



## Call to action on energy demand

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# Call to action on energy demand

## Introduction

We need to change the way energy is used. The UK has been a leader on delivering climate change legislation but has been slow to act on energy demand reduction and the associated co-benefits<sup>1</sup>. In this report, we show that embracing energy demand reduction is a necessary part of the UK's Net Zero strategy. We also set out how the Energy Demand Research Centre (EDRC) will advance thinking on how to deliver the change needed in energy demand in buildings, transport and industry, while improving people's lives and economic wellbeing.

## The need for action on energy demand: Limiting climate change impacts

### The UK has a legal duty to become a Net Zero society by 2050

The UK must reach the goal of 'net zero' greenhouse gas (GHG) emissions by 2050, meaning that most GHG emissions must stop with any remaining emissions removed from the atmosphere<sup>2</sup>. This requires action across all areas of policy by national and local governments. For example, Scotland has a Net Zero emissions target of 2045<sup>3</sup>, and over 300 local authorities have declared climate emergencies<sup>4</sup>. Furthermore, the Climate Change Committee (CCC) estimates that "*local authorities have powers or influence over roughly a third of emissions in their local areas*"<sup>5</sup>.

### Taking early action is critical to reduce cumulative emissions

Globally, we need to reduce cumulative GHG emissions. There is widespread scientific consensus around the harmful impacts of climate change, the desire to achieve a 1.5°C limit to global warming, and the need for urgent emissions reduction<sup>6</sup>. Energy demand reduction measures can enable early and sustained emissions reductions, and reduce cumulative emissions. This is why the UK Government has committed to reduce GHG emissions by at least 68% by 2030 and 78% by 2035 (compared to 1990)<sup>7</sup>. There is a need to act with urgency to achieve this goal in a timely way.

### The UK is currently not on track to meet its climate targets

In July 2023, the CCC estimated that 43% of the Government's plans for emission reduction had either significant delivery risk or they were 'insufficient'<sup>8</sup>. The Prime Minister later announced in September 2023 a

change in priorities on how to approach Net Zero<sup>9</sup>, putting less emphasis on demand side measures. The CCC commented that “*ruling out demand-side measures in a range of areas... reduces the available options to reduce emissions, increasing overall delivery risks. It also removes some important flexibility in the way that future targets can be met*”<sup>10</sup>.

### The vital contribution of energy demand

Energy demand reduction is necessary to achieve the UK’s near-term ambitions of emissions reductions of 68% by 2030 and 78% by 2035. Previous research shows that by taking actions that drive energy efficiency while embracing broader social changes<sup>11</sup>, the UK could reduce energy demand between 2020 and 2035 by as much as 37%<sup>12</sup>. The same research also suggests that different policy approaches could reduce the amount of energy that society needs by around 50% by 2050 (just 5% reduction is likely with current “implemented” policies). Thus, we need more action on energy demand, which has not received as strong a policy focus as energy supply<sup>13</sup>.

## The benefits of action on energy demand: A better and fairer society

Tackling climate change is an opportunity for a major rethink about how blending technological and behavioural changes together can achieve a better and fairer society. Reducing energy demand is an opportunity for new investment in different sectors across the economy, bringing a range of co-benefits and social progress.

### A smaller energy system which is cheaper to build...



The system that supplies our electricity and heat via different fuels needs to be transformed to decarbonise the wider economy so that we can achieve climate targets. This is a significant challenge requiring new technologies and new infrastructure built in a short period of time. Lower energy demand scenarios which have a smaller energy system help to moderate this challenge. Previous research<sup>14</sup> suggests that the overall investment requirements in low carbon infrastructure and technologies can be reduced by up to 40% if we reduce our energy demand, making the transition more affordable. Reducing energy use also means it can be easier to rely on key technologies like heat pumps that are more efficient and cheaper to run than current fossil fuel alternatives.

### ...and more flexible

The Net Zero transition entails phasing out direct use of fossil fuels for service provision through electrification. This alone will enhance efficiency, resulting in potential reductions of up to 40% in final energy demand. Moving to a fully flexible energy system has the potential to deliver material net savings of between £9.6 billion and £16.7 billion per annum by 2050 and help reduce carbon emissions by up to 10 million tonnes per year<sup>15</sup>. In addition to the financial and environmental benefits, energy demand flexibility provides other system-wide benefits such as increased grid reliability and reduced need for additional generation capacity.



#### Increased energy security by reduced reliance on energy imports

If we reduce energy demand, we can reduce the amount of energy supplied to meet that demand, and thereby improve security of supply by reducing the need for imports of energy. For example, £76.6bn was spent in May 2021 to April 2022 on fuel imports (almost entirely fossil fuels)<sup>16</sup>. Volatility in global gas prices, following economic recovery from COVID and restricted gas supply from Russia, has impacted on gas and electricity prices in the UK. Reduced energy demand, when combined with the use of renewable energy sources, can further improve energy security and reduce the UK's exposure to global fossil fuel markets<sup>17</sup>.



#### More affordable and healthier lifestyles

Investing in Net Zero and energy demand solutions has the potential to lower energy bills, which can improve welfare outcomes and stimulate economic growth<sup>18</sup>. An estimated 6.3 million UK households are in fuel poverty<sup>19</sup>, having to choose between eating, heating, and travelling<sup>20</sup>. This has impacts on education, job prospects, and health, with damp homes increasing the risk of heart attacks, strokes and asthma<sup>21</sup>. Retrofitting homes and buildings to be more energy efficient, combined with a social tariff provision for the most vulnerable<sup>22</sup>, can reduce energy bills without risking underheating of homes. Citizens Advice estimates that upgrading 13 million energy inefficient homes could prevent 670,000 children from developing asthma<sup>23</sup>. The Department for Transport estimates that investing £2bn in active travel to switch people out of cars could contribute to between £20m and £100m of air quality benefits and help tackle the £1bn of costs caused to the NHS due to physical inactivity<sup>24</sup>.





### Innovative solutions that work for people and business

Using cleaner forms of energy and using energy differently creates innovation opportunities. For example, retrofitting and the energy efficiency gains it enables has demonstrated positive economic benefits, fostering job creation and bolstering the economy<sup>25,26</sup>. The roll out of smart meters and increasing adoption of electric vehicles create opportunities for vehicles to act as energy stores and smart charge outside of peak hours. Finally, National Grid ESO launched a Demand Flexibility Service in winter 2022<sup>27</sup>, marking an unprecedented opportunity for households to engage directly in demand-side response activities. The entire energy system can therefore be cheaper to build and operate. The UK can be at the forefront of such innovations.



## EDRC's action on energy demand: Creating an agenda for change

As we have set out, energy demand reduction is a critical part of the progress to Net Zero, and there are many opportunities for co-benefits to people, society and the economy. EDRC's programme of research aims to accelerate the integration of energy demand into policy design and delivery, to enable transformative solutions. Our work is organised into five themes to make the most of energy demand reduction opportunities.



### Futures: Understanding the transition to low energy futures

In our work on Futures, we want to find and articulate the essential conditions required for the UK to transition to a low energy future. This means assessing different policies, infrastructure, services, and public engagement. To understand and listen to citizens' views, we have a Citizens' Panel providing vital social intelligence on the social mandate for demand-side measures. By bringing together citizen panellists and technical experts, we want to understand what conditions are needed and what are the expected roles of citizens, governments, businesses, and other actors alike in the energy transition. We take the following action:

- Develop and test different options as to what a low energy future may look like, including mobility, shelter, nutrition and materials and products.

- Identify what change would be required at a societal level to achieve low energy futures, with views from the Citizens' Panel.
- Provide evidence on the conditions that are essential in moving to low energy futures. This includes considering different regions in the UK and what the costs, flexibility and resilience implications for a net-zero emission energy system would be.



### **Flexibility: Measuring, unlocking and harnessing demand-side flexibility**

Our work on Flexibility explores the solutions by which we can use demand-side flexibility effectively and fairly. Demand-side flexibility is increasingly seen as a solution to mitigating peaks associated with the electrification of heating and transport, making the most of renewables and reducing energy bills. We will assess the needs, impacts and implications of such solutions, and develop new methods and tools. Our work will:

- Increase the visibility of demand-side flexibility at different scales (e.g. household, building, and gridlevels) and propose metrics such as the Demand Flexibility Certificate<sup>28</sup>.
- Understand how different sectors of the economy, such as residential, commercial, industrial and transportation, engage in and potentially benefit from demand-side flexibility services.
- Identify how the capacity and willingness to provide demand-side flexibility can be widened in an equitable manner, to lessen existing disadvantages and prevent future ones from developing.



### **Place: Developing place-based action on energy demand**

Different places have different start points and opportunities for change. Early research suggests that taking a place-based approach to the Net Zero Transition could be done at just over one-quarter of the cost and release twice as many benefits to citizens as a top-down approach<sup>29</sup>. However, to realise a place-based approach requires developing new tools and methods which consider whole

system impacts while allowing places to be active participants in the Net Zero transition. In our work on Place, we will:

- Explore the role of different delivery models and social actors in influencing the uptake of retrofit solutions.
- Examine skills gaps for the uptake of new energy demand solutions in different places and the potential for creating new educational and economic opportunities.
- Understand the different strategies that different places may need to have, to tackle the barriers that communities have in changing demand patterns or switching technologies across transport, housing and industry.
- Enable local areas to understand, access and use the data and tools that are available to affect change with their communities, businesses and politicians<sup>30</sup>.



### **Governance: Embedding action on energy demand in governance**

Good governance is critically important to achieving the energy demand reductions in a socially equitable way. For example, the benefits of home insulation and energy efficiency as well as solutions that enable consumers to flex their energy demand need to be available to everyone. The changes required are in themselves demanding and need a more transparent way of decision making. In our Governance work, we work across EDRC to make energy demand reduction governable, and will:

- Identify innovative approaches to governance that can support policy practitioners and communities to take effective energy demand action.
- Examine how transparency in policy-making and inclusion in decision-making can enable citizens to participate the Net Zero journey.
- Explore whether more collaborative and transparent decisions around innovation and social change can help to make energy demand solutions politically more feasible.
- Assess co-benefits for energy demand reduction and incorporate this into decision-making processes.





## Equity: Delivering an affordable, clean and more equitable energy system

Different energy demand solutions have the potential to help deliver an affordable, clean and more equitable Net Zero transition and energy system. The design and delivery of these solutions, however, need to consider equity and fairness, to provide an opportunity to improve everyone's quality of life. It is vital to ensure that for example people who are vulnerable, have limited financial resources or face systematic disadvantage are not excluded in a transition to a low energy future. Therefore, we will:

- Identify what the main equity challenges are in how people need and want to use energy and how best to measure progress on key challenges such as reducing fuel and transport poverty.
- Explore how different energy demand and governance solutions may impact different individuals, households, communities and regions, as measured by poverty and other metrics such as the cost-of-living and the real value of wage and other incomes.
- Ensure that all potential energy demand solutions are investigated and assessed in how they impact people across different quality-of-life measures, including for example health, job and employment quality, real incomes and the cost of living, and how these interact with specific issues such as fuel and transport poverty.
- Inform the design and development of energy demand reductions in ways that account for both the extent to which emissions will be reduced and the equity and justice dimensions of affordability impacts and required lifestyle changes.

## Summary

Across our cross-sectoral work, the Energy Demand Research Centre (EDRC) is committed to a bold programme of internationally leading research which informs and inspires energy demand reductions as a key part of the transition to Net Zero. We want to hear from, and work with, organisations and businesses to ensure that we help to build the social mandate for change in energy use, by providing the evidence, tools and insights necessary to make that change a reality.

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## About EDRC

The Energy Demand Research Centre (EDRC) undertakes research for an affordable and secure low energy future. Our interdisciplinary research programme identifies evidence-based energy demand reductions for a sustainable and more equitable future. We work closely with partners from policy, industry, civil society and academia.

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