020). Lab Long Read: Human-centred policy? Blending 'big data' and 'thick data' in national policy, Policy Lab Blog, URL: https://openpolicy.blog.gov.uk/2020/01/17/lab-long-read-human-centred-policy-blending-big-data-and-thick-data-in-national-policy/. (Accessed 8th April 2022)

Springer, S. (2020). Caring geographies: The COVID-19 interregnum and a return to mutual aid. Dialogues in Human Geography, 10(2), 112–115. DOI: https://doi.org/10.1177%2F2043820620931277.

Sustrans. (2021). Safe walking and infrastructure reduces health inequalities, URL: https://www.sustrans.org.uk/our-blog/opinion/2021/january/safe-walking-and-cycling-infrastructure-reduces-health-inequalities. (Accessed 8th April 2022)

UK Government. (2022). PM to announce electric vehicle revolution. URL: https://www.gov.uk/government/news/pm-to-announce-electric-vehicle-revolution. (Accessed 8th April 2022)

Vandevijvere, S., Pedroni, C., De Ridder, K., Castetbon, K. (2020), The cost of diets according to their caloric share of ultraprocessed and minimally processed foods in Belgium. *Nutrients*, 12(9). DOI: https://doi.org/10.3390/nu12092787.

Verbeek, T., Hincks, S. (2022). The 'just' management of urban air pollution? A geospatial analysis of low emission zones in Brussels and London, Applied Geography, Vol.140. URL: https://www.sciencedirect.com/science/article/pii/S0143622822000133. (Accessed 8th April 2022)

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