APPGI and ICE Green Paper: What are the public behavioural changes required to meet net zero?

October 2023

Executive summary

The UK is committed to reaching net zero greenhouse gas emissions by 2050.

Future societal norms and behaviours will significantly impact how emissions are reduced, but they are also highly uncertain.

Some changes affecting the public in the net zero transition will be decided nationally by the government, for example, different energy mixes. However, many solutions will require personal choices, which can be influenced directly or indirectly with the right policies.

Therefore, the All-Party Parliamentary Group on Infrastructure (APPGI) and the Institution of Civil Engineers (ICE) are launching this Green Paper consultation to gather evidence and views on the changes required in public behaviour to achieve a net zero infrastructure system.

The consultation will also focus on what a public engagement strategy should look like, what is currently holding back change, and how these changes can best be delivered.

We are seeking to hear from infrastructure professionals, civil engineers, environmental groups, and other interested stakeholders regarding the following key questions:

- **What are the gaps and challenges in public engagement and net zero?**

- **What previous interventions on behavioural change generally have been successful? Can lessons be drawn from them?**

- **How can the net zero transition be made fair (i.e. with an equitable distribution of related costs and benefits) for all parts of society?**

- **What is preventing the public from making net-zero-aligned choices? What can incentivise the public to make net-zero-aligned choices?**

- **What lessons can be learned from other countries on public behaviour and net zero?**

- **In addition to government action, what else can be done to encourage public behavioural change to meet net zero?**

The consultation will close on **15 December 2023.**

The findings from responses to this paper, alongside further evidence gathering, will be formed into a policy paper with recommendations which will be published in early 2024.

Background

Public behaviour influences the pace and direction of economic change and will affect every sector of importance for the net zero transition to some degree. However, public behaviour is dependent on policy decisions.

In its advice to the UK government for the sixth Carbon Budget,[1] the Climate Change Committee (CCC) estimated that over 65% of emissions reductions to 2035 alone must involve some form of public choice. Additionally, the Mission Zero review by Chris Skidmore MP estimated that nearly half the policies in the Net Zero Strategy rely on individual action.[2][3]

This can include consumers buying or using new technology; adjustments made only to habits and lifestyles, and changes involving a mixture of the two. Many changes needed for net zero have upfront investment costs. However, demand-reduction measures instigated by public behavioural change may fully or partially offset these.

Currently, there is wide variation in people's willingness to change their behaviour as a contribution to meeting net zero. The recent debate around the Ultra Low Emission Zone (ULEZ) in London building up to and since the July 2023 Uxbridge and South Ruislip by-election, stemmed from public antipathy towards the introduction of ULEZ and being forced to upgrade older vehicles to ULEZ-compliant ones. This topic has since dictated the conversation around behavioural change and a sentiment that 'watered down' green policies could translate into popular support from voters. There is also a key concern around cost and who will pay for net zero.

Broadly, opinion polls have shown that rising concern over climate change does not always translate into support for policies to encourage changes that would reduce emissions. The public also has strong views on whether governments should decide on solutions or allow space for personal choice.

Moreover, the UK government's initial Net Zero Strategy included a section on empowering the public to make green choices, though demand-side policies were largely absent. The updated Net Zero Strategy in March 2023 did not outline details on a net zero public engagement strategy, as called for by Skidmore and the CCC, but promises that more detail will be set out in the coming months.

Public engagement and net zero: the story so far

In October 2022, the House of Lords Environment and Climate Change Committee warned that the government's current approach to enabling behavioural change was 'seriously inadequate' and would result in the UK failing to meet its net zero and environment targets.[4] There is no public engagement strategy for net zero, despite the fact that the target is enshrined in law.

The committee published a report entitled, 'In our Hands: Behaviour Change for Climate and Environmental Goals.' This report drew on an assessment by the CCC, which suggested that without changes to people's behaviours now, the 2050

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[1] Climate Change Committee (2020) Sixth Carbon Budget
[2] The Department for Energy Security and Net Zero and the Department for Business Energy and Industrial Strategy (2023) Mission Zero: Independent Review of Net Zero
[3] The Department for Energy Security and Net Zero and the Department for Business Energy and Industrial Strategy (2022) Net Zero Strategy
[4] Environment and Climate Change Committee (2022) In our hands: behaviour change for climate and environmental goals

net zero target was not achievable. Drawing on this assessment, the committee identified that 32% of emissions reductions up to 2035 required decisions by individuals and households to adopt low carbon technologies and choose low-carbon products and services, as well as reduce carbon-intensive consumption.

The committee also found that while the government had introduced some policies aimed at helping people to adopt new technologies, like electric cars, this had yet to be replicated in other areas where there were gaps in terms of rhetoric and action in changing public behaviour.

It also noted a reluctance by the government to help people cut carbon-intensive consumption and that there had been too much reliance on as yet undeveloped technologies. In addition, it argued that polling showed that the public was ready for leadership from the government in this area.

The National Infrastructure Commission (NIC) also identified in the recent Second National Infrastructure Assessment (NIA) that public behavioural change should be supported in a way that is 'fair and affordable'.[5] There was also a focus on prioritising transport infrastructure contributing to net zero targets in place of fossil fuels and new road building projects, for example. Suggested recommendations to support public behavioural change included:

- traffic management measures to support public transport
- reduction in the amount of water used by individuals through smart technology such as water meters and education campaigns to help consumers understand their water consumption
- tools and incentives to reduce or reschedule energy usage at times of peak demand.

Changes in the direction of travel on the road to net zero

Prime Minister Rishi Sunak confirmed a 'new approach' to net zero from the UK government under his leadership in September 2023.

While no changes to current emissions targets were announced, the Prime Minister confirmed that:

- the deadline for ending the sale of new petrol and diesel cars will shift from 2030 to 2035
- landlords would no longer be required to meet energy-efficiency targets on rented properties
- the gas boiler phase-out target for 2035 has been reduced from 100% to 80%.

The ICE has set out that the government needs to establish its public engagement strategy and outline what work will get done to ensure the existing carbon budgets are met.[6] This includes what detail and long-term certainty will sit behind these new public-facing schemes to support behavioural change.

Between 1990 and 2021, the UK cut emissions by 48%, decarbonising faster than any other G7 country and was also the first G7 country to sign net zero greenhouse gas emissions by 2050 into law.[7]

However, progress in certain areas relating to the net zero transition has been slow. For example, less than 10% of UK SMEs currently attempt to measure their carbon emissions.[8] Other countries are also moving ahead of the UK regarding R&D spending, with recent data from the IPPR (Institute for Public Policy Research) showing that the UK's share of global R&D investment has fallen by a fifth since 2014.[9] There is also a danger of an investment gap known as the 'valley of

[5] National Infrastructure Commission (2023) The Second National Infrastructure Assessment
[6] ICE (2023) The public has to make changes for us to hit net zero – but needs government support
[7] HM Government (2023) Powering Up Britain: The Net Zero Growth Plan
[8] Ibid.
[9] IPPR (2022) UK lags £62 billion behind in R&D

death' between technologies at an early and later stage of development,[10] with the International Energy Agency warning that 40% of emissions reductions rely on technologies not yet commercially deployed on a mass-market scale.[11]

Public perceptions of net zero

Although the UK has decarbonised faster than any other major economy in the G7,[12] this is not necessarily understood by the public. Instead, there is a perception of slow progress on the road to net zero. This is frustrating for many members of the public, with 2023 Renewable UK and Opinium polling highlighting that 57% of swing voters believe that the government is not investing enough in the green economy or taking sufficient action on climate change.[13]

There is a public perception that the public may also be disproportionately bearing the brunt financially of a slower net zero transition. National Grid data highlights that in 2022, energy bill payers paid between £600 million and £1 billion in network constraint costs. This was because the existing electricity transmission network did not have sufficient capacity to transmit all of the energy generated by renewables. By 2030, this is estimated to rise to a total of between £1.4 billion and £3 billion per year.[14]

Net zero can also be seen as a potential threat to livelihoods and employment opportunities, with 2021 research by Copper Consultancy indicating that only 14% of the public believed the net zero transition would improve their job prospects.[15]

Similarly, Climate Outreach and Britain Talks Climates' segmentation research has highlighted that the economic benefits of climate action appeal more to more affluent, already-engaged segments of society,[16] while impacting the least affluent and more conservative-leaning segments less. As outlined in the Skidmore Review, 17% of adults in the UK have no savings at all and face genuine barriers when it comes to upgrading to an electric vehicle or effectively insulating their home.[17] Likewise, while the public supports net zero, they may be unable to make more significant behavioural changes for financial reasons. More targeted information on how the public can reduce emissions would make this easier.

Therefore, generalised messaging focusing on green jobs and becoming a global leader in clean energy on the pathway to net zero is less likely to engage those worried about what this will mean for their jobs over the course of the next 20 to 30 years. National-level approaches may help to build public understanding and acceptance of future policies, while more local initiatives can stimulate grass-roots action that is more practical for the public. Thus far, a lack of joined-up policymaking and wider policy incoherence has impacted the progress of the electric vehicle transition, decarbonising homes and investing in energy efficiency.[18]

Any public engagement strategy should acknowledge the diversity and breadth of 'the public.' Further, as the cost-of-living and energy crises continue, the segmentation research makes evident that there is an openness from the public towards 'doing their bit,' but this looks different depending on people's capacity to act.[19]

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[10] Nemet, Zipperer and Kraus (2018) The valley of death, Energy Policy, Vol 119
[11] International Energy Agency (2020) Clean Energy Innovation
[12] HM Treasury (2021) Net Zero Review
[13] Renewable UK (2023) Polling shows overwhelming support for grasping the industrial and economic benefits of renewables
[14] National Grid (2022) Modelled Constraint Costs, NOA 2021/22 Refresh, p.3
[15] Copper Consultancy (2021) Public Attitudes to Net Zero and Infrastructure
[16] Climate Outreach (2020) Britain Talks Climate
[17] The Department for Energy Security and Net Zero and the Department for Business Energy and Industrial Strategy (2023) Mission Zero: Independent Review of Net Zero
[18] Ibid.
[19] Climate Outreach (2022) Net zero, fairness and climate politics

Incentivising behavioural change

Push vs. pull factors

A softer, 'pull,' incentive-based approach to behavioural change has proved successful in the recent past, evidenced by a 2020–21 study in Scotland on net-zero behaviours in the recovery from Covid-19 carried out by Climate Xchange.[20] The study found that participants were positive about the government providing advice, information, financial incentives and infrastructure.

However, they were generally unsupportive of charges, regulation, or a tougher enforcement 'push' approach from the government. This was echoed by findings in an October 2022 UK Research and Innovation (UKRI) report authored by Ipsos for the Government Office for Science and Sciencewise.[21] The report found that a small sample study of participants in a public dialogue on net zero were willing to accept changes to make their lifestyles more sustainable. However, they resented being 'pushed' and restrictions impacting their individual freedoms.

Therefore, a more supportive policy environment will be critical in incentivising widespread public participation in solutions, adoption of technologies, and shifts in behaviours focused on achieving net zero goals.[22] Rather than enforced push factors, a gentler incentive-based approach will lead to longer-term behavioural conformity, helping to accelerate the net zero transition.

Role of public information campaigns

The ICE has previously outlined the need for a net zero education and awareness-raising campaign for the built environment. This suggested using lessons from the public awareness campaign in the Icelandic Climate Strategy.[23]

Research at the Grantham Research Institute has also shown that advance information campaigns can increase the successful implementation of policies to promote the uptake of new technologies (such as the Clean Heat Grant).[24] This research has also highlighted that changes with a larger behavioural component will likely also need participatory and deliberative methods to make the public more receptive to changing their behaviour to reach net zero. Options include crowdsourcing, participatory budgeting, and citizens' assemblies.[25]

In Scotland, an ongoing TV, radio and digital campaign focused around net zero provides information on future changes the public can make to get to net zero.[26] This is a positive starting point to ensure the public understand what changes others are making and what will be required of them in future.

A citizen's assembly in Scotland involved 106 members randomly selected to broadly represent the wider population of Scotland concerning key demographics and climate attitudes. They made a significant contribution to climate change

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[20] Climate Xchange (2021) Net Zero Behaviours in the Recovery from Covid-19
[21] Ipsos (2022) A Net Zero Society: A Public Dialogue on Scenarios and Pathways
[22] Climate Change Committee (2019) Behaviour Change, Public Engagement and Net Zero
[23] Government of Iceland (2023) Climate Change Strategy
[24] Grantham Institute, London School of Economics (2020) Market Failures and Willingness to Accept the Smart Energy Transition: Experimental Evidence from the UK
[25] Grantham Institute, London School of Economics (2021) Public behaviour in the UK's Net Zero Strategy: the government must work out how to bring people with it
[26] Scottish Government (2023) Let's Do Net Zero

debate and policy in Scotland.[27] However, despite public backing, many of their recommendations were not taken forward by Scottish Government. This highlights the need for public information campaigns and exercises to genuinely engage, interact with and implement what the public is saying, rather than being perceived as a 'tick box' exercise, as this could generate further public distrust impacting future behavioural changes. To address the disconnect between the public advocating for what must be done to reach net zero and the Scottish Government that has to finance it, a more genuine debate would need to focus around questions relating to cost.

What action is needed from the public?

As highlighted in the 2023 report from the Behavioural Insights Team, a lot of behavioural change happens at the margins of substitutable or different options.[28] A detailed behavioural audit of specific public consumer journeys, such as the adoption of energy-efficient retrofits, can assist the public when taking action. Likewise, there is a need for smaller calls to action for the public, such as providing home energy surveys to prepare their homes for future heat pump installation, so long as these smaller actions act as effective building blocks towards more significant changes.

In May 2022, polling conducted by YouGov on behalf of the ICE aimed to uncover how easy the public would find it to act across ten areas of the net zero transition.[29] In an infrastructure systems sense, the easiest areas included flying less and using more energy-efficient cooking appliances and equipment. The most challenging areas for the public were living car-free, purchasing or producing renewable energy, and installing a heat pump. The Behavioural Insights Team has also cited installation of smart meters as a way to enable a more flexible and efficient energy system. However, there are barriers, including public distrust of smart technology relating to data security.[30]

The rising cost of living driven by increased inflation has also made people less likely to spend money on significant new investments. This affects potential behavioural changes in areas such as shifting to electric vehicles or improving household energy efficiency.

Electrifying transport is far from the only policy choice required for achieving net zero. Modal shift to lower-emission transport modes will also support decarbonisation. For example, shifting freight from road to rail and private vehicle use towards public transport and active travel, where suitable, will help reduce emissions and improve quality of life.[31] The government has previously committed to half of journeys in towns and cities to be walked or cycled by 2030, mainly targeting the 43% of all urban journeys under two miles.[32]

Significant modal shifts will require intervention through infrastructure and incentives to encourage active travel to become normative. A modal shift to active travel will play a critical role in meeting several UK government priorities, notably decarbonisation, reducing road congestion, and improving air quality and health.

The government previously positioned active travel as central to 'levelling-up.' In a cost of living crisis with rising fuel prices, active travel is an affordable and sustainable solution to expensive, carbon-intensive transport. However, there is a need to provide clearer communication to the public about what the continuation of the 'active travel renaissance' referred to in the second Cycling and Walking Investment Strategy (CWIS2) could mean for communities and how this can benefit them.[33]

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27 Scottish Government (2022) Scotland's Climate Assembly - Process, Impact and Assembly Member Experience: Research Report
28 Behavioural Insights Team (2023) How to Build a Net Zero Society
29 ICE (2022) How easily does the British public find it to take personal action on climate change?
30 Behavioural Insights Team (2023) How to Build a Net Zero Society
31 ICE (2020) A Plan for Transitioning Infrastructure to Net Zero
32 Ibid.
33 Department for Transport (2023) The second Cycling and Walking Investment Strategy

There is also a need for members of the public to take on roles as 'change agents'. If, for example, a public health approach is taken to encouraging behavioural change, change agents or public health practitioners could support people by providing the information they need to make public health choices and a plan for how changes can be implemented. With regards to net zero choices, often it is difficult or unclear for the public to know who to call upon and what to ask. Members of the public acting as change agents can help people understand the costs and benefits of the choices available to them that can help towards the net zero transition. This would then need to be backed up by national policy to ensure these choices can become easier and more cost-efficient.

> **Question 2: What previous interventions on behavioural change generally have been successful? Can lessons be drawn from them?**

A just transition?

While international commitment to net zero has moved apace over the last decade, converting progress from commitments to action is not an easy or simple task.

McKinsey Global Institute has cited the following five reasons for this:[34]

- the scale and pace of the step-up in spending needed on physical assets
- the collective and global action required, particularly as the burdens of the transition will not fall equally
- the near-term shifts needed for longer-term benefits
- the shifts needed in business practices and lifestyles that have evolved over decades
- the central role of energy in all economic activity, which means that transformation would need to be carefully managed.

Even small disturbances to the systems within which we live our lives could affect communities, from raising producer and consumer costs to affecting energy access. This, in turn, could lead to delays and a public backlash. There is a real risk that these transition burdens could be unbearable to many in the absence of compensating measures; for example, if companies and countries do not manage demand shifts or cost impacts to their existing products and services or if communities are or feel left behind as the world transitions to a net zero economy.

Leaders of EU countries have called on the European Commission to ensure that 'fairness and cost-effectiveness' are placed at the heart of proposals for EU countries to hit transition targets. To further mandate a fair transition, the EU has introduced a just transition mechanism, mobilising up to 90 billion euros of funding to provide the necessary financial and technical support to the regions most affected by the move to a low-carbon economy.[35]

Trade union leaders across the UK have also focused on how the net zero transition will directly affect millions of workers and the need to protect industry jobs to avoid repeating the policy mistakes made during deindustrialisation in the 1980s.

Policymakers and decision-makers must recognise what they are asking of the public and how policy can better prioritise and coordinate actions demanded of the public (affecting both their professional and personal lives), leading to a more orderly and inclusive net zero transition.[36]

The role of community and business decision-making

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[34] McKinsey Global Institute (2022) The Net Zero Transition – What it Would Cost, What it Would Bring
[35] Council of the European Union (2023) Climate change: What the EU is doing
[36] McKinsey Global Institute (2022) The Net Zero Transition – What it Would Cost, What it Would Bring

Individuals are able to make their own domestic choices. It can be dispiriting if they do not have agency over the wider choices impacting local businesses, communities and amenities. Actions which would increase agency include:

- giving workers a role on company boards to determine net zero strategies
- encouraging people to participate in planning decisions within their communities to ensure more net-zero friendly choices
- adapting public services and amenities to enable people to make net-zero friendly choices.

It is important that there is a just transition where the cost burden does not fall on those with the least means. There needs to be a redistribution of the support needed, targeted to enable those with little means to make the same policy choices as the more affluent. This inequality needs to be addressed through policy and engagement/agency.

> **Question 3: How can the net zero transition be made fair (i.e. with an equitable distribution of related costs and benefits) for all parts of society?**

Barriers to public behavioural change

Lack of financial means is a significant indicator preventing the public from making net-zero-aligned choices.

A 2023 report by the Behavioural Insights team has highlighted that many of the necessary behaviours required from the public to help accelerate the net zero transition are currently too expensive, inconvenient, unappealing, or simply not what people are used to. For instance, heat pumps are too expensive, electric vehicle ownership is too inconvenient for those without off-street parking, and there are no cheap and quick alternatives to long-haul flights.[37]

In terms of transport, heavily subsidising public transport has proved to be an effective tool in encouraging the public to reduce their emissions through how they travel.

Transport for Greater Manchester has set out a long-term ambition for transport in the city region, focusing on the plan for 50% of all journeys to be made by cycling, walking and public transport by 2040. The new 'Bee Network' of electric buses, introduced from September 2023, is part of this plan to create a more sustainable public transport system with a zero-emissions bus fleet by 2032.[38] For the first time in almost 40 years, the Bee Network will also enable bus routes and fares to be set at a local level, leading to cheaper fares for passengers. By making it possible for users to travel more cheaply and sustainably, Greater Manchester leadership at a local authority level has pulled the lever to incentivise the public to make more net-zero-aligned choices in the future.

Active travel infrastructure in countries such as the Netherlands and Denmark also normalises cycling for example and makes it simpler for the public to make a net-zero friendly choice, as active travel is increasingly safer, more convenient and easier than other methods of travel.

> **Question 4: What is preventing the public from making net-zero-aligned choices? What can incentivise the public to make net-zero-aligned choices?**

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[37] Behavioural Insights Team (2023) How to Build a Net Zero Society
[38] Transport for Greater Manchester (2023) Greater Manchester Transport Strategy 2040

International best practice

There are some key common lessons the international community shares when it comes to net zero.

Governments play a significant role in establishing the early commitment to reach net zero goals. They provide upfront investment, support skills development, build public support, and incentivise better decision-making.

However, the Committee for Climate Change (CCC) states that many of the necessary actions are outside government control.[39] Decisions also need to be made at a private household level. These decisions can and must be facilitated through effective government action.

Canada and the US

In Canada, for example, the [Greener Homes Initiative](#) provides federally funded grants and a loan for home energy evaluations, energy efficiency, and climate resiliency retrofits, focusing on the customer journey.[40]

Distributional analysis of the impact of net zero policies on households undertaken for the Skidmore Review highlighted that decarbonisation can be good for households and the economy.[41] Schemes such as the Greener Homes Initiative support the public in developing their 'carbon conscience' and demonstrate how they can save money.

As highlighted in the ICE's 2022 briefing paper on financing and funding net zero,[42] in the US, polling from the Pew Research Center in 2021 identified that more than six in ten Americans say large businesses and corporations (69%) and the energy industry (62%) are doing too little to address climate change. Another poll highlighted that 16% of U.S adults have donated money to an organisation that is focused on addressing climate change in the past year.[43]

This highlights that while there is still a relatively limited appetite in the US for individuals to pay for net zero themselves, there is nevertheless a willingness to contribute and an expectation that the organisations they patronise should play a part in reducing emissions.

Community solar power, as an example, is well established in the US, as highlighted in a June 2023 report from the Energy Saving Trust and Green Alliance. In New York, community energy schemes have key incentives driving take-up. Moreover, the New York State Climate Act requires that at least 35% of clean energy investments must be directed to benefit disadvantaged communities. The New York Inclusive Community Solar Adder (ICSA) is one of the three main strategies in New York's Solar Energy Equity Framework. It functions by providing a subsidy incentive to solar developers with a high proportion of participation by subscribers from low- and mid-income (LMI) households. ICSA combines the benefits of lower costs and increased access to individual households and affordable housing providers, and the programme was heavily shaped by public input.[44] Therefore, providing incentives for the public to support initiatives contributing to net zero and allowing them to shape the direction of these initiatives can be a highly effective lever in influencing behavioural change.

Australia

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[39] Climate Change Committee (2023) [Progress Report to Parliament](#)
[40] Government of Canada (2022) [Canada Greener Homes Initiative September 2022 Update](#)
[41] The Department for Energy Security and Net Zero and the Department for Business Energy and Industrial Strategy (2023) [Mission Zero: Independent Review of Net Zero](#)
[42] ICE (2022) [Financing and Funding Net Zero](#)
[43] Pew Research Center (2021) [Gen Z, Millennials Stand Out for Climate Change Activism, Social Media Engagement with Issue](#)
[44] Energy Saving Trust and Green Alliance (2023) [Climate Policy that Cuts Costs: International Policy Comparison](#)

Likewise, in Australia, according to a Lowy Institute 2022 poll, most Australians (74%) say that 'the benefits of taking further action on climate change will outweigh the costs'.[45] The Australian Climate Change Act 2022 was passed in Parliament in September 2022 and legislated that Australia would meet net zero greenhouse gas emissions by 2050 and have a 43% reduction in emissions below 2005 levels by 2030. The Act does not impose obligations directly, but its passage into law sets the scene for sector-based reforms to achieve the emissions reduction targets.

The ICE's 2023 Presidential Roundtable, with experts from Infrastructure Australia, highlighted that Australia has strategic advantages in reaching net zero, with abundant space for renewables and capacity for solar energy.[46] However, the vast size of its carbon extraction sector is an issue impacting a future just transition, which has been cited as a critical priority for the new statutory net zero authority that will sit within the remit of the Prime Minister and Cabinet.

In a poll conducted by research company Resolve Strategic for The Sydney Morning Herald and The Age, when it comes to paying personally, only 40% of voters say they are not willing to pay a personal cost to reduce emissions.[47] A 2023 report by the Climate Council identified that transport is the third largest source of Australia's greenhouse gas emissions.[48]

While many other sectors have begun a necessary decline in emissions, personal transport is one of Australia's fastest-growing sources of emissions. Popular ute (utility vehicle) models continue to reach high sales figures despite being expensive to run and pumping out high levels of harmful carbon dioxide and other pollutants. The role of behavioural change within this sector is therefore crucial – for if all Australians who bought one of the top-selling utes in the 12 months to October 2022 had instead opted for the lowest emitting model, they would have collectively saved a total of AU$42 million in fuel costs and avoided over 87,300 tonnes of CO_2 emissions.[49] Therefore, consumer habits and spending in Australia can provide important lessons regarding public behaviours impacting the net zero transition in Australia that can be applied across different countries.

Denmark

Denmark has played a leading role in encouraging initiatives to influence public behaviour regarding net zero. In Copenhagen, for example, investment has been directed into initiatives to reduce energy use across the city. Energy Leap, a network of the largest building owners in Copenhagen, has received support from the city and is targeting a 3% annual energy reduction in all buildings.[50]

The network includes 46 partners, accounting for just under 30% of the total building stock in Copenhagen. The city has a 40% energy reduction goal in municipal buildings by 2025. By collecting data based on energy reduction and tracking the performance of completed projects, the city has developed a business case for further investment to drive more sustainable public behaviours and improve options for the public when it comes to choosing energy-efficient housing.

Consumption-based emissions targets

Governments across Europe have also begun to explore policy options to reduce consumption-based emissions through demand-side solutions.[51] This includes individual behavioural change, where Sweden is forging ahead of international

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[45] Lowy Institute (2022) Paying the Price: Australians Want Action on Climate Change
[46] ICE (2023) In conversation with Infrastructure Australia – What progress is Australia making on net zero?
[47] The Age (2022) Voters Believe They're Doing Their Bit On Climate But Want Government To Do More
[48] The Climate Council (2023) Ute Beauty! The case for lower and zero emissions utes in Australia
[49] Ibid.
[50] C40 Cities (2023) Building liveable cities through clean energy and infrastructure
[51] Foreign, Commonwealth and Development Office (2022) Bridging the behavioural science-policy gap for a net-zero society

counterparts with the world's first consumption-based emission target to hit a 2045 net zero target, with an intention to demonstrate 'international climate leadership.'[52]

Moreover, cities like Portland in Oregon, US, have developed a consumption-based emissions inventory (CBEI).[53] The city found that 62% of its carbon dioxide emissions from consumption were created in the production phase of products and services rather than transportation or use, which often receive more attention. The most significant source of consumption emissions in Portland is the use of vehicles in the city, which is already covered in Portland's sector-based emissions inventory and earlier climate planning. By understanding emissions by category and lifecycle phase, cities can target strategies that address the bulk of emissions not covered by traditional climate action plans.

Consumer-side interventions to reduce vehicle miles and shift journeys to sustainable transport modes in Portland are therefore critical for reducing transport emissions, alongside measures to transition to the production and use of zero-emission vehicles. With this knowledge, the public can make behavioural changes to make a meaningful contribution to Portland's net zero transition.

> **Question 5: What lessons can be learned from other countries on public behaviour and net zero?**

The role of local and central government

Central government

In Wales, central government has taken a lead in terms of consulting on and subsequently developing a strategy for public engagement and action relating to climate change focused on 2022 to 2026. The draft consultation document for this strategy indicated that in many cases, autonomous behaviour changes designed to be more climate-friendly (e.g. travel) will incur some financial costs. Sometimes cost savings and communicating any significant co-benefits will be essential in increasing public action – particularly during the current cost of living crisis.[54]

The completed strategy document highlights four key 'Green Choices', including in transport and energy, covering actions associated with reducing carbon emissions.[55] The Welsh Government has committed to developing an outline timeline for the introduction of government policy levers centred around the four Green Choices.

The Welsh Government also commits within the document to focusing on making these choices easier and more affordable for the public. It will undertake a review to determine the extent to which deliberative public engagement on the climate emergency is already being undertaken across Wales and how a more joined-up approach to public engagement can be developed.

Alongside this, multiple behavioural change-focused campaigns have been implemented across Wales, including a national Climate Action Wales communications programme asking people to make greener choices now and indirectly 'warming them up' in readiness for future changes. This highlights that central government action can play a positive role in terms of encouraging public behavioural change to meet net zero.

Local government

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[52] Government Offices of Sweden (2021) Sweden's climate policy framework
[53] C40 Cities (2022) How to cut your city's consumption-based emissions
[54] Welsh Government (2022) Consultation Document: Climate Change – A Strategy for Public Engagement and Action (2022-2026)
[55] Welsh Government (2023) Climate Action Wales – Public Engagement Strategy (2023–2026)

The ICE has highlighted that unlocking place-based initiatives and funding will be instrumental in empowering people to make the lasting behavioural changes needed.[56]

Leadership from local government will play a crucial role in embedding opportunities for net zero delivery. Recent hydrogen heating trials demonstrate potential pushback when national government takes the lead.[57] Local action will embed opportunities for delivery and net zero much better and will also better navigate permitting, planning, and consent issues.

As the UK100 has emphasised, many local authorities have committed to decarbonising faster than the Government.[58] However, they have been limited by a lack of a defined role in net zero delivery and a policy and strategy ecosystem and framework that fails to enable and support local delivery. The Skidmore Review has also focused on the need for reform of the planning system at a local and national level to ensure that it properly supports net zero.[59] The UK100 has also recommended the need for a Local-National Net Zero Delivery Framework co-designed between local authorities and the UK government, overseen by a National Net Zero Delivery Unit to increase the understanding within local contexts of the powers they have and build a systematic understanding of gaps. This, in turn, will clarify what delivery needs to look like – enabling place-based solutions that work in local communities and progress towards the delivery of net zero.[60]

The National Infrastructure Commission (NIC) has also called for regulators to engage more with devolved administrations, metro mayors, local government, utility companies, consumer groups, elected representatives, and members of the public – and take their views into account in strategic decision-making, including investment.[61] This would be extremely important when it comes to financing a net zero transition and ensuring the public's voice is heard in key investment decisions focused on behavioural changes.

The benefits of a place-based approach to net zero

Mott McDonald and the Net-Zero Infrastructure Industry Coalition's 2021 report highlighted that place-based systems thinking can bring benefits in the form of more effective leveraging of private investment towards net zero. Sometimes it is the local mandate that stimulates market confidence in new approaches, enabling the minimum volume commitments required to mobilise the market and create local jobs.[62]

As highlighted in the APPG for Net Zero's 2023 'Myth Busting' Report, not all parts of the country can be expected to reach net zero at the same time or decarbonise at the same pace. Cities must take on a burden of responsibility here and play a heavier role in helping the UK hit its net zero target. This will be particularly important when it comes to cutting emissions in transport and housing, two areas that have yet to experience as much progress in recent decades as other sectors.[63]

The ICE's 2022 Next Steps programme on funding and financing net zero highlighted the value of a place-based approach to net zero, ensuring vital progress is made, and the public can help accelerate the transition if governments continue to take limited action.[64] A 2022 study commissioned by Innovate UK found that 'place-based' carbon reduction measures led by UK cities and towns would produce far better environmental, economic, and social results at a much lower cost than a

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[56] ICE (2023) Skidmore Net Zero Review: What does it mean for the UK's infrastructure?
[57] BBC (2023) Ellesmere Port hydrogen heating trial scrapped after protests
[58] UK100 (2022) UK 100's Response to the Net Zero Review
[59] The Department for Energy Security and Net Zero and the Department for Business Energy and Industrial Strategy (2023) Mission Zero: Independent Review of Net Zero
[60] UK100 (2023) Powers in Place: The Handbook of Local Authority Net Zero Powers
[61] National Infrastructure Commission (2019) Strategic Investment and Public Confidence
[62] Mott Macdonald and Net-Zero Infrastructure Industry Coalition (2021) A Place-based Approach to Net Zero
[63] APPG for Net Zero (2023) Myth Busting Report
[64] ICE (2022) Financing and Funding Net Zero

national 'one size fits all' approach.[65] Tailoring net zero policies to match people's lived experiences in their communities ensures behavioural changes can become more relevant and meaningful to their own lives and are more likely to become a regular practice in the long term.

> **Question 6: In addition to government action, what else can be done to encourage public behavioural change to meet net zero?**

About the authors

ICE

Established in 1818 and with over 96,000 members worldwide, the Institution of Civil Engineers exists to deliver insights on infrastructure for societal benefit, using the professional engineering knowledge of our global membership.

The ICE's strategy is focused around the decarbonisation of the infrastructure system, building resilience against the effects of climate change, and transforming productivity in infrastructure delivery, aligning with the UN Sustainable Development Goals (SDGs).

This policy programme on public behavioural changes and net zero supports the ICE's strategy by examining potential pathways to the decarbonisation of the infrastructure system by identifying public behavioural changes required to accelerate the net zero transition and how policymakers can facilitate this.

APPG on Infrastructure

The All-Party Parliamentary Group on Infrastructure (APPGI) is Parliament's leading cross-party group dedicated to economic infrastructure in the UK. The APPGI is chaired by former Treasury and Transport Minister Andrew Jones MP.

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[65] Innovate UK (2022) Accelerating Net Zero Delivery