



Net Zero Review: call for evidence

27 October 2022

CREDS responds to consultations and calls for evidence from government, agencies and businesses, providing insight and expertise to decision-makers.

This response was created for an independent review, commissioned by the Secretary of State for Business, Energy and Industrial Strategy, of the [government's approach to delivering its net zero target](#). The consultation ran from 29 September-27 October 2022.

The consultation response was written on behalf of CREDS by Professor Nick Eyre (University of Oxford, Director of CREDS).

The consultation response, as submitted, is below. CREDS responded to consultation questions 1, 3, 4 and 6.

CREDS Consultation 34

The Centre for Research into Energy Demand Solutions (CREDS) was established as part of the UK Research and Innovation's Energy Programme in April 2018. Its mission is to make the UK a leader in understanding the changes in energy demand needed for the transition to a secure and affordable, zero carbon energy system. CREDS has a team of over 100 people based at 22 UK universities and has published more than 200 papers, on which this synthesis is based.

Our answers to the questions focus on the amount and ways that energy is used in the UK. The answers draw on CREDS research and we would be happy to share more details with the Review team.

Q1. How does net zero enable us to meet our economic growth target of 2.5% a year?

Economic growth is driven by increased productivity. Most forms of productivity (e.g. labour productivity) therefore increase economic activity, energy use and carbon emissions. Only energy efficiency (energy productivity) contributes to both economic growth and reduced emissions. Energy efficiency therefore plays a critical role in delivering net zero goals in an economically beneficial way.

Demand side investment tends to generate economic activity that has a high propensity to create jobs locally and within the UK (Nieto et al, 2021). For example, energy efficient retrofit of buildings makes a larger contribution than new build to GDP, income and jobs (Nieto et al, 2020). Energy efficiency programmes in buildings and industrial policies can therefore support post-pandemic recovery (Dicks et al, 2021). Well-designed energy efficiency programmes can support skills and retraining initiatives for a net-zero economy, e.g. by re-training of gas installers (Killip, 2020). Digitalisation will continue to make a major contribution to increasing economic growth as well as the potential to improve energy efficiency significantly (Fouquet and Hippe, 2022).

Q3. What opportunities are there for new/amended measures to stimulate or facilitate the transition to net zero in a way that is pro-growth and/or pro-business?

It is well-documented that UK public policy on energy saving is not adequate to deliver climate goals. Previous CREDS analysis has shown that energy saving policies have been seriously weakened over the last decade (Eyre and Killip, 2019) and need to be strengthened to deliver climate goals (Barrett et al., 2021; Barrett et al., 2022). Efficiency improvements have stalled

in conventionally-fuelled vehicles, new building standards that would cut energy consumption have been delayed, and energy supplier obligations, local authority funding and energy advice services have all been cut.

Critically for those affected by the affordability crisis, levels of energy efficiency retrofits for homes have been severely cut, meaning that future increased activity needs to be expanded hugely to lower bills, reduce carbon emissions and to support new jobs.

This decade of weakened policy has put the UK in a worse position to respond to the crisis than we would have been in with a more consistent approach to energy saving. Looking forwards, the Government's Net Zero Strategy (HMG, 2021) still assumes that policy should not seek to change energy demand. In the context of the current affordability and security crises, this seems highly unrealistic (Eyre and Oreszczyn, 2022).

More recent policy announcements have shown some tentative steps in the direction of more support for energy efficiency. The 2022 financial Spring Statement included decisions to remove VAT on energy saving materials for 5 years (HMT, 2022). The energy security strategy announced a a £30M Heat Pump Investment Accelerator Competition and energy advice services for consumers and SMEs (HMG, 2022). Subsequently, Government has announced the fourth round of the Energy Company Obligation (ECO₄) targeted on energy efficiency investment in low-income households. This will spend an estimated £1 billion annually for 4 years and reduce fuel bills by a notional (i.e. before rebound) £220 million annually by 2026 (BEIS, 2021).

The new measures to support increased energy efficiency are therefore helpful, but, alone, will not significantly change energy efficiency investment. The levels of investment in ECO₄ are slightly increased from ECO₃, but still below the levels required under energy supplier obligation before 2013. The projected savings are much lower than a decade ago, due to the measures being more capital intensive. Energy savings from the 4-year programme of ECO₄ will be approximately 3% of the total fuel bills for targeted households and 0.3% of all household energy.

The most fundamental problem with recent policy lies not in detailed policy design, but in the underlying philosophy to energy efficiency improvement. The Government's approach to energy efficiency in its energy security strategy is non-interventionist, stating that: "this is not being imposed on people and is a gradual transition following the grain of behaviour. The British people are no-nonsense pragmatists who can make decisions based on the information" (HMG, 2022). However, this is not a viable policy for public goods, such as climate protection and energy security. Neither net zero emissions nor better energy security can be realised by relying solely on individual decisions; collective action is also needed and has to be Government led.

Q4. What more could government do to support businesses, consumers and other actors to decarbonise?

Deploying better technology will be important to saving energy and to systems change more generally, but people are critical, especially to change at the point of energy use. Changing service demands implies change lifestyles; and changing technology requires active support. People need to be supportive and/or engaged in various aspects of the transition: as energy users, as citizens and as decision-makers in the wide range of production and services that constitute the transition. And Government can play a critical role in supporting that.

Shifts in consumer purchases are necessary for transitions in vehicles and home heating. And consumer practices are heterogeneous, which implies that changes can increase or decrease energy use. However, energy is usually not the most important driver of choice, for example most users of smart technologies consider convenience, security and time savings to be more important (Sovacool et al, 2021a). Active travel reduces energy use, but affordable, reliable, green, healthy travel and reducing congestion are stronger drivers for local action (Brand, 2021).

Generalised information about demand-reducing options alone is insufficient to drive most changes. People face decisions that are specific to their own lives, homes and travel. Personalized information can help and smart meters can assist in providing this, but they are a facilitator rather than a driver of change (Sovacool et al, 2021b). Government can assist by supporting the provision of bespoke energy advice, i.e., guidance specific to personal circumstances is needed, particularly for vulnerable households, in the face of rapid change and more complex technology options (Eyre and Oreszczyn, 2022). The domestic energy saving advice service proposed for England and Wales in the energy security strategy appears to have been launched with no accompanying public-facing publicity campaign. This is a major missed opportunity, particularly as it could offer important advice during the current heating season. The advice service is focused on home heating energy use, but could be extended to inform consumers about making energy efficient choices in other areas of energy consumption. Crucially, no support for local energy advice in England, of the type that existed before 2013, has yet been announced.

Some 'pro-environmental' consumer behaviours, such as recycling, are now well-established and based on ideas about social responsibility. But these are not universal with respect to energy saving, where some options challenge dominant narratives, for example about cars and mobility (Hopkins and Brand, 2021) and comfort and heating (Sovacool et al, 2020). Government can help by offering support for novel new, low-carbon business models, for example prosumer-centred energy business models as an alternative to energy as a commodity purchase (Hiteva and Foxon, 2021). And reconceptualising energy as a provider of

services (Fell, 2021) allows extension of the range of business solutions, for example positioning the fashion industry as a provider of warmer clothes (Morley, 2018).

Voluntary change within existing frameworks will be insufficient; nudges are not sufficient. Even though personal circumstances differ, behaviour change is largely an outcome of investment in sustainable infrastructure, stronger regulation and economic incentives, not an easy alternative to them (Eyre and Fawcett, 2020).

People play a wider role in energy systems as citizens. CREDS researchers have been active in providing information in Citizens' Assemblies on climate change at national and local levels (Barrett, 2020). Our experience is that, when faced with the decision choices implied by climate concerns, people are willing to consider and support change, both as users and service providers. Wider use of citizens' assemblies can build consensus for action by governments, businesses and individuals.

The energy transition has profound implications for new types and skills of jobs in the economy. Most 'just transition' attention is focussed on the move away from unsustainable supply sectors (e.g. oil extraction), as whole industries disappear. But there will be more significant changes within other sectors, as investment and operations move towards compatibility with zero-carbon goals. In particular, across the construction sector, improving skills will require higher levels of accreditation and professionalisation. The sector currently operates in a low-skills equilibrium which makes it difficult to produce low-energy buildings or retrofit to the depth and quality needed (Killip et al, 2021).

Q6. How should we balance our priorities to maintaining energy security with our commitments to delivering net zero by 2050?

Reducing energy demand combines the benefits of lower emissions with a reduced reliance on imported energy. Reducing the UK's overall energy demand should be at the heart of a fair, affordable and healthy route to net-zero carbon emissions. UK final energy use could be halved by 2050, whilst improving energy security, enhancing quality of life, and reducing the risks and costs associated with carbon dioxide removal. This would reduce UK per capita energy use from its current level of 89 GJ/year (2.8 kW) to 40 GJ/year (1.3 kW) (Barrett et al, 2021), which is well below the current global average of 55 GJ/year (1.7 kW) (Barrett et al, 2022).

Techniques for improving energy efficiency are well-established. They have historically played the largest role in reducing UK emissions, although the rate of improvement has declined in the last decade due to weaker policies (Lees and Eyre, 2021), as set out in our response to Q3.

The scale of the net-zero challenge should not be underestimated. Fundamental changes in energy demand will be required and Government can provide leadership, certainty and direction for citizens, public bodies and business. We will need to reduce demand, move to using zero-carbon energy sources, use energy with greater flexibility and address the drivers of energy intensive activities (Eyre and Killip, 2019). Fortunately, doing this will also enhance the UK's energy security.

Energy use is driven by the demand for energy services in other systems of provision – notably for mobility (transport), materials (industry), shelter and comfort (buildings) and nutrition (food). Changes in these systems are therefore critical to changing energy demand and critical to UK decarbonisation goals. Historically systems have evolved in such a way that energy service demand have risen, but many of these trends have moderated and can be reversed (Barrett et al, 2021).

Energy demand can be significantly reduced in all the main energy-using sectors, although sectors differ their potential for energy demand reduction. This is likely to provide new business opportunities in zero-carbon products and services. Transport has the highest potential for demand reduction, by combining shifts towards more active travel and public transport modes with a move to high-efficiency electric vehicles. In buildings, the main potential lies in reducing heat demand through high-efficiency heat pumps and improved building fabric. In industry, there is less potential for improved energy efficiency at the point of use, but a larger potential for demand reduction through improved material efficiency (Barrett et al, 2021).

Over the period of the energy transition, there will be changes to the services we want from energy due to broader societal and technological changes, as well as climate change drivers. Digital technologies have the potential to enable large energy savings, for example through e-commerce and home-working reducing overall travel. There is some indication that this has happened during the pandemic (Anable et al, 2022), although evidence for significant net savings from analysis of historical data is not conclusive (Hook et al, 2020; Caldorola and Sorrell, 2022). New business models based around the 'sharing economy' in principle have significant energy saving potential. However, digital technologies are now significant energy users themselves (Williams et al, 2022) and can have large rebound effects, so that some may lead to a net increase in energy consumption (Sorrell, 2020). Future savings will therefore depend on specific policy interventions to shape the uses of digitalisation.

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